

T H E S I S

PLANTS OF THE ROCKY MOUNTAIN NATIONAL PARK

COLORADO

With Keys for Their Identification

Submitted by

Ruth E. Ashton

for the Degree of Master of Science

Colorado Agricultural College

Fort Collins, Colorado

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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER
MY SUPERVISION BY Ruth E. Ashton
ENTITLED PLANTS OF THE ROCKY MOUNTAIN NATIONAL PARK
COLORADO. With Keys for Their Identification.
BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS
FOR THE DEGREE OF Master of Science.

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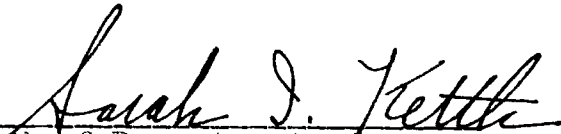
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This is to certify that Miss
Ruth E. Ashton has translated for me
assigned passages of technical French
bearing upon her graduate Botanical
work.

Respectfully,


Head of Department of
Modern Language.

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INTRODUCTION

Although considerable botanical work has been done by different people during the past 40 years in that region which is now the Rocky Mountain National Park no one has published a thorough study of the plants of the area. Such a study has been undertaken by the author, and has been carried on, along with other work, over a period of five years.

Two lists of the plants of the Rocky Mountain National Park, and Estes Park, region have been published. Neither of them contained keys for identification, but both of them are interesting and helpful to the student of plants. The first of these was prepared by Mrs. Frederick H. Chapin (3) and printed as an appendix to her husband's volume entitled "Mountaineering in Colorado" published in Boston in 1890 by the Appalachian Mountain Club and now out of print. The second list was prepared by Mr. Dean Babcock (1), then a ranger in the Rocky Mountain National Park, and published in the information pamphlet of that park in 1923. Subsequently an edition of 1,000 copies was published in pamphlet form. This edition has been exhausted and there is at present no publication available on the plants of this region. There is, however, a rather large demand for such a publication and this study has been undertaken with the hope of partially satisfying this demand.

While the actual work has been done within the Colorado National Forest and mostly within the Rocky Mountain National Park it will be found applicable to all of the mountainous region of North central Colorado and South central Wyoming. This study should prove valuable to all those who are in any way interested in the plant life of the higher mountains. Visitors to this region will find it helpful in giving them information on mountain flowers. Teachers and students in mountainous districts of the state will find it useful in their nature study classes and forestry and experiment station officials will find it a ready catalogue of species of plants and trees which they may expect to find above the altitude of 7,000 feet in northern Colorado and southern Wyoming, and therefore useful in forestry and grazing investigations.

Literature of the botany of the region has been carefully studied and a review of such literature, together with a bibliography, is included.

Two hundred and seventy-six genera and 658 species are listed. The author has personally collected five hundred species listed here and has seen specimens of most of the remaining species. Some of these were collected by Dr. W. S. Cooper and are now in the Rocky Mountain Herbarium at the University of Wyoming. Another collection made by Mr. Walter Kiener was loaned for this study. A few other species which the author has not seen have been included, particularly

those cited for the Estes Park region by Dr. P. A. Rydberg (31) in his Flora of Colorado (1906), and some reported by Professor E. C. Smith of the Colorado Agricultural College who has made a careful study of the plants of this region.

A study of the ecology of these plants has been made and of the plant zones of the region. The chapter on "Plants in Their Homes" is the result of an attempt to translate this work into popular language.

Popular keys for the identification of the plant families and in some cases for the smaller groups, are also included. Much time and effort has been spent to make these keys usable. Conspicuous and easily recognized characters have been used for the differentiation of groups and individuals, scientific terms have been avoided as much as possible and common names used for the families in every case and for the smaller groups where generally accepted common names are known. Where no common name is known the genus name is used as a common name or a fitting name has been "coined". Most of the individual plants listed have no well known, distinctive common names. In coining common names for these plants two methods have been followed. Where a translation of the specific name makes a practical common name, as it does in the majority of cases, that has been used; in other cases, a fitting descriptive name without regard to the specific name has been applied. Thus Smilacina stellata is called the "Star-flowered Solomon's

Seal" because the adjective stellata (set with stars) describes the blooms of this plant very satisfactorily. On the other hand, Asplenium septentrionalis is called the "Grass-leaved fern" rather than "Northern spleenwort" because the former indicates the most distinctive characteristic of this plant while the exact translation is much less specific.

To avoid confusion an effort has been made to use the more familiar scientific names and to retain the larger and more practical concept of genus and species. The majority of the names used here are according to the Coulter and Nelson's (15) "New Manual of Botany of the Central Rocky Mountains." Reference is also made to "Flora of the Rocky Mountains and Adjacent Plains" by P. A. Rydberg (32).

ACKNOWLEDGEMENTS

The author is indebted to Miss Mildred Mathias for the determination of plants of the Parsnip family, and to Dr. J. M. Greenman for verification of the species of ferns included, both of the Missouri Botanic Gardens; to Professor A. S. Hitchcock of the United States Department of Agriculture for the determination of some of the grasses; also to Professor Francis Ramaley of the University of Colorado for the determination of specimens of Hawthorne, to Professor E. C. Smith of the Colorado Agricultural College for assistance and helpful suggestions in the preparation of this list and especially to Dr. Aven Nelson of the University of Wyoming. Dr. Nelson, in addition to making several determinations, gave much valuable assistance and most generously allowed the use of his excellent herbarium and library. Grateful acknowledgement is also due to the officers of the National Park Service in Rocky Mountain National Park for the opportunity to do the collecting and to Professor L.W. Durrell, Dr. H.C. Hanson and Miss Anna M. Lute of the department of Botany of the Colorado Agricultural College for assistance, suggestions and encouragement.

The illustrations in this thesis are mostly by the author with the exception of a few kindly furnished by Dr. Margaret Fuller Boos, Naturalist at Rocky Mountain National Park, for which grateful acknowledgement is made.

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The illustrations in this thesis are by the author with the exception of several very kindly furnished by Dr. Margaret Fuller Boos, Naturalist at Rocky Mountain National Park, for which grateful acknowledgement is made.

LITERATURE ON ROCKY MOUNTAIN BOTANY

The first systematic work to be published on the flora of this region was Porter's "Synopsis of the Flora of Colorado" about 1875. This was followed in 1885 by "The Manual of the Botany of the Rocky Mountain Region" by Dr. John M. Coulter. In 1909 Dr. Coulter's manual was revised by Dr. Nelson (15) and this edition still remains the standard text for systematic botany in this region. "A Flora of Colorado" by Dr. P. A. Rydberg (31) was published in 1906 which is an annotated list of 2,912 species with keys to the families, genera and species. Altitudinal ranges for each species are given. This book is indispensable to the student making a systematic study in Colorado but is entirely too technical to be of value to the amateur. In 1917 a "Flora of the Rocky Mountains and Adjacent Plains" was published by the same author (32). In many groups it is necessary to use both Nelson and Rydberg in order to arrive at a satisfactory determination of species because some of our species are not described in the Nelson. On the other hand the species distinctions as defined by Rydberg are often too fine for practical use. Clements and Clements (5) in 1910 published a rather popular volume on Rocky Mountain wild flowers. The plates in this book of Clements' are excellent but the lack of species descriptions reduces the value of the keys and the nomenclature is largely unfamiliar. A smaller volume containing

the same beautiful color plates has subsequently been published by Mrs. Clements (4).

There is a very satisfactory treatment of the woody plants of the Rocky Mountain region by Professor Longyear (14) which may be easily used by anyone and at the same time is valuable to the trained botanist. It is well illustrated with many line drawings by the author and nine color plates. The evergreens of Colorado have also been excellently treated in a bulletin by Professor Longyear (13). In this bulletin all the species of coniferous trees native to the state are described and illustrated. It also includes maps showing distribution of species and information on their economic value as well as instructions for planting and caring for evergreens.

The first botanical work to be done in the immediate vicinity of the Rocky Mountain National Park, as far as is known, was a partial list of 281 species of Estes Park printed in a work on mountaineering by F. H. Chapin (3) in 1890. In 1923 a list, by Mr. Babcock (1), of plants of the Rocky Mountain National Park was included in the government bulletin of the park. This list with some additions was privately published in pamphlet form in 1925. The evergreens of the Rocky Mountain National Park have been described and illustrated in a series of papers by Mr. P. A. Smoll (34) who was formerly park naturalist.

Papers and monographs on special groups with particular emphasis on this region are comparatively few. A paper on "The

Loco Plants" by Dr. Nelson (17) is of value. He abandons the generic name Aragallus Neck., in favor of Oxytropis DC. in accordance with the present day tendency of systematists. He limits the species Lamberti to the Missouri River region in Nebraska and South Dakota from which it was originally described. The species which has been commonly called Lamberti here in Colorado he names Oxytropis bilocularis because he finds the pod entirely 2 celled. This species he calls the "Colorado Loco" because its center of distribution is in this state.

Two bulletins on the Glacier Park flora by Dr. Paul C. Standley (35 and 36) are applicable to this region because many of the species described and illustrated occur also in the Colorado mountains.

A monograph on the genus Aquilegia by Dr. E. B. Payson (19) is of interest. This is illustrated by seven plates including a phylogenetic chart, drawn by the author. In the introduction a brief but interesting discussion of the species concept is given. The author refers to Dr. Gray's statement that species are only judgments often fallible and of variable value and adds that they are not only judgments, they are matters of convenience. He goes on to say that the species of Aquilegia are so variable and hybridize so readily that no two closely related species seem ever to grow together, and that for this reason isolation may be thought of as the chief factor

in species production in this genus. This author also considers that the light colors, blue and white, are the most primitive and that the genus originated in the arctic or alpine regions and hence concludes that extension southward or to lower altitudes is accompanied by specialization in color and form.

Dr. Payson in making this study had collections from many herbaria including that from the Colorado Agricultural College.

The description of a stellate (spur-less) variety of the Colorado blue columbine, Aquilegia caerulea daileyae Eastwood, is included the type of which is from Estes Park.

There is also a monograph of Oreocarya by Dr. Payson (23) which is accompanied by six plates of beautiful drawings of the nutlets. He describes and illustrates forty-six species. He had specimens from all the large herbaria and cites every individual which makes this an exhaustive work on this group. Oreocarya has been distinguished from Cryptantha on the basis of its perennial habit. Cryptantha has been considered as annual in habit but certain perennial species have been discovered in South America which belong undoubtedly to Cryptantha. On the strength of this fact Dr. Payson makes Oreocarya a subgenus or section of Cryptantha.

Several other papers by Dr. Payson (20, 21, 22) are valuable, particularly the one on Wyoming Penstemon which is equally useful for the northern Colorado species.

The Flora of Boulder County, Colorado has been studied by F. P. Daniels (11) who published an annotated list of species . This list, much of which is compilations, includes 486 genera and 1,225 species.

Any taxonomic study of flowering plants in Colorado should include mention of Mr. George Osterhout (18). He has collected throughout the state and has a very good private herbarium. He also has several good new species to his credit. His publications consist mainly of descriptions, in various periodicals, of new species from the Rocky Mountains.

Many papers have been published on various phases of the ecology of plant life in northern Colorado. A few of the more important of these will be discussed here. In 1911 Miss Katherine Bruderlin (2) made a study of the forests around Tolland and concluded that the lodgepole pine forest is a climax formation. The lodgepole forests in the vicinity of Estes Park had been the subject of a bulletin by Dr. F. E. Clements (6) in 1910. He enumerates the forest types of Estes Park as follows:

1. Yellow pine type, from the foothills up to 9,000 ft.
2. Douglas fir type, from 8,000 to 10,000 ft., in which lodgepole and Douglas are cozonal with the former reaching higher and the latter lower. Typically the Douglas forest occupies a zone between the yellow pine and Engelmann forests but due to fires it has largely been replaced by lodgepole.

3. Engelmann spruce-alpine fir type, beginning along streams at 8,000 ft. and going up to timberline.

Limber pine ranges through all these forest types on the rocky ridges from 7,8000 ft. up to timberline on the rocky ridges.

The region around Estes Park has been the scene of more forest fires than any other region of Colorado. Thirteen different burns were studied and dated (6). The methods used in dating the burns are discussed as well as the life history of the lodgepole pine forests.

Dr. Clements concludes that lodgepole is not a climax and that if fire could be kept entirely out of such forests in central and southern Colorado these lodgepole forests would disappear to be replaced by forests of Engelmann spruce.

The alpine flora of Colorado has been discussed by Professor T. D. A. Cockerell (8) in a paper based on Rydberg's Flora of Colorado (31). He finds that 386 species are recorded as growing at 12,000 ft. or higher. In another paper by the same author (9) the flora of Boulder County is compared with that of a similar area in Switzerland. Boulder County with an area of 751 sq. miles has 1,300 species while the Canton of St. Gallen with 779 sq. miles has 1,295 species. Colorado has 2,912 species and the whole of Switzerland, a much smaller area has 2,460 species.

Alpine vegetation on Longs Peak was treated in a paper

published by Dr. W. S. Cooper (10) in 1908. The successions on the exposed slopes and in the canyons of the alpine zone were worked out and charted. This author concludes that on the ridges the forest has reached its climatic timberline but that in the canyons it is still invading the wet meadow society.

Several papers on various phases of Colorado ecology have been published by Dr. Francis Ramaley. One of which (25) discusses plant zones in the Rocky Mountains. He distinguishes the following five zones. 1, Plains Zone, below 5,000 ft. , characterized by grassland; 2, Foothill zone, 5,000 to 8,000 ft., characterized by yellow pine; 3, Montane zone 8,000 to 10,000 ft., characterized by lodgepole pine; 4, Sub-alpine zone, 10,000 to 11,500 ft., characterized by Engelmann spruce; 5, Alpine zone above 11,500 ft., a rock desert and steppe zone characterized by mat-forming plants, deep rooted perennials, grasses, sedges and lichens.

Vegetation of the subalpine lakes is treated in another of Ramaley's papers (27). He finds that Engelmann spruce forest is the climatic climax association and that the stages of succession in the filling up of these lakes lead to this forest. The specific composition of the associations and their subdivisions together with their successional relations and seasonal aspects are described by this author. The dry grassland of Boulder Park has been discussed in much the same way by Dr. Ramaley (26). A popular volume of Ramaley's (28) takes up the

ecology of Colorado plant life in an interesting and helpful way for the layman.

The various forest formations with regard to Boulder County have been studied by Robert T. Young (37). Seven formations are discussed and zonation considered. Tables of temperature, water content of soil, relative humidity, and light values taken at different stations in Boulder Canyon are given. The conclusion is that temperature, soil water content and possibly glacial history are responsible for zones.

The phenomenon of timberline has been discussed by two authors. Dr. Raymond J. Pool (24) takes up the subject in a popular way describing the region as he sees it with considerable emphasis on the part played by the wind. Professor H. C. Shaw (33) finds that timberline in the Selkirks is caused by snow.

The relation of climate to the plant life of Colorado has been discussed by Dr. W. W. Robbins (30). This includes maps showing the mean summer temperature, length of frostless season, mean annual precipitation, and average date of last spring frost. The principal changes resulting from an increase in altitude are given as follows: 1, Decrease in air pressure; 2, Decrease in air temperature; 3, Decrease in the difference between the mean temperature of the warmest month and that of the coldest month; 4, Greater difference between sun and shade temperatures; 5, Greater differences between day and night temperatures; 6, Increase in the heating effect of the sun; 7, Increase in the

difference between the temperature of soil and plant surfaces and that of the surrounding air; 8, Increase in the effect of exposure; 9, Shortening of the growing season; 10, Increase in precipitation; 11, Decrease in absolute amount of moisture in the air; 12, Increase in the rate of evaporation; 13, Stronger wind movement; 14, Increase in the intensity of ultra-violet rays.

PLANTS IN THEIR HOMES

As one journeys up the mountains from their foothills to their summits he cannot avoid noticing that the scenery he passes changes greatly. This change in appearance is due mainly to a change in the character of the vegetation and this in turn is indirectly due to the change in altitude which results in a change in climate.

Zones of altitude on a mountain can be roughly compared to zones of latitude on the surface of the earth. A mountain situated at the equator in a humid climate and reaching an altitude of eighteenthousand feet will carry approximately all the variations in environment that would be encountered on a trip from the equator to the arctic circle. The altitude of timberline decreases with an increase in the latitude north. Timberline is at approximately eleven thousand five hundred feet in north central Colorado although it may vary as much as five

hundred feet up or down due to local conditions, while in Montana it is at nine thousand feet and in Alberta at about seven thousand.

Each belt of both latitude and altitude carries its own type of plant and animal life. Of course these associations merge into each other as their boundaries are approached. Some individuals have a much wider range than others, some range through several zones, others are confined very strictly to one. Those which are strictly limited in distribution become what are called zone indicators. By noting their distribution the ecologist can determine his elevation to within a few hundred feet. Thus we have what are called Life Zones. These are recognized for the entire continent and for animals as well as plants.

Three of these life zones are represented in the Rocky Mountain National Park: the montane from six to nine thousand feet, the subalpine from nine thousand to timberline, and the alpine above timberline.

Life zones are much influenced by local conditions of available moisture, prevailing winds, exposure, and topography. For instance timberline will be found much higher on the south exposure of a sheltered ravine than on a windswept ridge exposed to the north. If the upper west-facing slope of Twin-sisters mountain, which is crossed on the trail just before reaching timberline is compared with the barren rock field

encountered as the trail swings from the west to the north slope it will be seen that the former is protected by a buttress of rock jutting out to the north. A forest of Engelmann spruce and limber pine extends well up on the protected slope. As the turn is made it can be seen that the tree-line on the north is far below that of the west which has just been left behind.

All the lower slopes of the Park are included in the Montane zone (Figs. 1 and 2). It is characteristically a region of open yellow pine forest with Douglas tree intermixed. It includes moist and dry aspen groves, lodgepole-Douglas forests on north slopes, open meadows, and barren, dry, rocky ridges. The yellow pine may be mixed with juniper and usually is so on warm south slopes. On the high rocky points there is some limber pine. Many of the shrubs from the foothills are found here where they reach their highest point. Antelope-brush with its tiny, pale yellow, fragrant blossoms early in June, flowering raspberry with large rose-like, white blooms growing in the rockiest places, squaw currant almost everywhere with pungent aromatic foliage and little red currants, are all typical of this zone. There are also many characteristic flowering herbs here. The one-sided penstemon, the wild geranium, kinnikinnic, shooting-star, and Porter's aster are most numerous and reach their greatest development in this zone but occasionally they will be found higher or lower.



Fig. 1. Plant succession on a rock in the montane zone, showing crustaceous and foliose lichens in the foreground, mosses (black patches) in the center, grasses and alumroot in the crevice, mats of alumroot spreading over the rock in the middle background. Notice the pine-needles and other debris accumulating in the crevice. A yellow pine is shown at the right and aspen in the background.



Fig. 2. A later stage in the succession. Grasses and kinnikinnic (dark patches at left) nearly covering the rocks. Yellow pine-Douglas forest in the background.

Above this is the region of heavy Engelmann spruce-alpine fir forests, the subalpine zone (Figs. 3 and 5). This region receives the heaviest snowfall of any in the mountains and because of the heavy forest the snow remains late into the spring and sometimes well into the summer, insuring plentiful moisture throughout the short season. The abundance of moisture here makes this zone the most luxuriant of all in vegetation. This forest is interrupted here and there by lakes and marshes, and contains pure lodgepole stands on the places burned by forest fires, and limber pine on the more exposed slopes. Approximately between ten thousand five hundred and eleven thousand five hundred feet we find the typical subalpine or timberline region. Timberline itself varies between these two extremes according to the exposure and topography. This area contains the luxuriant subalpine meadows, (Fig. 4) many lakes, considerable elfin or dwarf forest at timberline (Fig. 7) and many exposed rocky ridges. Typical plants of the spruce forest are, pipissiwa, star flower (Fig. 6), one-sided wintergreen, twinflower and fairy slipper (Fig. 8). Characteristic shrubs are, mountain ash, and the involucred honeysuckle or twinberry, both found along streams. Some subalpine flowers of the meadows and bogs are pearly everlasting (Fig. 9), fringed parnassia (Fig. 37), ladies' tresses, brook-cress, and rose crown.



Fig. 3. Subalpine meadow near Dream Lake. Engelmann spruce forest in background. The most abundant flower here is the subalpine daisy (Erigeron saluginosus).



Fig. 4. A streamside in a subalpine meadow showing little red elephant (Pedicularis groenlandica) and rose crown (Sedum rhodanthum).

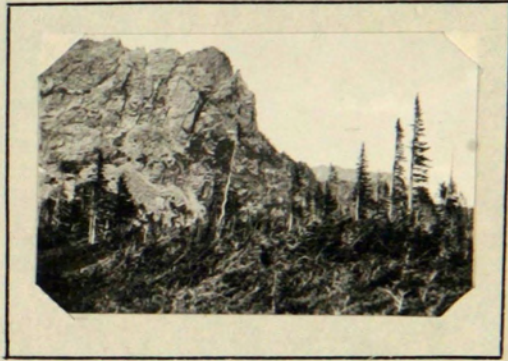


Fig. 7. Windswept trees at timberline.



Fig. 5. The trail to Nymph Lake showing the young forest following the fire of 1900.



Fig. 6. Star-flower (Moneses uniflora).
Flowers white and fragrant.



Fig. 8. Fairy slipper (Calypso bulbosa). Flowers
rose-purple.



Fig. 9. Pearly everlasting (Anaphalis sub-alpinum) foreground, red-berried elder (Sambucus microbotrys) in center.

Timberline itself with its gnarled and twisted trees is one of the most interesting regions of the park (Fig. 7). Here the wind and snow have combined to produce an elfin forest of fantastic appearance. Twisted trunks bearing branches only on their lee side indicate the direction of the prevailing winds; trains of little trees each one younger and shorter than the last run out from the shelter of a big boulder or an old deformed tree. In places gnarled old individuals stand isolated, in others the trees are crowded and their tops intermingle to such an extent as to be indistinguishable from one another. On these tree tops only a few feet above the ground, heavy snows lie long and late, pressing down the branches and making of the whole an impenetrable thicket. Many a shelter from the sudden storms of the region may be found where trails have been cut through these thickets, under the dense, matted canopy of these tree tops.

Above timberline we find the alpine zone. Here we have grassland, meadows, and rock fields with the environment growing steadily more severe culminating in the arctic conditions found on the highest peaks. Here are snow banks the year around and freezing temperatures nearly every night. As the snow recedes flowers burst into bloom. The yellow snow buttercup, a large almost poppy-like flower with much dissected leaves, and the white marsh-marigold (Fig. 10) may be found breaking through the snow to bloom. The little bright blue alpine forget-



Fig. 10. White marsh-marigold
(Caltha rotundifolia).

me-not, the moss campion with its cushion-like growth starred with pink blossoms, the Rydbergia with its big golden head and its covering of shaggy white hair, the mountain dryad with its eight creamy petals and its long plumed seeds, the tiny but gay rose-colored fairy primrose, and the fragrant rock jasmine, and many more are all at home on these heights.

In June and July the high rock fields which appear at a little distance to be barren wastes on closer examination will be found to be gay with the bright colors of the cushion-like plants which fill the spaces between them. The effect is that of a brilliant crazy-quilt spread out over the mountainside. One of the best examples of this may be seen in June on the north slope of Twinsisters just before the summit is reached. A little later these plants are in their prime on Fall River Pass, Trail Ridge, Flattop Mountain and the other high peaks.

The mountain climate is severe due to the strong winds, dry atmosphere, low soil moisture in many places, and the exceptionally strong sunlight. Consequently many mountain plants have special provisions to protect them from excessive evaporation.

The little alpine forget-me-not is protected by a cloak of soft silky hairs which form a dead air space around it and so retard evaporation from the surface of the leaves. Many of our other plants are covered with similar protecting hairs or wool; for instance the scorpion weed (Fig. 11), the black-headed daisy, the Rydbergia, the miner's candle (Fig. 12) and

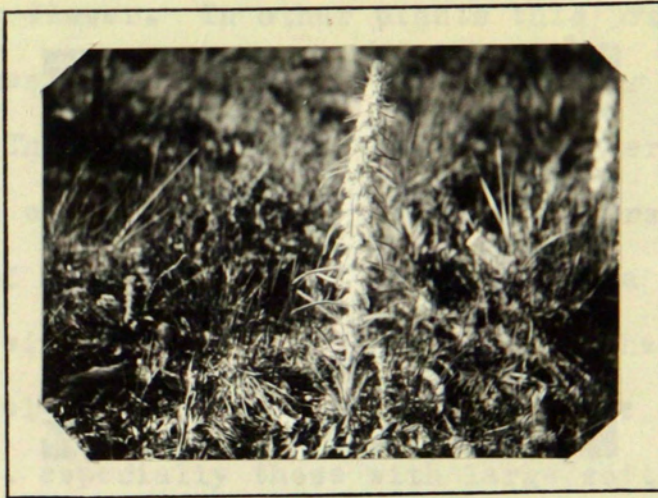


Fig. 12. Miner's candle (Oreocarya virgata).
Photograph by Margaret Fuller Boos.



Fig. 11. Scorpion weed (Phacelia heterophylla).
Flowers small, white or lavender tinged.

the sulphur flower. In other plants this protection is secured by the presence of a hard outer cuticle over the epidermis of the leaf. There is on certain leaves a layer of wax in addition to the cuticle. Cuticle and waxy layers are both present on leaves of many evergreens which grow in a temperate climate. During the winter the plant must not lose the moisture that is in the cells because no more is available until spring. Many plants, especially those with large soft leaves, shed their leaves at the approach of the dry season. The plants which keep their leaves throughout the winter or dry season, for instance in our case kinnikinnic (Fig. 13) and mountain lover, have tough, thick leaves with a hard surface and the stomata are deep set and well protected. In the case of the pine family the danger from too much evaporation is further lessened by the reduction in area of the leaf surface. In some members the stomata are set in grooves and the needles covered with a waxy coating. This wax is what gives the blue spruce its characteristic color. It is often noticeable on other conifers giving them a bluish tinge.

Many of the grasses and some other plants have the margins of the leaves inrolled. This device reduces the leaf surface exposed to the dry air and is a very effective means of preventing loss of moisture. Storage of water, when it is available, in thick leaves and stems for future use is another form of adaptation more common with plants of desert regions than with



Fig. 14. *Jamesia* (*Jamesia americana*).
Flowers white. The leaves take on beautiful
autumn coloring in shades of red. Photo-
graph by Margaret Fuller Boos.



Fig. 13. Kinnikinnick (*Arctostaphylos*
uva-ursi). Flowers white or pinkish.

mountain plants but noticeable in our stonecrops,^{and} some of our saxifrages. In these cases the leaves are usually smooth, though not always so, but often covered with a glaucous bloom (the waxy covering described above). The thickening of the leaf also results in a decreased surface area in relation to the volume which is an added advantage.

Succession of plant life from the first inhabitant of the bare rock to the climax type of vegetation for the region follows a definite course. In a mountainous region such as the Rocky Mountain National Park succession is particularly interesting and easy to study because all stages may usually be found within a very short distance. On dry rocks it begins with the crustaceous lichens (Fig. 1). They occur in different shades of gray and green and some are bright orange. All lichens become more brightly colored as soon as wet. These crustaceous lichens are the earliest pioneers, sticking tightly to the rocks and spreading over them in circular patterns. They live, die and are succeeded by their descendants for many years until a thin layer of humus has collected which will hold a little moisture and collect a little dust thus beginning to form soil. Then come the foliose or leafy lichens which make the layer a little thicker so that mosses and a few grasses can get a foothold. Following these come some or all of the following plants, fireweed, billberry, kinnikinnic, golden banner and wild geranium (Fig. 2).

In the crevices of the rocks alum root (Fig. 50), and seedlings of pine or some of the pioneer shrubs such as juniper, Jamesia (Fig. 14) or flowering raspberry will begin to grow. Their leaves drop down and decay and gradually the crevice is filled with soil. Underneath all this the rock is slowly crumbling due partly to the slightly acid action of the ground water and the root excretions, but mostly to alternating heat and cold and to frost action. By this time the seeds of other trees and shrubs will become lodged here and be able to germinate and grow in the protection afforded by this pioneer nursery. Finally after hundres of years we find in the montane zone open grassy slopes dotted with giant yellow pines and Douglas trees, and in the subalpine zone close forests of spruce and fir.

On wet rocks and along stream banks the succession will occur much faster. Water loving plants rather than drought-resisting ones will occupy the area. Much more growth will take place each season so that humus and soil will accumulate more rapidly. In this case algae and mosses are the pioneers followed by swamp grasses and sedges, next by willows and then by aspens or lodgepole pines and these eventually by spruce forest.

Where man or fire interferes the succession progresses somewhat differently. In such cases there is usually some soil left and a few living plants to reseed the area. After a forest

fire in the open yellow pine forest this same forest usually re-establishes itself without any intervening forest of a different kind, but when fire wipes out a close stand of mixed pine and Douglas tree or of Engelmann spruce a different story follows. Here after the fire we find fireweed, lupine, golden banner with billberry and kinnikinnic, beginning to cover the ground. The following year we find lodgepole pine seedlings coming up in abundance with willows and aspens in the wettest places. The young lodgepoles and aspens must have abundant sun in order to grow and a place where fire has made a clean sweep affords them an ideal home. Under favorable conditions as many as seven lodgepole seedlings to a square yard will come up. As they grow taller of course they crowd each other and some die because of lack of light. This closeness of habit results in the dense stands so evident in many places in the park. Three lodgepole forests of different ages may be seen between Baldpate Inn and Longs Peak Inn, a distance of about three miles, along the South Saint Vrain road. Each of these is the result of a fire. Much of that region has been burned several times. It is evident due to the closeness of the trees and their pitchiness and comparative dryness that a lodgepole forest constitutes a much greater fire hazard than any other forest we have. Consequently when once established they are frequently re-burned usually because of the carelessness of man but sometimes due to lightning.

The lodgepole and aspen forests are also merely a phase and if the succession is not interrupted by fire or logging will give way eventually to other species. Given a chance to reach an age of fifty to seventy years the lodgepole forest will be invaded by Engelmann spruce. This is beginning to happen in the forest on Twinsisters Mountain. A few spruces may be seen here and there among the lodgepoles. Seedling spruces do not thrive in sun and must get their start where they have some protection. In the Bear Lake region after the fire of 1900 many dead trees were left standing and many more were strewn on the ground so that the ground itself was quite shaded. In addition it is probable that the ground here is a little too moist for the best development of lodgepole. Here many Engelmann spruce seedlings and some alpine firs have started to grow (Fig. 5) and managed to survive along with the lodgepoles which occupy the more sunny places. So that in forty or fifty years, barring fire, we may expect to see the barren hills around Bear Lake and along Mill Creek covered with a mixed forest of lodgepole, Engelmann spruce and alpine fir. The former will eventually be crowded out by the others and the forest will then be what is termed the climax forest for this region, Engelmann spruce mixed with alpine fir, and will perpetuate itself indefinitely unless destroyed by some outside agency.

Plants are somewhat like people in their habits. Some are extremely aggressive, others are shy and retiring. The aggressive ones are ^{often} the ones which man calls weeds. They are the ones which will stand being much trampled upon, or which thrive on freshly turned ground, or for some unknown reason flourish around buildings and along roadways. Man's activities of plowing, building, and road-making disturb the native plants which are of the retiring habit and by their disappearance the ground is left open for the aggressive invaders. Many of these are not natives but their seed is carried in various ways, sometimes in hay or in the fur of domestic animals, or in seed the farmer buys. Twenty-five years ago the common dandelion did not exist in Estes Park. But now we have not only the dandelion and the Russian thistle but many more weeds introduced from all over this country and Europe.

Some of the natives are aggressive also. Fields which have at one time been ploughed and then abandoned can be noticed for many years because the vegetation on them is entirely different from that on the natural grassland. The native species most common on these fields are: stickseed, mountain wormwood, gumweed and tansy aster. Gramma grass which is the characteristic native grass of open fields and slopes will not begin to re-establish itself for five or six years.

PLANTS OF THE ROCKY MOUNTAIN NATIONAL PARK

POLYPODIACEAE

Asplenium septentrionalis
Athyrium americanum -Fig. 16
Athyrium Filix-femina
= *Cheilanthes Fendleri*
Cryptogramma acrosticoides
Dryopteris spinulosa Fig. 15
Filix fragilis
= *Pellaea Breweri*
Phegopteris Dryopteris
Polypodium hesperium
Polystichum Lonchitis
Pteridium aquilinum
Woodsia oregana
Woodsia scopulina

EQUISETACEAE

Equisetum arvense
Equisetum laevigatum

LYCOPODIACEAE

Lycopodium annotinum

PINACEAE

Pinus ponderosa scopulorum
Pinus flexilis
Pinus contorta Murrayana
Picea Engelmannii
Picea pungens
Pseudotsuga mucronata
Abies lasiocarpa
Juniperus scopulorum
Juniperus communis

SPARGANIACEAE

**Sparganium angustifolium*
Sparganium minimum
**Sparganium multipedunculatum*

FERN FAMILY

Grass-leaved Fern
Alpine Lady Fern
Lady Fern
Lip Fern
Parsley Fern
Shield Fern
Brittle Fern
Rock Brake
Beech Fern
Western Polypody
Holly Fern
Bracken
Oregon Woodsia
Rocky Mountain Woodsia

HORSETAIL FAMILY

Horsetail Rush
Smooth Scouring-rush

CLUB MOSS FAMILY

Club Moss

PINE FAMILY

Rock Pine
Limber Pine
Lodgepole Pine
Engelmann's Spruce
Blue Spruce
Douglas Tree
Alpine Fir
Rocky Mountain Juniper
Dwarf Juniper

BUR-REED FAMILY

Narrow-leaved Bur-reed
Least Bur-reed
Many-stemmed Bur-reed

Note:- Species not seen by the author are indicated as follows:

- *Species listed by Dr. Rydberg in the Flora of Colorado
- =Species reported by Professor E. C. Smith of the Botany Department of the Colorado Agricultural College.



Fig. 15. Shield Fern
(Dryopteris spinulosa).



Fig. 16. Alpine Lady Fern
(Athyrium americanum).

ALISMACEAE

Sagittaria arifolia

GRAMINEAE

Agropyron Bakeri
= *Agropyron pseudorepens*
Agropyron Scribneri
Agropyron spicatum
Agropyron tenerum
'*Agropyron Vaseyi*
Agropyron violaceum
Agropyron Richardsonii
Agropyron Smithii
= *Agrostis alba*
Agrostis hiemalis
= *Avena Mortoniana*
= *Beckmannia erucaeformis*
Bouteloua gracilis
Bromus ciliatus
Bromus inermis
Bromus Porteri
Bromus polyanthus
Bromus Pumpellianus
'*Bromus Richardsonii*
Bromus tectorum
Calamagrostis canadensis
Calamagrostis Langsdorfii
Calamagrostis purpurascens
= *Danthonia intermedia*
= *Danthonia Parryi*
Deschampsia alpicola
Deschampsia caespitosa
Deschampsia curtifolia
Deschampsia atropurpurea
'*Elymus condensatus*
= *Eriocoma cuspidata*
Festuca arizonica
Festuca brachyphylla
Festuca elatior
Festuca ovina
Festuca saximontana
Festuca scabrella
= *Hilaria Jamesii*
Hordeum pusillum
Koeleria cristata
Melica parviflora
Melica spectabilis

WATER PLANTAIN FAMILY

Arrowhead

GRASS FAMILY

Baker's Wheat-grass
False Quack-grass
Scribner's Wheat-grass
Bunch Wheat-grass
Slender Wheat-grass
Vasey's Wheat-grass
Violet Wheat-grass
Richardson's Wheat-grass
Western Wheat-grass
Redtop
Winter Redtop
Alpine Wild Oats
Slough Grass
Grama Grass
Mountain Brome-grass
Smooth Brome-grass
Porter's Brome-grass
Many-flowered Brome-grass
Pumpelly's Brome-grass
Richardson's Brome-grass
Downy Brome-grass
Bluejoint Reed-grass
Langsdorf's Reed-grass
Purple Reed-grass
Timber Oat-grass
Parry's Oat-grass
Alpine Hair-grass
Tufted Hair-grass
Sheep Hair-grass
Mountain Hair-grass
Giant Rye-grass
Indian Mountain Rice
Arizona Fescue
Alpine Fescue
Meadow Fescue
Sheep Fescue
Rocky Mountain Sheep Fescue
Rare Fescue
Galleta-Grass
Little Barley
June Grass
Small-flowered Melic-Grass
Showy Onion-grass

Muhlenbergia gracilis
 'Muhlenbergia subalpina
 Muhlenbergia racemosa
 =Oryzopsis micrantha
 Phleum alpinum
 Phleum pratense
 Panicularia grandis
 Panicularia Holmi
 Panicularia pauciflora
 'Poa alpicola
 Poa alpinum
 Poa arctica
 'Poa brevipaniculata
 Poa crocata
 Poa interior
 =Poa Lettermannii
 Poa Pattersonii
 Poa pratensis
 Poa Wheeleri
 =Savastana odorata
 'Sitanion brevifolium
 Sitanion elymoides
 Stipa comata
 Stipa Vaseyi
 Trisetum majus
 =Trisetum montanum
 Trisetum subspicatum

Slender Muhlenbergia
 Subalpine Muhlenbergia
 Marsh Muhlenbergia
 Mountain Rice
 Mountain Timothy
 Timothy
 American Manna-grass
 Holm's Manna-grass
 Few-flowered Manna-grass
 Mountain Bluegrass
 Alpine Bluegrass
 Arctic Bluegrass
 Short-panicled Bluegrass
 Purple Bluegrass
 Wood Bluegrass
 Lettermann's Bluegrass
 Patterson's Bluegrass
 Kentucky Bluegrass
 Wheeler's Bluegrass
 Vanilla Grass
 Short-leaved Squirrel-tail
 Squirrel-tail
 Needle Grass
 Sleepy Grass
 Tall Spiked Trisetum
 Mountain Trisetum
 Spiked Trisetum

CYPERACEAE

'Carex acutina
 'Carex alpina
 Carex atrata
 Carex aurea
 Carex canescens
 'Carex capillaris
 Carex chalciolepis
 'Carex chinaphila
 'Carex Douglasii
 Carex ebenea
 Carex festiva
 'Carex Geyeri
 'Carex Hoodii
 'Carex lanuginosa
 =Carex magellanica
 =Carex monile
 Carex nigricans
 'Carex obtusata

SEDGE FAMILY 0

Sedge

0 Because of the difficulty of distinguishing the species in this family and the lack of any generally known common names, there has been no attempt to give common names in this group except to the genera.

'Carex occidentalis
'Carex oreocharis
'Carex pratensis
Carex pyrenaica
=Carex Reynoldsii
'Carex rhomboidea
Carex rupestris
Carex scopulorum
'Carex siccata
=Carex tenella
Eriophorum gracile
Eriophorum ocreatum
'Eriophorum polystachyon
=Scirpus campestris

Cotton-grass

Bulrush

JUNCACEAE

Juncus balticus
Juncus biglumis
Juncus Drummondii
Juncus longistylis
Juncus parous
Juncus saximontanus
Luzula arctica
Luzula parviflora

RUSH FAMILY

Baltic Rush
Two-flowered Rush
Drummond's Rush
Short-styled Rush
Mountain Rush
Rocky Mountain Rush
Arctic Wood-rush
Small-flowered Wood-rush

LILIACEAE

Allium cernuum
Allium Geyeri
Allium Pikeanum
Calochortus Gunnisonii
Erythronium parviflorum
Leucocrinum montanum -Fig. 17
Lilium montanum
Lloydia serotina

LILY FAMILY

Nodding Onion
Purple Onion
Pikes Peak Onion
Mariposa Lily
Snow Lily
Sand Lily
Mountain Lily
Alpine Lily

MELANTHACEAE

Zygadenus elegans

BUNCH-FLOWER FAMILY

Wand Lily

CONVALLARIACEAE

Disporum trachycarpum
Smilacina amplexicaulis
Smilacina racemosa
Smilacina stellata
Streptopus amplexifolius -Fig. 18

LILY OF THE VALLEY FAMILY

Fairy Bells
Clasping Solomon's Seal
Solomon's Seal
Star-flowered Solomon's Seal
Twisted-stalk

IRIDACEAE

Iris missouriensis
Sisyrinchium occidentale

IRIS FAMILY

Blue Flag
Blue-eyed Grass



Fig. 17. Sand Lily (Leucocrinum montanum)
Flowers white.



Fig. 19. Ladies tresses (Spiranthes stricta).
Flowers white.



Fig. 18. Twisted Stalk (Streptopus amplexifolius)
showing the clasping leaves, the branched
stem, and the pendant berries.

ORCHIDACEAE

Calypso bulbosa-Fig. 8
Coeloglossum bracteatum
=Corallorhiza Corallorhiza
Corallorhiza multiflora
Cypripedium Knightae
Cypripedium veganum
Limnorchis borealis
Limnorchis viridiflora
Listera convallarioides
Listera cordata
Lysiella obtusata
Peramium Menziesii
Spiranthes stricta-Fig. 19

SALICACEAE

Populus angustifolia
Populus balsamifera
Populus tremuloides
=Salix Bebbiana
=Salix chlorophylla
=Salix glaucops
=Salix irrorata
=Salix monticola
=Salix Nuttallii
=Salix petrophila
=Salix saximontana
Salix Scouleri
=Salix Watsoni
=Salix Wolfii

BETULACEAE

Alnus tenuifolia
Betula fontinalis
Betula glandulosa

POLYGONACEAE

Eriogonum alatum
Eriogonum flavum
Eriogonum subalpinum
Eriogonum umbellatum-Fig. 20
Eriogonum xanthum
Oxyria digyna
Polygonum amphibium
Polygonum aviculare
Polygonum bistortoides
Polygonum Convolvulus
Polygonum Douglasii
Polygonum Engelmannii
Polygonum minimum

ORCHID FAMILY

Fairy Slipper
Bracted Bog Orchis
Coral Root
Coral Root
Knight's Lady's Slipper
Yellow Lady's Slipper
White Bog Orchis
Green Bog Orchis
Northern Twayblade
Heart-leaved Twayblade
One-leaved Orchis
Rattlesnake Plantain
Ladies' Tresses

WILLOW FAMILY

Narrow-leaved Cottonwood
Balsam Poplar
Trembling Aspen
Bebb's Willow
Green-leaved Willow
Glaucous Willow
Pussy Willow
Mountain Willow
Nuttall's Willow
Rock-loving Willow
Rocky Mountain Willow
Scouler's Willow
Watson's Willow
Wolf's Willow

BIRCH FAMILY

Mountain Alder
Mountain Birch
Bog Birch

BUCKWHEAT FAMILY

Winged Buckwheat
Golden Buckwheat
Subalpine Buckwheat
Sulphur Flower
Alpine Sulphur Flower
Alpine Sorrel
Water Buckwheat
Sidewalk Weed
Bistort
Black Bindweed
Knotweed
Engelmann's Knotweed
Least Knotweed



Fig. 21. Strawberry blite (Chenopodium capitatum). Flowering heads red.
Photograph by Margaret Fuller
Boos.



Fig. 20. Sulphur flower (Eriogonum umbellatum). Flowers yellow.

Polygonum viviparum
Rumex acetosella
Rumex crispus
Rumex mexicanus

Small Bistort
Sorrel
Curled Dock
Mexican Dock

CHENOPODIACEAE

Chenopodium album
Chenopodium capitatum -Fig. 21
Monolepis chenopodioides
Salsola pestifer

GOOSEFOOT FAMILY

Lamb's Quarters
Strawberry Blite
Monolepis
Russian Thistle

AMARANTHACEAE

Amaranthus retroflexus

AMARANTH FAMILY

Rough Pigweed

NYCTAGINACEAE

Allionia lanceolata

FOUR O'CLOCK FAMILY

Four O'clock

PORTULACACEAE

Claytonia lanceolata
Claytonia megarrhiza
Claytonia rosea
Lewisia pygmaea
Montia Chamissonis

PURSLANE FAMILY

Spring Beauty
Big-rooted Spring Beauty
Spring Beauty
Tiny Lewisia
Water Spring Beauty

CARYOPHYLLACEAE

Arenaria aequicaulis
Arenaria Fendleri
Arenaria sajanensis
Cerastium arvense
Cerastium Beeringianum
Cerastium oreophilum
Lychnis alba
Lychnis Drummondii
Lychnis montana
Moehringia lateriflora
Paronychia pulvinata
Sagina saginoides
Silene acaulis
Silene Hallii
Stellaria crassifolia
Stellaria longifolia
Stellaria umbellata

PINK FAMILY

Equal-stemmed Sandwort
Fendler's Sandwort
Alpine Sandwort
Mouse-ear Chickweed
Alpine Mouse-ear
Mouse-ear Chickweed
White Campion
Drummond's Pink
Mountain Pink
Blunt-leaved Sandwort
Whitlowort
Pearlwort
Moss Campion
Catchfly
Thick-leaved Chickweed
Long-leaved Chickweed
Umbelled Chickweed

NYMPHACEAE

Nymphaea polysepala -Fig. 22

WATERLILY FAMILY

Yellow Pond Lily



Fig. 23. Monkshood (Aconitum columbianum). Flowers blue or whitish.
Photograph by Margaret Fuller Boos.



Fig. 22. Yellow pond lily (Nymphaea polysepala).

RANUNCULACEAE

Aconitum columbianum -Fig. 23
= *Aconitum Bakeri*
Actaea arguta
Anemone zephyra
Anemone globosa
Anemone canadensis
= *Anemone cylindrica*
Aquilegia caerulea -Fig. 24
Aquilegia caerulea daileyae
Aquilegia saximontana
Aquilegia elegantula
Batrachium flaccidum
Batrachium confervoides
Caltha rotundifolia -Fig. 10
Clematis occidentalis
Clematis ligusticifolia
= *Clematis Douglasii*
= *Clematis pseudoalpina*
Delphinium Nelsonii
Delphinium robustum
= *Delphinium reticulatum*
Delphinium subalpinum
Pulsatilla hirsutissima -Fig. 25
Ranunculus adoneus
Ranunculus alpeophilus
Ranunculus calthaeflorus
Ranunculus cardiophyllus
Ranunculus cymbalaria
Ranunculus glaberrimus
Ranunculus inamoenus
Ranunculus Nuttallii
Ranunculus pygmaeus
Ranunculus reptans
Ranunculus pedatifidus
Thalictrum alpinum
Thalictrum Fendleri
Thalictrum sparsiflorum
= *Thalictrum venulosum*
Trollius albiflorus

BERBERIDACEAE

Berberis aquifolium

FUMARIACEAE

Corydalis aurea

BUTTERCUP FAMILY

Monkshood
Baker's Monkshood
Baneberry
Alpine Anemone
Wind Flower
Northern Anemone
Cylindric Anemone
Colorado Blue Columbine
Star-flowered Blue Columbine
Rocky Mountain Columbine
Red Columbine
Water Crowfoot
Water Crowfoot
Marsh Marigold
Western Blue Clematis
Virgin's Bower
Douglas' Clematis
Alpine Clematis
Nelson's Larkspur
Mountain Larkspur
Reticulate Larkspur
Subalpine Larkspur
Pasque Flower
Snow Buttercup
Buttercup
Clatha-flowered Buttercup
Heart-leaved Buttercup
Creeping Buttercup
Early Buttercup
Buttercup
Nuttall's Buttercup
Pygmy Buttercup
Trailing Buttercup
Bird-foot Buttercup
Alpine Meadow Rue
Fendler's Meadow Rue
Few-flowered Meadow Rue
Veined Meadow Rue
Globe Flower

BARBERRY FLOWERS

Oregon Grape

FUMITORY FAMILY

Golden *Corydalis*

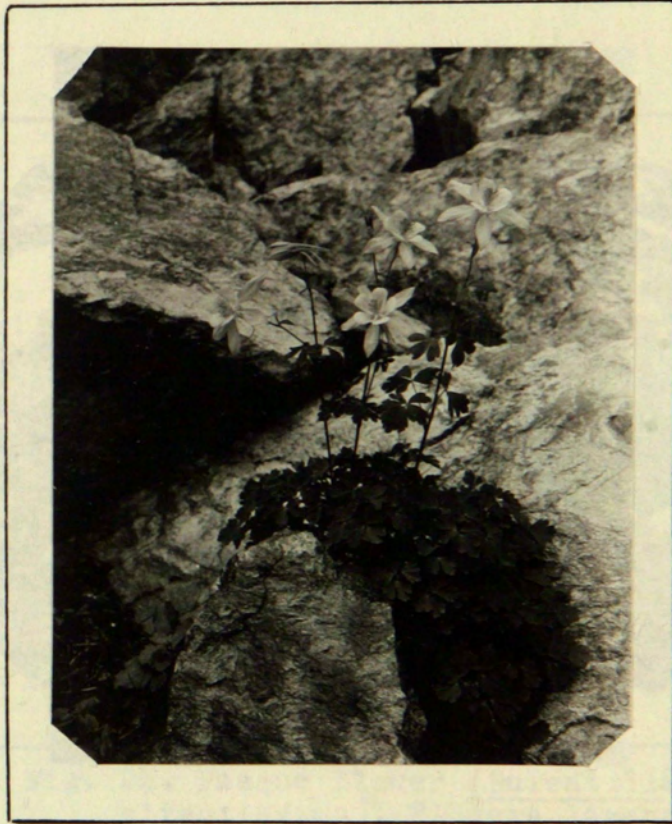


Fig. 24. Colorado blue columbine (Aquilegia caerulea). Flowers blue or lavender and white.



Fig. 25. Pasque flower (Pulsatilla
hirsutissima). Flowers lavender
with conspicuous yellow centers.

CRUCIFERAE

Arabis Drummondii
Arabis hirsuta
-Arabis divaricarpa
-Arabis oxylobula
Cardamine cordifolia
Draba aurea
Draba crassifolia
Draba nitida
Draba streptocarpa
=Draba chrysantha
Draba spectabilis
Erysimum asperum -Fig. 34
Erysimum nivale
Erysimum Wheeleri
Lepidium apetalum
Lesquerella montana
Sisymbrium altissimum
Roripa hispida
Sophia Hartwegiana
Sophia Sophia
-Thelypodium paniculatum
Thlaspi coloradense
Thlaspi Fendleri
Thlaspi glaucum
Thlaspi arvense

CAPPARIDACEAE

Cleome serrulata

CRASSULACEAE

Sedum integrifolium
Sedum rhodanthum
Sedum stenopetalum

SAXIFRAGACEAE

Boykinia Jamesii
Heuchera bracteata -Fig. 50
-Heuchera Hallii
Heuchera parvifolia
Mitella Parryi
Mitella pentandra
Mitella violaceae
Parnassia fimbriata -Fig. 37
Saxifraga arguta
Saxifraga austromontana
Saxifraga cernua
Saxifraga debilis
Saxifraga chrysantha

MUSTARD FAMILY

Drummond's Arabis
Hairy Arabis
Spreading Arabis
Sharp-pointed Arabis
Brook Cress
Yellow Draba
Thick-leaved Draba
Shining Draba
Twisted-pod Draba
Golden Draba
Showy Draba
Wallflower
Alpine Wallflower
Wheeler's Wallflower
Peppergrass
Mountain Lesquerella
Hedge Mustard
Hispid Water Cress
Hartweg's Sophia
Common Sophia
Panicled Thelypodium
Colorado Candytuft
Fendler's Candytuft
Alpine Candytuft
Frenchweed

CAPER FAMILY

Rocky Mountain Bee Plant

ORPINE FAMILY

King's Crown
Rose Crown
Stonecrop

SAXIFRAGE FAMILY

Purple Saxifrage
Alum Root
Hall's Alum Root
Small-leaved Alum Root
Parry's Mitewort
Miterwort
Violet-leaved Miterwort
Fringed Parnassia
Brook Saxifrage
Dotted Saxifrage
Nodding Saxifrage
Alpine Saxifrage
Golden Saxifrage

Saxifraga flagillaris
Saxifraga rhomboidea

GROSSULARIACEAE

Ribes coloradense
Ribes cereum
Ribes parvulum
Ribes saximontanum
 =*Ribes Wolfii*

HYDRANGEACEAE

Jamesia americana

ROSACEAE

Agrimonia Brittoniana
Argentina anserina
Dasiopnora fruticosa -Fig. 26
Dryas octopetala
Drymocallis fissa
Fragaria ovalis glauca
Fragaria americana
Geum strictum
Geum rivale
Holodiscus dumosus
Physocarpus monogynus
Potentilla effusa
Potentilla glaucophylla
Potentilla gracilis
Potentilla Hippiana
Potentilla nivea
Potentilla Pennsylvanica strigosa
Potentilla pinnatifida
Potentilla pinnatisecta
Potentilla pulcherrima
Potentilla quinquefolia
Potentilla rubricaulis
Potentilla uniflora
 =*Potentilla monspeliensis*
 'Potentilla coloradensis
 'Potentilla minutifolia
 'Potentilla saximontana (rubripes)
 'Potentilla dissecta
 'Potentilla arachnoidea
Purshia tridentata
Rosa Woodsia
Rosa Sayi
Rubus deliciosus
Rubus strigosus

Whip-lash Saxifrage
 Snow-ball Saxifrage

GOOSEBERRY FAMILY

Subalpine Black Currant
 Squaw Currant
 Black Gooseberry
 Mountain Gooseberry
 Wolf's Currant

HYDRANGEA FAMILY

Jamesia

ROSE FAMILY

Agrimony
 Silver Weed
 Shrubby Cinquefoil
 Mountain Dryad
 Leafy-Cinquefoil
 Wild Strawberry
 Wild Strawberry
 Bur Avens
 Brook Avens
 Mountain Spray
 Nine-bark
 Silvery Cinquefoil
 Glaucus Cinquefoil
 Golden Cup
 Hipp's Cinquefoil
 Snow-loving Cinquefoil
 Pennsylvania Cinquefoil
 Pinnate Cinquefoil
 Cut-leaved Cinquefoil
 Beautiful Cinquefoil
 Five-leaved Cinquefoil
 Red-stemmed Cinquefoil
 One-flowered Cinquefoil
 Rough Cinquefoil
 Colorado Cinquefoil
 Small-leaved Cinquefoil
 Rocky Mountain Cinquefoil
 Cinquefoil
 Cob-webby Cinquefoil
 Antelope Brush
 Wild Rose
 Wild Rose
 Flowering Raspberry
 Wild Raspberry

5922 NC 10



Fig. 26. Shrubby cinquefoil (Dasiphora fruticosa). Flowers yellow.
Photograph by Margaret Fuller Boos.

Photograph by Margaret Fuller Boos.

Sibbaldia procumbens
Sieversia ciliata
Sieversia turbinata

POMACEAE

Amelanchier alnifolia
Amelanchier elliptica
Crataegus chrysocarpa
Sorbus scopulina

DRUPACEAE

Prunus melanocarpa
Prunus pennsylvanica

LEGUMINOSAE

Astragalus alpinus
Astragalus campestris
Astragalus felxuosus
Astragalus racemosus
Astragalus sulphurescens
Glycyrrhiza lepidota
Lupinus alpestris
Lupinus parviflorus
Melilotus alba
Melilotus officinalis
Onobrychis sativa
Oxytropis bilocularis
Oxytropis saximontana
Oxytropis sericea
Thermopsis divaricarpa -Fig. 27
Trifolium dasyphyllum
= *Trifolium nanum*
Trifolium Parryi
Trifolium pratensis
Trifolium repens

GERANIACEAE

Geranium Fremontii-28
Geranium Richardsonii

LINACEAE

Linum Lewisii

POLYGALACEAE

Polygala alba

Sibbaldia
Pink Plumes
Alpine Avens

APPLE FAMILY

Service Berry
Service Berry
Hawthorne
Mountain Ash

PLUM FAMILY

Chokecherry
Bird Cherry

PEA FAMILY

Alpine Vetch
Field Vetch
Limber Vetch
Racemose Vetch
Sulphur Vetch
Licorice
Mountain Lupine
Small-flowered Lupine
White Sweet-clover
Yellow Sweet-clover
Sain-Foin
Colorado Loco
White Loco
Silky Loco
Golden Banner
Alpine Clover
Dwarf Clover
Rose Clover
Red Clover
White Clover

GERANIUM FAMILY

Fremont's Geranium
White Geranium

FLAX FAMILY

Blue Flax

POLYGALA FAMILY

White Milkwort



Fig. 27. Golden banner (Thermopsis divaricarpa). Flowers yellow.
Photograph by Margaret Fuller Boos.



Fig. 28. Fremont's Geranium (Geranium fremontii). Flowers pink.
Photograph by Margaret Fuller Boos.

EUPHORBIACEAE
Euphorbia robusta

ANACARDIACEAE
Rhus trilobata

ACERACEAE
Acer glabrum

CELASTRACEAE
Pachystima myrsinites

RHAMNACEAE
Ceanothus Fendleri
Ceanothus velutinus

MALVACEAE
Sidalcea candida
Sidalcea neo-mexicana

HYPERICACEAE
Hypericum formosum

VIOLACEAE
Viola bellidifolia
Viola biflora
Viola canadensis Rydbergia
Viola Nuttallii
Viola palustris

LOASACEAE
Mentzelia multiflora
Mentzelia nuda
Mentzelia speciosa

CACTACEAE
Mamillaria vivipara
Opuntia polyacantha

ELAEAGNACEAE
Shepherdia canadensis

ONAGRACEAE
Epilobium angustifolium-Fig. 29
(*Chamaenerion angustifolium*)
Epilobium latifolium
(*Chamaenerion latifolium*)
Epilobium adenocaulon
Epilobium alpinum
Epilobium anagallidifolium
Epilobium brevistylum
Epilobium Drummondii

SPURGE FAMILY
Spurge

SUMAC FAMILY
Three-leaved Sumac

MAPLE FAMILY
Mountain Maple

STAFF TREE FAMILY
Mountain Lover

BUCKTHORN FAMILY
Fendler's Buckthorn
Mountain Balm

MALLOW FAMILY
Modest Mallow
Wild Hollyhock

ST. JOHN'S WORT FAMILY
St. John's Wort

VIOLET FAMILY
Blue Violet
Yellow Violet
Canada Violet
Nuttall's Yellow Violet
Meadow Violet

LOASA FAMILY
Many-flowered Evening Star
White Evening Star
Snowy Evening Star

CACTUS FAMILY
Pincushion Cactus
Prickly Pear

OLEASTER FAMILY
Buffalo Berry

EVENING PRIMROSE FAMILY
Fireweed

Broad-leaved Fireweed
Willow Herb
Willow Herb
Willow Herb
Willow Herb
Willow Herb



Fig. 29. Fireweed (Epilobium angustifolium). Flowers rose-purple.
Photograph by Margaret Fuller Boos.

Epilobium Hornmannii
Epilobium paniculatum
Gayophytum Nuttallii
Gayophytum ramosissimum
Oenothera strigosa (Onagra
strigosa)
Oenothera macroglottis
(Pachylophus macroglottis)
Oenothera coronopifolia
(Anogra coronopifolia)
Oenothera Nuttallii
(Anogra Nuttallii)

UMBELLIFERAE

Angelica ampla
Angelica Grayi
Carum Carui
Conioselinum scopulorum
Harbouria trachypleura
Heracleum lanatum- Fig. 30
Ligusticum simulans
Pseudocymopterus montanus
Oreoxis alpina
Oxypolis Fendleri
Washingtonia obtusa

CORNACEAE

Cornus instoloneus

PYROLACEAE

Chimaphila umbellata
Moneses uniflora -Fig. 6
Pyrola chlorantha
Pyrola minor
Pyrola secunda
Pyrola uliginosa -Fig.32

MONOTROPA CEAE

Pterospora Andromeda

ERICA CEAE

Arctostaphylos uva-ursi -Fig.13
Gaultheria humifusa
Kalmia polifolia

VACCINIACEAE

Vaccinium scoparium
Vaccinium oreophilum Fig. 31

Willow Herb
Annual Willow Herb
Baby's Breath
Baby's Breath

Evening Primrose

Fragrant Evening Primrose

White Morning Primrose

Nuttall's Morning Primrose

PARSNIP FAMILY

Angelica
Gray's Angelica
Caraway
Hemlock-Parsley
Yellow Parsley
Cow Parsnip
Lovage
Mountain Parsley
Alpine Parsley
Fendler's Oxypolis
Sweet Cicely

DOGWOOD FAMILY

Dogwood

PYROLA FAMILY

Pipsissewa
Star-flower
Green-flowered Pyrola
Least Pyrola
One-sided Pyrola
Bog Pyrola

INDIAN PIPE FAMILY

Pinedrops

HEATH FAMILY

Kinnikinnick
Creeping Wintergreen
Dwarf Laurel

HUCKLEBERRY FAMILY

Red Billberry
Black Billberry



Fig. 30. Cow parsnip (Heracleum lanatum). Flowers white. Plant 3-8 ft. high.

Fig. 31. Black hollyhock (Arhusia
arvensis). Photograph by Margaret
Fuller Bond.



Fig. 31. Black huckleberry (Vaccinium oreophilum). Photograph by Margaret Fuller Boos.



Fig. 32. Bog pyrola (*Pyrola uliginosa*). Flowers pink.

PRIMULACEAE

Androsace diffusa
Androsace subumbellata
Drosace carinata
Primula angustifolia
Primula Parryi-Fig. 33
Dodecatheon pauciflorum .

GENTIANACEAE

Chondrophylla americana
Chondrophylla Fremontii
Fraseria speciosa -Fig. 35
Gentiana affinis
Gentiana barbellata
Gentiana Bigelovii-Fig. 36
Gentiana elegans
Gentiana elegans unicaulis
Gentiana monantha
Gentiana Parryi
Gentiana plebeja
Gentiana Romanzovii
Gentiana strictiflora
Pleurogyne fontana
Swertia congesta
Swertia palustris-Fig. 37

MENYANTHACEAE

Menyanthes trifoliata

APOCYNACEAE

Apocynum androsaemifolium

POLEMONIACEAE

Collomia linearis
Gilia aggregata
Gilia pinnatifida
Gilia spicata
Polemonium confertum-Fig. 38
Polemonium foliosissimum
Polemonium mellitum
Polemonium occidentale
Polemonium pulcherrimum
Polemonium viscosum -Fig.38
Phlox caespitosa

HYDROPHYLLACEAE

Hydrophyllum Fendleri
Phacelia heterophylla-Fig. 11
Phacelia glandulosa
Phacelia sericea

PRIMROSE FAMILY

Mountain Androsace
Alpine Androsace
Rock Jasmine
Fairy Primrose
Brook Primrose
Shooting Star

GENTIAN FAMILY

American Moss Gentian
Fremont's Moss Gentian
Monument Plant
Closed Gentian
Fragrant Gentian
Bigelow's Gentian
Rocky Mountain Fringed Gentian
Alpine Fringed Gentian
One-flowered Gentian
Parry's Gentian
Rose Gentian
Arctic Gentian
Swamp Gentian
Marsh Felwort
Star Gentian
Star Gentian

BUCKBEAN FAMILY

Buckbean

DOGBANE FAMILY

Dogbane

PHLOX FAMILY

Narrow-leaved Collomia
Skyrocket
Pinnate-leaved Gilia
Spicate Gilia
Blue Polemonium
Leafy Polemonium
Honey Polemonium
Western Jacob's Ladder
Beautiful Jacob's Ladder
Sticky Polemonium
Alpine Phlox.

WATERLEAF FAMILY

Waterleaf
Scorpion Weed
Sticky Scorpion Weed
Purple Fringe



Fig. 33. Brook primrose (Primula
Parryi). Flowers rose-purple, strong
scented.



Fig. 34. Wallflower (Erysimum asperum). Flowers yellow. Photograph by Margaret Fuller Boos.

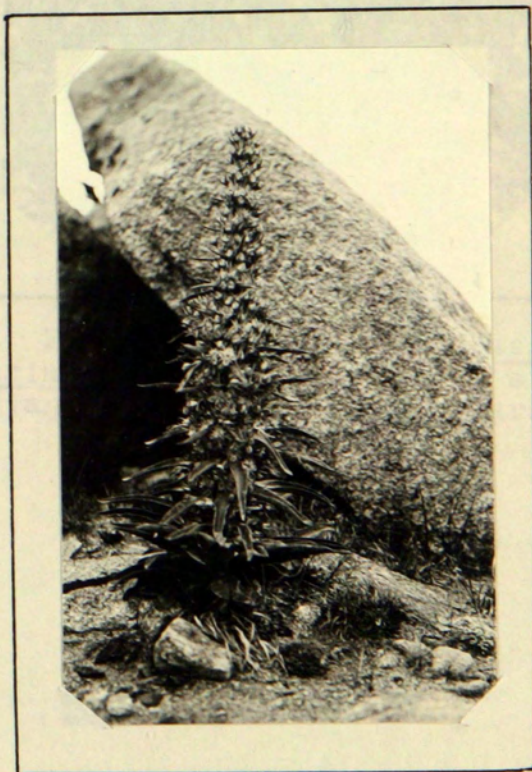


Fig. 35. Monument plant (Fraseria speciosa). Flowers greenish, plant 2 -5 ft. high. Photograph by Margaret Fuller Boos.



Fig. 37. Fringed Parnassia (Parnassia fimbriata) flowers white, and star gentian (Swertia palustris) dark blue

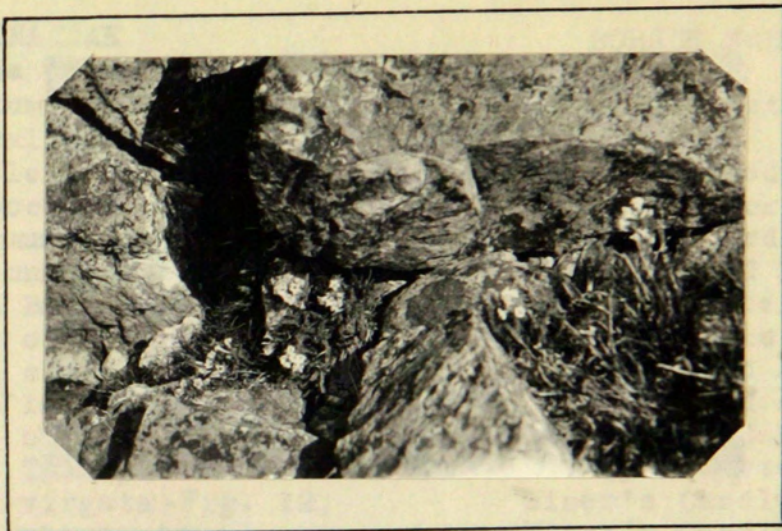


Fig. 38. Sticky polemonium (Polemonium viscosum). Photograph by Margaret Fuller Boos.



Fig. 36. Bigelow's gentian (Gentiana Bigelovii). Flowers blue.

BORAGINACEAE

Cryptantha flexuosa
 Eritrichium argenteum
 Lappula calycosa
 Lappula floribunda
 Lappula occidentalis
 Lithospermum angustifolium
 Lithospermum multiflorum
 Mertensia Bakeri lateriflora
 Mertensia ciliata -Fig. 42
 Mertensia coriacea
 Mertensia lanceolata
 Mertensia ovata
 Mertensia Tweedyi
 Oreocarya virgata -Fig. 12
 Oreocarya glomerata

VERBENACEAE

Verbena bracteosa

LABIATAE

Dracocephalum parviflorum
 Monarda menthaefolia
 Mentha spicata
 Mentha canadensis
 Stachys palustris
 Scutellaria Brittonii

SOLANACEAE

Solanum triflorum
 Solanum nigrum

SCROPHULARIACEAE

Castilleja brachyantha
 Castilleja laeta
 Castilleja linariaefolia
 Castilleja occidentalis
 Castilleja rhexifolia -Fig. 39
 Castilleja septentrionalis
 Chionophila Jamesii
 Collinsia tenella
 Mimulus guttatus
 Mimulus floribundus
 Orthocarpus luteus
 Pedicularis Grayi -Fig. 40
 Pedicularis bracteosa
 Pedicularis scopulorum
 Pedicularis Parryi
 Pedicularis racemosa

BORAGE FAMILY

Cryptantha
 Alpine Forget-me-not
 Stickseed
 Many-flowered Stickseed
 Western Stickseed
 Narrow-leaved Puccoon
 Broad-leaved Puccoon
 Baker's Mertensia
 Chiming Bells
 Thick-leaved Mertensia
 Lance-leaved Mertensia
 Ovate-leaved Mertensia
 Tweedy's Mertensia
 Miner's Candle
 Miner's Candle

VERBENA FAMILY

Vervain

MINT FAMILY

Dragon-head
 Horsemint
 Spearmint
 Wild Mint
 Woundwort
 Skullcap

POTATO FAMILY

Wild tomato
 Black Nightshade

FIGWORT FAMILY

Short-flowered Paintbrush
 Rosy Paintbrush
 Narrow-leaved Paintbrush
 Yellow Paintbrush
 Scarlet Paintbrush
 Northern Paintbrush
 Snow Lover
 Blue-eyed Mary
 Yellow Monkey Flower
 Many-flowered Monkey Flower
 Gold-Tongue
 Giant Lousewort
 Bracted Lousewort
 Rock-loving Lousewort
 Parry's Lousewort
 Mountain Figwort



Fig. 39. Scarlet paintbrush
(Castilleja sp.).



Fig. 41. One-sided Penstemon (Penstemon unilateralis) Flowers blue and purple. Photograph by Margaret Fuller Boos.



Fig. 40. Giant lousewort (Pedicularis Grayi). Flowers greenish. Photograph by Margaret Fuller Boos.

VALERIANACEAE
Valerian parviflora
Valerian acutifolia

COMPOSITEAE
Achillea millefolium
Actinella lanata
Agoseris aurantiaca

VALERIANACEAE
Valerian
Mountain Valerian

COMPOSITEAE
Yarrow
Woody Actinella
Burnt-orange Danellian

Pedicularis crenulata
Pedicularis groenlandica -Fig. 4
Penstemon alpinus
Penstemon humilis
Penstemon procerus
Penstemon Rydbergii
Penstemon secundiflorus
Penstemon unilateralis -Fig. 41
Penstemon Whippleanus
Scrophularia occidentalis
Syntheris alpina
Syntheris plantaginea
Verbascum Thapsus
Veronica alpina
Veronica americana
Veronica perigrina

OROBANCHACEAE

Thalesia fasciculata

RUBIACEAE

Galium boreale
Galium triflorum

CAPRIFOLIACEAE

Linnaea americana
Lonicera involucrata
Sambucus microbotrys
Symphoricarpus racemosus
Viburnum pauciflorum

ADOXACEAE

Adoxa Moschatellina

CAMPANULACEAE

Campanula Parryi
Campanula rotundifolia -Fig. 43
Campanula uniflora

VALERIANACEAE

Valerian furfurescens
Valerian acutiloba

COMPOSITAE

Achillea millefolium
Actinella lanata
Agoseris aurantiaca

Purple Lousewort
Little Red Elephant
Blue Mountain Penstemon
Dwarf Penstemon
Clustered Penstemon
Rydberg's Penstemon
Purple Beardtongue
One-sided Penstemon
Whipple's Penstemon
Western Figwort
Alpine Kitten-Tails
Kitten-tails
Mullein
Alpine Veronica
American Brooklime
Annual Veronica

BROOMRAPE

Broomrape

MADDER FAMILY

Northern Bedstraw
Three-flowered Bedstraw

HONEYSUCKLE FAMILY

Twinflower
Twin Berry
Red-berried Elder
Snowberry
Arrow-wood

MOSCHATEL FAMILY

Muskroot

BLUEBELL FAMILY

Parry's Harebell
Harebell
Alpine Harebell

VALERIAN FAMILY

Valerian
Mountain Valerian

COMPOSITE FAMILY

Yarrow
Wooly Actinella
Burnt-orange Dandelion



Fig. 43. Harebells (Campanula rotundifolia). Flowers blue.



Fig. 42. Chiming bells along the outlet from Dream Lake. Flowers blue, buds often pinkish. (Mertensia ciliata)

Agoseris glauca
 Agoseris villosa
 Anaphalis subalpina
 Antennaria aprica
 Antennaria pulcherrima
 Antennaria rosea
 =Antennaria umbrinella
 Arnica cordifolia
 Arnica gracilis
 Arnica fulgens
 Arnica Parryi
 Arnica pumila
 Arnica subplumosa
 Arnica sylvatica
 =Artemisia arbuscula
 Artemisia aromatica
 Artemisia canadensis
 Artemisia coloradensis
 Artemisia frigida
 Artemisia gnaphalodes
 Artemisia ludoviciana
 Artemisia Pattersoni
 =Artemisia nova
 Artemisia saxicola
 Artemisia scopulorum
 Artemisia tridentata
 =Artemisia silvicola
 Aster adscendens
 Aster adscendens armeriaefolius
 =Aster andinus
 Aster caeruleus
 Aster Canbyi
 =Aster campestris
 Aster commutatus
 Aster Cordineri
 Aster Engelmannii
 Aster Fremontii
 Aster Geyeri
 Aster laevis
 Aster Porteri (Fig. 44)
 Aster Tweedyi
 Bahia dissecta
 Brickellia grandiflora
 Cirsium Drummondii
 Cirsium filipendulum
 =Cirsium bipinnatum
 =Chrysopsis arida
 Chrysopsis foliosa
 =Chrysopsis hirsutissima
 Chrysopsis pumila

Tall False Dandelion
 Hairy False Dandelion
 Pearly Everlasting
 Sun-loving Catspaw
 Beautiful Catspaw
 Fussy Toes
 Brownish Catspaw
 Heart-leaved Arnica
 Slender Arnica
 Shining Arnica
 Rayless Arnica
 Daffodil Arnica
 Plumose Arnica
 Aromatic Arnica
 Wormwood
 Aromatic Wormwood
 Canada Wormwood
 Colorado Wormwood
 Mountain Sage
 White Wormwood
 Louis' Wormwood
 Alpine Sagewort
 New Wormwood
 Rocky-loving Wormwood
 Alpine Wormwood
 Sagebrush
 Wood-loving Wormwood
 Blue Aster
 Blue Aster
 Alpine Aster
 Sky-blue Aster
 Canby's Aster
 Field Aster
 Rough White Aster
 Estes Park Aster
 Engelmann's Aster
 Red-purple Aster
 Geyer's Blue Aster
 Smooth Aster
 Porter's White Aster
 Tweedy's Aster
 Cut-leaved Bahia
 Large-flowered Thoroughwort
 Drummond's Thistle
 Purple Thistle
 Bipinnate Thistle
 Arid Golden Aster
 Leafy Golden Aster
 Hairy Golden Aster
 Dwarf Golden Aster



Fig. 44. Porter's aster (Aster Porteri). Flower heads white with yellow or reddish centers.



Fig. 45. Black-headed daisy (Erigeron melanocephalus). Heads lavender or white with yellow centers.

<i>Chrysopsis resinolens</i>	Resinous Golden Aster
- <i>Chrysopsis villosa</i>	Villous Golden Aster
<i>Chrysothamnus pumilus</i>	Dwarf Rabbit Brush
<i>Crepis alpicola</i>	Alpine Crepis
<i>Crepis riparia</i>	Brookside Crepis
= <i>Crepis runcinata</i>	Meadow Crepis
<i>Erigeron acris</i>	Bitter Fleabane
<i>Erigeron compositus</i>	Cut-leaved Daisy
<i>Erigeron corymbosus</i>	Blue Daisy
<i>Erigeron divergens</i>	Spreading Fleabane
<i>Erigeron elatior</i>	Beautiful Daisy
<i>Erigeron flagellaris</i>	Whip-lash Daisy
<i>Erigeron lonchophyllus</i>	Long-leaved Fleabane
<i>Erigeron melanocephalus</i> -Fig. 45	Black-headed Daisy
<i>Erigeron pinnatisectus</i>	Pinnate-leaved Daisy
<i>Erigeron pumilus</i>	Dwarf Mountain Daisy
<i>Erigeron macranthus</i> -Fig. 46	Mountain Daisy
<i>Erigeron salsuginosus</i>	Subalpine Daisy
<i>Erigeron superbus</i>	Superb Daisy
<i>Erigeron uniflorus</i>	One-flowered Daisy
<i>Erigeron yellowstonensis</i>	Yellowstone Fleabane
<i>Gaillardia aristata</i>	Mountain Gaillardia
<i>Gnaphalium decurrens</i>	Creamy Everlasting
<i>Grindelia squarrosa</i> -Fig. 47	Gumweed
<i>Helianthus quinquenervis</i>	Five-nerved Helianthella
<i>Helianthus annuus</i>	Annual Sunflower
<i>Helianthus pumilus</i>	Dwarf Sunflower
<i>Hieracium albiflorum</i>	White-flowered Hawkweed
<i>Hieracium gracile</i>	Slender Hawkweed
<i>Iva xanthifolia</i>	Careless weed
<i>Liatris punctata</i>	Gayfeather
<i>Lygodesmia juncea</i>	Milk-pink
<i>Machaeranthera varians</i> -Fig. 48	Tansy-aster
= <i>Machaeranthera aspera</i>	Rough Tansy-aster
<i>Oreochrysum Parryi</i>	Parry's Goldenrod
<i>Prenanthes racemosa</i>	Rattlesnake Root
<i>Pyrrocoma crocea</i>	Pyrrocoma
<i>Ratibida columnaris</i>	Cone Flower
<i>Rudbeckia hirta</i> -Fig. 49	Brown-eyed Susan
<i>Rudbeckia laciniata</i>	Golden Glow
= <i>Rydbergia Brandegei</i>	Smooth Rydbergia
<i>Rydbergia grandiflora</i>	Rydbergia
<i>Senecio atratus</i>	Black-tipped Senecio
<i>Senecio Bigelovii</i>	Bigelow's Groundsel
<i>Senecio carthamoides</i>	Rock-loving Ragwort
<i>Senecio cernuus</i>	Nodding Senecio



Fig. 46. Mountain daisy (Erigeron macranthus). Flower heads blue or violet with yellow centers. Photograph by Margaret Fuller Boos.

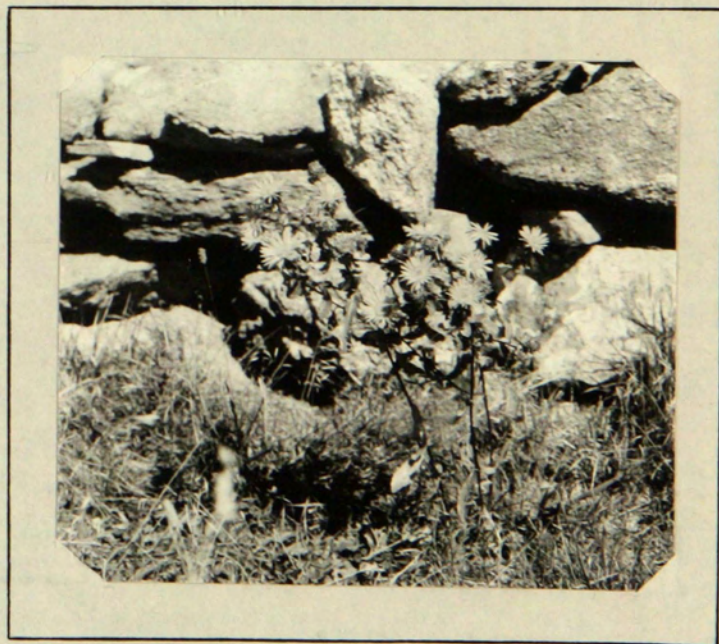


Fig. 47. Gumweed (Grindelia squarrosa). Flowers yellow, buds very sticky.



Fig. 49. Brown-eyed Susan (Rudbeckia hirta). Flower heads yellow with dark brown centers.



Fig. 48. Tansy aster (Machaeranthera varians). Flower heads purple with orange-yellow or reddish centers.

Senecio crocatus
Senecio eremophilus
Senecio Fendleri
Senecio Holmii
Senecio perplexus
Senecio rapifolius
Senecio spartioides
Senecio taraxacoides
Senecio triangularis
=Senecio anacletus
=Senecio columbianus
Solidago ciliosa
Solidago concinna
Solidago decumbens
Solidago missouriensis
Solidago pulcherrima
Solidago serotina
Taraxacum officinale
Taraxacum scopulorum
Tonsetus pygmaeus
Townsendia exscapa
=Townsendia grandiflora

Orange Ragwort
Western Golden Ragwort
Fendler's Senecio
Dwarf Senecio
Puzzling Senecio
Turnip-leaved Senecio
Narrow-leaved Senecio
Alpine Senecio
Triangle-leaved Ragwort
Senecio
Senecio
Golden Rod
Golden Rod
Mountain Goldenrod
Missouri Goldenrod
Beautiful Goldenrod
Tall Goldenrod
Common Dandelion
Rock Dandelion
Tonsetus
Easter Daisy
Large-flowered Townsendia

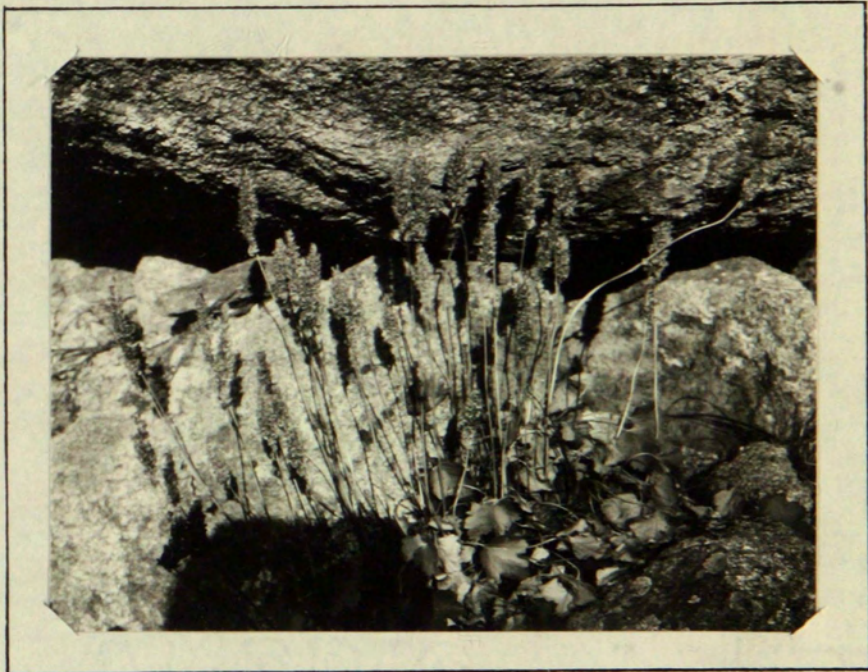


Fig. 50. Alumroot (Heuchera bracteata) .
Flowers greenish. Plant usually
growing on rocks or in rock
crevices.

A KEY TO THE WOODY PLANTS OF ROCKY MOUNTAIN NATIONAL PARK
Trees, Shrubs, Vines or Creepers

Plants parasitic, brownish or yellowish, never green in any part

Mistletoe (*Razoumofskya*)

Plants not parasitic, always with green leaves.

Leaves evergreen, needle-like, or if broad, thick and shiny.

Leaves needle-like, scale-like, or awl-shaped.

Conifers, (Pines, Spruces, Firs, Junipers page 82)

Leaves neither needle-like nor scale-like.

Leaves definitely opposite.

Flowers axillary, greenish, insignificant

Mt. Lover (*Pachystima myrsinites*).

Flowers in terminal umbels, rose-red; plant only a few inches high

Dwarf Laurel, (*Kalmia polifolia*)

Leaves alternate

Leaves with spine-tipped teeth, holly-like

Oregon Grape (*Berberis aquifolium*).

Leaves without spine-tipped teeth, edges smooth.

Leaves 1 inch long or less; plant trailing

Kinnikinnic, (*Arctostaphylos uva-ursi* Fig. 13)

Leaves more than 1 inch long, often sticky; plant not trailing

Mt. Balm, (*Ceanothus velutinus*).

Leaves not evergreen, usually not both thick and shiny.

Trees.

Bark on young trees smooth and whitish or greenish, if gray very rough and furrowed.

Leaves roundish; tree very common

Aspen, (*Populus tremuloides*).

Leaves longer than broad; not common.

Leaves broad at base and tapering to apex, pale underneath

Balsam Poplar, (*Populus balsamifera*)

Leaves narrower and tapering to both ends, green underneath

Narrow-leaved Poplar (*Populus angustifolia*)

Bark gray or yellowish gray, and smooth; leaves with toothed margins

Alder, (*Alnus tenuifolia*).

Shrubs or trailing plants.

Leaves definitely opposite

Plant climbing or trailing on the ground

Leaves compound; plants not dwarf nor matted

Flowers in clusters, white

Virgin's Bower, (*Clematis ligusticifolia*).

Flowers solitary, blue

Western Clematis, (*Clematis occidentalis*).

Leaves simple; dwarf, matted plant of high altitudes

Mt. Dryad, (*Dryas octopetala*).

Plant erect.

Leaves compound; flowers white, in a cluster,

Red-berried Elder, (*Sambucus microbotrys* Fig. 9).

Leaves not compound; flowers various.

Leaves lobed and toothed.

Plants growing in dense clumps; fruit a winged seed

Mt. Maple, (*Acer glabrum*)

Plants not growing in dense clumps; fruit a red berry

Leaves entire. Arrow-wood (*Viburnum pauciflorum*).

Flowers few

Flowers yellow, in pairs, ripening into black, shiny berries;
leaves over 2 in. long.

Involucred Honeysuckle, (*Lonicera involucrata*)

Flowers pinkish, ripening into white berries; leaves less
than 2 in. long

Snowberry, (*Symphoricarpus racemosus*).

Flowers many in clusters, white.

Bark red or reddish-brown, smooth

Red-stemmed Dogwood, (*Cornus instolonensis*)

Bark gray, shreddy

Jamesii (*Jamesia americana* Fig. 14).

Leaves alternate.

Plant thorny or spiny

Leaves compound

Leaflets 3 -5; flowers white

Wild raspberry, (*Rubus strigosus*)

Leaflets 5-7; flowers pink or red

Wild Rose, (*Rosa*).

Leaves not compound.

Leaves entire; plant very low; flowers white

Buckthorn, (*Ceanothus Fendleri*)

Leaves lobed or toothed or both

Spines stout, 1-2 in. long; flowers white

Hawthorne, (*Crataegus chrysocarpa*)

Spines slender, not over 1/2 in. long; flowers pinkish or greenish

Spines 2 or 3 together; berries 1 to 4, reddish purple

Mt. Gooseberry, (*Ribes saximontanum*)

Spines solitary; berries several, black

Small Gooseberry, (*Ribes parvulum*).

Plant not thorny nor spiny.

Leaves compound

Leaflets 3, sometimes lobed; flowers inconspicuous

Three-leaved Sumac, (*Rhus trilobata*)

Leaflets more than 3.

Leaflets 5-7, entire; flowers yellow

Shrubby Cinquefoil, (*Dasiphora fruticosa* Fig. 26)

Leaflets 11-15, serrate; flowers in a large cluster, white

Mt. Ash, (*Sorbus scopulina*)

Leaves not compound.

Leaves lobed or deeply toothed

Leaves 3-lobed, not over 1½ in. long, somewhat wedge shaped.

Bush not silvery-gray nor aromatic

Antelope Brush, (*Purshia tridentata*).

- Bush silvery-gray, aromatic
 - Sage-brush, (*Artemisia tridentata*)
- Leaves 3-7 lobed, oval, roundish or heart-shaped in outline
- Flowers white, not tubular nor bell-shaped
 - Flowers 1-2 in. across
 - Flowering Raspberry, (*Rubus deliciosus*).
 - Flowers small, in clusters
 - Clusters flat or rounded on top
 - Nine-bark, (*Physocarpus monogynus*).
 - Clusters pyramidal
 - Mt. Spray, (*Holodiscus dumosus*)
- Flowers pink, greenish, or yellowish tubular or bell-shaped.
- Leaves $1\frac{1}{2}$ -2 in. broad, fruit black
 - Subalpine Black Currant, (*Ribes coloradense*)
- Leaves less than $1\frac{1}{2}$ in. broad; fruit red
 - Squaw Currant, (*Ribes cereum*).
- Leaves entire or merely slightly toothed, never lobed.
- Plants low, not over 1 ft. high; flowers urn-shaped, white or pinkish; fruit a juicy berry.
 - Leaves less than $\frac{1}{2}$ in. long; berries red
 - Small-leaved Billberry, (*Vaccinium scoparium*)
 - Leaves mostly over $\frac{1}{2}$ in. long; berry black or bluish.
 - Black Billberry, (*Vaccinium oreophilum* (Fig. 31)).
- Plants taller
 - Plants growing in wet places; flowers in catkins.
 - Leaves serrate
 - Bark reddish-brown and shiny
 - Mt. Birch, (*Betula fontinalis*).
 - Bark blackish; twigs rough with whitish glands
 - Bog-Birch, (*Betula glandulosa*).
 - Leaves usually entire; bark smooth, greenish, yellowish, or in winter sometimes red
 - Willows, (*Salix*)
 - Plants not confined to wet places; flowers not in catkins
 - New twigs and buds rust color; under side of leaves silvery
 - Buffalo berry, (*Shepherdia canadensis*)
 - New twigs and buds not rust-color; leaves green underneath
 - Leaves oval or roundish
 - Serviceberry, (*Amelanchier alnifolia*)
 - Leaves at least half again as long as broad, usually tapering at both ends.
 - Fruit black, in a raceme
 - Chokecherry, (*Prunus melanocarpa*)
 - Fruit red, in an umbel
 - Bird Cherry, (*Prunus pennsylvanica*)

KEY TO PINE FAMILY

- Leaves needle-like, 1 in. long or longer; seeds in cones
 - Leaves occurring in bundles of 2-5, 3-cornered in cross-section.
 - Leaves 2 in each bundle; cones remaining on the trees for many years; this tree often occurs in very dense, pure stands.
 - Lodgepole Pine (*Pinus contorta* Murrayana)
 - Leaves 3 (rarely 2), or 5 in each bundle.
 - Leaves 3 (rarely 2) in each bundle; bark of mature trees reddish-yellow
 - Rock Pine (*Pinus ponderosa scopulorum*)
 - Leaves 5 in each bundle; bark of mature trees grayish-black
 - Limber Pine (*Pinus flexilis*)
 - Leaves occurring singly
 - Leaves flattened, not sharp-pointed
 - Cones numerous, pendant; 3-parted bracts conspicuous between the cone-scales.
 - Douglas Tree (*Pseudotsuga mucronata*)
 - Cones few, erect, in the top of the tree; no conspicuous bracts present
 - Alpine Fir (*Abies lasiocarpa*)
 - Leaves 4-angled, sharp-pointed; cones pendant
 - Cones about 2 in. long, leaves acute
 - Engelmann Spruce (*Picea Engelmannii*)
 - Cones 3-5 in. long, spine-tipped
 - Blue Spruce (*Picea pungens*)
 - Leaves scale-like or awl-shaped, less than 1 in. long; seeds in berries.
 - Leaves scale-like; an erect shrub, or small, much branched tree
 - Rocky Mt. Juniper (*Juniperus scopulorum*)
 - Leaves awl-shaped, spine-tipped; plant a prostrate shrub
 - Dwarf Juniper (*Juniperus communis sibirica*)

KEY TO THE HERBACEOUS PLANTS OF ROCKY MOUNTAIN NATIONAL PARK

A. Plants never bearing true flowers
(Pteridophytes, i. e. "fern-like plants")

Plants with broad leaves, usually much dissected

Fern Family (page 88)

Plants with needle-like, awl-like or tooth-like leaves, or apparently none.

Plants with green hollow jointed stems; no evident leaves,

Scouring Rush Family

Plants with solid and continuous stems; awl-like leaves present,

Club Moss Family

B. Plants bearing true flowers
(Spermatophytes, i. e. "seed-bearing plants")

a. Plants with leaves parallel-veined and entire margined; flower
parts if brightly colored in threes or sixes, (Monocotyledons)

Tall plants 3-6 ft. high; flowers small in dense brown spikes

Cat-tails (*Typha latifolia*)

Plants usually less than 6 ft. tall; flowers not in dense brown spikes.

Plants grass-like or rush-like; flowers numerous and inconspicuous.

Stems round or flattened.

Stems jointed; leaf-blades flat

Grass Family

Stems not jointed; leaves round or flat

Rush Family

Stems usually 3-angled

Sedge Family

Plants not grass-like nor rush-like, or if so with colored flowers

Plants aquatic

Leaves narrow and floating; fruit a bur-like cluster of achenes

Bur-reed Family

Leaves upright and arrow-head shaped

Arrow-head Family

Plants growing in soil although often in wet places.

Flowers regular with 6 perianth segments and 3-6 stamens.

Flowers blue; leaves 2-ranked

Iris Family

Flowers not blue; leaves not 2-ranked

Lily Family (*Liliaceae*, *Convallariaceae* and *Melanthaceae*)

Flowers irregular, the lower petal usually sac-shaped or spurred

Orchid Family

b. Plants with netted-veined leaves; flower parts usually in fours or fives,
(Dicotyledons)

(a) Leaves definitely opposite

Plants with milky juice.

Leaves petioled, more than 1 in. long

Dog-bane (*Apocynum androsaemifolium*)

Leaves and bracts less than 1 in. long, sessile

Spurge (*Euphorbia robustum*)

Plants without milky juice.

Flowers composite (i. e. made up of numerous small florets crowded together on a receptacle and surrounded by an involucre, ex. Sunflower, Dandelion)
Arnica and Sunflower, in Composite Family

Flowers not composite

Plants low and trailing, with paired blossoms

Twinflower (*Linnaea americana* in Honeysuckle Family)

Plants not trailing

Corolla of separate petals or wanting

Stems swollen at the joints; plants sometimes very dwarf and densely matted; flowers never yellow.

Corolla present Pink Family

Corolla absent.

Plant 1 ft. or more high, purplish and hairy; calyx corolla-like; involucre present; flowers opening in late afternoon

Four O'clock Family

Plants less than 1 ft. high

Pink Family (a few inconspicuous species)

Stems not swollen at the joints; plants never dwarf nor matted; flowers yellow

St. Johnswort (*Hypericum formosum*, St. Johnswort Family)

Corolla of united petals

Stem 4-angled, square

Leaves more than 2 at each node

Madder Family

Leaves 2 at each node

Plant branched from the base and spreading on the ground

Vervain (*Verbena bracteosa*, Vervain Family)

Plant erect, usually aromatic

Mint Family (page 101)

Stem not distinctly 4-angled, usually round

Seed-pod one-seeded and inferior

Valerian Family

Seed-pod several seeded and superior

Corolla regular

A low shrub growing in boggy places at high altitudes

Dwarf Laurel (*Kalmia polifolia* in Heath Family)

Not shrubs

Plants 1-3 in. high; flowers pale blue, $\frac{1}{2}$ in. broad or more, plant forming dense mats

Alpine Phlox (*Phlox caespitosa* in Phlox Family)

Plants not forming dense mats, more than 3 in. high, if low, flowers $\frac{1}{4}$ in. broad or less
flowers mostly bright blue

Gentian Family (page 98)

(b) Leaves not definitely opposite

Plants aquatic; leaves floating.

Leaves simple and entire.

Leaves 4-12 in. long, floating; flowers 2-5 in. across, yellow

Yellow Pond Lily (*Nymphaea polysepala* in
Water-lily Family Fig. 22).

Leaves 2-6 in. long, erect, arrowhead-shaped; flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. across, white,
Arrowhead (*Sagittaria arifolia*, Arrowhead Family)

Leaves compound or finely dissected.

Leaves 3-foliolate, inflorescence spike-like

Buckbean (*Menyanthes trifoliata* in Buckbean Family)

Leaves finely dissected, inflorescence not spike-like

Water Crowfoot (*Batrachium flaccidum* in
Buttercup Family)

Plants not aquatic although sometimes growing in wet places.

Flowers composite, i. e. made up of numerous small florets crowded together on a
receptacle and surrounded by an involucre

Composite Family (105)

Flowers not composite although sometimes in heads.

Plants entirely parasitic or saprophytic, never having any green color.

Parasites on branches of coniferous trees

Mistletoe Family

Parasites or saprophytes growing on the ground on roots or dead wood.

Plant hairy.

Plant 10-60 in. high

Pinedrops (*Pterospora Andromedea* in Indian Pipe Family)

Plant 6 in. high or less

Broomrape (*Thalesia fasciculata* in Broomrape Family)

Plant smooth

Coral Root (*Corallorhiza multiflora* in Orchid Family)

Plants never entirely parasitic nor saprophytic, always with some green coloring

Leaves all basal.

Flowers 2-3 in. across, white fading pink

Fragrant Primrose (*Oenothera macroglottis* in Evening
Primrose Family).

Flowers 1 in. or less, across.

Leaves simple and entire.

Flowers white, solitary

Flowers regular.

Stem with a leaf-like bract about the middle

Fringed Parnassia (*Parnassia fimbriata* in Saxifrage
Family Fig. 37)

Stem entirely leafless.

Growing in swamps or meadows; back of sepals usually bluish

Marsh Marigold (*Caltha rotundifolia* in Buttercup
Family Fig. 10).

- Growing in forests ; blossom fragrant not bluish on the back
 - Star-flower (*Moneses uniflora* in Pyrola Family Fig. 6)
- Flowers irregular, violet-like
 - White Violet (*Viola blanda* in Violet Family)
- Flowers if white not solitary.
 - Flowers clustered at the top of the stem or if solitary rose-colored.
 - Flowers bright blue
 - Alpine Forget-me-not (*Eritrichium argenteum* in Borage Family)
- Flowers not blue.
 - Flowers white or rose-colored
 - Primrose Family (page 97)
 - Flowers yellow or cream-colored
 - Sulphur Flower (*Eriogonum* in Buckwheat Family Fig. 20)
- Flowers in a raceme.
 - Flowers not crowded together
 - Pyrola Family (page 96)
 - Flowers crowded together.
 - Leaves longer than broad
 - Snow-Lover (*Chionophila Jamesii* in Figwort Family)
 - Leaves as broad or broader than long
 - Alpine Dock (*Oxyria digyna* in Buckwheat Family)
- Leaves not entire.
 - Leaves crenate but not lobed
 - Kitten-tails (*Syntheris* in Figwort Family)
 - Leaves toothed or lobed or both
 - Saxifrage Family (page 93)
- Leaves not all basal.
 - Weedy plants of roadsides and waste ground with inconspicuous flowers.
 - Flowers in dense terminal panicles
 - Dock (*Rumex* in Buckwheat Family)
 - Flowers solitary or in clusters in the leaf axils.
 - Leaves cylindrical becoming spine-tipped
 - Russian Thistle (*Salsola pestifer* in Goosefoot Family)
 - Leaves flat.
 - Seeds triangular
 - Knotweed (*Polygonum* in Buckwheat Family)
 - Seeds lens-shaped
 - Inflorescence prickly
 - Rough Pig-weed (*Amaranthus retroflexus* in Amaranth Family)
 - Inflorescence not prickly.
 - Plants 2 ft. high or less
 - Goosefoot (*Chenopodium* in Goosefoot Family)
 - Plants more than 2 ft. high, stout
 - Careless Weed (*Iva xanthifolia* in Composite Family)

Plants not roadside weeds, if along roadsides or in waste places with
conspicuous flowers

Stems hollow; flowers many and small, always in umbels; leaves usually compound
or finely dissected

Parsnip Family

Stems solid; flowers not in umbels

Leaves of 5-7 holly-like leaflets; stem woody

Oregon Grape (*Berberis aquifolium* in Barberry
Family)

Leaves not of 5-7 holly-like leaflets.

Calyx always present; corolla sometimes absent.

Calyx of separate sepals

Calyx showy and petal-like, or else the flowers buttercups

Buttercup Family (page 90)

Calyx not usually petal-like; flowers not buttercups

Flowers irregular

Leaves simple and entire

Violets (*Viola* in Violet Family)

Leaves compound or dissected

Flowers like those of a pea or bean

Pea Family (page 95)

Flowers not like those of a pea or bean

Golden Corydalis (*Corydalis aurea* in Fumitory
Family)

Flowers regular

Sepals 5; petals 5.

Petals blue

Blue Flax (*Linum Lewisii* in Flax Family)

Petals not blue

Stamens united into a column

Mallow Family

Stamens separate; pistils united into a column

Geranium Family

Sepals 4; petals usually 4, sometimes absent.

Seed-pod inferior

Evening Primrose Family (page 96)

Seed-pod superior

Leaves of 3 entire or slightly toothed leaflets; seed-pod
stalked and slender; flower rose-purple

Rocky Mt. Bee Plant (*Cleome serrulata* in
Capper Family)

Leaves not 3-foliate; flowers mostly white or yellow; seed-pod
not conspicuously stalked

Mustard Family (page 92)

Calyx more or less united at least at base, cup-shaped or saucer-shaped.

Leaves with stipules; pistils many, each one-seeded

Rose Family (page 94)

Leaves without stipules; pistils few, each several seeded

Leaves sessile, entirely smooth; pods 4-5

Orpine Family (page 92)

- Leaves usually with petioles, if sessile hairy or at least ciliate on the margins
Saxifrage Family (page 93)
- Calyx and corolla both present and both united.
 - Corolla regular
 - Corolla urn-shaped; fruit a berry often red
Heath Family (see key to woody plants page 79)
 - Corolla bell-shaped or funnell-shaped; fruit a dry pod.
 - Calyx separate from the seed-pod
 - Stamens conspicuously protruding
Waterleaf Family
 - Stamens not conspicuously protruding
Phlox Family (page 99)
 - Calyx closely attached to the seed-pod
Bluebell Family
 - Corolla irregular
 - Figwort Family (page 102).

KEY TO THE FERNS OF THE ROCKY MOUNTAIN NATIONAL PARK.

- Frond very little dissected, apparently more grass-like than fern-like
Grass-leaved Fern (*Asplenium septentrionalis*)
- Frond dissected and very evidently fern-like.
 - Fronds of one kind
 - Fronds once pinnate, evergreen
 - 3 in. to 6 in. long with no indusium
Western Polypody (*Polypodium hesperium*)
 - 10 in. long or longer; indusium kidney-shaped, conspicuous
Holly Fern (*Polystichum lonchitis*)
 - Fronds more than once pinnate, not evergreen
 - Fronds long and tapering
 - 10 in. to 3 ft. long.
 - Sori long or crescent-shaped; indusium conspicuous
Common Lady Fern (*Athyrium filix-femina*)
 - Sori round.
 - Indusium not evident
Alpine Lady Fern (*Athyrium americanum* Fig. 16)
 - Indusium evident
Shield Fern (*Dryopteris spinulosa* Fig. 15)
 - 3 in. to 8 in. long.
 - Plants tufted, old leaf bases persistent.
 - Rachis hairy, divisions long triangular
Rocky Mountain Woodsia (*Woodsia scopulina*)
 - Rachis smooth; divisions short triangular
Oregon Woodsia (*Woodsia oregana*)
 - Plants not tufted; old leaf bases not present
Brittle Fern (*Filix fragilis*)
 - Fronds nearly as broad as long, often 3-parted.
 - Fronds soft and thin, 1 ft. high or less
Beech Fern (*Phegopteris Dryopteris*)
 - Frond firm and thicker, 1-4 ft. high
Bracken (*Pteridium aquilinum*)
 - Fronds of two kinds, the fertile ones taller
Parsley Fern (*Cryptogramma acrosticoides*)

LILY FAMILY

(Including the Bunch-flower and the Lily of the Valley Family)

Inflorescence a slender, erect, spike-like raceme

Wand Lily (*Zygadenus elegans*)

Inflorescence not as above.

Inflorescence umbellate, flowers pink or whitish

Wild Onions (*Allium*).

Inflorescence not umbellate.

Flowers solitary or few, erect, or, if bright yellow nodding; stems if leafy not branched.

Flowers white or lavender-tinged.

Blooming in May and June.

Pure white stemless flower of open fields; low altitudes

Sand Lily (*Leucocrinum montanum* Fig. 17)

White flower with purplish veins; alpine regions

Alpine Lily (*Lloydia serotina*)

Blooming in July and August, flowers cup-shaped with dark splotches at base of petals

Mariposa Lily (*Calochortus Gunnisonii*)

Flowers red or yellow.

Flowers bright yellow, nodding

Snow Lily (*Erythronium parviflorum*)

Flowers red, erect

Mountain Lily (*Lilium montanum*)

Flowers usually many; plant leafy-stemmed.

Stem branched.

Flowers solitary or few, terminal, ripening into red berries

Fairy Bells (*Disporum trachycarpum*)

Flowers axillary pendant

Twisted Stalk (*Streptopus amplexifolius* Fig. 18)

Stem unbranched

Solomon's Seal (*Smilacina*).

BUTTERCUP FAMILY

Vines with woody stems

Clematis (Clematis).

Herbs, never climbing.

Leaves much dissected into roundish segments.

Flowers conspicuous ; petals spurred

Columbine (Aquilegia page 90).

Flowers inconspicuous; petals usually wanting

Meadow Rue (Thalictrum).

Leaves entire or dissected, but if dissected, the segments not roundish.

Flowers regular.

Petals wanting or minute; calyx petal-like.

Plant conspicuously long silky hairy; flower 1-2 inches deep, seeds plumed

Pasque Flower (Pulsatilla hirsutissima Fig. 25)

Plant smooth, or if hairy, the hairs short; flowers less than 1 in. deep;
seeds not plumed.

Plant smooth.

Leaves all basal and entire; sepals white, bluish tinged on back

Marsh Marigold (Caltha rotundifolia Fig. 10)

Leaves not all basal, much dissected, sepals cream-colored, not
bluish on the back

Globe Flower (Trollius albiflorus)

Plant hairy

Anemone (Anemone)

Petals present and conspicuous.

Flowers not in spike-like racemes.

Plants aquatic; flowers white

Water Crowfoot (Batrachium flaccidum)

Plants not aquatic; flowers yellow

Buttercups (Ranunculus page 91).

Flowers in spike-like racemes; fruit conspicuous red or white berries

Baneberry (Actea arguta)

Flowers irregular; sepals petal-like; flowers mostly dark blue, rarely whitish.

Upper sepal spurred

Larkspur (Delphinium page 91).

Upper sepal helmet-shaped

Monkshood (Aconitum columbianum Fig. 23)

Columbine (Aquilegia)

Flowers red and yellow, growing on western slope

Red Columbine (Aquilegia elegantula)

Flowers blue or lavender, or white.

Plant dwarf not over 6 in. high; spurs short

Rocky Mt. Dwarf Columbine (Aquilegia saximontana)

Plant more than 6 in. high; spurs long

Colorado Blue Columbine (Aquilegia caerulea
Fig. 24).

Larkspur (Delphinium)

- Plant not over 1 ft. high blooming in June
 - Nelson's Larkspur (Delphinium Nelsonii)
- Plant 2-6 ft. high blooming in late July and August.
 - Inflorescence long and loose, montane aspen groves
 - Mt. Larkspur (Delphinium robustum)
 - Inflorescence crowded, subalpine stream banks and swamps
 - Subalpine Larkspur (Delphinium subalpinum)

Buttercups (Ranunculus)

- Plants aquatic; flowers white
 - Water Crowfoot (Batrachium flaccidum)
- Plants not aquatic although some growing in very wet places; flowers yellow.
 - Plant spreading by means of runners
 - Creeping Buttercup (Ranunculus cymbalaria)
 - Plant without runners.
 - Plant rooting at the nodes of the stem
 - Trailing Buttercup (Ranunculus reptans)
 - Plants not rooting at the nodes.
 - Leaves compound and finely dissected; flowers less than $\frac{1}{2}$ in. across
 - Nuttall's Buttercup (Ranunculus Nuttallii)
 - Leaves never truly compound.
 - Leaves simple and at least some of them entire
 - All of the leaves entire
 - Caltha-flowered Buttercup (Ranunculus calthaeiflorus)
 - Some of the stem leaves lobed
 - Early Buttercup (Ranunculus glaberrimus)
 - Leaves toothed, lobed or dissected
 - Leaves finely dissected into linear divisions; flowers usually $\frac{3}{4}$ in. across or more, around snowbanks and wet places, alpine zone
 - Snow Buttercup (Ranunculus adoneus)
 - Leaves lobed, or divided but never finely dissected into linear divisions; flowers usually less than $\frac{3}{4}$ in. across.
 - Plant dwarf, not over 4 in. high
 - Pygmy Buttercup (Ranunculus pygmaeus)
 - Plant usually over 4 in. high; head of seeds usually oblong or cylindric.
 - Plant hairy.
 - At least some of the lower leaves heartshaped
 - Heart-leaved Buttercup (Ranunculus cardiophyllus)
 - None of the leaves heartshaped
 - Meadow Buttercup (Ranunculus inamoenus)
 - Plant smooth
 - Smooth Buttercup (Ranunculus alpeophyllus)

MUSTARD FAMILY

(Only the most common and easily distinguished species are included).

Flowers white.

Plant abundant along edges of subalpine streams, blooming in summer; leaves green and toothed

Brook Cress (*Cardamine cordifolia*)

Plants of open fields blooming in early spring (or of alpine fields in summer)

Plant very slender, usually solitary; leaves bluish; flowers often tinged lavender

Drummond's Arabis (*Arabis Drummondii*)

Plants lower and stouter, usually tufted

Candytuft (*Thlaspi*)

Flowers yellow or dark orange red

Plant gray, hairy, rough often spreading on the ground

Mt. Lesquerella (*Lesquerellamontana*)

Plant erect, the alpine ones often very tiny and dwarf.

Leaves finely dissected; flowers inconspicuous

Hedge Mustard (*Sophia*).

Leaves not finely dissected

Pod linear, much more than twice as long as wide, square in cross section; flower conspicuous.

Flowers yellow.

Plant rough, abundant and conspicuous on fields and hillsides in early summer.

Wallflower (*Erysimum asperum* Fig. 34).

Plant smooth, abundant and conspicuous on alpine fields and meadows

Alpine Wallflower (*Erysimum nivale*)

Flowers dark orange or reddish, rare

Wheeler's Wallflower (*Erysimum Wheeleri*)

Pod rarely more than twice as long as broad, narrow in cross section.

Pod twisted, leaves long hairy

Twisted Pod (*Draba streptocarpa*)

Pod not twisted

Draba (several species difficult to distinguish, many of them dwarf, high alpine plants).

ORPINE FAMILY

Flowers yellow, common plant in rocky places of all zones

Stonecrop (*Sedum stenopetalum*)

Flowers red or pink

Flowers dark red, subalpine and alpine zone

Kings Crown (*Sedum integrifolium*)

Flowers pink, stream banks and wet places, subalpine and alpine zones

Rose Crown (*Sedum rhodanthum* Fig. 4)

SAXIFRAGE FAMILY

Flowers not white or greenish.

Flowers yellow, plants of alpine zone.

Plant with runners; leaves hairy or at least ciliate

Whiplash Saxifrage (*Saxifraga flagellaris*)

Plant without runners; leaves smooth

Golden Saxifrage (*Saxifraga chrysantha*)

Flowers purple, not alpine plants

Purple Saxifrage (*Boykinia Jamesii*)

Flowers white or greenish.

Flowers white, solitary, in heads or in open panicles, never in spikes or racemes.

Stems leafy

Petals with small colored dots, basal leaves in rosettes

Dotted Saxifrage (*Saxifraga austromontana*)

Petals without colored dots; alpine plants of moist, shady rock crevices.

Plant with bulblets in the axils of the leaves

Nodding Saxifrage (*Saxifraga cernua*)

Plant without such bulblets

Alpine Saxifrage (*Saxifraga debilis*)

Stems not truly leafy, sometimes bearing one leaf-like bract.

Stem with one leaf-like bract about the middle; petals fringed

Fringed Parnassia (*Parnassia fimbriata* Fig. 37).

Stems entirely leafless.

Spring blooming plant of fields and woods; flowers at first in a dense cluster which later elongates

Snowball Saxifrage (*Saxifraga rhomboidea*)

Summer blooming plant of subalpine brooksides and wet places

Brookside Saxifrage (*Saxifraga arguta*)

Flowers greenish, in spike-like racemes.

Racemes many-flowered, crowded; plants growing mostly in rock crevices

Alum Root (*Heuchera*) Fig. 50 (also fig. 1)

Racemes with a few ^{flowers} widely spaced; plants growing in moist shady places

Mitrewort (*Mitella*).

ROSE FAMILY

(for the shrubs of this family see key to Woody Plants
page 79).

Flowers white or cream colored, conspicuous.

Flowers having eight petals; seeds plumed; alpine plants

Mt. Dryad (*Dryas octopetala*)

Flowers having five petals

Strawberries (*Fragaria*).

Flowers yellow or rose, sometimes inconspicuous; petals five.

Flowers yellow.

Foliage glaucous, leaflets three, each 3-toothed at apex; plant and flower
inconspicuous; high altitudes.

Sibbaldia procumbens)

Foliage green or silvery, rarely glaucous, if so the flowers conspicuous.

Plants rough to touch, tall 1-3 ft. high, of moist places

Inflorescence spicate

Agrimony (*Agrimonia Brittoniana*)

Inflorescence not spicate.

Fruit a bur covered with hooked prickles

Bur Avens (*Geum strictum*)

Fruit not a bur

Rough Cinquefoil (*Potentilla monspeliensis*)

Plants not rough to touch; flowers bright yellow.

Plant with runners; under side of leaves silvery

Silverweed (*Argentina anserina*)

Plant without runners

Foliage, or at least upper part of stem and calyx, dark green or purple
tinged; leaves finely dissected; plant abundant on alpine fields

Alpine Avens (*Sieversia turbinata*)

Foliage light green, silvery or glaucous, rarely finely dissected

Cinquefoil (*Potentilla* and *Drymocalis*, many
species very difficult to distinguish)

Flowers rose-colored; seeds plumed

Basal leaves finely dissected; stem, upper leaves and calyx rosy-tinged

Pink Plumes (*Sieversia ciliata*)

Basal leaves irregularly divided, terminal lobe the largest, but not finely
dissected; petals and calyx rose or purple

Brook Avens (*Geum rivale*)

PEA FAMILY

Leaves palmately compound

Flowers in a close head.

Native species of high altitudes.

Flowers 1-3

Dwarf Clover (*Trifolium nanum*)

Flowers more than 3.

Flowers rose-colored fragrant; margins of leaves minutely toothed

Rose Clover (*Trifolium Parryi*)

Flowers purple and yellowish; margins of leaves entire

Alpine Clover (*Trifolium dasyphyllum*)

Cultivated species introduced.

Flowers deep rose-colored

Red Clover (*Trifolium pratense*)

Flowers white or pinkish

White Clover (*Trifolium repens*)

Flowers not in close heads but in spikelike racemes.

Flowers small; pods 1 or 2 seeded; plant sweet scented; leaflets 3.

Flowers white

White Sweet Clover (*Melilotus alba*)

Flowers yellow

Yellow Sweet Clover (*Melilotus officinalis*)

Flowers large, conspicuous; pods several seeded; plant not sweet scented.

Flowers yellow; leaflets 3

Golden Banner (*Thermopsis divaricarpa* Fig. 27.)

Flowers blue or whitish; leaflets 5 or more.

Flowers distinctly blue

Mt. Lupine (*Lupinus alpestris*)

Flowers dirty white or pale blue

Small-flowered Lupine (*Lupinus parviflora*)

Leaves pinnately compound.

Pod green-netted veined with spine tipped margins; introduced plant around ranches

Sain-foin (*Onobrychis-sativa*)

Pods not as above, plants native.

Foliage covered with silky hairs; keel of corolla sharp pointed.

Flowers bright, reddish purple

Colorado Loco (*Oxytropis bilocularis*)

Flowers white or cream-colored

White Loco (*Oxytropis saximontana*)

Foliage not silky-hairy; keel of corolla blunt

Vetch plants (*Astragalus*, several species
very difficult to distinguish).

EVENING PRIMROSE FAMILY

Seeds tipped with a bunch of white hairs.

Flowers bright purple, 1-2 in. broad, conspicuous.

Inflorescence a spikelike raceme; plant very common along roadsides and in
burned over areas Fireweed (*Epilobium angustifolium* Fig. 29)

Inflorescence axillary; plant only known from the western slope

Broad-leaved Fireweed (*Epilobium latifolium*)

Flowers white, pink or bluish, small and inconspicuous

Willow Herbs (*Epilobium*, several species
very difficult to distinguish)

Seeds without a bunch of white hairs

Flowers minute, white fading reddish

Baby's Breath (*Gayophytum ramosissimum*)

Flowers larger usually 1 in. broad or more.

Flowers yellow when fresh, opening in the evening

Yellow Evening Primrose (*Oenothera strigosa*)

Flowers white when fresh, sometimes fading pink.

Flowers 2 in. across or more fragrant; plant stemless

Fragrant Primrose (*Oenothera macroglottis*)

Flowers less than 2 in. across, opening in the morning; plant branched.

Leaves pinnately finely dissected

White Morning Primrose (*Oenothera coronopifolia*)

Leaves not dissected; stem white and shining

Nuttall's Morning Primrose (*Oenothera Nuttallii*)

PYROLA FAMILY

Bog Pyrola, as the name implies, is a plant of mountain bogs, the rest of this group will be found in coniferous woods of the montane and subalpine zones.

Flower solitary

Star-flower (*Moneses uniflora* Fig. 6).

Flowers several

Flowers in an umbel

Pipsissiwa (*Chimaphila umbellata*)

Flowers in a simple raceme.

Flowers pink

Bog Pyrola (*Pyrola uliginosa* Fig. 32).

Flowers white or greenish.

Racemes one-sided

One-sided Pyrola (*Pyrola secunda*)

Raceme not one-sided

Style long and declined

Green-flowered Pyrola (*Pyrola calochortis*)

Style short

Least Pyrola (*Pyrola minor*)

PRIMROSE FAMILY

Flower solitary, rose-colored; plant usually only 2 or 3 in. high; alpine zone
Fairy Primrose (*Primula angustifolia*)

Flowers several in an umbel.

Umbel compound.

Inconspicuous plant common on montane fields

Mountain Androsace (*Androsace diffusa*)

Inconspicuous plant of alpine fields

Alpine Androsace (*Androsace subumbellata*)

Umbel not compound.

Flowers white with yellow eye, fading pink, fragrant; small alpine plant
Rock Jasmine (*Drosace carinata*)

Flowers pink or rose-purple

Petals reflexed; plant of montane meadows and streamsides

Shooting Star (*Dodecatheon pauciflorum*)

Petals spreading; very conspicuous and strong smelling plant of subalpine
and alpine streamsides and wet places

Brook Primrose (*Primula Parryi* Fig. 33)

GENTIAN FAMILY

Corolla saucer shaped.

Plant tall 2-4 ft. high, stout, light green

Monument Plant (*Frasera speciosa* Fig. 35)

Plant 18 in. tall or less, slender.

Flowers white

Marsh Felwort (*Pleurogyne fontana*)

Flowers dark blue sometimes purplish

Star Gentian (*Swertia palustris* Fig. 37).

Corolla with a distinct tube its lobes closed or spreading.

Flowers bright blue.

Plants very small usually less than 4 in. high; alpine zone

Moss Gentian (*Chondrophylla americana*)

Plants taller usually 6 in. tall or more.

Corolla 4-lobed more or less fringed

Flower fragrant; plant perennial

Fragrant Gentian (*Gentiana barbellata*)

Flower not fragrant, plant annual

Fringed Gentian (*Gentiana elegans*)

Corolla usually 5 lobed never fringed.

Low, spreading, tufted plants of open dry fields; flowers usually closed

Bigelow's Gentian (*Gentiana Bigelovii* Fig. 36)

Taller erect plants of moist meadows.

Flowers several to many, $1\frac{1}{4}$ in. long or less; montane zone

Closed Gentian (*Gentiana affinis*)

Flowers 1-5; montane and rarely, alpine, zones

Parry's Gentian (*Gentiana Parryi*)

Flowers never bright blue either pale blue, rose-tinged or greenish

Flowers white or greenish with dark markings; common in alpine zone

Arctic Gentian (*Gentiana Romanzovii*)

Flowers not as above.

Flowers solitary.

Flower pale blue, borne on a slender terminal peduncle; small, rare, alpine plant

One-flowered Gentian (*Gentiana monantha*)

Flower lavender or rose-tinged

Dwarf Rose Gentian (*Gentiana plebeja* Holmii)

Flowers several to many.

Flowers lavender or rose-tinged; plant slender

Rose Gentian (*Gentiana plebeja*)

Flowers dirty white or bluish, very numerous in a dense thick spike-like inflorescence

Marsh Gentian (*Gentiana strictiflora*)

PHLOX FAMILY

Flowers scarlet or pink

Skyrocket (*Gilia aggregata*)

Flowers blue, white or pale yellow.

Flowers with narrow cylindrical tube and spreading lobes to the corolla

Plants of alpine zone, dwarf and cushion-like, never sticky; flowers pale blue

Alpine Phlox (*Phlox caespitosa*)

Plants not as above.

Leaves simple and entire; flowers inconspicuous; calyx papery

Collomia (*Collomia linearis*)

Leaves lobed or divided,

Flowers yellowish; some of the leaves with a few lobes; stems woody

Spicate Gilia (*Gilia spicata*)

Flowers bluish; leaves pinnatifid; stem sticky but not woolly

Pinnate-leaved Gilia (*Gilia pinnatifida*)

Flowers funnel-form or wheel-shaped.

Lobes of the corolla shorter than the corolla tube; mostly plants of high altitudes

Corolla bright blue

Sticky Polemonium (*Polemonium viscosum* Fig. 38)

Corolla cream-colored

Honey Polemonium (*Polemonium mellitum*)

Lobes of the corolla longer than the corolla tube; flowers blue.

Stems decumbent clustered; plant found in subalpine and upper montane forests

Jacob's Ladder (*Polemonium pulcherrimum*)

Stems erect.

Slender plant of bogs and wet ground in submontane and montane zones

Western Jacob's Ladder (*Polemonium occidentale*)

Stout, usually much branched plant of fields and meadows, montane zone

Leafy Polemonium (*Polemonium foliosissimum*)

BORAGE FAMILY

Flowers yellow; seeds smooth, white and shining.

Flowers 1/2 in. broad and over 1 in. long

Narrow-leaved Puccoon (*Lithospermum angustifolium*)

Flowers about 1/4 in. broad and 1 in. long or less

Many-flowered Puccoon (*Lithospermum multiflorum*)

Flowers blue or white.

Plant very small, rosette type, with numerous white hairs and intense blue flowers;
alpine zone.

Alpine Forget-me-not (*Eritrichium argenteum*)

Plants not as above.

Flowers blue; buds often pinkish

Flowers "forget-me-not" like; seed a small bur

Stickseed (*Lappula floribunda*)

Flowers bell-shaped or funnel-form

Chiming Bells (*Mertensia* Fig. 42).

Flowers white or very pale blue.

Plant erect, stiff-hairy, unbranched; flowers white, numerous; seed without
prickles

Miner's Candle (*Oreocarya virgata* Fig. 12)

Plants much branched and spreading; weeds growing on waste ground; flowers
inconspicuous.

Fruit bur-like

Stickseed (*Lappula*)

Fruit smooth and shining

Cryptantha (*Cryptantha flexuosa*)

MINT FAMILY

Inflorescence axillary.

Plant aromatic; flowers in whorls in the axils, pale pink

Wild Mint (*Mentha canadensis*)

Plant not aromatic; flowers 1 or 2 at each node, purple or rarely pink

Skullcap (*Scutellaria Brittonii*)

Inflorescence terminal

Flowers clustered.

Flowers conspicuous bright purplish-red; plant strongly aromatic

Horsemint (*Monarda menthaefolia*)

Flowers inconspicuous; plant not aromatic

Dragon-head (*Dracocephalum parviflorum*)

Flowers in a spike-like raceme.

Stamens equal in length; plant introduced

Spearmint (*Mentha spicata*)

Stamens not equal in length, one pair shorter; native plant

Woundwort (*Stachys palustris*)

FIGWORT FAMILY

Leaves alternate or mostly basal.

Plant 2-6 ft. tall densely woolly; stamens 5; flowers yellow
Common Mullein (*Verbascum Thapsus*)

Plant usually not woolly, if woolly stamens 2; stamens 4 or 2

Stamens 4; leafy-stemmed plants

Flowers in dense spikes or heads often interspersed with bright colored bracts

Bracts brightly colored or white, more conspicuous than the flowers

Paintbrush (*Castilleja* page 104)

Bracts green or greenish, less conspicuous than the bright yellow flowers

Gold-tongue (*Orthocarpus luteus*)

Flowers usually with prolonged beak; inflorescence spikelike; bracts often present but never brightly colored

Lousewort (*Pedicularis* page 103).

Stamens 2, leaves mostly basal

Kittentails (*Synthyris*).

Leaves mostly opposite, the lower ones always so; anther bearing stamens 4 or 2

Calyx 5 parted; anther bearing stamens 4, a 5th one with no anther usually present

Sterile stamen as long or longer than the others and evident.

Plants dwarf with cream-colored flowers; spike one-sided; alpine zone

Snow Lover (*Chionophila Jamesii*)

Plant usually taller and with blue or purple flowers

Penstemon (*Penstemon* page 103).

Sterile stamen short or absent

Plant tall and stout with inconspicuous greenish or brownish flowers

Figwort (*Scrophularia occidentalis*)

Plant slender and weak.

Flowers bright yellow from $\frac{1}{2}$ to 1 in. long

Monkey Flower (*Mimulus guttatus*)

Flowers blue or blue and white, less than $\frac{1}{2}$ in. long

Blue-eyed Mary (*Collinsia tenella*)

Calyx 4 parted, anther bearing stamens 2

Veronica (page 104)

PENSTEMON

Flowers blue or bluish-purple.

Sterile stamen smooth; flowers blue with purple throats

One-sided Penstemon (*Penstemon unilateralis* Fig. 41)

Sterile stamen bearded.

Leaves pale, smooth and bluish, tapering; flowers purple

Purple Beardtongue (*Penstemon secundiflorus*)

Leaves decidedly green

Blossoms large, $3/4$ - 1 in. long and $1/2$ in. or more across, bright blue

Blue Mountain Penstemon (*Penstemon alpinus*)

Blossoms smaller, $1/2$ in. or less in length, about $1/4$ in. across, dark blue

Plant tufted; flowers scattered or continuous along the stem

Dwarf Penstemon (*Penstemon humilis*)

Plant not tufted; flowers crowded in heads or in clusters along the stem

Clustered Penstemon (*Penstemon procerus*, *Penstemon*

Rydbergii is a very similar, slightly larger species)

Flowers dark reddish-purple or whitish; subalpine and alpine zones

Whipple's Penstemon (*Penstemon Whippleanus*)

LOUSEWORT (Pedicularis)

Leaves undivided.

Flowers purple; plant of montane meadows

Purple Lousewort (*Pedicularis crenulata*)

Flowers white; plant of montane and subalpine forests; foliage often reddish

Mountain Figwort (*Pedicularis racemosa*)

Leaves finely pinnately divided, appearing fernlike.

Flowers rose-colored or purple, leaves tinged purplish.

Flowers with a long slender upcurved beak; abundant in wet meadows.

Little Red Elephant (*Pedicularis groenlandica* (Fig. 4)

Flowers with beak not slender and upcurved; very rare plants of the alpine zone

Rock-loving Lousewort (*Pedicularis scopulorum*)

Flowers greenish or yellowish.

Plants of montane and subalpine wood; leaves bright green

Flowers greenish; plant 2-4 ft. high.

Giant Lousewort (*Pedicularis Grayi*) Fig. 40

Flowers yellow; plant 8 in. to 2 ft. high

Bracted Lousewort (*Pedicularis bracteosa*)

Plants of alpine grassland

Parry's Lousewort (*Pedicularis Parryi*)

VERONICA

Flowers white

Annual Veronica (*Veronica peregrina*)

Flowers blue.

Flowers in the axils of the leaves; plant growing along brooks of the montane zone and lower

American Brooklime (*Veronica americana*)

Flowers in a terminal spike; subalpine and alpine situations

Alpine Veronica (*Veronica alpina*)

PAINTBRUSH (*Castilleja*)

Plants which have very inconspicuous flowers surrounded by very brightly colored calices and floral bracts which make them some of our most beautiful wildflowers.

Floral bracts red, rose-colored, purple or pink

Stem branched, flower-spike red.

Plant of montane zone and lower on dry hillsides, often with sage-brush; leaves narrow.

Narrow-leaved Paintbrush (*Castilleja lineariaefolia*)

Plant of the upper montane and subalpine zones in moist situations; leaves wider

Scarlet Paintbrush (*Castilleja rhexifolia*) Fig. 39

Stem not branched; plant of subalpine and alpine meadows; bracts pink to rose-purple

Rosy Paintbrush (*Castilleja lauta*)

Floral bracts white, yellow or brownish.

Dwarf plant of exposed alpine fields; bracts brownish or yellowish

Short-flowered Paintbrush (*Castilleja brachyantha*)

Taller plants; bracts white or greenish or yellow.

Bracts white or greenish; montane meadows; stem sometimes branched

Northern Paintbrush (*Castilleja septentrionalis*)

Bracts yellow; subalpine and alpine meadows; stem never branched

Yellow Paintbrush (*Castilleja occidentalis*)

COMPOSITE FAMILY

This is the largest of all the families of flowering plants and contains about one-fifth of all seed plants growing in the Rocky Mountain National Park. It is one of the groups in which the flower parts are most highly specialized and is also one of the most difficult families in which to distinguish the different individuals. On that account a short explanation of the structure of the flower head is given here. This group includes many of our common weeds as well as many beautiful and showy wildflowers. While apparently very different all of these plants have a similar arrangement of the flowers. What appears to the casual observer to be the "flower" of a sunflower is in reality an inflorescence made up of numerous small flowers called florets, closely packed together on the enlarged upper end of the stem, the receptacle, and surrounded by several or many bracts. These bracts form the involucre around the head of flowers. Superficially they resemble a calyx made up of sepals.

In plants of this family there are two types of corollas. This character forms the basis on which the family may be separated into two groups. One group is composed of those plants having only ligulate, (i. e. strap-shaped) corollas and the others having at least some tubular corollas. The second group is much the larger. Our common dandelion is an example of the first group. The corollas of all the florets of the dandelion head are alike. They are long, flat, and narrow, and are referred to as strap-shaped or ligulate. The sunflower

head on the other hand belongs in the second group. It is made up of two kinds of flowers, the ray florets with yellow ligulate corollas around the outside of the head which are often spoken of as the "petals" when the head is erroneously considered as one flower, and the disk florets comprising the center of the sunflower head. The corollas of the disk florets are tubular in shape, and in the case of the sunflower they are brownish in color, more usually they are yellow. It is very easy to take a sunflower head apart and see the parts of each individual flower (floret), but many members of this family have such tiny florets that even the botanist can not tell much about them without the use of a high-powered magnifying glass. Daisies, asters and goldenrods have the same type of head as the sunflower, i. e. composed of ray florets and disk florets. Some composite flowers are composed entirely of disk florets. The common thistle is one of this type. Its tube is split part way down and the corolla is longer than in most of the disk florets. But in the other discoid forms, the corolla tube is not split, it is short and usually 5-toothed at the apex.

Plants of this group have hard, one-seeded fruits which are technically called achenes. The calyx of the florets is a much modified structure called the pappus. It consists usually of long soft hairs attached to the apex of the achene. These hairs are often very conspicuous as the plant goes to seed. Sometimes the pappus consists of scales or bristles.

The pappus of dandelions and many others of this group serve as parachutes by which their seeds are carried long distances by the wind. Thus Mother Nature has provided for the widespread distribution of these plants.

KEY TO COMPOSITE FLOWERS

Florets all ligulate.

Florets pink or purplish, never yellow.

Florets pink, soon withering; leaves inconspicuous; plant much branched

Milk Pink (*Lygodesmia juncea*)

Florets purplish in a long narrow raceme; heads somewhat drooping;
stems not branched

Rattlesnake-root (*Prenanthes racemosa*)

Florets yellow or white.

Florets yellow.

Heads solitary, stems leafless.

Involucre black hairy

Alpine Crepis (*Crepis alpicola*)

Involucre not black hairy

Leaves entire margined, broadest near the apex and tapering to the base

False Dandelion (*Agoseris*)

Leaves wavy-toothed, tapering to both ends

Dandelion (*Taraxacum*)

Heads several.

Pappus of soft, pure white hairs; plants of wet meadows and river banks

Crepis (*Crepis*)

Pappus of soft dirty-white to tawny hairs; plants of hillsides and fields

Slender Hawkweed (*Hieracium gracile*)

- Florets white or cream-colored; basal leaves with long white hairs

White-flowered Hawkweed (*Hieracium albiflorum*)

Florets not all ligulate, at least some disk florets with tubular corollas present.

Florets of only one kind, corollas all tubular.

Foliage spine-tipped; corollas deeply cleft.

Heads rose-purple

Purple Thistle (*Cirsium filipendulum*)

Heads cream-colored or dirty white

Drummond's thistle (*Cirsium Drummondii*)

Foliage not spine-tipped.

Leaves opposite; heads large and nodding

Parry's Arnica (*Arnica Parryi*)

Leaves alternate.

Heads drooping, $\frac{1}{4}$ in. broad or more; plant never silvery; flowers green
or yellowish

Thoroughwort (*Brickellia grandiflora*)

Heads erect, or if drooping less than $\frac{1}{4}$ in. broad, or if broader the
plants are silvery.

Heads small, many in spike-like raceme, color inconspicuous; foliage
usually silvery.

Wormwood, Sagebrush (*Artemisia*)

Heads not as above, usually bright colored.

Heads yellow.

Heads solitary, very compact; leaves 3-parted

Gold-buttons (*Erigeron compositus discoideus*)

Heads several to many

Heads very small, numerous; a dwarf fall-blooming shrub of open fields

Rabbit-brush (*Chrysothamnus pumilus*)

Heads larger; plants never shrubs

Rayless Ragwort (A few species in the genus *Senecio*)

(Key to Composite Family continued)

Heads not yellow.

Heads white, cream-colored, pink or brownish, "everlasting flowers".

Spring blooming plants rarely over 10 in. high, usually less.

Catspaw (*Antennaria*)

Summer and fall blooming plants usually 1 ft. or more high.

Heads pure white, papery

Pearly Everlasting (*Anaphalis subalpina* Fig. 9)

Heads cream-colored, satiny

Cudweed (*Gnaphalium decurrens*)

Heads bright purple, plant of open fields

Gayfeather (*Liatris punctata*)

Florets of two kinds disk and ray, the ray corollas ligulate.

Ray flowers yellow with basal portion dark red; disk florets dark red

Gaillardia (*Gaillardia aristata*)

Ray flowers entirely yellow.

Leaves opposite

Arnica (*Arnica*)

Leaves alternate.

Disk floret also yellow.

Lower leaves 8-12 in. long, head 1-2 in. across solitary or few

Pyrrocoma (*Pyrrocoma crocea*)

Lower leaves much shorter or the heads many and small.

Plant either rough-hairy or sticky.

Leaves deeply divided; stems sticky

Bahia (*Bahia dissecta*)

Leaves not deeply divided; margins entire or wavy-toothed.

Plant smooth below but buds very sticky; growing along roadsides
and on disturbed soil

Gumweed (*Grindelia squarrosa*)

Plants rough thruout, usually found on dry fields or roadsides

Golden Aster (*Chrysopsis*).

Plants neither very rough nor sticky, sometimes woolly or hairy.

Plants of alpine regions; heads solitary

Plants densely woolly at least at base; ligules 3-toothed.

Flowers 2-3 in . across

Rydbergia (*Rydbergia*).

Flowers smaller

Woolly Actinella (*Actinella lanata*)

Plants not densely woolly, ligules entire at apex

Plant woody at base

Tonestus (*Tonestus pygmaeus*)

Plant soft and herbaceous at base

Dwarf Senecio (*Senecio Holmii*)

Plants not confined to alpine regions; heads usually several to many.

Bracts of the involucre in one series, often dark tipped.

Ragworts (*Senecio*)

Bracts of the involucre in 2 or more series never dark tipped.

Bracts loose and leafy

Parry's Goldenrod (*Oreochrysum Parryi*)

Bracts tightly appressed, not leafy

Goldenrod (*Solidago*)

Disk florets darker than the rays, usually brownish or blackish

Disk cone-shaped or cylindrical.

Disk cylindrical, leaves finely dissected.

Coneflower (*Ratibida columnaris*)

(Key to Composite Family continued)

Disk cone-shaped.

Rough plant of medium size, common on open fields and meadows; leaves entire not divided.

Brown-eyed Susan (*Rudbeckia hirta* Fig. 49).

Smooth plant of 3-6 ft. high; leaves often lobed or divided; found along streams and in moist wood.

Goldenglow (*Rudbeckia laciniata*)

Disk flat; at least some of the leaves opposite.

Perennial native plants.

Bushy, many-flowered plant of dry fields and hillsides

Dwarf Sunflower (*Helianthus pumilus*)

Slender, mostly unbranched plants of meadows and aspen thickets

Helianthella (*Helianthella quinquenervis*)

Annual plant escaped from cultivation around ranches and roadsides

Annual Sunflower (*Helianthus annuus*)

Ray florets never yellow, either white, blue, purple or pinkish.

Plants stemless, blooming in early spring

Easter Daisy (*Townsendia exscapa*)

Plant with evident stem but sometimes dwarf.

Flower heads aggregated in dense clusters; disks and rays white; plants aromatic

Yarrow (*Achillea millefolium*)

Flower heads not aggregated in dense clusters; disks always colored, usually yellow

Rays comparatively broad and few; involucre bracts of different lengths imbricated in several rows.

Rays reddish purple; plant much branched; involucre bracts bent out at the tips

Tansy Aster (*Machaeranthera varians* Fig. 48).

Rays bluish, lavender or white, rarely reddish purple; bracts not bent out at tips

Asters (*Aster*, many species very difficult to distinguish).

Rays comparatively narrow and very numerous; bracts of the involucre in one or two rows of equal length

Daisy (*Erigeron*, page 110).

ERIGERON

Rays inconspicuous.

Plant widely branched, inflorescence in a corymb or panicle

Stem and involucre greenish

Bitter Fleabane (*Erigeron acris*)

Stem and involucres purplish

Yellowstone Fleabane (*Erigeron yellowstonensis*)

Plant unbranched or with only a few, erect branches, inflorescence in a raceme.

Long-leaved Fleabane (*Erigeron lonchophyllum*)

Rays conspicuous

Plants much branched throughout, many flowered

Branching Daisy (*Erigeron divergens*)

Plants unbranched or very little branched; flowers one to several

Plants 8 in. to 2 ft. tall, leaves smooth

Involucres densely woolly, flowers rose-colored

Beautiful Daisy (*Erigeron elatior*)

Involucres not densely woolly.

Ligules comparatively wide; heads usually one, sometimes 2-3

Subalpine Daisy (*Erigeron salsuginosus*)

Ligules very narrow and numerous (60 or more); heads usually several

(Erigeron continued)

Plants of montane meadows and aspen groves; entirely smooth

Mountain Daisy (*Erigeron macranthus* Fig. 46)

Plants of the subalpine zone or higher with some white hairs at the base of the involucre

Superb Daisy (*Erigeron Superbus*)

Plants less than 8 in. tall, if taller leaves pubescent.

Medium sized plants 6-10 in. tall, decidedly pubescent, montane zone.

Plants spreading by runners these sometimes not evident early in the season but flowers always pink in the bud, white when opened; rays narrow.

Whip-lash Daisy (*Erigeron flagellaris*)

Plants without runners, rays wider never pink in the bud

Flowers white

Dwarf Daisy (*Erigeron pumilus*)

Flowers blue

Blue Daisy (*Erigeron corymbosus*)

Dwarf plants usually less than 6 in. tall, if taller growing in the alpine zone

Leaves divided or lobed.

Leaves 3-parted; montane zone

Cut-leaved Daisy (*Erigeron compositus*)

Leaves pinnately dissected; alpine zone

Pinnate-leaved Daisy (*Erigeron pinnatisectus*)

Leaves entire, alpine zone

Involucre black hairy

Black-headed Daisy (*Erigeron melanocephalus* Fig. 45)

Involucre white hairy

One-flowered Daisy (*Erigeron uniflorus*)

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