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# Plants

OF ROCKY MOUNTAIN

NATIONAL PARK  





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# Plants

OF ROCKY MOUNTAIN  
NATIONAL PARK



*by* RUTH ASHTON NELSON

*With Illustrations and Keys for Identification*

REVISED EDITION 1953

*United States*  
*Department of the Interior*

DOUGLAS MCKAY, Secretary

*National Park Service*

CONRAD L. WIRTH, Director



United States  
Government Printing Office  
Washington : 1953

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# Contents



	PAGE
Foreword . . . . .	VII
Preface to the second edition . . . . .	IX
Introduction . . . . .	1
Scientific names . . . . .	3
Mountain plants at home . . . . .	3
Key for identification . . . . .	21
Families of plants . . . . .	31
Glossary . . . . .	183
Bibliography . . . . .	187
General index . . . . .	189
Index to localities . . . . .	201

## Illustrations

PLATE		PAGE
I.	SCENERY OF MONTANE, SUBALPINE, AND ALPINE ZONES COMPARED . . . . .	4
II.	MONTANE ZONE. ( <i>See also</i> PLATES I, A, AND VII.) . . . . .	7
III.	(a) PROSTRATE TIMBER-LINE TREES SHAPED BY THE ICY WINDS . . . . .	10
	(b) POUDDRE LAKE AT THE CONTINENTAL DIVIDE, 10,659 FEET . . . . .	10
IV.	ON THE HEIGHTS . . . . .	11
V.	SHOWING PLANT SUCCESSION ON GRANITE ROCK . . . . .	13
VI.	LODGEPOLE PINE . . . . .	14
VII.	ASPEN GROVE IN THE MONTANE ZONE . . . . .	16
VIII.	SUBALPINE FOREST OF ENGELMANN SPRUCE AND ALPINE FIR . . . . .	18
IX.	TIMBER-LINE TREES SHOWING THE EFFECT OF PREVAILING WINDS . . . . .	19
X.	(a) PARTS OF A TYPICAL FLOWER . . . . .	152
	(b) TYPICAL HEAD OF RADIATE COMPOSITE. . . . .	152
	(c) RAY FLORET SHOWING PAPPUS OF CAPILLARY BRISTLES . . . . .	152
	(d) DISK FLORET SHOWING PAPPUS OF BRISTLE-TIPPED SCALES . . . . .	152

XI. COMPARISON OF INVOLUCRES OF TYPICAL COM- POSITES . . . . .	157
XII. SIMPLE LEAVES . . . . .	180
XIII. DIAGRAMS SHOWING TYPES OF LEAVES . . . . .	181
XIV. DIAGRAMS SHOWING TYPES OF INFLORESCENCE . . . . .	182

## FIGURE

## PAGE

1. SUBALPINE MEADOW NEAR DREAM LAKE . . . . .	8
2. DWARF JUNIPER . . . . .	15
3. BRACKEN . . . . .	33
4. SHIELD FERN . . . . .	35
5. GRAMA GRASS . . . . .	39
6. MARIPOSA-LILY . . . . .	46
7. SNOW-LILY . . . . .	47
8. SAND-LILY . . . . .	48
9. WOOD LILY . . . . .	48
10. ALP-LILY . . . . .	48
11. WAND-LILY. . . . .	49
12. TWISTED STALK . . . . .	49
13. BLUE FLAG . . . . .	50
14. BLUE-EYED GRASS . . . . .	50
15. FAIRY SLIPPER . . . . .	52
16. YELLOW LADYSLIPPER . . . . .	52
17. MOUNTAIN BIRCH . . . . .	57
18. ALDER. . . . .	57
19. MISTLETOE EFFECT ON PINES . . . . .	58
20. ALPINE-SORREL . . . . .	61
21. WATER BUCKWHEAT . . . . .	61
22. BISTORT . . . . .	62
23. SQUAW PAINT . . . . .	63
24. BIG-ROOTED SPRING BEAUTY . . . . .	64
25. ALPINE SANDWORT. . . . .	66
26. MOSS CAMPION. . . . .	66
27. MARSH-MARIGOLD . . . . .	68
28. GLOBEFLOWER . . . . .	70
29. SNOW BUTTERCUP . . . . .	70
30. PASQUE FLOWER. . . . .	72
31. ALPINE ANEMONE . . . . .	74
32. COLORADO COLUMBINE . . . . .	76
33. SUBALPINE LARKSPUR. . . . .	77
34. HOLLYGRAPE . . . . .	77
35. BROOK-CRESS . . . . .	79
36. ROSE CROWN . . . . .	82
37. KINGS CROWN . . . . .	82
38. YELLOW ALPINE SAXIFRAGE . . . . .	84

FIGURE	PAGE
39. DOTTED SAXIFRAGE . . . . .	84
40. SNOWBALL SAXIFRAGE . . . . .	86
41. PURPLE SAXIFRAGE . . . . .	89
42. ALUMROOT . . . . .	89
43. MOUNTAIN DRYAD . . . . .	91
44. ALPINE AVENS . . . . .	92
45. THIMBLEBERRY . . . . .	95
46. MOUNTAIN-ASH . . . . .	97
47. ROCKY MOUNTAIN LOCO . . . . .	101
48. WILD PINK GERANIUM . . . . .	101
49. WILD WHITE GERANIUM . . . . .	102
50. BLUE FLAX . . . . .	102
51. RYDBERG VIOLET . . . . .	104
52. MANY-FLOWERED EVENING STAR . . . . .	104
53. PRICKLY-PEAR . . . . .	106
54. FIREWEED . . . . .	109
55. FRAGRANT MORNING-PRIMROSE . . . . .	110
56. COW-PARSNIP . . . . .	113
57. STAR-FLOWERED PYROLA . . . . .	114
58. PIPSISSEWA . . . . .	114
59. BOG PYROLA . . . . .	115
60. KINNIKINNIC . . . . .	116
61. DWARF MOUNTAIN-LAUREL . . . . .	117
62. PINEDROPS . . . . .	117
63. FAIRY PRIMROSE . . . . .	119
64. PARRY PRIMROSE . . . . .	120
65. ROCK JASMINE . . . . .	121
66. SHOOTING STAR . . . . .	122
67. MONUMENT PLANT . . . . .	124
68. ROCKY MOUNTAIN FRINGED GENTIAN . . . . .	124
69. PARRY GENTIAN . . . . .	126
70. ARCTIC GENTIAN . . . . .	126
71. ALPINE PHLOX . . . . .	128
72. ALPINE POLEMONIUM . . . . .	128
73. JACOBS LADDER . . . . .	129
74. PURPLE FRINGE . . . . .	130
75. ALPINE FORGET-ME-NOT . . . . .	132
76. TALL CHIMING BELLS . . . . .	133
77. FIELD MERTENSIA . . . . .	134
78. MINERS CANDLE . . . . .	135
79. SKULLCAP . . . . .	136
80. HORSEMINT . . . . .	136
81. MOUNTAIN BEARDTONGUE . . . . .	141
82. INDIAN PAINTBRUSH . . . . .	142
83. YELLOW PAINTBRUSH . . . . .	142

FIGURE	PAGE
84. MOUNTAIN FIGWORT . . . . .	145
85. ELEPHANTELLA . . . . .	145
86. TWINFLOWER . . . . .	147
87. REDBERRIED ELDER . . . . .	148
88. MOUNTAIN HAREBELL . . . . .	150
89. EASTER-DAISY . . . . .	150
90. TANSY ASTER . . . . .	158
91. PORTER ASTER . . . . .	158
92. SUBALPINE DAISY . . . . .	163
93. ASPEN DAISY . . . . .	164
94. ONE-FLOWERED DAISY . . . . .	165
95. GAILLARDIA . . . . .	166
96. HEART-LEAVED ARNICA . . . . .	167
97. RYDBERGIA . . . . .	169
98. WOOLLY ACTINEA . . . . .	170
99. DWARF SENECEO . . . . .	173
100. BLACK-EYED-SUSAN . . . . .	175

# Foreword



THIS REVISED EDITION of *Plants of Rocky Mountain National Park* is being published in answer to a continued demand on the part of visitors for a guide to the wildflowers, which spread a carpet of color at all altitudes of the Rockies from the time the snow retreats to the mountaintops in late spring until it descends again in early autumn to blanket the valleys. The original edition was exhausted in 1945, at which time the author was already busy bringing the work up to date.

By instinct, training, and experience Ruth Ashton Nelson is admirably qualified for the work she has undertaken. Her natural love for wildflowers was stimulated by childhood summers spent in the high Rockies, followed by residence in this region. During several seasons as an employee of the National Park Service, she found time to make an intensive study of the park flora which culminated in the publication of *Plants of Rocky Mountain National Park*. Mrs. Nelson brings to this new edition the results of increased training, added experience in field work, and the benefits of collaboration with her eminent husband, Dr. Aven Nelson, dean of Rocky Mountain botanists. Her skill in noting and describing salient field characters as guides to plant identification makes her work especially valuable to the observant but untrained person interested in flowers.

The National Park Service feels that in obtaining the services of the author of the original edition for the preparation of this revised edition it has assured visitors to Rocky Mountain National Park a work which will add greatly to their understanding and enjoyment of a magnificent vacation land.

CONRAD L. WIRTH,  
*Director, National Park Service.*



# *Preface to the Second Edition*



WHEN THE PUBLICATION *Plants of Rocky Mountain National Park* was prepared 20 years ago, the standard textbooks on plant identification for this area were *Botany of the Central Rocky Mountains* by John M. Coulter, revised by Aven Nelson, and *Flora of the Rocky Mountains and Adjacent Plains* by P. A. Rydberg. Both of these books are now out of print. During the past two decades contemporary botanists have been revising the families and genera embracing a large number of our plants. Within this time botanical concepts and methods of systematic treatment of plant entities have undergone considerable change. The era of discovery has closed and a period of revision has set in. Thus many of the Latin names used in this edition differ from those in the original publication. One reason for changing the Latin names is that in many cases extensive research revealed an earlier valid name for the entity. Another is the current tendency to reduce closely related entities to one species and designate the differing forms as subspecies or varieties.

In the main, the author has endeavored to follow these recent treatments, still keeping in mind the original goal of offering a practical method of wildflower identification for the many nature lovers. Some common names used in the first edition have been changed and others added in order to bring them into agreement with Standardized Plant Names and thus have the publication conform to policies of the National Park Service.

Synonyms have been treated differently than in the first edition. In the use of synonyms all authors' names have been omitted, for in many cases the names treated as "synonyms" are not, in a technical sense, true synonyms. They may be names which have been used erroneously either in the first edition of this publication or in other treatments. Since they are in the literature, they are included here for reference purposes. In other cases, they are names which depend for their interpretation on one's concept of the species; in still other cases, they are true synonyms in the technical sense. This procedure may bring criticism on the author, but the excuse offered is that the nature lovers (for whom this book is primarily written and who are greatly in the majority among its users) may not care about the synonyms. The botanists who wish to use it as a checklist will find these names useful in referring to more technical publications where they may find complete scientific treatments.

The bibliography has been enlarged to include several of the recent systematic papers on different groups of Rocky Mountain plants, as well

as the new books which have appeared dealing with the flora of this area, but to cite every article dealing with this subject is impracticable. The names of more than 50 species have been added in this edition, making a total of more than 750 vascular plants for the park.

In the preparation of this revision the author has had much valuable assistance from many sources. Warm appreciation and thanks are extended to Dr. C. L. Porter, curator of the Rocky Mountain Herbarium, for his kindness in permitting use of the herbarium and also for advice in regard to the treatment of certain groups; to Dr. George J. Goodman, professor of botany in the University of Oklahoma, for helpful suggestions; and to the members of the National Park Service who have given encouragement and assistance in various ways. Not least, my sincere gratitude goes to the earlier mentioned "nature lovers," whose demand for and appreciation of this publication have made the revision possible.

RUTH ASHTON NELSON.

# Plants



## OF ROCKY MOUNTAIN NATIONAL PARK . *Introduction*<sup>1</sup>

THE WILDFLOWERS of Rocky Mountain National Park are one of its main attractions. They paint its fields, meadows, hillsides, and rocky gorges in all the colors of the rainbow. There has been a constant demand for an illustrated guide to these flowers, and this publication has been prepared in response to that demand. It is the result of several years' study of the plants of the region. Emphasis has been put on the outstanding field characters of the plants described and on their habitats. Keys for identification and an illustrated glossary are included. The chapter on Mountain Plants at Home deals with the relations between the plants and their severe mountain environment and their adaptations to that environment.

The keys have been made as practical and simple as possible. They have been previously published, tested, and revised, and the author feels that they will be useful to all persons who are seriously interested in the identification of our common wildflowers, whether or not they have had training in botany. In order to keep the keys from being long and unwieldy, some of the inconspicuous plants are not included. However, the names of all seed plants and ferns known to grow in the park are given in the text. Technical terms have been avoided as much as possible, but because it is impossible to differentiate between related plants by using only every-day English, a few technical terms have been employed to assure accuracy. These are adequately explained by drawings and definitions in the glossary.

<sup>1</sup> This introduction is a slight revision of that appearing in the first edition.

More than 750 species are included. Specimens of most of these have been collected by the writer and are in the herbarium of Rocky Mountain National Park. Most of the collecting has been done on the eastern side of the Continental Divide, and it is probable that some plants not included herein will be found on the western slope. A thorough study of the grass and sedge families has not been attempted, but lists of those species known to occur have been included. The region that has been intensively studied is that of the Rocky Mountain National Park and the territory surrounding Estes Park, but this book will be found useful above 7,000 feet throughout the mountains of northern Colorado and southern Wyoming.

The scientific nomenclature is, in most cases, according to the International Code. The author's purpose has been to use the simpler and more familiar names and to retain the larger and most practical concept of genus and species. This purpose is the excuse offered for any apparent inconsistencies in nomenclature. Because of the present state of confusion existing in our botanical nomenclature, it has seemed advisable to include a large number of synonyms.

A bibliography of publications on various phases of plant life in this region is appended.

To all the many teachers and friends who have aided in one way or another in the preparation of this publication, the writer wishes to express appreciation and indebtedness. To name them all is impossible. Much of the research work was done while the author was preparing a thesis offered in connection with work done for a Master of Science degree at the botany department of the Colorado A. and M. College, under the direction of Dr. H. C. Hanson and Dr. L. W. Durrell, both of whom gave valuable suggestions and encouragement. Much valuable assistance has been given by members of the National Park Service.

Special appreciation is due Dr. Aven Nelson, professor of botany at the University of Wyoming, for his valuable service in the identification of many difficult species and for his reading of the entire manuscript. His generosity in allowing access to his excellent library and to the Rocky Mountain Herbarium has been of great help.

Others who have given freely of their time in reading the manuscript or in identifying plants are Dr. J. M. Greenman, Dr. A. S. Hitchcock, Dr. W. S. Cooper, Mr. E. C. Smith, and Miss Anna Maude Lute.

Whatever value this publication may have for the general public will be in large measure due to the very excellent illustrations which have been generously furnished by the photographers to whom credit is given. Where not otherwise noted, the prints are National Park Service photographs.

If flower-loving visitors to the Rocky Mountain National Park find herein some information of value my purpose will have been accomplished.

## SCIENTIFIC NAMES

In spite of popular opinion to the contrary, scientific names do mean something. They are usually descriptive of the plant to which they are applied, as for instance: *Chenopodium*, the goosefoot or lambs quarters. This Latin name is from two Greek words—*chen*, goose, and *podion*, little foot—and is descriptive of the shape of the leaves. This name applies to all of the goosefoots, as the name Smith applies to all members of the Smith family. If we wish to speak of one particular kind of goosefoot, we apply a specific name which is a Latin descriptive adjective.

The name *album*, meaning white, is given to our common lambs quarter, *Chenopodium album*, the white goosefoot, because of the white, powdery substance which covers the leaves of this plant. Sometimes the botanist who named the plant wanted to honor one of his friends, so he named a plant for him. Fremonts goosefoot (*Chenopodium fremontii* Wats.) is an example. A botanist is not satisfied with knowing only the name of a plant. He also wants to know the authority for that name. The name or abbreviation following the scientific name indicates the person who first described the plant.

These scientific names have the advantage of being the same in all countries, so that they mean the same to every botanist no matter what language he speaks. The main trouble with common names is that as soon as a person knows more than a hundred plants, he runs out of names. Moreover, the same common names are used for very different plants in different parts of the country. For instance, daisy, mayflower, and windflower. The mayflower may be any flower that blooms in May in different parts of the country and the daisy may be any one of a dozen field flowers. The writer has known half a dozen different windflowers representing two distinct plant families, and as many mayflowers. A person with a wide knowledge of plants is never sure just what plant is being referred to when a common name is used. Consequently, students of plants prefer the scientific names.

## MOUNTAIN PLANTS AT HOME

On all mountains of great height there exist climatic belts or zones. 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 18,000 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 timber line decreases with an increase in the latitude north. Timber line is at approximately 11,500 feet in north central Colorado, although it may vary as much as 500 feet up or down due to local conditions, while in Montana it is at 9,000 feet and in Alberta at about 7,000 feet.



(a)

(b)



Plate I.—SCENERY OF MONTANE, SUBALPINE, AND ALPINE ZONES COMPARED. (a) ENGELMANN SPRUCE FOREST, SUBALPINE ZONE, 10,000 TO 11,000 FEET, AND ALPINE GRASSLAND ABOVE 11,000 FEET. (b) PONDEROSA PINE FOREST, MONTANE ZONE, 7,500 FEET. Photograph by F. J. Francis.

Each belt of both latitude and altitude carries its own type of plant and animal life, and these are called by the biologist *life zones*. 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, and others are confined 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. Life zones are recognized for the entire continent and for animals as well as plants. Several different systems of zonation have been used by different authors but the following arrangement seems the most practical for this region. Three life zones are represented in the Rocky Mountain National Park—the *montane*, 6,000 feet to 9,000 feet; the *subalpine*, from 9,000 feet to timber line (approximately 11,500 feet) and the *alpine*, above timber line.<sup>2</sup>

Some writers use a zone arrangement based on corresponding geographical belts, calling the zones Sonoran, Transition, Canadian, Hudsonian, and Arctic-alpine, but in this region the preceding names have become familiar and they are also more commonly used in botanical literature. Consequently, it has seemed advisable to use them here rather than to use the geographical names. The Sonoran zone, typified by the arid region of the Southwest, is not represented at all in the park. There seems to the writer no definite line of distinction in this part of the Rockies between the Transition and Canadian zones. Therefore, in this publication they are both included under montane zone, that region characterized by yellow pine, aspen, and the Douglas-fir. The Hudsonian zone corresponds to the subalpine zone; the Arctic-alpine, to the alpine.

Life zones are much influenced by local conditions of available moisture, prevailing winds, exposure, and topography. Timber line will be found much higher on the south exposure of a sheltered ravine than on a wind-swept ridge exposed to the north. For instance, as one travels westward toward the head of Hidden Valley on the Trail Ridge Road, the irregularity of timber line is quite noticeable. At the head of the valley, where the exposure is due east, it dips down in a distinct V formation. Apparently this is caused by a large snow bank which remains in this location well into the summer and is so deep that it smothers seedling trees, allowing them no chance to get started. An additional factor here may be the cold air draining down the slope from the snow bank. On each side of this valley trees extend higher than they do at its head, but on the right-hand side where the exposure is toward the southeast they extend considerably higher than they do on the left-hand side where it is toward the northeast. The same condition may be noted at the head of Fall River Valley.

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<sup>2</sup> This zonation agrees with that given in *Plant Ecology*, by John L. Weaver and Frederic E. Clements, published by the McGraw-Hill Book Co., 1929.

## LIFE ZONES IN ROCKY MOUNTAIN NATIONAL PARK

All the lower slopes of the park are included in the montane zone (pls. Ib, II, and VII). It is characteristically a region of open ponderosa pine forest, with the Douglas-fir intermixed. It includes moist and dry aspen groves, lodgepole Douglas-fir forest on north slopes, open meadows, and barren, rocky ridges. The ponderosa pine may be mixed with Rocky Mountain juniper (also called western red-cedar), and usually is so found on warm south slopes (pl. IIa). On the high, rocky points there is some limber pine. Along the streams are found groves of the magnificent Colorado blue spruce associated with willows, alder, and the Rocky Mountain birch (pl. IIb). Many of the shrubs from the foothills are found here, where they reach their highest elevation. Antelope-brush with its small fragrant pale-yellow blossoms early in June, thimbleberry with large rose-like white blooms growing in the rockiest places, squaw-currant almost everywhere, with pungent, aromatic foliage, and little red currants—all are typical. There are also many characteristic flowering herbs here. The tall penstemon, wild geranium (fig. 48), kinnikinnic (fig. 60), shooting-star (fig. 66), and Porter aster (fig. 91) are most numerous and reach their greatest development in this zone, but occasionally they will be found at both higher and lower altitudes.

Above the montane zone is the region of heavy Engelmann spruce-alpine fir forest, the subalpine zone (pl. Ia). This region receives the heaviest snowfall of any in the mountains. 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 makes this zone the most luxuriant of all in vegetation. The 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. Between approximately 10,500 and 11,500 feet we find the transition from the subalpine to the alpine region. Timber line varies between these two extremes, according to the exposure and topography. This area contains luxuriant subalpine meadows (fig. 1), many lakes (pl. IIIb), considerable elfin or dwarf forest, and many exposed rocky ridges. Typical plants of the spruce forest are pipsissewa (fig. 58), star-flowered pyrola (fig. 57), one-sided pyrola, twinflower (fig. 86), and fairy slipper (fig. 15). Characteristic shrubs are mountain-ash (fig. 46) and the involucred honeysuckle or twinberry, both found along streams. Some subalpine flowers of the meadows and wet banks are pearly everlasting, fringed parnassia, ladies-tresses, brook-cress (fig. 35), and rose crown (fig. 36).

Timber line itself, with its gnarled and twisted trees, is one of the most interesting regions of the park (pl. IX). Here the wind and snow have combined to produce an elfin forest of fantastic appearance. Twisted trunks bearing branches only on their lee sides indicate the direction of the



(a)

(b)



*Plate II.*—MONTANE ZONE. (SEE ALSO PLATES I AND VII.) (a) DWARF SAGEBRUSH AND ROCKY MOUNTAIN JUNIPER IN FOREGROUND, AND PONDEROSA PINE IN BACKGROUND, ON SOUTHERN SLOPES. (b) STREAMSIDE GROWTH. WILLOWS, ALDER, AND BIRCH BORDERING THE WATER, COLORADO BLUE SPRUCE IN THE NEXT RANK, AND PONDEROSA PINE WITH DOUGLAS-FIR IN THE BACKGROUND.



Figure 1.—SUBALPINE MEADOW NEAR DREAM LAKE. *Photograph by author.*

prevailing wind; 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 (pl. IV*b*). Often gnarled old individuals stand isolated, but sometimes the trees are crowded and their tops intermingle to such an extent as to be indistinguishable from one another. In many places snowdrifts cover the dwarf trees, protecting them from the icy winds. Every little twig that sends a shoot above the snow line is promptly killed by the combined effect of the extreme cold and the desiccating wind. By this killing of the terminal shoot the lateral buds below the snow line are stimulated to vigorous growth. This accounts in part for the denseness of these timber

line thickets. In addition, the weight of the snow probably plays some part in their development along horizontal lines. Shelter from sudden mountain storms is often found under the dense, matted canopy of these tree tops. Their trunks are sometimes as high as a man's head; in other places they are prostrate on the ground, their branches forming low, rounded "windrows" a foot or two high, parallel to the direction of the prevailing winds and as neatly trimmed by the winds as though clipped by a hedge-trimmer's shears. Many an old, dead snag, and often the windward side of a living tree, has been stripped of its bark and etched and carved by the tools of ice and sand carried by fierce alpine gales (pl. IIIa).

The trees which form the forest frontier in Rocky Mountain National Park are Engelmann spruce, alpine fir, limber pine, and, rarely, lodgepole pine. Clumps of dwarf willow and birch are seen high above the tree line, dotting the open slopes with their low, rounded masses.

Above timber line we find the alpine zone (pl. IVa). 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 the flowers burst into bloom. The yellow snow buttercup (fig. 29), a large almost poppylike flower with much dissected leaves, and the white marsh-marigold (fig. 27) may be found breaking through the snow to bloom. The little bright blue alpine forget-me-not (fig. 75), the moss campion (fig. 26) with its cushionlike growth starred with pink blossoms, the *Rydbergia* (fig. 97) with its big golden head and its covering of shaggy white hair, the mountain dryad (fig. 43) with its eight creamy petals and its long plumed seeds, the tiny but gay rose-colored fairy primrose (fig. 63), the fragrant rock jasmine (fig. 65), 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, will be found on closer examination to be gay with the bright colors of the cushionlike plants which fill the spaces between them (pl. IVa). 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 Twin Sisters just before the summit is reached. A little later these plants are in their prime on Fall River Pass, Trail Ridge, Flattop Mountain, Longs Peak, and the other high peaks.

## ADAPTATION TO ENVIRONMENT

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



(a)

(b)



Plate III.—(a) PROSTRATE TIMBER-LINE TREES SHAPED BY THE ICY WINDS. (b) POUFRE LAKE AT THE CONTINENTAL DIVIDE, 10,659 FEET.



(a)

(b)



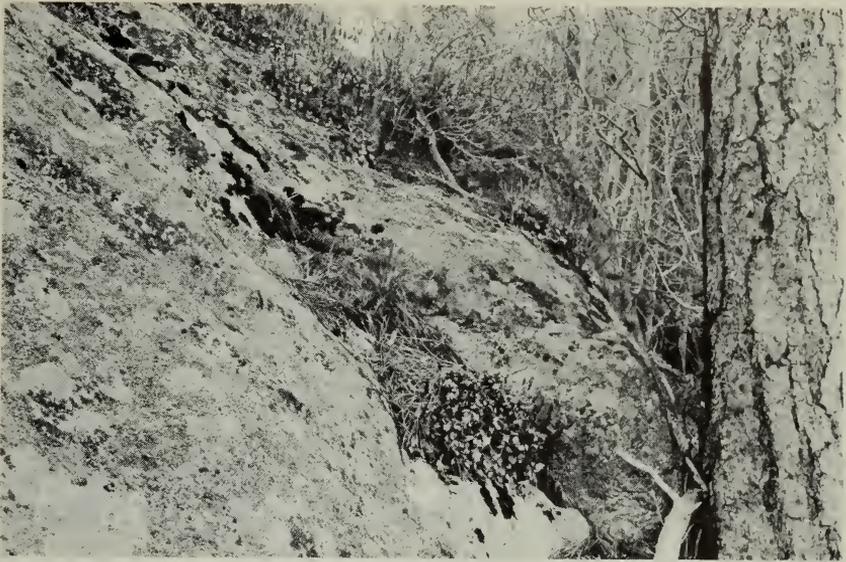
Plate IV.—ON THE HEIGHTS. (a) ALPINE ZONE ON LONGS PEAK. NUMEROUS BRILLIANT FLOWERS BLOOM AMONG THESE ROCKS AND AT THE EDGES OF THE SNOW BANKS. Photograph by Frank Wolff. (b) THE FOREST FRONTIER.

The little alpine forget-me-not is covered by a cloak of soft silky hairs which forms a dead air space around it, thus retarding evaporation from the surface of the leaves. Many other plants are covered with hairs or wool; for instance, the scorpion weed, the miners candle (fig. 78), the Rydbergia, and the sulphur flower. In other plants this protection is secured by the presence of a hard outer cuticle over the epidermis of the leaf. On certain leaves there is a layer of wax in addition to the cuticle. Cuticle and waxy layer are both present on the leaves of many evergreens that grow in a temperate climate. During the winter the plant must not lose the moisture that is in its cells because no more will be available until spring. Many plants, especially those with large soft leaves, shed their leaves at the approach of the dry season. The plants (kinnikinnic, fig. 60, and mountain lover) that keep their leaves throughout the winter, or dry season, have tough, thick leaves with a hard surface, and the deep-set stomata are well protected. In the case of the pine family the danger from too much evaporation is further lessened by the reduction in area of 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 or silvery tinge.

Many of the grasses and some other plants have the margins of the leaves in-rolled. 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 for future use in thick leaves and stems is another form of adaptation, more common with plants of desert regions than with mountain plants, but noticeable in our stonecrops and some of our saxifrages. In these cases the leaves are usually smooth, though not always so, and are often covered with a *glaucous bloom* (the waxy covering already described). The thickening of the leaf also results in a decreased surface area in relation to the volume, an added advantage.

### **PARK OFFERS OPPORTUNITY TO STUDY PLANT SUCCESSION**

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 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 (pl. V). These 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 often 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



(a)

(b)



*Plate V.*—SHOWING PLANT SUCCESSION ON GRANITE ROCK. (a) EARLY STAGE, CRUSTACEOUS AND LEAFY LICHENS INHABITING BARE ROCK. THE BLACK PATCHES ARE PIONEER MOSSES. ALONG THE CREVICE, ALUM ROOT AND OTHER PLANTS HAVE TAKEN HOLD AND ARE GATHERING AROUND THEM PINE NEEDLES AND DEBRIS WHICH GRADUALLY BECOME SOIL. *Photograph by the author.* (b) A LATER STAGE, KINNIKINNICK AND OTHER PIONEER SEED PLANTS SPREADING OVER THE ROCK. IN THE UPPER LEFT CORNER MAY BE SEEN THE EARLIER STAGE OF LICHENS AND MOSSES.



*Plate VI.*—LODGEPOLE PINE. (*Left*) TYPICAL YOUNG GROWTH. THESE TREES ARE SCARCELY HIGHER THAN A PERSON'S HEAD. THERE ARE FROM 30 TO 50 INDIVIDUALS HERE ON A SQUARE YARD OF GROUND. (*Right*) OLDER LODGEPOLE FOREST RECENTLY KILLED BY FOREST FIRE. THE CHARRED LOGS LYING ON THE GROUND ARE RELICS OF EARLIER FIRES.



Figure 2.—DWARF JUNIPER GROWING IN ROCK CREVICE.

moisture and collect a little dust. Soil begins to form and 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 (fig. 54), grouseberry, kinnikinnick (fig. 60 and pl. Vb), golden banner, and wild pink geranium (fig. 48). In the crevices of the rocks alumroot and seedlings of pine or some of the pioneer shrubs, such as juniper (fig. 2), jamesia and thimbleberry (fig. 45), 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, a process 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 have lodged here, and be able to germinate and grow in the protection afforded by this pioneer nursery. Finally, after hundreds of years, we find in the montane zone open grassy slopes dotted with ponderosa pines and Douglas-firs, and in the subalpine zone close forests of spruce and fir.

Succession will occur much faster on wet rocks and along stream banks. 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 (pls. IIb and VIII).

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 an open ponderosa pine



*Plate VII.*—ASPEN GROVE IN THE MONTANE ZONE.

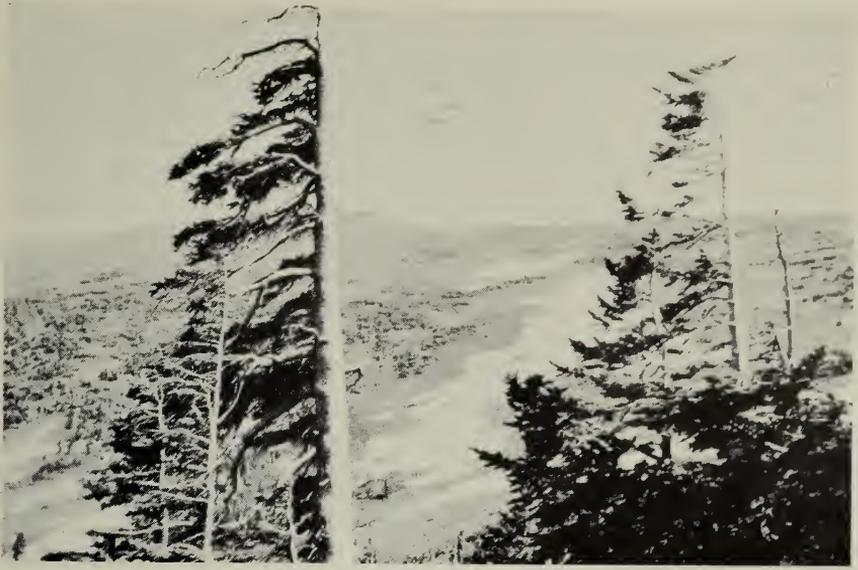
forest, this same forest usually reestablishes itself without any intervening forest of a different kind, but when fire wipes out a close stand of mixed pine and Douglas-fir or of Engelmann spruce, a different story follows: there, after the fire, we find elder, aspen, fireweed, lupine, golden banner, grouseberry, and kinnikinnic beginning to cover the ground. Normally, the following year we find lodgepole seedlings coming up in abundance, with willows and aspens in the areas of greatest moisture. The young lodgepoles and aspens require abundant sun, and a place where fire has made a clean sweep affords them an ideal home. Under favorable conditions as many as 50 lodgepole seedlings to a square yard will come up (pl. VI). 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 found in many places in the park. Three lodgepole forests of different ages, each the result of a fire, may be seen between Baldpate Inn and Longs Peak Inn, a distance of about 3 miles, along the South St. Vrain Road. Much of that region has been burned several times. A lodgepole forest constitutes a much greater fire hazard than any other forest we have because of the closeness of the trees, their pitchiness, and comparative dryness. Fires in lodgepole forests are sometimes caused by lightning, but usually by the carelessness of man.

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 50 to 70 years, lodgepole forests will be invaded by Engelmann spruce. This is beginning to happen in the forest on Twin Sisters Mountain. A few spruces may now be seen here and there among the lodgepoles. Seedling spruces do not thrive in sunlight, 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 this ground is a little too moist for the best development of lodgepole. Here many Engelmann spruce seedlings and some alpine firs have started to grow, and have managed to survive, along with the lodgepoles which occupy the sunnier places. In 40 or 50 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 (pl. VIII) and will perpetuate itself indefinitely unless destroyed by some outside agency.

Plants resemble people in some of 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 that will stand being much trampled upon, or that thrive on freshly turned ground, or for some



*Plate VIII.*—SUBALPINE FOREST OF ENGELMANN SPRUCE AND ALPINE FIR.



*Plate IX.*—TIMBER-LINE TREES SHOWING THE EFFECT OF PREVAILING WINDS. *Upper photograph by Frank Wolff; lower by F. J. Francis.*

reason flourish around buildings and along roadways. Man's activities of plowing, building, and road making disturb the native plants of 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 animals, or in the seed that the farmer buys. Forty 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 plowed and then abandoned can be distinguished for many years by the vegetation on them, which is entirely different from that on the natural grassland. The native species most common on these fields are stickseed, fringed mountain-sage, gumweed, and tansy aster. Grama grass, the characteristic native grass of open fields and slopes, does not begin to reestablish itself for 5 or 6 years.

# A Key for the Identification of the Common and Conspicuous Plants of the Rocky Mountain National Park

## A. WOODY PLANTS, TREES, SHRUBS, OR VINES

- X. Plants parasitic, brownish or yellowish, never green in any part . . . . . *Mistletoe* (p. 58)
- XX. Plants not parasitic, always with green leaves.
- Y. Leaves evergreen, needlelike, or if broad, usually thick and shiny.
  - a. Leaves needlelike, scalelike, or awlshaped . . . . . *Pine family* (p. 37)
  - aa. Leaves neither needlelike nor scalelike, usually flat.
    - b. Leaves definitely opposite.
      - c. Flowers axillary, greenish, inconspicuous . . . . . *Mountain lover* (p. 104)
      - cc. Flowers in terminal umbels, rose-red; plant only a few inches high, leaves dull  
*Dwarf mountain-laurel* (p. 116)
    - bb. Leaves alternate.
      - c. Leaves with spine-tipped teeth, hollylike . . . . . *Hollygrape* (p. 78)
      - cc. Leaves with smooth edges, no spine-tipped teeth present.
        - d. Leaves 1 inch long or less, plant trailing . . . . . *Kinnikinnick* (p. 116)
        - dd. Leaves more than 1 inch long, often sticky; plant not trailing . . . . . *Mountain balm* (p. 104)
- YY. Leaves not evergreen, usually not both thick and shiny.
  - a. Trees.
    - b. Bark on young trees smooth and whitish or greenish, if gray rough and furrowed; buds not stalked.
      - c. Leaves roundish; tree very common, usually found in groves . . . . . *Aspen* (p. 54)
      - cc. Leaves longer than broad; not common.
        - d. Leaves broad at base and tapering to apex, pale underneath . . . . . *Balsam poplar* (p. 54)
        - dd. Leaves narrower and tapering to both ends, green underneath. . *Narrow-leaved cottonwood* (p. 53)

- bb. Bark gray or yellowish gray, smooth; leaves with toothed margins; buds stalked. . . . *Alder* (p. 56)
- aa. Shrubs or trailing plants.
  - b. Leaves definitely opposite.
    - c. Plant climbing or trailing on the ground.
      - d. Flowers in clusters, white . . . . . *Virgins bower* (p. 72)
      - dd. Flowers solitary, blue . . . . . *Columbian rock clematis* (p. 73)
    - cc. Plant erect.
      - d. Leaves compound; flowers white, in a cluster . . . . . *Redberried elder* (p. 142)
      - dd. Leaves not compound; flowers various.
        - e. Leaves lobed and toothed.
          - f. Plants often growing in dense clumps; fruit two-winged. . . . . *Mountain maple* (p. 103)
          - ff. Plants not growing in dense clumps; fruit a red berry . . . . . *Arrowwood* (p. 149)
        - ee. Leaves entire.
          - f. Flowers few.
            - g. Flowers yellow, in pairs, ripening into black, shiny berries; leaves over 2 inches long  
*Twinberry* (p. 148)
            - gg. Flowers pinkish, ripening into white berries; leaves less than 2 inches long  
*Snowberry* (p. 149)
          - ff. Flowers many, in clusters, white.
            - g. Bark red or reddish-brown, smooth . . . . . *Red-stemmed dogwood* (p. 112)
            - gg. Bark gray, shreddy . . . . . *Jamesia* (p. 88)
  - bb. Leaves alternate.
    - c. Plant thorny or spiny.
      - d. Leaves compound.
        - e. Leaflets three to five; flowers white . . . . . *Wild raspberry* (p. 96)
        - ee. Leaflets five to seven; flowers pink or red . . . . . *Wild rose* (p. 96)



- dd. Leaves not compound.
  - e. Leaves entire; plant very low, flowers white. . . . . *Fendler buckthorn* (p. 104)
  - ee. Leaves lobed or toothed or both.
    - f. Spines stout, 1 to 2 inches long; flowers white . . . . . *Fireberry hawthorn* (p. 96)
    - ff. Spines slender, not over one-half inch long; flowers pinkish or greenish.
      - g. Spines two or three together; berries one to four, reddish-purple  
*Mountain gooseberry* (p. 88)
      - gg. Spines solitary, berries several, black . . . . . *Prickly currant* (p. 88)
- cc. Plant not thorny nor spiny.
  - d. Leaves compound.
    - e. Leaflets three, sometimes lobed; flowers inconspicuous. . . . . *Three-leaf sumac* (p. 103)
    - ee. Leaflets more than three.
      - f. Leaflets five to seven, entire; flowers yellow. . . . . *Shrubby cinquefoil* (p. 94)
      - ff. Leaflets 11 to 15, serrate; flowers in large clusters, white . . . . . *Mountain-ash* (p. 96)
- dd. Leaves not compound.
  - e. Leaves lobed or deeply toothed.
    - f. Leaves three-toothed at apex, not over 1½ inches long, somewhat wedge-shaped.
      - g. Bush silver-gray, aromatic . . . . . *Sagebrush* (p. 178)
      - gg. Bush not silver-gray nor aromatic . . . . . *Antelope-brush* (p. 94)
    - ff. Leaves three- to seven-lobed, oval roundish or heart-shaped in outline.
      - g. Flowers white, not tubular nor bell-shaped.
        - h. Flowers 1 to 2 inches across . . . . . *Thimbleberry* (p. 96)
        - hh. Flowers small, in clusters.
          - i. Clusters flat or rounded on top . . . . . *Mountain ninebark* (p. 94)
          - ii. Clusters pyramidal . . . . . *Mountain spray* (p. 94)
      - gg. Flowers pink, greenish, or yellowish, tubular or bell-shaped.

- h. Leaves 1½ to 2 inches broad, fruit black . . . . . *Subalpine black currant* (p. 88)
- hh. Leaves less than 1½ inches broad, fruit red . . . . . *Squaw currant* (p. 88)
- ec. Leaves never lobed, entire or merely slightly toothed.
- f. Plants low, not over 1 foot high.
  - g. Flowers urn-shaped, pinkish or white; fruit a juicy berry.
    - h. Leaves less than one-half inch long; berries red, branches green  
*Red grouseberry* (p. 118)
    - hh. Leaves mostly over one-half inch long; berry black or bluish, branches mostly brown . . . . . *Black grouseberry* (p. 118)
  - gg. Flower saucer-shaped, eight-petaled; plant dwarf and matted  
*Mountain dryad* (p. 90)
- ff. Plants taller.
  - g. Plants growing in wet places; flowers in catkins.
    - h. Leaves serrate.
      - i. Bark reddish-brown and shiny; leaves pointed . . . . . *Mountain birch* (p. 56)
      - ii. Bark blackish; twigs rough with whitish glands; leaves roundish  
*Bog birch* (p. 56)
    - hh. Leaves usually entire; bark smooth, gray, green, yellow, or reddish  
*Willow* (p. 53)
  - gg. Plants not confined to wet places; flowers not in catkins.
    - h. New twigs and buds rust color; under side of leaves silvery. *Buffalo-berry* (p. 107)
    - hh. New twigs and buds not rust color; leaves green underneath.
      - i. Leaves oval or roundish . . . . . *Serviceberry* (p. 96)
      - ii. Leaves at least half again as long as broad, usually tapering at both ends.
        - j. Fruit black, in a raceme . . . . . *Chokecherry* (p. 97)
        - jj. Fruit red, in an umbel . . . . . *Bird cherry* (p. 97)



## AA. NONWOODY PLANTS

- X. Plants never bearing true flowers (Pteridophytes, i. e., "fern plants").
- Y. Plants with broad leaves usually much dissected . . . . . *Fern family* (p. 31)
- YY. Plants with needlelike, awllike, or toothlike leaves, or apparently none.
- a. Plants with hollow, jointed green stems; no evident leaves . . . . . *Horsetail family* (p. 35)
- aa. Plants with solid and continuous stems; awllike leaves present . . . . . *Clubmoss family* (p. 36)
- XXX. Plants bearing true flowers (Spermatophytes, i. e., "seed plants").
- Y. Plants aquatic, growing partly or entirely submersed in water, bearing conspicuous flowers or fruits.
- a. Leaves simple and entire.
- b. Leaves not linear.
- c. Leaves 4 to 12 inches long, floating; flowers 2 to 5 inches across, yellow . . . . . *Yellow pondlily* (p. 69)
- cc. Leaves 2 to 6 inches long; flowers not yellow.
- d. Leaves oval or lanceolate, floating; flowers bright pink . . . . . *Water buckwheat* (p. 59)
- dd. Leaves erect, arrowhead shaped; flowers small, white . . . . . *Arrowhead* (p. 38)
- bb. Leaves linear floating; fruit a burlike cluster of achenes . . . . . *Bur-reed* (p. 38)
- aa. Leaves compound or finely dissected; flowers white or yellow, not in spikes. . . . . *Buttercup family* (p. 69)
- YY. Plants terrestrial, never floating but sometimes growing on very wet ground.
- a. Plants without green foliage, parasites or saprophytes.
- b. Parasites growing on branches of coniferous trees . . . . . *Mistletoe family* (p. 57)
- bb. Parasites or saprophytes growing on the ground, on roots or dead wood.
- c. Plant hairy.
- d. Plant 10 to 60 inches high; flowers nodding . . . . . *Pinedrops* (p. 112)
- dd. Plant 6 inches high or less; flowers erect . . . . . *Broomrape* (p. 146)
- cc. Plant smooth . . . . . *Corahoot* (p. 51)
- aa. Plants with green foliage.
- b. Plants with parallel-veined leaves; flower parts if brightly colored in threes or sixes (Monocotyledons).



- c. Plants 3 to 6 feet high; flowers small, in dense brown spikes . . . . . *Cat-tail* (p. 37)
- cc. Plants usually less than 3 feet high.
  - d. Plants grasslike or rushlike; flowers numerous and inconspicuous.
    - e. Stems round or flattened.
      - f. Stems jointed; leaf blades flat . . . . . *Grass family* (p. 38)
      - ff. Stems not jointed; leaf blades round or flat . . . . . *Rush family* (p. 44)
    - ee. Stems usually three-angled . . . . . *Sedge family* (p. 43)
  - dd. Plants not grasslike or rushlike, or if so with colored flowers.
    - e. Flowers regular, with six perianth segments and three or six stamens.
      - f. Flowers blue; leaves two-ranked . . . . . *Iris family* (p. 51)
      - ff. Flowers not blue; leaves not two-ranked . . . . . *Lily family* (p. 44)
    - ee. Flowers irregular, the lower petal usually sac-shaped or spurred . . . *Orchid family* (p. 51)
- bb. Plants with netted-veined leaves; flower parts usually in fours or fives (Dicotyledons).
  - c. Flowers clustered in dense heads, the head surrounded by bracts and often resembling a single flower . . . . . *Composite family* (p. 151)
  - cc. Flowers not in a dense head surrounded by bracts (except in clover).
    - d. Leaves opposite.
      - e. Plants with milky juice.
        - f. Leaves petioled, more than 1 inch long . . . . . *Indian-hemp* (p. 126)
        - ff. Leaves and bracts sessile, 1 inch or less long, bracts opposite . . . . . *Spurge* (p. 102)
      - ee. Plants without milky juice.
        - f. Corolla of separate petals or absent.
          - g. Stems swollen at the joints; flowers never yellow.
          - h. Flowers in small clusters, each subtended by an involucre; fruit one-seeded  
*Wild four o'clock* (p. 64)
          - hh. Flowers never subtended by an involucre.



- i. Fruit many-seeded, leaves without stipules . . . . . *Pink family* (p. 65)
  - ii. Fruit one-seeded, leaves with scarious stipules  
*Whitlow-wort family* (p. 65)
- gg. Stems not swollen at the joints; petals thin.
- h. Flowers yellow; leaves with translucent dots . . . . . *St. Johnswort* (p. 105)
  - hh. Flowers pink or white with pink veins, leaves not dotted  
*Purslane family* (p. 64)
- ff. Corolla of united petals.
- g. Stem square, distinctly four-angled.  
    - h. Leaves more than two at each node . . . . . *Bedstraw* (p. 147)
    - hh. Leaves two at each node.  
      - i. Plant branched from the base and spreading on the ground . *Vervain* (p. 136)
      - ii. Plant erect, usually aromatic . . . . . *Mint family* (p. 137)
  - gg. Stem usually round, not four-angled.  
    - h. Plants not trailing vines with paired blossoms.  
      - i. Seed pod one-seeded and inferior . . . . . *Valerian* (p. 150)
      - ii. Seed pod several seeded and superior.  
        - j. Corolla regular.  
          - k. Plant a diminutive shrub of boggy ground at high altitudes  
*Dwarf mountain-laurel* (p. 116)
          - kk. Plants not shrubs.  
            - I. Plant 1 to 3 inches high, forming dense mats in alpine zone;  
flowers pale blue or white. . . . . *Alpine phlox* (p. 127)
            - II. Plants usually taller, not matted, flowers mostly bright or dark  
blue . . . . . *Gentian family* (p. 122)
          - jj. Corolla irregular . . . . . *Figwort family* (p. 138)
  - hh. Plant a trailing vine with paired, pink blossoms . . . . . *Twinflower* (p. 148)

- dd. Leaves alternate or all basal.
- e. Leaves with papery sheathing bases, or all basal and then the numerous small yellow flowers in umbels . . . . . *Buckwheat family* (p. 59)
- ee. Leaves without papery sheathing bases and flowers not as above.
- f. Petals separate.
  - g. Flowers very small, in umbels; leaves compound, usually large.
  - h. Stems hollow; plant often very large; flowers numerous, white or yellow, in flattish umbels . . . . . *Parsnip family* (p. 111)
  - hh. Stems not hollow; flowers in small roundish umbels . . . . . *Wild sarsaparilla* (p. 111)
  - gg. Flowers not usually in umbels; stems not hollow.
  - h. Leaves composed of five to seven hollylike leaflets . . . . . *Hollygrape* (p. 78)
  - hh. Leaves not composed of hollylike leaflets.
  - i. Stamens many, at least more than 10.
    - j. Filaments united into a column . . . . . *Mallow family* (p. 105)
    - jj. Filaments distinct.
      - k. Sepals distinct.
        - l. Foliage glaucous with many straw-colored prickles
          - Prickle-poppy (p. 78)
          - Buttercup family (p. 69)
        - ll. Foliage not glaucous, without prickles. . . . .
          - kk. Sepals united, at least at base.
            - l. Calyx saucerlike or cup-shaped . . . . . *Rose family* (p. 89)
            - ll. Calyx forming a cylindrical or ovoid tube inclosing the seeds.
              - m. Stems very rough, leaves evident . . . . . *Loasa family* (p. 107)
              - mm. Stems thick, green, covered with tufts of spines, no leaves evident . . . . . *Cactus family* (p. 107)
    - ii. Stamens not more than 10.



- j. Stamens exactly twice as many as the pistils; leaves fleshy  
*Stonocrop family* (p. 83)
- jj. Stamens not exactly twice as many as the pistils.
  - k. Petals four; stamens usually six.
    - 1. Sepals two; flowers irregular, yellow . . . . *Golden smoke* (p. 78)
    - II. Sepals four; flowers regular.
      - m. Ovary superior.
        - n. Leaves three-foliolate; pod stalked  
*Rocky Mountain bee plant* (p. 82)
        - nn. Leaves not three-foliolate; pod sessile  
*Mustard family* (p. 78)
  - mm. Ovary inferior . . . . *Evening primrose family* (p. 108)
- kk. Petals 5; stamens usually 5 or 10.
  - l. Flowers regular.
    - m. Petals blue. . . . . *Blue flax* (p. 102)
    - mm. Petals not blue.
      - n. Leaves not deeply divided.
        - o. Leaves evergreen, leathery, petals waxy  
*Pyrola subfamily* (p. 114)
      - oo. Leaves neither evergreen nor leathery, petals not waxy.
        - p. Sepals five . . . . . *Saxifrage family* (p. 83)
        - pp. Sepals two . . . . . *Purslane family* (p. 64)
- nn. Leaves divided, or deeply toothed.
  - o. Styles united into a column  
*Geranium family* (p. 108)
  - oo. Styles and ovaries distinct . . . . *Rose family* (p. 89)

- II. Flowers irregular.
  - m. Leaves simple . . . . . *Violet family* (p. 105)
  - mm. Leaves compound: . . . . . *Pea family* (p. 98)
- ff. Petals united.
  - g. Corolla regular.
    - h. Corolla urn-shaped; fruit often a red berry . . . . . *Heath family* (p. 112)
    - hh. Corolla bell-shaped, funnel or salver-form.
      - i. Fruit consisting of four nutlets sometimes prickly.
        - j. Stamens conspicuously protruding . . . . . *Waterleaf family* (p. 130)
        - jj. Stamens not protruding; flowers blue, white or yellow  
*Borage family* (p. 131)
      - ii. Fruit consisting of a many-seeded pod.
        - j. Calyx closely attached to the inferior ovary . . . *Bellflower family* (p. 149)
        - jj. Calyx entirely free from the superior ovary.
          - k. Leaves all basal, simple . . . . . *Primrose family* (p. 118)
          - kk. Leaves not all basal, often compound . . . . . *Phlox family* (p. 127)
  - gg. Corolla irregular . . . . . *Figwort family* (p. 138)



# Families of Plants<sup>3</sup>

## FERN FAMILY (POLYPODIACEAE)

FERNS ARE NOT VERY NUMEROUS in this region because of the dry climate, and with the exception of two or three species are rarely seen. They should be looked for mainly in the subalpine zone, although a few will be found in the montane and alpine zones. Ferns are a lower order of plant life than the flowering plants and do not produce seeds. Instead, they reproduce by minute bodies called *spores* which are borne in little cases called *sporangia*. These *sporangia* (singular *sporangium*) occur in small clusters called "fruit dots" or *sori* (singular, *sorus*), on the backs of the fronds. In some species the sorus is covered with a thin scalelike structure called the *indusium*.<sup>4</sup>

- A. Frond very little dissected, apparently more grasslike than fernlike  
*Grass-leaved fern* (p. 34)
- AA. Frond dissected and very evidently fernlike.
  - B. Fronds of one kind, all alike.
    - a. Fronds once pinnate, plants rare, mostly evergreen.
      - b. Pinnae thin and fragile, narrowed at the base and attached at a point . . . *Maidenhair spleenwort* (p. 34)
      - bb. Pinnae tough, evergreen, attached by their whole width.
        - c. Frond 3 to 6 inches long; sori with no indusium; growing mostly in rock crevices  
*Western polypody* (p. 34)
        - cc. Fronds usually 10 inches long or longer; indusium kidney shaped, conspicuous; plants very rare  
*Holly fern* (p. 34)
    - aa. Fronds more than once pinnate, not evergreen.
      - b. Fronds long and tapering.
        - c. Fronds 10 inches to 3 feet long.
          - d. Sori long or crescent-shaped; indusium conspicuous . . . . . *Common lady fern* (p. 34)
        - dd. Sori round.

<sup>3</sup> Two species of moonwort or grapefern, *Botrychium lunaria* (L.) Sw. and *B. lanceolatum* (Gmel.) Angstrom, were reported from the Lawn Lake Trail by Estelle H. Kelso, which adds the Adders-Tongue family, *Ophioglossaceae*, to the park flora (Rhod. 39:149. 1937).

<sup>4</sup> For technical terms used and not explained in the text see Glossary, p. 183.

- e. Indusium evident . . . *Shield fern* (p. 34)
- ee. Indusium not evident
  - Alpine lady fern* (p. 32)
- cc. Fronds 3 to 8 inches long.
  - d. Plants tufted, old brown leaf bases persistent.
    - e. Rachis and underside of fronds hairy; divisions long-triangular
      - Rocky Mountain woodsia* (p. 34)
    - ee. Rachis and underside of fronds mostly smooth; divisions short-triangular
      - Oregon woodsia* (p. 34)
  - dd. Plants not tufted; old leaf bases not present
    - Brittle fern* (p. 32)
- bb. Fronds nearly as broad as long; often three-parted.
  - c. Fronds soft and thin, a foot high or less
    - Oak fern* (p. 34)
  - cc. Fronds firm and leathery, 1 to 4 feet high
    - Bracken or eagle brake* (p. 32)
- BB. Fronds of two kinds, the fertile ones taller . *Parsley fern* (p. 34)

*Brittle fern* or *brittle bladderfern*, *Cystopteris fragilis* (L.) Bernh.—A small fern with very fragile fronds, as its scientific name implies. The frond is tapering, usually twice-pinnate, and rarely over 8 inches in length. This is the most common and widely distributed fern in the park as well as one of the most widely distributed ferns in the world. It will be found in moist places on banks and cliffs, under ledges and in rock crevices at all altitudes. It has been found on the summit of both Specimen Mountain and Trail Ridge above 12,000 feet. (*Filix fragilis*).

*Western bracken or eagle brake*, *Pteridium aquilinum* var. *pubescens* Underwood, fig. 3.—A stout plant, 1 to 4 feet high, with a tough, leathery frond, which has usually three to seven triangular divisions. It is also one of the most widely distributed ferns in the world but in the park is confined to the montane zone. It may be found in either sun or shade usually in sandy or rocky soil, and is abundant on the Fern Lake trail below the Pool. The young shoots of this plant were used by some of the western Indians for food. (*Pteris aquilina*).

*Alpine lady fern*, *Athyrium americanum* (Butters) Maxon (*A. alpestre*). A rather large fern, with very delicate and lacy, tapering light-green fronds 10 inches to 3 feet long, found in the upper subalpine and alpine zones often in full sun and usually in very wet places. It is conspicuous along the streams and in the meadows between Dream and Emerald Lakes, and has been found at Lake of Glass and in Wild Basin. It also grows in the Sierra, in Quebec, Alaska, and the mountains of Europe and Asia. The



Figure 3.—BRACKEN, FRONDS 1 TO 4 FEET HIGH. Photograph by F. J. Francis.

*common lady fern*, *Athyrium filix-femina* (L.) Roth, with large dark-green, tapering fronds and elongated sori, is found occasionally in wet places of the lower subalpine and montane zones. (*Asplenium filix-femina*).

*Western polypody*, *Polypodium hesperium* Maxon, with once-pinnate fronds and large yellowish sori, is occasionally found in rock crevices throughout this region but is nowhere common. It resembles the common polypody, *P. vulgare*.

*Holly fern* or *mountain hollyfern*, *Polystichum lonchitis* (L.) Roth, is a rare evergreen fern of the subalpine zone, with long, narrow, once-pinnate fronds. The pinnae are serrate and have lobes on the lower margins next to the rachis. It resembles the eastern Christmas fern, *P. acrostichoides*.

*Parsley fern* or *American rockbrake*, *Cryptogramma acrostichoides* R. Br., is the only species of fern within the park having two kinds of fronds. The short parsley-like fronds carry on the functions of leaves and the taller, narrower fronds are specialized for spore bearing. These fronds are more yellowish in color and each segment is slightly podlike and contains many spores. This is a rock-loving fern of the subalpine zone and is often found in full sun. It grows on the rocks around Bear and Dream Lakes and elsewhere in the park. This fern is mainly confined to western North America and is abundant in the Sierra Nevada as well as in the Rocky Mountains.

The *woodsias* are small tufted ferns of dry and often exposed rocky situations. The stipes of last year's fronds are usually present and of a reddish-brown color. There are two species similar in appearance and difficult to distinguish. The *Oregon woodsia*, *Woodsia oregana* D. C. Eat., has the back of the frond smooth and is most commonly found in the montane zone, especially under shelving rocks, while the *Rocky Mountain woodsia*, *Woodsia scopulina* D. C. Eat., has white jointed hairs on the back of the frond and is more commonly found in the subalpine and alpine zones. Both are exclusively North American ferns and mainly western in distribution.

Other ferns which may be found are: *oak fern* *Dryopteris phegopteris* (L.) Christens., a delicate fern of shady places, with triangular, three-parted fronds, which has been found in Glacier Gorge and on the Cub Lake Trail; *shield fern* or *mountain woodfern*, *Dryopteris dilatata* (Hoffm.) Gray (*Aspidium spinulosum*), (fig. 4), which has been found in the subalpine zone; *maidenhair spleenwort*, *Asplenium trichomanes* L., a fern of moist rock crevices, very rare in this region; the *lip fern* or *Fendler lipfern*, *Cheilanthes fendleri* Hook., grows on rocky hillsides near Estes Park, and the *rock brake* or *Brewers cliffbrake*, *Pellaea breweri* D. C. Eat., has been reported for this region. The *grass-leaved fern*, *Asplenium septentrionale* (L.) Hoffm., (*Acrapteris septentrionale* or *Belvisia septentrionalis*), grows in tufts in dry rock crevices. It is a curious plant appearing to the casual observer more like a grass than a fern. It may be recognized by the black, shiny base of the rachis and by the rusty-colored sori at the tips of the narrow fronds.



Figure 4.—SHIELD FERN, FRONDS  
10 INCHES TO 2 FEET HIGH.

### HORSETAIL FAMILY (*EQUISETACEAE*)

The *horsetails* and *scouringrushes* are plants with hollow, jointed green stems and apparently no leaves. The leaves are reduced to very small toothlike scales around the joints of the stem and to scales which make up a conelike fruiting structure called a *strobilus* (plural *strobili*). These strobili grow on the tips of the stems. The stems contain the green coloring matter and perform the functions of leaves. They also contain minute particles of silica which give them their scouring quality. These plants are closely related to the ferns and reproduce by means of spores which are borne in spore cases on the scales of the strobili.

*Horsetail*, *Equisetum arvense* L.—A plant 4 to 18 inches high frequently found in the park. It has two kinds of stems, the fertile unbranched stems, pale brownish in color, bearing the strobili, and sterile green stems with whorls of slender branches which give it its horsetail-like appearance. The fertile stems disappear early in the season, so that often only the sterile ones are found. This plant is widely distributed throughout this country and Europe and is often found along railroad embankments. In the park it occurs along roads and trails on moist soil.

*Brauns scouringrush* or *smooth horsetail*, *Equisetum laevigatum* A. Br.—This evergreen plant is much less common than the former and much larger. The stem may be 1 to 3 feet high and one-half inch in diameter and is usually unbranched. Both the fertile and sterile stems are green. It is found on sandy soil.

### CLUBMOSS FAMILY (LYCOPODIACEAE)

*Groundpine* *Lycopodium annotinum* L.—Occasionally found in moist situations in the subalpine zone. A creeping evergreen plant, with flattened, awl-shaped leaves arranged in several ranks, and twice-forking branches. *Fir clubmoss*, *Lycopodium selago* L., smaller than the preceding, is also found.

### SPIKEMOSS FAMILY (SELAGINELLACEAE)

*Spikemosses*, or “*little clubmosses*,” are rarely noticed because of their small size, but they play an important part in the building up of fertile soil on dry barren ground and sometimes on rock surfaces. Where other vegetation is scanty, these little plants fill in many vacancies with mats of their creeping stems. Ordinarily gray, they become beautifully green in wet weather. The so-called “resurrection plant” of Mexico belongs to this family. *Selaginella densa* Rydb. is the most common species here. Tiny orange bodies in the axils of the leaves are the *megaspores*, from which new plants will grow. *Selaginella mutica* D. C. Eat., a more slender plant, and *Selaginella scopulorum* Maxon are also found.

**PINE FAMILY (PINACEAE)**

The nine species of coniferous trees included in the following key occur in the park.<sup>5</sup>

- A. Leaves needlelike, 1 inch long or longer; seeds in cones.
  - B. Leaves occurring in bundles of two to five, three-cornered or crescent-shaped in cross section.
    - a. Leaves two in each bundle; cones remaining on the trees for many years . . . . . *Lodgepole pine* (pl. VI)
    - aa. Leaves three (rarely two), or five in bundle, cones falling when mature.
      - b. Leaves three (rarely two) in each bundle; bark of mature trees reddish-yellow . . . . . *Ponderosa pine* (pl. I b)
      - bb. Leaves five in each bundle; bark of mature trees grayish-black . . . . . *Limber pine*
  - BB. Leaves occurring singly.
    - a. Leaves flattened, not sharp-pointed.
      - b. Cones numerous, pendent; three-parted bracts conspicuous between the cone scales; leaves narrowed to a tiny stem . . . . . *Douglas-fir*
      - bb. Cones few, erect, in the top of the tree; no conspicuous bracts present; leaves sessile . . . . . *Alpine fir*
    - aa. Leaves four-angled, sharp-pointed; cones pendent.
      - b. Cones about 2 inches long; leaves acute  
*Engelmann spruce* (pl. VIII)
      - bb. Cones 3 to 5 inches long, leaves spine-tipped  
*Colorado blue spruce* (pl. II b)
- AA. Leaves scalelike or awl-shaped, less than 1 inch long, seeds in berrylike cones.
  - B. Leaves scalelike; an erect shrub or small, much-branched tree  
*Rocky Mountain juniper*
  - BB. Leaves awl-shaped, spine-tipped; a prostrate shrub  
*Dwarf juniper* (fig. 2)

**CATTAIL FAMILY (TYPHACEAE)**

Everyone is familiar with the tall *cattail*, *Typha latifolia* L., of marshes and pond borders. This is found around a few ponds below 8,000 feet.

<sup>5</sup> For detailed description of these trees see Longyear, B. O., "Evergreens of Colorado," or More, Robert E., "Colorado Evergreens."

## BUR-REED FAMILY (SPARGANIACEAE)

*Narrow-leaf bur-reed*, *Sparganium angustifolium* Michx., is found in Bear Lake and some other lakes in the park. It has long, narrow floating leaves and dense burlike clusters of achenes. *Sparganium multipedunculatum* (Morong) Rydb., has been reported for this region.

## PONDWEED FAMILY (NAIADACEAE)

The *pondweeds* are aquatic plants growing in ponds and slow-moving streams, with two-ranked leaves, the upper firm and floating, the lower submersed and very fragile. *Potamogeton* is the commonest genus. The following species have been identified: *Potamogeton natans* L., *Potamogeton alpinus* Balbis, and *Potamogeton americanus* Cham. and Schlecht.

## WATERPLANTAIN FAMILY (ALISMACEAE)

Plants growing in shallow water or marshy ground with basal, sheathing leaves and small three-petaled flowers. *American waterplantain*, *Alisma plantago-aquatica* L., occurs in marshes and ponds of the park, and *arrowhead*, *Sagittaria arifolia* (Nutt.) J. G. Smith, a water plant with small white flowers and arrowhead-shaped leaves, is found in Bear, Bierstadt, Sheep, and other lakes.

## ARROWGRASS FAMILY (JUNCAGINACEAE)

Rushlike plants of marshy ground. *Swamp arrowgrass* or *arrow podgrass* *Triglochin palustris* L., has been found in swamps of the montane zone.

## WATERWEED FAMILY (HYDROCHARITACEAE)

A group of water plants which grow submersed in ponds or lakes, represented in the park by *Anacharis canadensis* (Michx.) Babingt., a plant with oblong or linear, transparent, one-nerved leaves in whorls of three or, on the lower part of the stems, opposite. (*Elodea canadensis*, *Philotria canadensis*.)

## GRASS FAMILY (GRAMINEAE)

This is one of the largest and most important plant families. Primarily, it furnishes all of our bread and cereal foods. Without it, we would have no meats and dairy products, as livestock are dependent upon it. It is



Figure 5.—GRAMA GRASS, STEMS 4 TO 16 INCHES HIGH, SPIKES PURPLISH. Photograph by Colorado A. and M. College.

important in our clothing and our buildings. However, most of its members are inconspicuous and of little interest to the majority of people. The grasses do not need conspicuous flowers because they have developed long filaments on which their anthers are hung, so that pollination is accomplished by the wind.

*Grama grass* or *blue grama*, *Bouteloua gracilis* (H. B. K.) Lag., erroneously called buffalo grass (fig. 5).—A small grass easily recognized by its purplish flaglike inflorescence and curling leaves. It is one of the commonest grasses of the montane zone, where it forms large mats on the open fields and hillsides, and is a valuable pasture grass. (*B. oligostachya*).

*Mountain timothy* or *alpine timothy*, *Phleum alpinum* L.—A plant with shorter, broader, and more purplish heads than the common timothy is frequent on the mountain meadows.

Many grasses common in the arctic regions, especially species of *bluegrass*, *Poa*, and *fescue*, *Festuca*, are found in the alpine zone. Species of grasses which have been identified in the park are given in the following list:<sup>6</sup>

- Agropyron bakeri* E. Nels. . . . . Baker wheatgrass.
- Agropyron griffithsii* S. & S. . . . . Griffith wheatgrass.
- Agropyron pseudorepens* S. & S. . . . . False quackgrass.
- Agropyron scribneri* Vasey . . . . . Scribner wheatgrass.
- Agropyron smithii* Rydb. (*A. occidentale*) . . . . . Western wheatgrass, Bluejoint, or bluestem wheatgrass.
- Agropyron spicatum* (Pursh) S. & S. (*A. divergens*) . . . . . Bunch wheatgrass or bearded bluebunch wheatgrass.
- Agropyron subsecundum* (Link) Hitchc. (*A. richardsoni*) . . . . . Richardson wheatgrass or bearded wheatgrass.
- Agropyron trachycaulum* (Link) Malte (*A. pauciflorum*, *A. tenerum*) (*A. violaceum*).  
This name has been used for alpine forms of *A. trachycaulum*) . . . . . Slender wheatgrass.
- Agrostis alba* L. . . . . Redtop.
- Agrostis scabra* Willd. (*A. hiemalis*) . . . . . Winter redtop or winter bentgrass.
- Agrostis scabra* va. *geminata* (Trin.) Swallen . . . . . Arctic winter bentgrass.
- Agrostis humilis* Vasey . . . . . Alpine bentgrass.
- Agrostis rossae* Vasey . . . . . Ross redtop or Ross bentgrass.
- Alopecurus aequalis* Sabol. . . . . Shortawn foxtail.
- Alopecurus alpinus* Smith . . . . . Alpine foxtail.
- Avena hookeri* Scribn. . . . . Spike oat.
- Avena mortoniana* Scribn. . . . . Alpine oat.
- Beckmannia syzigachne* (Steud.) Fern. (*B. erucaeformis*) . . . . . American sloughgrass.
- Bouteloua gracilis* (H. B. K.) Lag. (*B. oligostachya*) . . . . . Grama grass or blue grama.
- Bromus anomalus* Rupr. (*B. porteri*) . . . . . Nodding Brome.
- Bromus anomalus* var. *lanatipes* (Schear) Hitchc. . . . . Woolly nodding brome.
- Bromus ciliatus* L. (*B. richardsonii*) . . . . . Fringed brome.
- Bromus inermis* Leyss . . . . . Smooth brome.
- Bromus polyanthus* Scribn. . . . . Many-flowered brome.

<sup>6</sup> Based mainly on information furnished by Dr. H. D. Harrington, of Colorado A. and M. College.

- Bromus pumpellianus* Scribn. . . . . Pumpelly brome or mountain brome.
- Bromus tectorum* L. . . . . Downy brome or cheatgrass brome.
- Calamagrostis canadensis* (Michx.) Beauv. . Bluejoint reedgrass.
- Calamagrostis inexpansa* Gray . . . . . Northern reedgrass.
- Calamagrostis purpurascens* R. Br. . . . . Purple reedgrass or purple pinegrass.
- Cinna latifolia* (Trev.) Griseb. . . . . Drooping woodreed.
- Danthonia intermedia* Vasey . . . . . Timber oatgrass or timber danthonia.
- Danthonia parryi* Scribn. . . . . Parry oatgrass or Parry danthonia.
- Deschampsia atropurpurea* (Whal.) Scheele . Mountain hairgrass.
- Deschampsia caespitosa* (L.) Beauv. (*D. alpicola*) . Tufted hairgrass.
- Elymus ambiguus* Vasey & Scribn. . . . . Colorado wild-rye.
- Elymus condensatus* Presl . . . . . Giant wild-rye.
- Elymus glaucus* Buckl. . . . . Blue wild-rye.
- Festuca arizonica* Vasey (*F. vaseyana*) . . . Arizona fescue.
- Festuca elatior* L. . . . . Meadow fescue.
- Festuca idahoensis* Elmer . . . . . Bluebunch fescue or Idaho fescue.
- Festuca ovina* L. (*F. saximontana*) (*F. minutiflora*) . Sheep fescue.
- Festuca ovina* var. *brachyphylla* (Schult.) Alpine fescue.  
Piper
- Festuca thurberi* Vasey . . . . . Thruber fescue.
- Glyceria borealis* (Nash) Batch. . . . . Northern mannagrass.
- Glyceria elata* (Nash) Hitchc. . . . . Tall mannagrass.
- Glyceria grandis* S. Wats. . . . . American mannagrass.
- Glyceria pauciflora* Presl (*G. holmii*. The Weak mannagrass.  
type on which this name was based was collected by Holm on Longs Peak)
- Hierochloa odorata* (L.) Beauv. . . . . Sweetgrass.
- Hordeum jubatum* L. . . . . Foxtail barley.
- Hordeum pusillum* Nutt. . . . . Little barley.
- Koeleria cristata* (L.) Pers. . . . . Junegrass or prairie junegrass.
- Melica spectabilis* Scribn. . . . . Purple oniongrass or showy oniongrass.
- Muhlenbergia filiculmis* Vasey . . . . . Slimstem muhly.
- Muhlenbergia montana* (Nutt.) Hitchc. (*M. gracilis* of Am. authors) (*M. subalpina*) . Mountain muhly.
- Muhlenbergia racemosa* (Michx.) B. S. P. . Marsh muhly or green muhly.

- Muhlenbergia richardsonis* (Trin.) Rydb. Mat muhly.  
(*M. squarrosa*)
- Muhlenbergia wrightii* Vasey . . . . . Spike muhly.
- Oryzopsis asperifolia* Michx. . . . . Roughleaf ricegrass.
- Oryzopsis hymenoides* (R. & S.) Ricker Indian ricegrass.  
(*Eriocoma cuspidata*)
- Oryzopsis micrantha* (Trin. & Rupr.) Thurb. Littleseed ricegrass.
- Phleum alpinum* L. . . . . Mountain timothy or alpine  
timothy.
- Phleum pratense* L. . . . . Timothy.
- Poa alpina* L. . . . . Alpine bluegrass.
- Poa ampla* Merr. . . . . Big bluegrass.
- Poa arctica* R. Br. (*P. alpicola*) . . . . . Arctic bluegrass.
- Poa canbyi* (Scribn.) Piper . . . . . Canby bluegrass.
- Poa epilis* Scribn. . . . . Skyline bluegrass.
- Poa fendleriana* (Steud.) Vasey (*P. brevipaniculata*)  
Mutton grass or mutton bluegrass.
- Poa glaucifolia* Scribn. & Will.
- Poa interior* Rydb. . . . . Inland bluegrass.
- Poa leptocoma* Trin. . . . . Bog bluegrass.
- Poa lettermani* Vasey . . . . . Letterman bluegrass.
- Poa nervosa* (Hook.) Vasey (*P. wheeleri*) . . . . . Wheeler bluegrass.
- Poa occidentalis* Vasey . . . . . New Mexican bluegrass.
- Poa palustris* L. (*P. crocata*) . . . . . Fowl bluegrass.
- Poa pattersoni* Vasey . . . . . Patterson bluegrass.
- Poa pratensis* L. . . . . Kentucky bluegrass.
- Poa reflexa* Vasey & Scribn. . . . . Nodding bluegrass.
- Poa rupicola* Nash . . . . . Timberline bluegrass.
- Poa secunda* Presl . . . . . Sandberg bluegrass.
- Poa stenantha* Trin. . . . . Trinius bluegrass.
- Schizachne purpurascens* (Torr.) Swallen . . False-melic.
- Sitanion hystrix* (Nutt.) Smith . . . . . Squirreltail or bottlebrush  
squirreltail.
- Stipa columbiana* Macoun . . . . . Columbia needlegrass.
- Stipa columbiana* var. *nelsoni* (Scribn.) Nelson needlegrass or big sub-  
alpine needlegrass.  
Hitche.
- Stipa comata* Trin. & Rupr. . . . . Needle-and-thread.
- Stipa viridula* Trin. . . . . Green needlegrass.
- Trisetum montanum* Vasey . . . . . Rocky Mountain trisetum.
- Trisetum spicatum* (L.) K. Richt. (*T. majus*)  
*majus*)

## SEDGE FAMILY (CYPERACEAE)

Many members of the genus *Carex* are found within the park. The casual observer often includes them with the grasses, but most sedges may be distinguished from grasses by the shape of their stems, usually triangular, and by the absence of nodes or joints in the stems. Sedges are very abundant in the subalpine meadows and the alpine grassland. Several of the high-altitude sedges are conspicuous for their black, spikelike heads.

*Carex aquatilis* Wahl (*C. acutina*), is a tall plant, 1 to 2 feet high, with two to four slender, black, heads each 2 to 3 inches long. *Carex scopulorum* Holm (*C. tolmii*), is a shorter plant with short, thick heads. Both are found at high altitudes. *Carex inflata* Hudson (*C. rostrata*), is a tall plant, 1 to 3 feet, growing in very wet places such as beaver ponds, of the montane zone. It has long, slender, brownish heads up to 2 inches long. The following additional species occur in the park.<sup>7</sup>

- |   |  |
|---|--|
| <i>Carex angustior</i> Mack.                        | <i>Carex lanuginosa</i> Michx. ( <i>C. watsoni</i> )   |
| <i>Carex arapahoensis</i> Clokey                    | ( <i>C. filiformis latifolius</i> )                    |
| <i>Carex aurea</i> Nutt.                            | <i>Carex nigricans</i> C. A. Meyer                     |
| <i>Carex atrata</i> L.                              | <i>Carex nova</i> L. H. Bailey                         |
| <i>Carex brunescens</i> (Pers.) Poir.               | <i>Carex obtusata</i> Lily                             |
| <i>Carex canescens</i> L.                           | <i>Carex occidentalis</i> L. H. Bailey                 |
| <i>Carex capillaris</i> L.                          | <i>Carex oreocharis</i> Holm                           |
| <i>Carex chalciolepis</i> Holm                      | <i>Carex pachystachya</i> Cham.                        |
| <i>Carex chimaphila</i> Holm                        | <i>Carex paupercula</i> Michx. ( <i>C. magel-</i>      |
| <i>Carex disperma</i> Dewey ( <i>C. tenella</i> )   | <i>lanica</i> )  |
| <i>Carex douglasii</i> Boott ( <i>C. irrasa</i> )   | <i>Carex petasata</i> Dewey                            |
| <i>Carex ebenea</i> Rydb.                           | <i>Carex pityophila</i> Mack.                          |
| <i>Carex eleocharis</i> L. H. Bailey                | <i>Carex praticola</i> Rydb. ( <i>C. pratensis</i> )   |
| <i>Carex elynoides</i> Holm                         | <i>Carex praegracilis</i> W. Boott                     |
| <i>Carex festivella</i> Mack. ( <i>C. festiva</i> ) | <i>Carex pyrenaica</i> Wahl.                           |
| <i>Carex geyeri</i> Boott                           | <i>Carex raynoldsii</i> Desv. ( <i>C. aboriginum</i> ) |
| <i>Carex gymnoclada</i> Holm                        | <i>Carex rupestris</i> All.                            |
| <i>Carex gymnocrates</i> Wormsk.                    | <i>Carex rossii</i> Boott                              |
| <i>Carex heliophila</i> Mack.                       | <i>Carex siccata</i> Dewey                             |
| <i>Carex hoodii</i> Boott                           | <i>Carex straminiformis</i> L. H. Bailey               |
| <i>Carex interior</i> L. H. Bailey                  | <i>Carex vernacula</i> L. H. Bailey                    |
|   | <i>Carex vesicaria</i> L. ( <i>C. monile</i> )         |

<sup>7</sup> Very little work has been done by the author on the sedges and most of the species of *Carex* given here are included on the authority of Prof. E. C. Smith, of the Colorado A. and M. College.

*Cottongrass* or *narrowleaf cottongsedge*, *Eriophorum angustifolium* Honckney (*E. gracile*, *E. ocreatum*), is found in wet meadows and cold bogs of the park, where it may be recognized by its white, cottony head.

*Alkali bulrush*, *Scirpus paludosus* A. Nels (*S. campestris*), grows around some of the lakes and the *few-flowered spikerush* or *few-flowered spikesedge*, *Eleocharis pauciflora* (Lightf.) Link., a small plant of wet ground also occurs here.

### DUCKWEED FAMILY (LEMNACEAE)

Tiny, floating plants, each consisting of a flat, oval or roundish plant body about 1/8-inch long or less, from one edge of which a slender threadlike root extends into the water. These plants multiply vegetatively, sometimes forming large floating mats. Rarely they produce very simple flowers. *Star duckweed*, *Lemna trisulca* L., has been found in the park.

### RUSH FAMILY (JUNCACEAE)

The rushes have a six-parted perianth and their flowers are similar in structure to the lilies to which they are related, but their perianths are always small and inconspicuous, usually made up of brownish scales. These plants are grasslike in appearance with round stems. The following species are found in the park:

- Juncus balticus* Willd. . . . . Baltic rush.
- Juncus drummondii* E. Meyer . . . . . Drummond rush.
- Juncus longistylis* Torr. . . . . Short-styled rush.
- Juncus paryi* Engelm. . . . . Parrys rush.
- Juncus saximontanus* A. Nels. . . . . Rocky Mountain rush.
- (*J. parous*)
- (*J. xiphioides montanus*)
- Luzula spicata* (L.) DC. . . . . Arctic wood-rush or spike wood-rush.
- (*Juncoides spicatum*)
- Luzula parviflora* (Ehrh.) Desv. . . . . Small-flowered wood-rush or millet woodrush.
- (*Juncoides parviflorum*)

### LILY FAMILY (LILIACEAE, MELANTHACEAE, CONVALLARIACEAE)

This family is characterized by undivided and parallel-veined leaves and flower parts in 3's or 6's. The perianth is made up of segments. These may be all alike or of two kinds corresponding to sepals and petals.

- A. Inflorescence a slender, erect, spikelike raceme, flowers cream  
*Wandlily* (p. 49)
- AA. Inflorescence not as above.
  - B. Inflorescence umbellate; flowers pink or whitish  
*Wild onion* (p. 45)
  - BB. Inflorescence not umbellate.
    - a. Flowers solitary or few, erect, or if bright yellow, nodding; stems not branched.
      - b. Flowers white or lavender-tinged.
        - c. Plant stemless; flower pure white; growing on open fields at low altitudes; blooming in early spring  
*Sandlily* (p. 47)
      - cc. Plant with slender stem.
        - d. Flower 1 inch long or less; alpine zone; petals purple-veined . . . . . *Lloydia* (p. 47)
        - dd. Flower usually 2 inches long or more; petals with dark splotches at base . . . *Mariposa* (p. 46)
    - bb. Flowers red or yellow.
      - c. Flowers bright yellow, nodding . . . *Snowlily* (p. 46)
      - cc. Flowers red, erect . . . . . *Wood lily* (p. 47)
  - aa. Flowers few or many; plant leafy-stemmed.
    - b. Stem branched.
      - c. Flowers few, terminal, ripening into red berries  
*Fairybells* (p. 49)
    - cc. Flowers axillary, pendent, ripening into red berries  
*Twisted stalk* (p. 50)
  - bb. Stem unbranched; flowers in a terminal raceme  
*Solomonplume* (p. 49)

*Wild onion, Allium*.—Plants from bulbs with slender basal leaves and leafless stems bearing terminal umbels of white or rose-colored flowers. Perianth segments all alike. Foliage with a distinct onion smell when bruised. The different species may be distinguished by the following key:

- Umbels nodding, flowers pink or whitish, bulb coat not netted . . .  
*Nodding onion*
- Umbels not nodding; bulb coat netted or fibrous.
  - Flowers rose-purple; plants of montane and subalpine meadows  
*Purple onion*
  - Flowers pinkish or whitish; rare, alpine plant . . . *Pikes Peak onion*

*Nodding onion, Allium cernuum* Roth, is common on fields and hillsides of the montane and subalpine zones and the *purple onions, Allium geyeri* Wats. and *Allium brevistylum* Wats., in meadows of the same zone. The *Pikes*

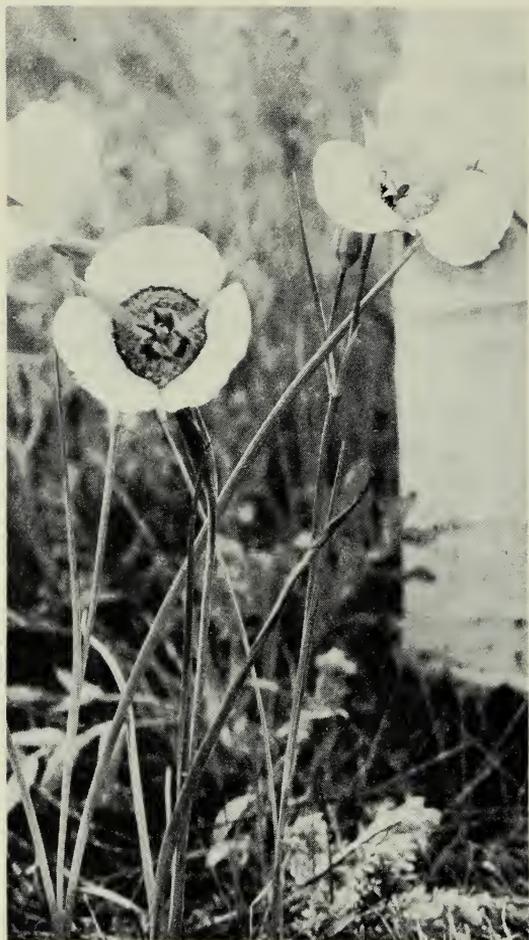


Figure 6.—MARIPOSA-LILY.  
FLOWERS WHITE OR PALE  
LAVENDER, 2 TO 3 INCHES ACROSS.  
Photograph by Kenneth Hartley.

*Peak onion*, *Allium pikeanum* Rydb., is a rare alpine plant and has been found in the Rocky Mountain National Park only on Twin Sisters Mountain. *Allium textile* Nels. & Macb. has been reported.

*Mariposa-lily*, or *Gunnison mariposa*, *Calochortus Gunnisonii* Wats. (fig. 6).—One of the most beautiful plants of the park blooming in early summer. The large tuliplike white or lavender flowers are borne on a slender stem. Perianth segments are of two kinds, three broad petals, with dark splotches at their bases, and three narrow sepals. The leaves are narrow and tapering. These plants are most commonly found near the edges of moist aspen thickets and in meadows.

*Snowlily* or *yellow fawnlily*, *Erythronium grandiflorum* ssp. *chrysandrum* Applegate (fig. 7).—A striking plant with bright yellow flowers, blooming as the



Figure 7.—SNOW-LILY. FLOWERS BRIGHT YELLOW, 1 TO 2 INCHES ACROSS. Photograph by Paul F. Shope.

snow melts in the subalpine zone. The six-pointed petals are recurved. Leaves, only two and basal. This plant is frequent in Wild Basin, on Specimen Mountain, and on the western slope. It follows the snow up the slopes, and all stages, from ripened seed to pointed shoots just breaking the ground, may be found in a climb of from 9,000 to 11,000 feet.

*Sand-lily* or *starlily*, *Leucocrinum montanum* Nutt. (fig. 8).—A snow-white lily blooming close to the ground in early spring. The leaves are long and narrow and the flowers without stems. This plant is abundant on the plains and eastern foothills, where it blooms in April. It is found in May around Estes Park, but is seldom found at a higher altitude.

*Mountain wood lily*, or *Western orangecup lily*, *Lilium umbellatum* Pursh, (*L. montanum*) (fig. 9).—A rare and beautiful plant of the montane meadows



*Figure 8.*—SAND-LILY. PLANT STEMLESS, FLOWERS WHITE, 1 INCH OR MORE ACROSS. Photograph by Kenneth Hartley.

*Figure 9.*—WOODLILY. FLOWERS ORANGE-RED. PLANT 10 TO 18 INCHES HIGH. Photograph by Joseph Dixon.

*Figure 10.*—ALP-LILY. STEM 2 TO 6 INCHES HIGH. FLOWERS WHITE OR CREAM. Photograph by Kenneth Hartley.



and moist thickets with erect goblet-shaped red blossoms 3 or 4 inches deep. The upper leaves are in whorls. This is similar to and closely related to the wood lily, *Lilium philadelphicum* of the East.

*Lloydia* or *alplily*, *Lloydia serotina* (L.) Sweet (fig. 10).—A slender plant of the alpine zone usually blooming rather early in the season. The petals and sepals are creamy-white, veined with purple, sometimes tinged with pink on the outside. Stem 2 to 6 inches high. It is most abundant on exposed rocky slopes.

*Wandlily* or *mountain deathcamas*, *Zygadenus elegans* Pursh (fig. 11).—Flowers several in a spikelike raceme, cream-colored; petals and sepals alike, each with a greenish or yellowish spot. Plants growing in meadows at all altitudes. In the alpine zone a dwarf form is common. This plant is somewhat poisonous but less so than are the other species of the genus which are found at lower altitudes and sometimes cause the death of sheep and cattle.

*Fairybells* or *wartberry fairybells*, *Disporum trachycarpum* (Wats.) B. & H.—Flowers greenish or yellowish, inconspicuous; fruit a bright red, three-lobed berry, at the tips of the branches. This has been found around the Brinwood and along the Cub Lake Trail.

*Starry Solomonplume*, *Smilacina stellata* (L.) Desf. (*Vagnera stellata*).—A frequent plant of the montane and subalpine zones with a terminal raceme

Figure 11.—WANDLILY. STEMS 6 TO 24 INCHES HIGH. FLOWERS WHITE WITH GREEN OR YELLOWISH SPOTS. Photograph by Kenneth Hartley.



Figure 12.—TWISTED STALK, 2 TO 4 FEET HIGH. FLOWERS CREAM-COLORED, BERRIES RED. Photograph by author.



of small, star-shaped white flowers ripening into mottled berries. The leaves are opposite and sessile. Two forms of this plant occur—a slender dark green type with flat leaves in shady moist situations, and a more stout and dwarf form, yellowish-green and with leaves more or less folded, in dry and sunny situations. The stems of the Solomonplume are never branched. Two other kinds of *Solomonplume* are sometimes found: *Smilacina racemosa* (L.) Desf. (*Vagnera racemosa*), and *Smilacina amplexicaulis* Nutt. (*Vagnera amplexicaulis*).

*Twistedstalk* or *claspleaf twistedstalk*, *Streptopus amplexifolius* (L.) DC. (fig. 12).—A plant 2 to 4 feet high, frequent in the upper montane and subalpine forests. It may be distinguished from the Solomonplume by the branching stem and axillary, pendent blossoms which ripen into red berries.

Figure 13.—BLUE FLAG. FLOWERS BLUE, PLANTS 8 TO 16 INCHES HIGH. Photograph by Kenneth Hartley.



Figure 14.—BLUE-EYED-GRASS. PLANT 6 TO 12 INCHES HIGH. FLOWERS SMALL, BLUE. Photograph by Kenneth Hartley.



## IRIS FAMILY (IRIDACEAE)

This family is related to the lily family and has parallel-veined leaves; sepals, petals, stamens, and divisions of the seed pod—three each. The seed pod is inferior, that is, the corolla and other flower parts are on top of it.

*Blue flag* or *Rocky Mountain iris*, *Iris missouriensis* Nutt. (fig. 13).—Common in meadows and moist situations of the montane zone. The flower may be easily recognized by its similarity to the garden irises. The meadows in Moraine Park, Horseshoe Park, and along the Devils Gulch and Longs Peak roads are often blue with these charming flowers in June.

*Blue-eyed-grass*, *Sisyrinchium occidentale* Bickn. (fig. 14).—A plant with grass-like leaves and small, bright blue flowers found in wet meadows. The flowers open only when the sun is shining.

## ORCHID FAMILY (ORCHIDACEAE)

This is one of the most highly specialized families of plants. The stamens and pistil are grown together and the flower is irregular. The lower petal is usually developed into a sac or spur and is called the *lip*. All flowers in the orchid family are so constructed that in order to produce good seed they must be pollinated by insects.

Flowers conspicuous; lip inflated.

Flowers yellow; plant 8 inches high or over . *Yellow ladyslipper* (p. 52)

Flowers not yellow.

Flowers rose-purple, solitary . . . . . *Fairy slipper* (p. 52)

Flowers dull purplish or brownish, usually two or more on each stem. . . . . *Brownie ladyslipper* (p. 53)

Flowers usually inconspicuous, white or greenish.

Plant brown except for the flowers, no green leaves present

*Coralroot* (p. 53)

Plant always with green leaves.

Leaves dark green mottled with white. *Rattlesnake-plantain* (p. 53)

Leaves bright, even green.

Leaves only one or two.

Leaf one, near base of stem . . . *One-leaved orchid* (p. 53)

Leaves two, opposite, half way up stem. *Twayblade* (p. 53)

Leaves several, flowers in spikes.

Spike spirally twisted . . . . . *Spiranthes* (p. 53)

Spike not spirally twisted . . . . . *Bog orchid* (p. 53)



Figure 15.—FAIRY SLIPPER. PLANT 4 TO 6 INCHES HIGH. FLOWER ROSE-PURPLE. Photograph by Kenneth Hartley.



Figure 16.—YELLOW LADYSLIPPER. STEMS 10 TO 16 INCHES HIGH, FLOWERS YELLOW. Photograph by Kenneth Hartley.

*Fairy slipper* or *calypso*, *Calypto bulbosa* (L.) Oakes (fig. 15).—A dainty little orchid with rose-colored, slipperlike flower found in June in moist pine and spruce woods and along shady streams (*C. borealis* and *Cytherea bulbosa*).

*Yellow ladyslipper* or *large yellow ladyslipper*, *Cypripedium parviflorum* var. *pubescens* (Wild.) Knight (*C. veganum*) (fig. 16).—One of the rarest and most beautiful plants in the Rocky Mountains. On no account should any blossoms be picked as the plant is in danger of extermination. This is a leafy-stemmed, one-flowered plant about 1 foot in height. The flower has a large yellow lip, 1 to 2 inches in length, and reddish-brown, twisted sepals.

**Brownie ladyslipper**, *Cypripedium fasciculatum* Kellogg (*C. knightae*).—A small plant with only two leaves on each stem and several inconspicuous dark-reddish flowers, frequently found in the spruce forests of the subalpine zone. It grows singly or in clumps.

**Spotted coralroot**, *Corallorhiza maculata* Raf. (*C. multiflora*).—A saprophytic plant without green leaves growing in coniferous forests of the montane and subalpine zones. The brownish stem bears several dainty flowers with purplish-spotted petals. Another species of **Coralroot**, *Corallorhiza trifida* Chatelain (*C. innata* and *C. corallorhiza*), has been reported.

**Spiranthes** or **Continental ladies-tresses**, *Spiranthes romanzoffiana* Cham. (*S. stricta*, *Gyrostachys stricta*, *Ibidium strictum*).—A small plant rarely over 6 inches high with light green foliage and a twisted, crowded spike of pure white, fragrant blossoms. It is frequent in the subalpine zone where it is often found growing in moss, especially around Nymph Lake and in bogs along the Loch Vale trail.

**Western rattlesnake-plantain**, *Goodyera decipiens* (Hook.) Hubbard (*G. menziesii*, *Peramium decipiens*).—A plant of moist, coniferous forests, with mottled leaves, all basal, and a spike of inconspicuous greenish flowers. Flower stem 4 to 8 inches high.

**White bog-orchid**, *Habenaria dilata* (Pursh) Hook. (*Limnorchis borealis*).—A slender plant 1 to 2 feet tall bearing a spike of white flowers with narrow petals, the lower produced backward into a slender spur. The **Northern green habenaria** *Habenaria hyperborea* (L.) R. Br. (*L. viridiflora*), a stouter plant with green blossoms and the **bracted bog-orchid** or **Satyr habenaria**, *Habenaria bracteata* (Willd.) R. Br. (*Coeloglossum bracteatum*), with toothed lip are also found. All three grow in the bogs and meadows of the subalpine zone and are especially abundant around Bear Lake. The **one-leaved orchid**, *Habenaria obtusata* Richards. (*Lysiella obtusata*), is occasionally found in wet coniferous woods. It may be recognized by its one obtuse leaf.

**Heart-leaved twayblade**, *Listera cordata* (L.) R. Br. (*L. nephrophylla*, *Ophrys nephrophylla*), and **northern twayblade** (*Listera convallarioides* (Sw.) Torr. (*Ophrys convallarioides*)).—Inconspicuous plants of mossy or wet shaded banks. They are easily recognized by the two broad, opposite leaves placed about the middle of the stem. The shape of the lip petal distinguishes the two species. In the former it is divided halfway to the base into two narrow pointed lobes. In the latter it is wedge-shaped with two short rounded lobes.

## WILLOW FAMILY (SALICACEAE)

Nearly all of the nonevergreen trees and many of the shrubs of the park belong to this family. The leaves of these are never compound, lobed, or cut.

**Narrowleaf cottonwood**, *Populus angustifolia* James.—Very abundant along

the streams in the montane zone and below. This tree is striking in the autumn, when the leaves turn a brilliant orange-yellow.

*Balsam poplar, Populus balsamifera* L.—A rare tree in the park. A few are found along the lower part of the Fern Lake trail and some have been seen in Wild Basin. It may be distinguished from the above by its fragrant, sticky buds and broader, ovate leaf. The name *Populus tacamahacca* Mill. is being adopted by some authors for this tree.

*Quaking aspen, Populus tremuloides* Michx. (pl. VII).—The most common broad-leaved tree in the park. It is found throughout the montane and subalpine zones. In moist, sheltered situations and on good soil it develops beautiful groves of tall, straight white-barked trees. On rocky slopes or on poor soil it forms scrubby thickets. The petiole is flattened at right angles to the blade of the leaf, which enables the leaves to move with the slightest breeze, and this habit gives the trees their name of *quaking aspen*. Some of these trees will be found along nearly all water courses and ravines in the park. When they put on their autumn coloring every big and little ravine stands out, a stream of flame or gold color, in vivid contrast to the dark green of the surrounding coniferous forest.

*Willow, Salix*.—The willows of the park are numerous in species and abundant as individuals. They border the streams in all the lower valleys, form dense thickets in the subalpine zone, spread over the moist swales at timberline as knee-deep carpets and creep as tiny dwarfs among the stones of the alpine regions. They are subject to diseases which cause them to die back periodically but when in good condition they contribute in all seasons to the beauty of the region. The gray tones of their leafless twigs merging into yellow, reds, and bronzes, which become intensified with the approach of the growing season, give life to the winter picture; in spring several species display typical "pussy willow" catkins, their flower buds. As the flowers develop and these silvery "kittens" extend into catkins with yellow-anthered stamens increasing their size and conspicuousness, some of these shrubs are really handsome. Then comes the early green of their leaves while other shrubs and trees are still dormant. During the summer different species show subtle differences in color, bright greens, blue greens, and silvery effects. As autumn approaches, their foliage becomes a mantle of gold and russet, ripening and falling to merge with the accumulation of vegetation which helps build up the bogs into meadows, forming spongy humus-filled soil.

In addition to their contribution to our sense of the beautiful, they serve much of our wildlife in many ways. Beaver are almost entirely dependent on them for food in areas where aspen are not available, and they are used extensively in the dams. Elk and deer browse their bud-laden twigs and rest in the protection of their dense thickets. Many smaller mammals and birds, notably the ptarmigan, find both food and shelter in all types of willow growth.

Members of this genus may always be easily identified by the single bud-scale which covers each bud like a little hood. In many species when the bud begins to expand this scale is simply pushed up where it perches temporarily as a small cap. The differentiation of the individual species of *Salix* is much more difficult. To anyone who wishes to study this group in detail, a paper entitled "The Willows of Colorado" by Professor E. C. Smith<sup>8</sup> is highly recommended. Professor Smith has spent much time in studying willows, especially in the park area. His paper is the basis for the information given here.

The commonest tall willow (9 to 18 feet) along the streams about Estes Park and up to about 8,500 feet (extends occasionally to 9,000 feet), is the *mountain willow*, *Salix monticola* Bebb. *Bebb willow*, *Salix bebbiana* Sarg., is naturally a tall shrub (on the Wild Basin trail it reaches 25 feet) with very small leaves, distinctly netted on the under side. However, in the open parks, such as Horseshoe Park, it is often browsed down to only 2 or 3 feet. The commonest species found below 8,000 feet about Estes Park village, Beaver Point, and Grand Lake, is the *caudate-leaved willow* or *whiplash willow*, *Salix caudata* (Nutt.) Heller. This grows 6 to 12 feet tall and has shining reddish or reddish-yellow twigs. (The road into the Stanley Hotel grounds is bordered by these.)

The *silver pussy willow* of the park is *Salix subcoerulea* Piper. This shrub grows 3 to 12 feet tall; its smooth purplish-brown branches are often covered with a bluish bloom; its leaves are silvery-silky; and its large silvery catkins appear before the leaves unfold. The anthers are a "striking red before shedding the pollen." *S. irrorata* Anders., another handsome pussy willow is only found along canyons below 6,000 feet.

*Scouler willow*, *Salix scouleriana* Barr.—A shrub or small tree found along streams with exceptionally large, oval or roundish, staminate catkins, from  $\frac{3}{4}$  to  $1\frac{1}{4}$  inches long and  $\frac{3}{4}$  inch wide, blooming before the leaves appear. The staminate bushes are conspicuous in May and early June when each shrub becomes a mass of pale yellow from the pollen-laden anthers of the catkins. (*S. flavescens*, *S. nuttallii*.) This species is seen at Bear Lake, Dream Lake, and at the first parking place on the Trail Ridge road. While it is common in moist locations it is the one species most likely to be found in dryer situations such as the dryer meadows and occasionally up on hillsides.

*Salix planifolia*, represented by two varieties, the *subalpine willow* or *mono piper willow*, *Salix planifolia* var. *monica* (Bebb) Schn. (*S. chlorophylla*), and *Nelsons willow* or *Nelson piper willow*, *Salix planifolia* var. *nelsoni* (Ball) Schn., is very abundant. Both forms extend over a wide range in altitude. They are bushy, much branched shrubs with their leaves dark green and shining above but glaucous beneath. Many of the dwarf willow thickets

<sup>8</sup> The American Midland Naturalist, vol. 27, no. 1, pp. 217-252, Jan. 1942.

at higher altitudes are made up mainly of these two, although Nelsons willow is also found growing 8 to 10 feet tall at lower stations such as Beaver Point.

One of the most interesting groups of plants in the whole park is that comprising the alpine creeping willows. These are woody plants with "trunks" sometimes an inch or more in diameter and often buried in the ground, and prostrate branches. Only short branchlets, one to a few inches high, stand erect. The *rock willow* or *skyland willow*, *Salix petrophila* Rydb. (*S. arctica petraea*), may be recognized by its dark green shiny leaves, pale beneath, which have distinctly yellow petioles. The *cascade willow*, *Salix cascadiensis* Cockerell, is rare in our area, more common in the northern Rockies, but may be found on Trail Ridge. It has more slender stems than the preceding and its leaves are light green on both surfaces. *Snow willow*, *Salix nivalis* Hook., is one of the tiniest. Its leaves are shining above, glaucous and strongly netted-veined beneath, with in-rolled margins and yellowish petioles. The *Rocky Mountain snow willow*, *Salix nivalis* var. *saximontana* (Rydb.) Schn., is much more common and larger, its branches may be up to 4 inches high with leaves paler and less shining but otherwise similar.

The alpine slopes between Fall River Pass and Poudre Lakes are excellent places to see these miniature willows. Many of the larger forms may be found here as well.

In addition to the above the following species have been identified in this area by Professor Smith: *Salix barclayi* Anders., *Salix brachycarpa* Nutt., *Salix geyeriana* Anders., *Salix petiolaris* J. G. Smith, *Salix pseudocordata* (Anders.) Rydb., *Salix pseudomonticola* var. *padophylla* (Rydb.) Ball, *Salix pseudolappinum* von Seem, *Salix serissima* (Bailey) Fern., *Salix wolfii* Bebb.

### BIRCH FAMILY (BETULACEAE)

Shrubs or small trees found along streams or on wet ground. Their flowers are in catkins and their leaves have toothed margins.

*Mountain birch* or *water birch*, *Betula occidentalis* Hook. (*Betula fontinalis*) (fig. 17).—A large graceful shrub with smooth reddish-brown bark and drooping branches, frequent along streams in the montane zone. The leaves are thin, ovate, and serrate. In some seasons these birches turn a beautiful clear yellow in the autumn.

*Bog birch*, *Betula glandulosa* Michx.—Abundant in the lower alpine and the subalpine zones and occasionally found lower. A dwarf, much-branched shrub with small, roundish toothed leaves; very common in meadows and along streams in the timber-line region.

*Alder* or *thinleaf alder*, *Alnus tenuifolia* Nutt. (fig. 18).—A small tree of shrub-like growth with gray bark and rather large distinctly veined and



Figure 17.—MOUNTAIN BIRCH. SHRUB 4 TO 12 FEET HIGH WITH SHINING REDDISH-BROWN BARK.

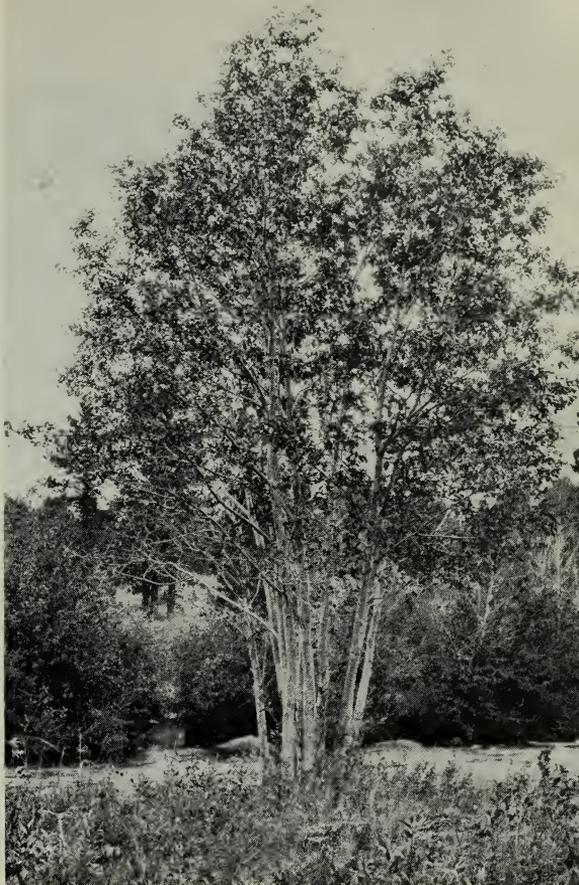


Figure 18.—ALDER. SMALL TREE OR SHRUB WITH GRAY BARK, 6 TO 20 FEET HIGH.

double-toothed leaves. Abundant along streams. The trunks are often 4 to 8 inches in diameter.

### NETTLE FAMILY (URTICACEAE)

The common *tall nettle*, *Urtica procera* Muhl. (*U. gracilis*), has been found on waste ground and along roadsides.

### MISTLETOE FAMILY (LORANTHACEAE)

The members of this family are all parasites. Those growing in the park are inconspicuous and belong to the group called the *lesser mistletoe*.

*Pine mistletoe*.—Yellowish-brown, woody plants with scalelike leaves, inconspicuous flowers, and sticky berries, growing as parasites on pine



Figure 19.—PONDEROSA PINES DEFORMED BY PARASITIC GROWTH OF MISTLETOE.

trees. *Arceuthobium americanum* Nutt. (*Razoumowskyia americana*), is found on limber pine and lodgepole pine. *Arceuthobium campylopodum* (A. Nels.) Gill, is also found on limber pine and *Arceuthobium vaginatum* (Engelm.) Gill, on ponderosa pine.

The mistletoe results in the development of "witches brooms" on the trees which it attacks and finally may cause the death of the tree. (Fig.19.) The sticky seeds are carried by birds to other trees, where they germinate and produce new plants. The only way to exterminate the mistletoe is to cut off all the infected parts of a tree and burn them, being careful that no particles drop off and escape. In many cases it is necessary to destroy the whole tree.

*BUCKWHEAT FAMILY (POLYGONACEAE)*

This family is characterized either by having the flowers in umbels subtended by involucre (as in the sulphur flowers), or by having the stipules membranous and sheathing the stem (as in the docks and knotweeds). Most plants of this family have triangular achenes.

Plant 1 to 2 feet tall; inflorescence much branched; leaves all basal, seeds triangular-winged . . . . . *Winged buckwheat* (p. 60)

Plant usually less than 1 foot tall.

Flowers in umbels with subtending involucre.

Plants dwarf and matted; leaves white, woolly; alpine zone

*Alpine golden buckwheat* (p. 60)

Plants erect, flower stems over 3 inches high.

Flowers deep yellow, turning reddish in drying.

Perianth smooth, plant very abundant on montane fields

*Sulphur flower* (p. 60)

Perianth hairy, plant rare . . . *Golden buckwheat* (p. 60)

Flowers cream-colored, sometimes with reddish tinge; subalpine and alpine zones. . . . . *Subalpine buckwheat* (p. 60)

Flowers not in umbels.

Flowers in the axils; leaves with papery, sheathing bases.

Plant climbing by means of a twining stem; leaves heart-shaped

*Black bindweed* (p. 60)

Plants not climbing.

Plant flat and matlike; leaves oblong; dooryards and roadsides . . . . . *Sidewalk weed* (p. 60)

Plant with erect or ascending stems; leaves long and narrow

*Knotweed* (p. 60)

Flowers in dense panicles, spikes, or heads.

Flowers never white nor brilliant rose color.

Plants less than 1 foot high; leaves acid flavored.

Leaves roundish or heart-shaped; subalpine or alpine among rocks . . . . . *Alpine mountain-sorrel* (p. 60)

Leaves halberd-shaped; plants of roadsides and waste ground . . . . . *Sheep sorrel* (p. 60)

Plants 1 to 3 feet high with stout stems and large leaves

*Dock* (p. 60)

Flowers white, pinkish, or rose.

Plant aquatic; flowers brilliant rose

*Water buckwheat* (p. 60)

Plants not aquatic; flowers white or tinged pinkish

*Bistort* (p. 62)

*Winged buckwheat* or *wing eriogonum*, *Eriogonum alatum* Torr.—A silky-hairy plant 1 to 3 feet high, branched above, with long, narrow, mostly basal leaves, rounded at the tips; frequently found on the montane fields. The triangular seeds are winged.

*Sulphur flower* or *sulphur eriogonum*, *Eriogonum umbellatum* Torr.—Very abundant on montane fields and hillsides, easily recognized by its umbrella-like clusters of small smooth yellow flowers and its woolly, entire leaves. Late in the season these flowers often turn reddish.

*Golden buckwheat* or *yellow eriogonum*, *Eriogonum flavum* Nutt.—This resembles the sulphur flower in appearance but is much less frequent. It may be distinguished by the hairy perianth. The *alpine golden buckwheat*, *Eriogonum xanthum* Small, is a rare, matted, dwarf plant, with smaller flower heads, found in a few places above timber line.

*Subalpine buckwheat* or *subalpine eriogonum*, *Eriogonum subalpinum* Greene.—A flower very similar to the sulphur flower but cream-colored instead of yellow; in maturity it has a reddish tinge. Found abundantly in the subalpine and alpine zones.

*Black bindweed* or *dullseed cornbind*, *Polygonum convolvulus* L.—A climbing plant with heart-shaped leaves and inconspicuous flowers occasionally found on waste ground.

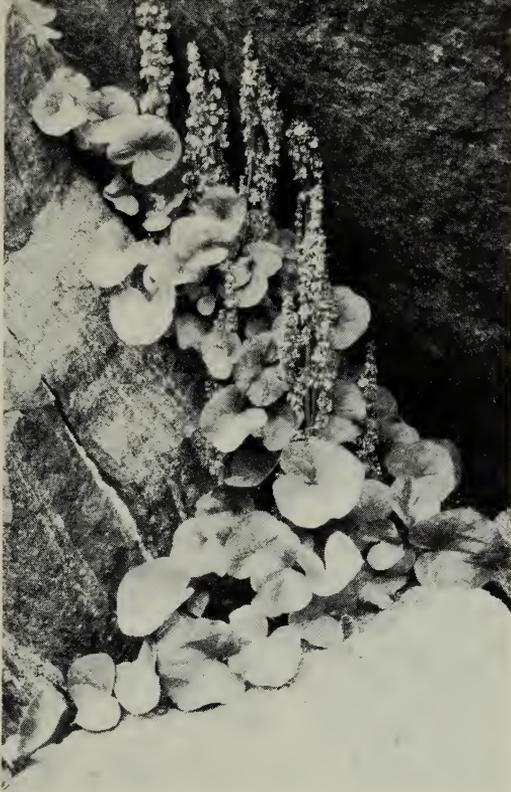
*Sidewalk weed* or *dooryard knotweed*, *Polygonum aviculare* L.—A common weed introduced from Europe; found around dwellings. It is a low spreading plant with pinkish green blossoms and black, shiny three-angled seeds. The following species of *knotweed*, with blossoms and seeds similar to the last, are found in the park: *Polygonum douglasii* Greene, *Polygonum engelmanni* Greene, *Polygonum emaciatum* A. Nels., and *Polygonum minimum* S. Wats. The latter is a small plant with crowded leaves and is apparently quite rare. Seed-eating birds are seen in late summer, fall, and winter busily feeding on knotweed seeds.

*Alpine mountain-sorrel*, *Oxyria digyna* (L.) Camptdera (fig. 20).—A smooth, rather fleshy plant with roundish leaves, found in the wet places among rocks of the alpine and subalpine zones. Many greenish flowers, the sepals tinged with red. The leaves of this plant are pleasantly acid and may be used to flavor the hiker's lunch.

*Sheep sorrel*, *Rumex acetosella* L.—A weed introduced from Europe, having leaves with two sharp lobes at the base, like a spearhead, and dense panicles of small reddish flowers; grows around dwellings and along roadsides. It is the "sour grass" of the East.

*Curly dock*, *Rumex crispus* L. and *Mexican dock*, *Rumex triangularis* (Dancer).—Both stout weeds with dense panicles of greenish blossoms. *Rumex densiflorus* Osterh. with valves without callosities and large leaves, often a foot or more in length, is found along streams or on wet ground.

*Water buckwheat* or *water ladysthumb*, *Polygonum amphibium* L., (*P. natans* and *Persicaria hartwrightii*) (fig. 21).—Growing in water, sometimes



*Figure 20.*—ALPINE-SORREL. LEAVES 1 TO 2 INCHES ACROSS, FLOWERS REDDISH GREEN. *Photograph by Joseph Dixon.*

*Figure 21.*—WATER BUCKWHEAT. SPIKE  $\frac{1}{2}$  TO  $1\frac{1}{2}$  INCHES LONG, BRIGHT ROSE. *Photograph by Kenneth Hartley.*





Figure 22.—BISTORT. WHITE,  
HEADS 1 TO 2 INCHES HIGH.  
Photograph by Joseph Dixon.

in mud, with bright rose-colored blossom spikes. This has been found in some of the lakes.

*American bistort*, *Polygonum bistortoides* Pursh, (*Bistorta bistortoides*) (fig. 22).—A plant of wet ground 8 inches to 2 feet high with a short, oblong, dense spike of white flowers sometimes tinged pinkish. Leaves narrow, entire, and mostly basal. *Slender bistort* or *viviparous bistort*, *Polygonum viviparum* L., (*Bistorta vivipara*) a much smaller plant with elongated, slender spike, in which the blossoms, or some of them, are often replaced by bulblets, is frequent in moist places of the subalpine and alpine zones. This plant also occurs in arctic America, Europe, and Asia.

### GOOSEFOOT FAMILY (CHENOPODIACEAE)

A family of weeds and vegetables. Most of the wild species are considered weeds, but the family includes many garden vegetables, such as spinach, beets, and chard.

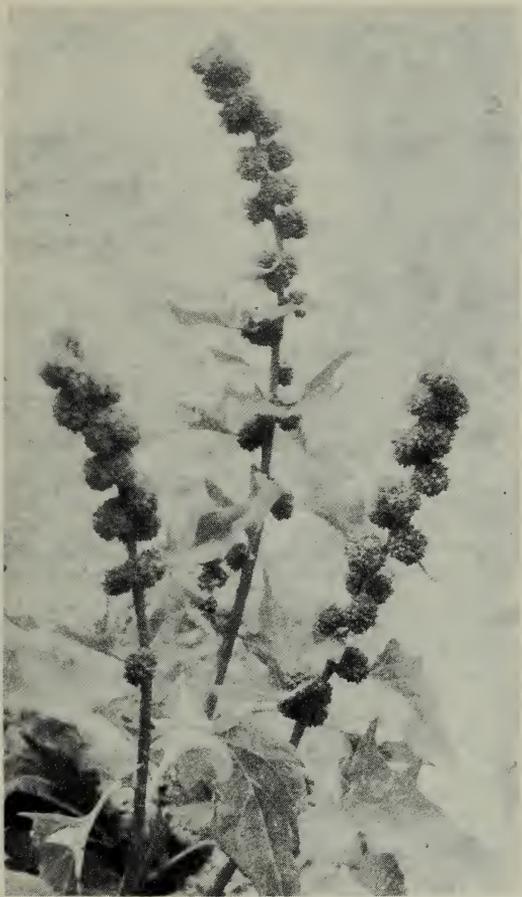


Figure 23.—SQUAW PAINT.  
FLOWER CLUSTERS DEEP RED;  
PLANT ABOUT 1 FOOT TALL OR  
LESS. Photograph by Kenneth  
Hartley.

*Squaw paint* or *blite goosefoot*, *Chenopodium capitatum* (L.) Asch. (*Blitum capitatum*) (fig. 23).—A plant with conspicuous deep-red, berrylike clusters of small flowers, and leaves with spear-shaped or heart-shaped bases. It is occasionally seen along roadsides and on poor soil. *Fremont chenopod*, *Chenopodium fremontii* S. Wats., a branching plant, 1 to 2 feet tall with triangle-shaped leaves and inconspicuous flowers, grows among bushes on open slopes of the montane zone and is very good cattle food. (*C. delta-phyllum*).

The other members of this family found in the park are weedy plants growing along roadsides and on waste ground. The following species occur; *lambsquarters*, *Chenopodium album* L., and *Chenopodium berlandieri* Moq., *monolepis*, *Monolepis nuttalliana* (Schult.) Greene. (*M. chenopodioides*) and *tumbling Russianthistle*, *Salsola pestifer* A. Nels.



Figure 24.—BIG-ROOTED SPRING BEAUTY. FLOWERS WHITE OR PINKISH, ABOUT ONE-HALF INCH ACROSS. Photograph by Paul F. Shope.

### AMARANTH FAMILY (AMARANTHACEAE)

A family containing many troublesome weeds, most of which are not native in this country.

*Rough pigweed* or *redroot amaranth*, *Amaranthus retroflexus* L.—A stout weed with crowded spikes of small, inconspicuous greenish flowers interspersed with spine-tipped bracts, growing along roadsides and on waste ground.

### FOUR O'CLOCK FAMILY (NYCTAGINACEAE)

The plants of this family derive their name from the habit of their flowers of opening late in the afternoon.

*Wild four-o'clock*, *Oxybaphus decumbens* (Nutt.) Sweet.—A purplish hairy plant with clusters of small flowers, surrounded by an involucre. Perianth pink or purplish. Found around Estes Park village and in rocky places of the montane zone. (Estes Park is the type locality for the form of this species described by Dr. Rydberg as *Allionia lanceolata*.)

### PURSLANE FAMILY (PORTULACACEAE)

This family may be recognized by the very thin and delicate petals, either white, pink, or purple, and the two sepals, together with smooth and entire leaves.

*Lanceleaf springbeauty*, *Claytonia lanceolata* Pursh, (*Claytonia rosea*).—An early spring plant with delicate pale pink blossoms often with darker veins, and a pair of smooth, entire leaves on the stem. The flowers open only in the sun and last but a day. Frequent on moist ground. It is quite abundant in Wild Basin, blooming around the snow banks.

*Big-rooted springbeauty* or *alpine springbeauty*, *Claytonia megarrhiza* (Gray) Parry (fig. 24).—A high alpine plant growing in rock crevices with a very large purple taproot, which often reaches to a great depth, and many white flowers with pinkish veins.

*Least lewisia*, *Lewisia pygmaea* (Gray) Robins (*Oreobroma pygmaea*).—A small plant of the alpine and subalpine zones with linear leaves and delicate rose-red or pale pinkish flowers. The two sepals have gland-tipped teeth which give them a minutely beaded appearance. The genus to which this plant belongs was named in honor of Capt. Meriwether Lewis, of the Lewis and Clark Expedition.

*Water springbeauty*, *Montia chamissoi* (Ledeb.) Durand & Jackson.—A weak-stemmed plant with fragile white flowers and opposite leaves, found along streams and in wet places.

### WHITLOW-WORT FAMILY (ILLEBRACEAE)

*Whitlow-wort* or *Rocky Mountain nailwort*, *Paronychia pulvinata* Gray, a tiny cushionlike plant of exposed mountaintops with very inconspicuous flowers, having awn-tipped sepals and no petals is occasionally found in the alpine zone. *James whitlow-wort* or *James nailwort*, *Paronychia jamesii* T. & G., has been found near Glen Haven.

### PINK FAMILY (CARYOPHYLLACEAE)

Opposite leaves and enlarged nodes are characteristics of this family. The petals are usually notched or split part way to the base. Most species are white-flowered; a few are pink or reddish.

Sepals united, forming a tubular or ovoid, 10-ribbed calyx.

Styles three . . . . . *Silene* (p. 67)

Styles five . . . . . *Lychnis* (p. 67)

Sepals distinct or nearly so.

Petals deeply notched or 2-cleft.

Styles usually three; plants usually smooth, never sticky  
*Chickweed* (p. 67)

Styles usually five; plants soft pubescent, often sticky above  
*Mouse-ear chickweed* (p. 66)

Petals entire or very slightly notched, often lacking.

Styles five . . . . . *Pearlwort* (p. 67)

Styles three.

Leaves narrow, rigid, sharp-pointed . . *Sandwort* (p. 66)

Leaves oblong, blunt at tip  
*Blunt-leaved chickweed* (p. 67)



Figure 25.—ALPINE SANDWORT. WHITE; PLANT MOSSLIKE. Photograph by Kenneth Hartley.

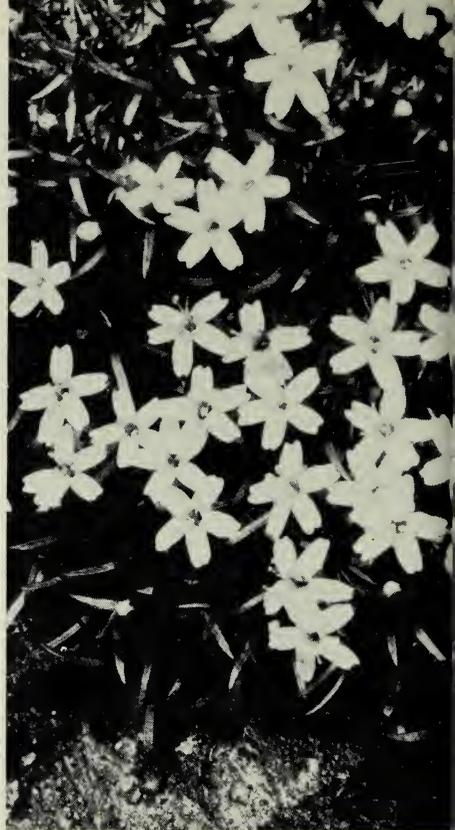


Figure 26.—MOSS CAMPION. PINK, NOT OVER 1 INCH ACROSS; PLANT MOSSLIKE. Photograph by Joseph Dixon.

*Fendler sandwort*, *Arenaria fendleri* Gray.—A tufted plant with narrow, rigid grasslike leaves and few to many white flowers with red or dark-colored anthers. Abundant in the montane and subalpine zones on hillsides and under pine trees. A dwarf form is sometimes found above timber line. The plant is sticky in the inflorescence.

*Equal-stemmed sandwort*, *Arenaria verna* var. *aequicaulis* A. Nels.—A small tufted plant apparently rather rare, with threadlike stems of nearly equal height, bearing small white flowers. The sepals are strongly three-nerved and longer than the petals. The leaves are crowded at the base, narrowly awl-shaped and semicylindric.

*Alpine sandwort*, *Arenaria obtusiloba* (Rydb.) Fern. (*A. sajanensis*, *A. biflora obtusa*, and *Alsinoopsis obtusiloba*.) (fig. 25).—A mosslike plant starred with comparatively large white blossoms, found in the alpine zone among rocks and on sandy ground, where it is very abundant.

*Mouse-ear chickweed* or *cerastium*, *Cerastium*.—The scientific name of this genus is from the Greek and means "little horn;" in reference to the shape

of the seed pod which suggests a powder horn. The small downy leaves give it its name of "mouse ear." This hairiness and the larger blossoms distinguish these plants from the true chickweeds of the genus *Stellaria*. Our species of *Cerastium* are difficult to distinguish and are found in all zones. The common white flower one-half inch broad or less, with hairy-sticky stem, cleft petals, and narrow, pointed leaves, found frequently on moist hillsides of the montane zone in May and June, is *Cerastium arvense* L.; *Cerastium oreophilum* Greene is also occasionally found. In the alpine zone *Cerastium beeringianum* Cham. & Schlect. is frequent.

**Mountain pink or campion**, *Lychnis montana* Wats. (*Wahlbergella montana*).—A dwarf, densely matted plant of the alpine zone with one-flowered stems 4 inches or less in height; calyx somewhat inflated and petals short, nearly or completely included in the calyx. It is not frequent.

**White cockle or evening campion**, *Lychnis alba* Mill.—A stout hairy weed with conspicuous white flowers, introduced around buildings and ranches. The flowers open at night. These plants are polygamo-dioecious.

**Drummond cockle**, *Lychnis drummondii* Wats. (*Wahlbergella striata*).—A slender plant of moist places, usually in the subalpine zone, with flowers 1 to 5, petals reddish (rarely whitish), and calyx with 10 dark stripes. At least the upper part of the stem is sticky.

**Moss campion or moss silene**, *Silene acaulis* L. (fig. 26).—A mossy, cushion-like plant with conspicuous pink flowers, abundant among rocks in the alpine zone. It is found in alpine-arctic situations from New Hampshire to New Mexico and to Alaska; also in Greenland and Eurasia.

**Hall catchfly**, *Silene hallii* S. Wats.—A sticky, weedy-looking plant with dirty-white or cream-colored blossoms, frequently found in the aspen groves of the montane zone.

The *chickweeds* or *starworts*, slender, smooth little plants with small white starlike blossoms and pointed leaves and sepals, are frequently found in moist situations in all zones. The following species occur: *Stellaria crassifolia* Ehrh. (*Alsine crassifolia*), *Stellaria longifolia* Muhl. (*Alsine longifolia*), *Stellaria umbellata* Turcz. (*Alsine baicalensis*).

**Blunt-leaved chickweed**. *Moehringia lateriflora* (L.) Fenzl.—Found in similar places, may be distinguished from species of *Stellaria* by its oblong, obtuse leaves and its usually obtuse sepals.

**Arctic pearlwort**, *Sagina saginoides* (L.) Brit.—A tiny inconspicuous plant with narrow leaves and small flowers on very slender stems, found above 12,000 feet on Trail Ridge; probably elsewhere.

## WATERLILY FAMILY (NYMPHACEAE)

A family of aquatic plants with showy blossoms and large floating leaves. Only one species is found in the park. These plants are not true lilies.



Figure 27.—WHITE MARSH-MARIGOLD. WHITE, 1 TO 2 INCHES ACROSS. Photograph by Paul F. Shope.

They are more nearly related to the buttercups, as their flower arrangement indicates.

*Yellow pondlily* or *Rocky Mountain cowlily*, *Nuphar polysepalum* Engelm. (*Nymphaea polysepala*).—A plant with yellow flowers 2 to 3 inches across, blooming in July and August. Common in lakes between 9,000 and 10,000 feet altitude.

**BUTTERCUP FAMILY (RANUNCULACEAE)**

This family is a very large one and contains many of our most beautiful wild flowers. It is characterized by having an indefinite number, usually several, stamens and pistils, and by having the stamens, sepals, and petals, when present, inserted below the pistils. It includes a great many plants of widely differing appearance. The buttercup order is believed to include the most primitive of seed plants now living, and is considered by many botanists to be the trunk of the family tree of the seed plants from which the more highly specialized groups have branched off at different times through the ages. Many of our most showy garden plants belong to this group, including the *Ranunculus*, *Anemone*, *Delphinium*, *Paonia* (peony), and *Aquilegia* (columbine).

Plants climbing or trailing, stems woody . . . . . *Clematis* (p. 73)

Plants erect, never climbing or trailing; stems herbaceous.

Leaves compound, made up of numerous, roundish, usually lobed leaflets.

Flowers conspicuous, petals spurred . . . . . *Columbine* (p. 75)

Flowers inconspicuous; stamens numerous, long  
*Meadow rue* (p. 73)

Leaves simple, divided or compound but never composed of roundish leaflets.

Flowers regular.

Flowers in spikelike racemes, ripening into white or red berries  
*Baneberry* (p. 77)

Flowers never in spikelike racemes; fruit not berrylike.

Flowers with only one cycle of perianth segments present, these usually petallike.

Plants with silky or hairy foliage and stems  
*Anemone* (p. 75)

Plants with smooth foliage and stems.

Leaves entire, all basal . . *Marsh-marigold* (p. 70)

Leaves much divided; stem leafy  
*Globe flower*(p. 70)

Flowers with two cycles in the perianth, both sepals and petals . . . . . *Buttercup* (p. 71)



Figure 28.—GLOBEFLOWER. CREAM-COLORED, 1 TO 2 INCHES ACROSS. Photograph by Paul F. Shope.



Figure 29.—SNOW BUTTERCUP. YELLOW, ABOUT 1 INCH ACROSS, LEAVES FINELY DIVIDED. Photograph by Kenneth Hartley.

Flowers irregular, mostly dark blue, rarely pale or whitish.

Upper sepal spurred . . . . . *Larkspur* (p. 75)

Upper sepal helmet-shaped . . . . . *Monksblood* (p. 77)

*Mousetail*, *Myosurus aristatus* Benth.—A diminutive plant growing in mud, with a tuft of narrow leaves and small white blossoms, with numerous pistils which form a cylindric spike of achenes when mature. It has been found on wet ground in the vicinity of Longs Peak.

*White marsh-marigold* or *elkslip*, *Caltha leptosepala* DC. (*C. rotundifolia*) (fig. 27).—Abundant in swampy places of the subalpine and alpine zones. Its oblong or narrowly oval sepals vary from 5 to 15 in number. They are white inside, sometimes tinged with bluish outside. The anthers of the numerous stamens give the flower a conspicuous yellow center. It has several pistils which develop into a cluster of small green pods. The leaves, all basal, are 1 to 4 inches long, entire and usually oval, with a somewhat heart-shaped base.

*Globeflower* or *white globeflower*, *Trollius albiflorus* (Gray) Rydb. (fig. 28).—Abundant in meadows of the subalpine zone and occasionally above timber line. The flowers are cream-colored or white, cup-shaped, and from 1 to 2 inches broad. This plant resembles the alpine anemone in general appearance, from which it may be distinguished by the smoothness of its foliage and by the fact that the numerous pistils develop into a cluster of small pods, each containing several seeds. The leaves are palmately five to seven parted, the divisions toothed.

*Buttercups* are usually easy to recognize because of their shiny yellow petals that often appear as though varnished, and their usually much-dissected leaves. They are sometimes confused with the cinquefoils (p. 62), a group of the rose family having five-petaled yellow flowers. These two groups may be distinguished by a glance at the calyx. The calyx of the buttercup is made up of five separate green or yellowish sepals, while the sepals of the cinquefoils are united into a saucer-shaped calyx having five main divisions and five alternating bractlets. The name of this genus, *Ranunculus*, is from an old Greek word meaning "little frog," in reference, probably, to the marshy places in which buttercups are usually found. There are several species of buttercups growing at all altitudes in the park.

*Alkali buttercup* or *shore buttercup*, *Ranunculus cymbalaria* var. *saximontanus* Fern. (*Halerpestes cymbalaria*).—A plant with simple crenate leaves, spreading by means of stolens similar to strawberry runners that eventually root and start new plants. It grows in moist meadows, especially on alkali or salty soil, and has been found in Horseshoe Park and along Cow Creek (foot of Twin Sisters).

*Trailing buttercup*, *Ranunculus flamula* var. *ovalis* (Bigel.) Benson, (*R. reptans strigosus*).—Found in very wet places around lakes and beaver ponds. Its leaves are entire and very narrow,  $\frac{1}{8}$  inch or less in width, its stems slender and rooting at the nodes. Our variety is more or less hairy.

*Nuttall buttercup*, *Ranunculus nutallii* Gray, (*R. ranunculinus*, *Cyrtorhyncha ranunculina*).—A plant with thrice compound leaves, each of the divisions petioled and much dissected. The sepals are yellow and petallike, the petals very small and sometimes lacking. It is frequently found in spring and early summer on moist, partially shaded hillsides.

*Caltha-flowered buttercup*, *Ranunculus alismaefolius* var. *montanus* S. Wats. (*R. calthaeiflorus*).—This plant has entire leaves which are from 1 inch to  $2\frac{1}{2}$  inches long and from  $\frac{1}{4}$  to  $\frac{3}{4}$  inch wide, and each flower has five or more oblong petals. This is the only one of our buttercups, besides the trailing buttercup, which has all of the leaves undivided. It is found along streams and lakes and in other moist places of the subalpine and alpine zones.

*Snow buttercup* or *alpine buttercup*, *Ranunculus adoneus* Gray (fig. 29).—The most conspicuous and showy of our buttercups. Its large flowers are from  $\frac{1}{2}$  to  $1\frac{1}{4}$  inches broad and brilliant yellow, almost poppylike in appearance; its leaves are ternately dissected into narrow divisions. It is found in the upper subalpine and alpine zones, beginning to bloom as soon as the snow melts. The beautiful flowers are often found right at the edge of the snow and sometimes they even come up through it.

*Ranunculus escholtzii* var. *eximius* Benson, another handsome, large-flowered species, with digitately 3–7-divided leaves has been found at Mt. Copeland.

*Pygmy buttercup*, *Ranunculus pygmaeus* Wahl.—A tiny plant with slender, weak stems, sometimes found in moist rock crevices and on ledges in the alpine zone.

*Ranunculus natans* C. A. Meyer, a yellow-flowered species growing in shallow water occurs in some of the ponds, *Ranunculus macounii* Britt., is a stout plant of meadows.

Several other buttercups, all rather similar, are found in meadows and on stream banks of the park: *Ranunculus alpeophilus* A. Nels., *Ranunculus cardiophyllus* Hook., *Ranunculus glaberrimus* Hook. *Ranunculus pedatifidus* J. E. Smith, *Ranunculus acriformis* Gray, *Ranunculus eremogenes* Greene, *Ranunculus inamoenus* Greene and *Ranunculus gmelinii* Dc. var. *hookeri* (D. Don) Benson.

**Water crowfoot**, *Ranunculus aquatilis* var. *capillaceus* (Thuill.) DC. (*Batrachium flaccidum*).—An aquatic plant with white, buttercup-like flowers and finely dissected, floating leaves; found in ponds of the montane zone, where it forms large floating masses of brownish green, and is quite conspicuous when starred with the white flowers.

**Clematis**.—Mostly trailing, somewhat woody plants with opposite, compound leaves and conspicuous clusters of plumed achenes. The *western virgins bower* or *white clematis*, *Clematis ligusticifolia* Nutt., with small white

Figure 30.—PASQUE FLOWER. LAVENDER, ABOUT 2 INCHES ACROSS. PLANT COVERED WITH SILKY HAIRS. Photograph by Kenneth Hartley.



flowers in panicles and very conspicuous clusters of feathery fruits is a common vine of the foothills and has been found near Estes Park village. This seems to be the upper limit of its range.

*Columbian rock clematis*, *Clematis columbiana* (Nutt.) T. & G. (*C. occidentalis*, *Atragene columbiana*), and the *subalpine clematis* or *Rocky Mountain clematis*, *Clematis pseudoalpina* (Kuntze) A. Nels., are trailing vines found in the moist woods of the montane and subalpine zones where they bloom in June. The former has three leaflets, usually entire, and the latter, a more delicate plant, has three to seven variously toothed or parted leaflets. Their similar flowers are borne singly, each having four long-pointed blue or purplish sepals 1 to 2 inches long. Later in the season the plumed seed clusters make them conspicuous.

*Bush clematis*, *leather-flower* or *Douglas clematis*, *Clematis hirsutissima* Pursh (*C. douglasii*, *Viorna bakeri*), is an erect, pubescent plant with thick, dark purple sepals, found on the lower slopes of Twin Sisters Mountain and should be looked for in the Grand Lake region.

*Meadowrue*, *Thalictrum*, is often mistaken for maidenhair fern as the leaves are similar and the rue does not have conspicuous flowers. But these plants are not ferns at all, for they bear true seeds which ferns do not. In some species the pistillate and staminate flowers are on different plants and the latter consist of tassels of long slender stamens. The *alpine meadowrue*, *Thalictrum alpinum*, a dwarf plant with perfect flowers, is found in the subalpine and alpine zones. The *few-flowered meadowrue*, *Thalictrum sparsiflorum* Turcz., with perfect flowers, and *Fendler meadowrue*, *Thalictrum fendleri* Engelm., with dioecious flowers, are both found in moist aspen groves of the montane zone. The last two may be distinguished if found together because Fendler meadowrue is a bluish green and the few-flowered meadowrue is more yellowish green in color. *Veiny meadowrue*, (*Thalictrum venulosum* Trelease, and *Western meadowrue*, *Thalictrum occidentale* Gray, also occur.

*American pasqueflower*, *Pulsatilla ludoviciana* (Nutt.) Heller (*P. hirsutissima*, *Anemone patens*) (fig. 30).—This plant comes through the ground sometimes as early as March, well protected by its fur-covered sepals and involucre. It is one of the most beautiful and conspicuous of the early spring flowers. The large lavender blossoms with their gold centers resemble the garden crocus, to which this plant is in no way related. With the advancing spring it follows the disappearance of the snow up the mountain slopes all the way from the foothills to the alpine zone, blooming in clumps among the rocks or on the open grassland. Each of the many achenes has a long plumed style. As they ripen, these styles lengthen, giving the seed cluster a feathery appearance and providing a sail for each individual seed so that it can be carried long distances by the wind.



Figure 31.—ALPINE ANEMONE. WHITE, PLANT 4 TO 16 INCHES HIGH. *Photograph by Kenneth Hartley.*

*Alpine anemone* or *narcissus anemone*, *Anemone zephyra* A. Nels. (fig. 31).—A hairy plant of the subalpine and alpine meadows with three or more (rarely one) white flowers subtended by a sessile involucre. When the sepals fall a broad head of smooth black achenes is left. (This plant is closely related to a European species, *A. narcissiflora*.)

*Northern anemone* or *meadow anemone*, *Anemone canadensis* L.—A hairy plant of moist aspen groves and stream banks found in the montane zone and lower, with forking stems each bearing a single white flower subtended by a sessile involucre. The white sepals are satiny-hairy on the outside.

*Wind flower* or *Pacific anemone*, *Anemone globosa* Nutt.—A slender plant with solitary long-peduncled red, white, or yellowish flowers. Stem, leaves, and sepals hairy; achenes densely woolly. Found occasionally on hillsides of the montane and subalpine zones. *Anemone cylindrica* Gray is also reported to grow in the park.

*Colorado columbine*, *Aquilegia caerulea* James (fig. 32).—The State flower of Colorado. A beautiful plant with flowers 2 to 3 inches across of blue and white with very long slender spurs is found in all zones of the park. Originally abundant throughout the Rocky Mountains, this plant has become scarce through thoughtless picking and digging. This vandalism is now prohibited by law in the State of Colorado. In the park, where these plants have been protected for several years, they may be found abundantly in the subalpine zone, especially on rock slides, where they seem to thrive particularly well. The color of the blossoms on the plants found at high altitudes is often pale and sometimes even white. In shady, moist situations, such as aspen groves and ravines of the montane zone, flowers of rich deep blue will be found. A spurless variety of this plant the *star-flowered columbine*, *A. caerulea daileyae* Eastw., has been named from plants found in this region.

*Dwarf blue columbine* or *Rocky Mountain columbine*, *Aquilegia saximontana* Rydb.—A rare dwarf plant only a few inches high, with dark blue, short-spurred flowers, grows among rocks of the alpine zone.

*Western red columbine*, *Aquilegia elegantula* Greene.—A plant with red and yellow flowers found in moist places on the western slope, mainly in the montane zone.

*Larkspur*, *Delphinium*.—Plants with lobed or dissected leaves and spikes of irregular flowers, usually dark blue. The upper sepal is produced into a spur from which the plants take their common name.

*Nelson larkspur*, *Delphinium nelsonii* Greene.—An early blooming plant from 4 inches to a foot high, with very rich, dark purplish-blue flowers, found on sandy hillsides of the montane zone and in the foothills. It blooms in May and early June.

*Mountain larkspur*, *Delphinium scopulorum* Gray.—A tall plant 3 to 7 feet high, found in aspen groves of the montane zone, blooming in August.



*Figure 32.*—COLORADO COLUMBINE. BLUE AND WHITE, 2 TO 3 INCHES ACROSS. *Photograph by Joseph Dixon.*



Figure 33.—SUBALPINE LARKSPUR. DEEP BLUE, PLANT 2 TO 4 FEET HIGH, IN DENSE CLUMPS. Photograph by Joseph Dixon.

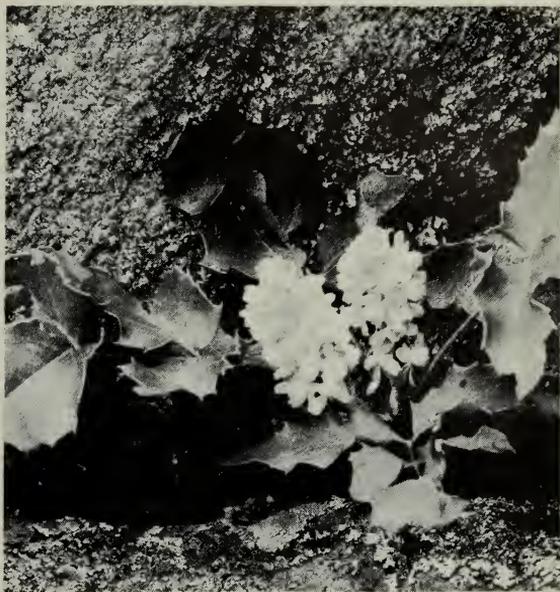


Figure 34.—HOLLYGRAPE. YELLOW, PLANT 6 TO 10 INCHES HIGH; BERRIES BLUE. Photograph by Kenneth Hartley.

Spike becomes elongated in fruit, sometimes with a few slender branches. Pods pubescent.

*Subalpine larkspur* or *Barbey larkspur* *Delphinium barbeyi* Huth. (*D. subalpinum*) (fig. 33).—A tall plant 2 to 4 feet high, growing in dense clumps in moist situations of the subalpine zone, with short, crowded spikes of very deep blue (rarely pink) flowers. Inflorescence often branched.

*Monkshead*, *Aconitum*.—Tall plants similar to the larkspur but with upper sepal forming a helmet instead of a spur and either blue or white flowers. These plants are said to be somewhat poisonous if eaten. *American monkshead* or *Columbia monkshead*, *Aconitum columbianum* Nutt. (*Aconitum bakeri*) with a long loose raceme of blue or whitish flowers, occurs in moist ground of the montane and subalpine zones.

*Baneberry*, *Actaea*.—Plants of moist thickets with compound leaves and spikes of showy red or white berries. *Actaea arguta* Nutt. is found in moist aspen thickets, especially along the lower part of the Fern Lake trail.

### BARBERRY FAMILY (BERBERIDACEAE)

Our plants of this family are shrubs with yellow blossoms and spiny-toothed leaves. Only one species is native in the park.

*Hollygrape* or *creeping mahonia*, *Mahonia repens* (Lindl.) G. Don, (*Berberis aquifolium*, *Odostemon repens*), (fig. 34).—A dwarf shrub, 6 to 10 inches high, with hollylike leaves, blooming in May and June, with clusters of pale yellow blossoms. The blue berries are found in late summer and fall. They are said to make delicious jelly when combined with apple or some other fruit and are much prized in the Northwest, where another species is abundant and grows much larger. The leaves often turn red, dark purple, or yellow in the fall.

### POPPY FAMILY (PAPAVERACEAE)<sup>9</sup>

*Pricklepoppy*, *Argemone intermedia* Sweet, with large, handsome white flowers having yellow centers, and glaucous foliage covered with very sharp, light-colored prickles, is a newcomer to these higher altitudes. Originally a plains species, it has spread during recent years along roadways until now it is quite frequently seen within the park.

### FUMITORY FAMILY (FUMARIACEAE)

Plants with irregular flowers having two sepals, and finely dissected, usually smooth leaves. The bleedingheart and Dutchmans breeches belong to this family. Only one species has been found in the park.

*Golden smoke* or *golden corydalis*, *Corydalis aurea* Willd., (*Capnoides aureum*).—A very attractive plant forming clumps of pale or bluish-green feathery foliage. In May and June short racemes of yellow flowers appear close to the ground. This plant thrives in disturbed soil and is seen most frequently along roadsides. It appeared abundantly on the burned area following the Twin Sisters fire.

### MUSTARD FAMILY (CRUCIFERAE)

This family receives its scientific name from the characteristic crosslike appearance of its four-petaled flowers. The ovary is above the other flower parts and the two-valved pod is termed a *siliqua*. It may vary in shape from almost circular, as in the penny cress, to linear, as in the wall-flowers. Most of the plants have a peppery taste. Many of our garden vegetables, such as radishes, turnips, cabbage, and cress, belong to this family.

(There are very many inconspicuous and weedy plants in this family, most of which are difficult to identify. Only the commonest and attractively flowered ones are included in this key.)

<sup>9</sup> The *alpine poppy*, *Papaver radicum* Rottb., is known from Grays Peak and several other high peaks of central Colorado and it seems logical to expect to find it in the park.



Figure 35.—BROOK-CRESS. WHITE; ABOUT A FOOT TALL, GROWING BY STREAMS. *Photograph by Joseph Dixon.*

Flowers white or lavender tinged.

Plant abundant along edges of subalpine streams, blooming in summer; leaves bright green and sharply toothed; flowers large, white

*Brook-cress* (p. 80)

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

Plant very slender, usually solitary; leaves bluish, flowers white or lavender . . . . . *Arabis* (p. 80)

Plant low, usually in tufts; flowers white . . . *Candytuft* (p. 80)

Flowers yellow or dark orange red.

Plant gray, hairy, rough, often spreading on the ground, pods inflated

*Lesquerella* (p. 81)

Plant erect, the alpine ones often very tiny and dwarf; pod not inflated.

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

Flowers yellow, large.

Plant rough, abundant and conspicuous on fields and hillsides in early summer . . . *Western wallflower* (p. 81)

Plant smooth, abundant and conspicuous on alpine fields and meadows . . . . . *Alpine wallflower* (p. 81)

Flowers dark orange or reddish, rare

*Wheelers wallflower* (p. 81)

Pod rarely more than twice as long as broad, flattened in cross section, often twisted . . . . . *Draba* (p. 81)

*Brook-cress* or *heartleaf bittercress*, *Cardamine cordifolia* Gray, (fig. 35).—A handsome plant frequently found along subalpine streams. It is a foot or more tall with a terminal raceme of white flowers somewhat resembling those of the garden candytuft, and heart-shaped leaves with toothed margins.

*Arabis* or *rockcress*, *Arabis*.—Slender, rather inconspicuous plants with small, white or lavender flowers and linear pods are very abundant on the montane fields and hillsides, blooming in April, May, and June. They are named for Arabia. *Arabis exilis* A. Nels. with hairy leaves and stem and pendent pods is the earliest to bloom. *Arabis Drummondii* Gray, with smooth, glaucous foliage, auriculate-clasping stem leaves, and erect pods, and *Arabis hirsuta* Scop., with erect pods and hairy, auriculate stem leaves, are both found in early summer. *Arabis divaricarpa* A. Nels., is also reported for this region. Early in the spring many of these plants are attacked by a yellow rust, a fungus parasite which grows in the tissue of the *Arabis* plant and gives the leaves a yellow color. These little rosettes of yellow leaves, very flowerlike in appearance, are quite conspicuous on the fields and hillsides in April.

*Wild candytuft* or *pennycress*, *Thlaspi*.—Tufted plants with wavy-mar-

gined, glaucous leaves, headlike racemes of white four-petaled flowers, and triangular or obcordate pods. *Fendler candytuft* or *Fendler pennycress*, *Thlaspi fendleri* Gray, (*T. purpurascens*) common on fields and open slopes of the montane zone and foothills in early spring, blooms in Estes Park in April and May. The *glaucous candytuft* or *blue pennycress*, *Thlaspi glaucum* A. Nels., is common in moist places above timber line in summer, and the *Colorado candytuft*, *Thlaspi coloradense* Rydb., a rare alpine plant, has also been found. *Frenchweed* or *field pennycress*, *Thlaspi arvense* L., an introduced weed, is occasionally seen around dwellings.

*Lesquerella* or *bladderpod*, *Lesquerella montana* (Gray) Wats.—A rough, grayish plant with stems spreading on the ground and turned up at the tips, bearing terminal racemes of pale yellow flowers. Pods more or less inflated. Frequent on dry, sandy, or stony soil of the montane zone.

*Wallflower* or *erysimum*, *Erysimum*.—Conspicuous plants found throughout the park with yellow, orange, or brown (rarely purplish), four-petaled flowers. The petals are broad above and narrowed into a slender “claw” at the base. The scientific name is from a Greek word meaning to draw blisters and probably refers to the early use of the acrid juice of these plants for that purpose. Even today the name “blister cress” is sometimes used for them. (Plants of this genus are also called *Cheirinia* and *Cheiranthus*.)

*Western wallflower* or *plains erysimum*, *Erysimum asperum* DC.—Very common on fields and open slopes of the montane zone and lower. The flowers are orange-yellow, conspicuous in June and early July. *Alpine wallflower*, *Erysimum nivale* (Greene) Rydb., a perennial plant with fragrant lemon-yellow flowers, is found above timber line, and *Wheeler wallflower* (*Erysimum wheeleri* Wats.), with orange, brownish, or rose-purple flowers, is sometimes found in the subalpine and alpine zones.

*Draba*, *rock cress*, or *whitlow grass*.—Small plants with yellow or white, four-petaled flowers, and flattened, ovate to lanceolate pods. Several species are found in the park but most are small and inconspicuous. Some are diminutive plants growing at very high altitudes and some are inconspicuous weeds. The *twisted pod draba*, *Draba streptocarpa* Gray, is the most conspicuous and is frequently found in the park. It blooms in May and June in the montane zone, where it is often found in colonies under ponderosa pine trees. Later in the season it will be found at high altitudes. Dwarf plants are sometimes seen among rocks on the highest summits. The flower is golden yellow and the pods distinctly twisted, as the specific name implies. Other yellow-flowered species of *Draba* found in the park are: *golden Draba*, *Draba aurea* Vahl, *thick-leaved Draba*, *Draba crassifolia* Graham, *shiny Draba*, *Draba nitida* Greene, (*D. stenoloba*), *yellow Draba*, *Draba chrysantha* Wats., *showy Draba*, *Draba spectabilis* Greene, and also *Draba nemerosa* L., *Draba lutea* Gilib, and *Draba crassa* Rydb. A rare, white-flowered species is *Draba fladnizensis* Wulf.

The following additional species belonging to this family, most of which are inconspicuous weeds, are found here: *Peppergrass*, *Lepidium apetalum* Willd., *tumblemustard*, *Sisymbrium altissimum* L., (*Norta altissima*) *tansymustard*, *Sophia hartwegiana* (Fourn.) Greene, and *Descurainia sophia* (L.) Webb., *cress*, *Roripa hispida* (Desv.) Brit. and *Roripa sinuata* (Nutt.) A. S. Hitch., *thelypody*, *Thelypodium paniculatum* A. Nels., and *shepherds purse* *Capsella bursa-pastoris* Medik., (*Bursa bursa-pastoris*).

### CAPER FAMILY (CAPPARIDACEAE)

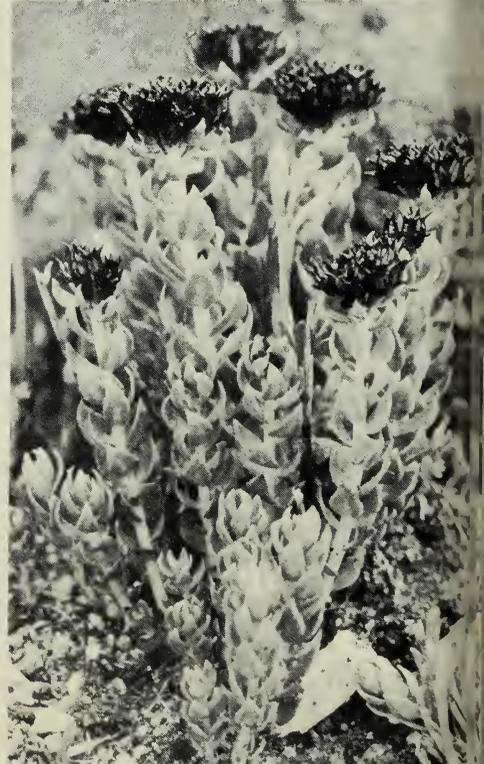
This family is characterized by having four petals, as is the mustard family, but in the caper family the pod is one-celled and elevated on a slender stem, and in the one species found in the park the leaves are palmately compound of three entire leaflets.

*Rocky Mountain bee plant* or *bee spiderflower*, *Cleome serrulata* Pursh.—A tall plant with conspicuous racemes of reddish-purple, or occasionally white, flowers, the raceme becoming very long in fruit. Occasionally found along roadsides of the montane zone, and lower. (*Peritonia serrulatum*.)

Figure 36.—ROSE CROWN. ROSE-COLORED; 6 TO 10 INCHES HIGH. Photograph by Joseph Dixon.



Figure 37.—KINGS CROWN. VERY DARK RED; 2 TO 8 INCHES HIGH. Photograph by Kenneth Hartley.



## STONECROP FAMILY (CRASSULACEAE)

Rock-loving plants with smooth fleshy leaves adapted for water storage, and four or five petals. Our plants take their generic name from the Latin verb *sedere*, "to sit," because of their habit of growing on rocks.

*Yellow stonecrop* or *wormleaf sedum*, *Sedum stenopetalum* Pursh.—A very common plant of stony ground, found from the plains to the alpine zone. The little rosettes of fleshy leaves appear very early, but the yellow flowers do not open until the middle of June in the montane zone. In August this plant is found in bloom in the higher altitudes. It is frequently found on rocks or in rock crevices, where it thrives with a minimum amount of water.

*Rose crown*, *Sedum rhodanthum* Gray (fig. 36).—A beautiful plant with a cluster of rose-pink blossoms found frequently along subalpine streams and occasionally in wet places of all zones. (*Clementsia rhodantha*.)

*Kings crown*, *Sedum integrifolium* (Raf.) A. Nels. (fig. 37).—A fleshy plant from 2 to 8 inches high with a crowded terminal cluster of very dark red or purplish, dioecious blossoms. It is found in July and later, in the alpine zone and occasionally lower. Late in summer the entire plant often turns a brilliant red. (*S. Rhodiola* and *Rhodiola integrifolia*.)

## SAXIFRAGE FAMILY (SAXIFRAGACEAE)

A family including many rock plants and taking its name, that means in the Latin "rock breaker," from the habit of many of its members of growing on or among rocks. Many of the species are arctic or alpine in their distribution.

Flowers not white or greenish.

Flowers yellow, small plants of alpine zone.

Plant with runners; leaves hairy or at least ciliate on the margins

*Whiplash saxifrage* (p. 85)

Plant without runners; leaves smooth

*Yellow alpine saxifrage* (p. 85)

Flowers purple; plants growing in rock crevices, not alpine

*Purple saxifrage* (p. 87)

Flowers white or greenish.

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

Stems leafy.

Petals with small colored dots, basal leaves in rosettes

*Dotted saxifrage* (p. 85)

Petals without colored dots; alpine plants of moist shaded crevices.

Plant with bulblets in the axils of the leaves

*Nodding saxifrage* (p. 85)



*Figure 38.*—YELLOW ALPINE SAXIFRAGE. 2 TO 4 INCHES HIGH, SOMETIMES GROWING SINGLY OR FEW TOGETHER. *Photograph by Paul F. Shope.*

*Figure 39.*—DOTTED SAXIFRAGE. WHITE WITH COLORED DOTS; 2 TO 4 INCHES HIGH. *Photograph by Joseph Dixon.*



Plant without such bulblets, very small and delicate, weak-stemmed. . . . . *Weak-stemmed saxifrage* (p. 85)

Stems not truly leafy, sometimes bearing one leaflike bract.

Stem with one leaflike bract about the middle; petals fringed  
*Fringed parnassia* (p. 87)

Stems entirely leafless.

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

*Snowball saxifrage* (p. 87)

Summer blooming plant of subalpine and alpine brooksides and wet ground . . . . . *Brook saxifrage* (p. 87)

Flowers greenish, in spikelike racemes.

Racemes many-flowered, crowded; plants often growing in rock crevices . . . . . *Alumroot* (p. 87)

Racemes with a few cap-shaped flowers widely spaced, plants growing in moist, shady places . . . . . *Mitrewort* (p. 87)

*Whiplash saxifrage*, *Saxifraga flagellaris* Willd.—A small infrequent alpine plant with brilliant yellow flowers and glandular-hairy stem and leaves. It spreads by means of runners, which accounts for its specific and common names. This is strictly an alpine plant and should be looked for among rocks on the high ridges and rocky summits above timber line. (*Leptasea flagellaris*.)

*Yellow alpine saxifrage* or *goldbloom saxifrage*, *Saxifraga chrysantha* Gray (fig. 38).—A dainty plant of the alpine rock fields with golden yellow flowers. The petals have orange spots and the yellow seed pod turns red in ripening. This is a smaller plant than the last and has none of the hairs or runners of its relative. It often grows in clumps sheltered by a protruding rock, and has been found in bloom on the summit of Mount Evans, more than 14,000 feet above the sea. (*Leptasea chrysantha*.)

*Dotted saxifrage*, *Saxifraga austromontana* Weigand, (fig. 39).—A dainty rock plant with a cushionlike habit of growth. Each rosette of pointed leaves sends up a slender stem bearing several flowers. The petals are white and dotted with orange and dark red. Found in dry pine and spruce forests of the montane and subalpine zones, and occasionally above timber line. In the lower altitudes it begins to bloom about the middle of June. (*S. bronchialis* L. and *Leptasia austromontana*.)

*Nodding saxifrage*, *Saxifraga cernua* L.—A diminutive plant with slender stem and five to seven-lobed leaves found under rock ledges and in crevices in moist, shady situations of the alpine zone. The white flowers are nodding and clusters of bulblets are borne in some of the leaf axils. A very similar plant with no bulblets, sometimes found in moss in very shady situations, is the *weak-stemmed saxifrage*, *Saxifraga debilis* Engelm.



Figure 40.—SNOWBALL SAXIFRAGE. WHITE; 3 TO 8 INCHES HIGH. *Photograph by Kenneth Hartley.*

*Snowball, or diamondleaf saxifrage, Saxifraga rhomboidea* Greene (fig. 40).—A spring blooming plant of the foothills and montane zone, occurring in summer in the alpine and subalpine zones. In April or May at the lower altitudes in the park, on moist hillsides and among aspens, you may find depressed rosettes of pale green oval or pointed leaves. Soon a stout stem is sent up from the center of this rosette, bearing a dense headlike cluster of small white flowers. As the flowers mature, the cluster elongates until a long inflorescence with scattered clusters of flowers or seed pods results. (*Micranthes rhomboidea*.)

*Brook saxifrage, Saxifraga arguta* Don.—A beautiful plant of subalpine brooks, lakesides, and very wet places. It seems to thrive best among rocks in shallow running water, where it is easily recognized by its shining, nearly round, coarsely toothed basal leaves which are from 1 to 2½ inches broad. The tall, slender-branched flower stem bears many dainty small white flowers. (*Micranthes arguta*.)

*Purple saxifrage* or *James boykinia, Boykinia jamesii* (Torr.) Engler (fig. 41).—A plant of rock crevices in the montane zone with kidney-shaped, toothed leaves and spikes of purple flowers. The petals have a round blade and long claw. (*Saxifraga jamesii* and *Telesonix jamesii*.)

*Fringed parnassia* or *Rocky Mountain parnassia, Parnassia finbriata* Banks. In the subalpine bogs and wet meadows one may find an attractive plant growing in clumps with many smooth, kidney-shaped or heart-shaped leaves at the base and slender flower stems. Each stem bears a heart-shaped leaf at about its middle and a dainty white five-petaled flower about one-half inch across. Each petal is fringed toward the base. *Grass of parnassus* or *smallflower parnassia, Parnassia parviflora* DC., a similar plant but lacking the fringe, has also been found.

*Alumroot, Heuchera bracteata* (Torr.) Ser. (fig. 42).—Found in dense mats on rocky ledges, in crevices, and among stones. The dead leaves are more or less persistent and with the prostrate stems form brown mats against which the bright new leaves show up in sharp contrast in spring. The flowers are small, bell-shaped, and greenish, and borne in short, dense spikes. The leaves are sharply toothed. In autumn some of the leaves turn rose-color or red. The *littleleaf alumroot, Heuchera parvifolia* Nutt., is frequent on shaded rocky slopes. In this species the spike elongates and the flowering stems are often nearly a foot high. The leaves have rounded lobes. *Halls alumroot, Heuchera hallii* Gray, has also been reported.

*Mitrewort* or *Bishops cap.*—Inconspicuous little plants of moist, rich ground in shaded pine and spruce forests, with basal leaves and slender stems bearing caplike flowers. The *common mitrewort* or *five-stamen miterwort, Mitella pentandra* Hook. (*Pectianthia pentandra*), is frequently seen and both *Mitella parryi* (Piper) A. Nels. (*Ozomelis parryi*), and *Mitella violaceae* Rydb. (*Ozomelis violaceae*) have been found.

*Gold-saxifrage, Chryso-splenium tetrandum* Th. Fries.—A low smooth plant

with alternate tender succulent leaves, reniform in shape with rounded lobes. The inconspicuous flowers have no petals, the four or five blunt calyx lobes are yellow inside; the stamens are four, or rarely five to eight. This very rare arctic plant has been found in the park on a cliff in dense shade in the subalpine zone, and is known to have been collected only once before in Colorado.

*Fairy stars* or *slender woodlandstar*, *Tellima tenella* (Nutt.) Walp., (*Lithophragma tenella*) grows near Fern Lake.

### GOOSEBERRY FAMILY (GROSSULARIACEAE)

Shrubs with or without spines, leaves palmately lobed with radiating veins, flowers tubular, and fruit a berry usually crowned with the withered remains of the flower.

*Mountain gooseberry* or *redshoot gooseberry*, *Ribes saximontanum* E. Nels.—A shrub with sharp spines, usually two or three together, and reddish-purple berries of good quality for jelly and preserves. Found on moist ground of the montane zone and lower.

*Prickly currant*, *Ribes lacustre* (Pers.) Poir.—A low shrub with bristly branches and black insipid berries covered with gland-tipped bristles, found in the upper montane and subalpine zones. (*Limnobotrya parvula*.) *Ribes saxosum* Hook. and *Gooseberry currant*, *Ribes montigenum* McClatchie, are also found.

*Squaw currant* or *wax currant*, *Ribes cereum* Dougl.—One of the most common shrubs of the ponderosa pine belt and found sometimes up to timber line. Usually forming rounded shrubs or clumps 1 to 3 feet high, the stems rigid and much branched, the leaves roundish, 1½ inches broad or less, crenately lobed, and with a distinctive odor when crushed. The red, insipid berries ripen in summer and are eaten by birds and small animals. (*Ribes inebrians*.)

*Subalpine black currant* or *Colorado currant*, *Ribes coloradense* Coville.—A rambling shrub of the subalpine zone with lobed, heart-shaped or kidney-shaped leaves and racemes of pinkish or purplish flowers which develop into black currants. *Wolfs currant* or *Rothrock currant*, *Ribes wolfii* Rothrock, has been found also.

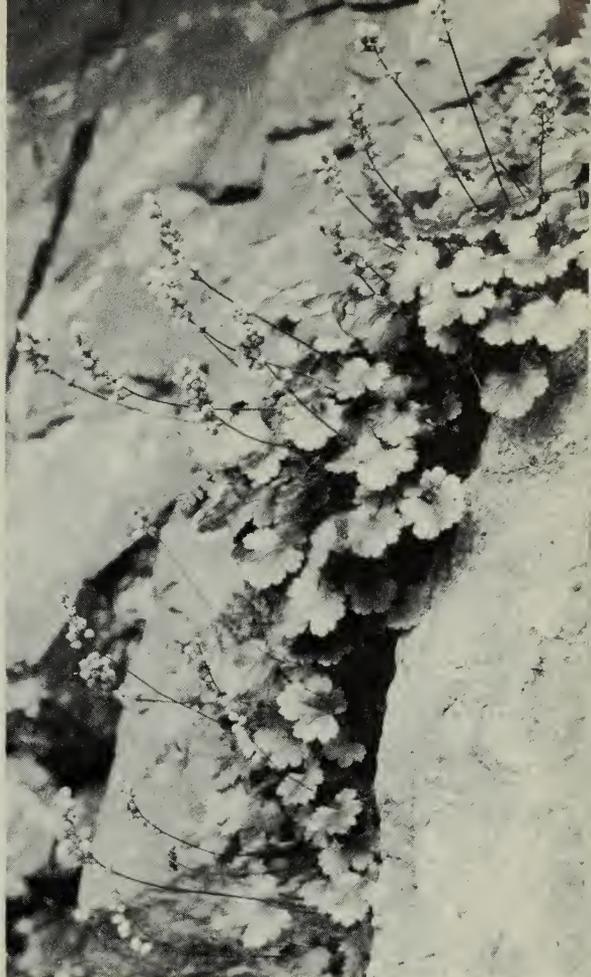
*Golden currant* or *clove currant*, *Ribes longiflorum* Nutt.—This fragrant, yellow-flowered currant, which bears good quality fruit, has been found near Estes Park. (*Chrysobotrya odorata*.)

### HYDRANGEA FAMILY (HYDRANGEACEAE)

A family of shrubby plants with opposite leaves and flowers much resembling the saxifrages. *Jamesia* or *wax-flower*, *Jamesia americana* T. & G., (*Edwinia americana*), is our only representative. This is a shrub with



*Figure 41.*—PURPLE SAXIFRAGE. 4 TO 8 INCHES HIGH, ROCK CREVICES. *Photograph by Kenneth Hartley.*



*Figure 42.*—ALUMROOT. GREENISH; FLOWERING STEMS 4 TO 6 INCHES HIGH. *Photograph by Kenneth Hartley.*

opposite, distinctly ribbed leaves and clusters of waxy white blossoms. In autumn the leaves turn beautiful shades of red. This plant is closely related to the saxifrages and has the same habit of growing on rocks and in rock crevices. It is common in rocky places from the foothills to timber line, but will be found most abundantly in the montane zone.

#### *ROSE FAMILY (ROSACEAE)*

This is a very large family. As treated here it includes the rose, apple, and cherry subfamilies. Many of its members differ widely in appearance.

Typically, its flowers have five sepals, five petals, and many pistils and stamens. The sepals are united at least at the base, and often there are five bractlets usually smaller than the sepals and alternating with them. These flowers may have as many as eight petals and as few as five stamens and one pistil. The petals and stamens are inserted on the edge of the calyx. The leaves are alternate and all have stipules, at least when young.

1. ROSE SUBFAMILY.

(For the shrubs of this group see Key to Woody Plants, p. 21)

Flowers white or cream-colored, conspicuous.

Flowers having eight petals; seeds plumed; alpine plants

*Mountain dryad* (p. 90)

Flowers having five petals . . . . . *Strawberry* (p. 91)

Flowers yellow or rose-colored; petals five, sometimes inconspicuous.

Flowers yellow.

Foliage glaucous, leaflets three, each three-toothed at apex; plant and flower inconspicuous; high altitudes . . . *Sibbaldia* (p. 92)

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

Plants rough to touch, 1 to 3 feet tall, growing on moist ground.

Inflorescence a spike; fruit burlike . . . *Agrimony* (p. 92)

Inflorescence widely branched; fruit a bur covered with hooked prickles . . . . . *Bur avens* (p. 93)

Plants not rough to touch; flowers bright yellow.

Plant with runners; underside of leaves silvery

*Silverweed* (p. 94)

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* (p. 93)

Foliage light green, silvery or glaucous; leaves compound but rarely finely dissected . . . . *Cinquefoil* (p. 93)

Flowers rose-colored; seeds plumed.

Basal leaves finely dissected; stem, upper leaves, and calyx often rose-tinged . . . . . *Pink plumes* (p. 93)

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

*Brook avens* (p. 93)

*Mountain dryad*, *Dryas octopetala* L. (fig. 43).—A charming dwarf creeping shrub of high altitudes that the uninitiated would never guess was a shrub. It often forms large dark green mats on the stony ground above timber line. Its specific name *octopetala* means eight petals, a rather unusual number among flowers. The cream-colored blossoms, 1 inch or more



Figure 43.—MOUNTAIN DRYAD. CREAM-COLORED, ABOUT 1 INCH ACROSS; PLANT PROSTRATE.  
Photograph by Kenneth Hartley.

across, are followed by heads of plumed achenes which make the plants conspicuous even after the petals have fallen. This is a typically alpine and arctic plant. It is also found in the White Mountains, Greenland, Alaska, and in arctic and alpine Europe and Asia.

*Wild strawberry*.—Small plants with five-petaled white flowers and palmately compound leaves of three leaflets, spreading by runners which root and start new plants. Common up to timber line. *Fragaria glauca*

(Wats.) Rydb. and *Fragaria americana* (Porter) Brit. are both found here.

*Sibbaldia*, *Sibbaldia procumbens* L.—A plant with glaucous compound leaves of three leaflets and very small and inconspicuous yellow flowers. It resembles a strawberry plant in general appearances. Abundant in the region of timber line and sometimes higher, in places covering the ground with its bluish foliage.

*Agrimony* or *roadside agrimony*, *Agrimonia striata* Michx.—A stout, hairy plant  $1\frac{1}{2}$  to  $2\frac{1}{2}$  feet high with a slender spike of small yellow five-petaled flowers separated by three-parted bracts. The calyx is 10-

Figure 44.—ALPINE AVENS. BRIGHT YELLOW, 1 INCH OR LESS ACROSS: ALPINE REGIONS. Photograph by Kenneth Hartley.



ribbed, and together with the inclosed seed develops into a top-shaped, rather hard fruit, crowned with numerous prickles which catch in one's clothing. It has been found along streams near Estes Park. (*A. brittoniana*).

*Bur avens* or *largeleaf avens*, *Geum macrophyllum* Willd.—A tall plant 1 to 3 feet high, with large lyre-shaped, pinnately divided leaves, the terminal lobe the largest, and a branching inflorescence. The five-petaled yellow flowers develop into round or oval burs covered with hooked prickles. This plant is frequently noticed along streams and on moist ground of the montane and lower subalpine zones. *Geum strictum* Ait., a similar but more slender plant, occurs also.

*Brook avens* or *water avens*, *Geum rivale* L.—A rather rare plant of the montane zone sometimes found along streams and on marshy ground. Its leaves are similar to the last but the plant is somewhat smaller and the five petals are reddish or purple.

*Alpine avens* or *golden sieversia*, *Sieversia turbinata* (Rydb.) Greene (*Geum rossii* and *Acomastylis turbinata*) (fig. 44).—This is probably the most abundant flower found above timber line. It grows in dense tufts or mats and blooms profusely with bright yellow five-petaled flowers. The stamens are inserted at the mouth of the more or less top-shaped calyx tube. The very dark green or purplish leaves are mostly basal, pinnately divided, and the divisions deeply toothed.

*Pink plumes* or *prairie-smoke sieversia*, *Sieversia ciliata* G. Don (*Geum triflorum*).—A rare plant with compound leaves, leaflets deeply incised, having leafy-bracted stems, each stem usually bearing three purplish flowers; styles very long, becoming conspicuously plumose in fruit.

*Cinquefoil*, *Potentilla*.—A large group containing many similar plants. The flowers are yellow with five petals and are sometimes mistaken for buttercups. The leaves are either pinnately or palmately compound of from 3 to 21 leaflets. The generic name *Potentilla* is from the Latin word *potens*, meaning powerful. The common name cinquefoil is from the French, meaning "five finger," referring to the leaves of some of the most common species which have five fingerlike leaflets. *Silvery cinquefoil* or *Saskatchewan cinquefoil*, *Potentilla effusa* Dougl., a pretty plant with almost white foliage (covered with white hairs) and many lemon-yellow flowers, is common on dry fields and hillsides of the montane zone. Its leaves are pinnately compound with usually five to seven irregularly toothed leaflets. It sometimes grows in large colonies covering the ground. The *glaucous cinquefoil* or *blueleaf cinquefoil*, *Potentilla glaucophylla* Lehm. is very common in the subalpine and alpine zones. Its leaves are mostly smooth but bluish and palmately five-foliolate, flowers bright yellow, and petals usually notched. *Gold cup* or *Northwest cinquefoil*, *Potentilla gracilis* Dougl., with bright yellow flowers, each petal having an orange spot at base, is frequent in meadows and fields below 9,000 feet. It has a palmately five-foliolate leaf. The leaflets are dark green on their upper sides but white with cottony hairs

on the lower side. *Beauty cinquefoil*, *Potentilla pulcherrima* Wats., similar to the last but with pinnate leaves, is frequently found on moist soil of the montane zone. The *singleflower cinquefoil*, *Potentilla uniflora* Ledeb., a small alpine plant with bright yellow flowers and three-foliolate, grayish woolly leaves, is sometimes found among the rocks above timber line. *Silverweed* or *silverweed cinquefoil*, *Potentilla anserina* L. (*Argentina anserina*), is a low plant with solitary yellow flowers on long stems and with stems and underside of leaves silvery white. This plant spreads by runners similar to those of the strawberry plant. It is found in the Horseshoe Park meadow and in other wet places of the montane zone. *Leafy cinquefoil* or *bigflower cinquefoil*, *Potentilla fissa* Nutt. (*Drymocallis fissa*).—A common plant with large creamy yellow blossoms, about 1 inch across, erect stems, and hairy, pinnate, green leaves. It often grows in rock crevices or among rocks and on burned-over land. It blooms abundantly in June and occasionally later. *Potentilla arguta* Pursh, a stout, coarse plant with white petals is less common.

*Shrubby cinquefoil* or *bush cinquefoil*, *Potentilla fruticosa* L., (*Dasiphora fruticosa*).—A rounded shrub of moist ground, bearing many yellow, rose-like blossoms and leaves of three to seven leaflets. It is common from the foothills to the alpine zone but is most beautiful at timber line and just above. Many other species of cinquefoil grow in the park. The following have been identified: *Potentilla coloradenis* Rydb., *Potentilla hippiana* Lehm., *Potentilla minutifolia* Rydb., *Potentilla monspeliensis* L., *Potentilla nivea* L., *Potentilla pennsylvanica strigosa* Pursh, *Potentilla pinnatifida* Dougl., *Potentilla pinnatisecta* (Wats.) A. Nels., *Potentilla quinquefolia* Rydb., *Potentilla rubri-caulis* Lehm., *Potentilla saximontana* Rydb., and *Potentilla rupicola* Osterh.

*Mountain spray, false meadowsweet, or bush rockspirea*, *Holodiscus dumosus* (Nutt.) Heller (*Sericotheca dumosa*).—A shrub with pyramidal clusters of small white flowers and toothed leaves which are silky and light-colored underneath, found in rocky canyons of the montane zone.

*Mountain ninebark*, *Physocarpus monogynus* (Torr.) A Nels., (*Opulaster monogynus*).—A small shrub with rather flat-topped clusters of white flowers in June or July; common on hillsides of the montane zone. The sepals turn reddish after the petals have dropped and the pods are densely covered with starlike hairs.

*Antelope-brush* or *antelope brittlebrush*, *Purshia tridentata* DC (*Kunzia tridentata*).—A low much-branched shrub of the fields and hillsides and open ponderosa pine forests of the montane zone having numerous fragrant dainty pale-yellow blossoms in May and June. The leaves are usually less than 1 inch in length, wedge-shaped, and three-toothed at the apex. This bush often grows close to rocks and the first branches to bloom in the spring are the ones which are against rock. One may often find bushes with one or two such branches in full bloom while the buds on the others are still tightly closed. That is because the rock reflects heat and also holds heat, thus lengthening the warm period of each day.



Figure 45.—THIMBLEBERRY. A SHRUB WITH WHITE BLOSSOMS 1 TO 3 INCHES ACROSS. Photograph by Joseph Dixon.

*Wild rose, Rosa*.—These are easily recognized, for wild roses are much the same the country over. The five-petaled, pink to red blossoms are exquisitely fragrant. The red fruits, called "hips," are conspicuous in late summer and fall, and the pinnately compound leaves often turn lovely shades of red as cold weather approaches. The different species of rose are very difficult to distinguish. *Rosa acicularis* Schwein and *Rosa woodsii* Lindl. are found in the park.

*Thimbleberry* or *boulder raspberry, Rubus deliciosus* (Torr.) (fig. 45).—A common shrub, bearing in May and June many large white blossoms 1 to 3 inches across. The blossoms resemble single white roses. It lacks the spines characteristic of other raspberries, grows most abundantly and profusely among rocks, and is common in the foothills and montane zone. (*Bossekia deliciosa, Oreobatus deliciosus*).

*Wild red raspberry, Rubus strigosus* Michx.—Especially at home among rock slides of the subalpine zone, where it is most difficult to gather the delicious fruit, but sometimes found in rocky places at lower altitudes. It has prickly stems, compound leaves with usually three or five leaflets, five-petaled white flowers, and juicy red fruit.

## 2. APPLE SUBFAMILY.

This is a group of trees and shrubs characterized by having a fleshy fruit formed by the thickening of the calyx tube which incloses the seeds in their carpels, of which the common apple is the best example.

*Serviceberry* or *shadbush, Amelanchier*.—A small tree or low shrub found occasionally on hillsides and along streams below 9,000 feet, with clusters of white flowers in June, and roundish, toothed leaves. The petals are oblong and the blue or purplish berries are very good to eat, but the birds and the worms usually find them first. Both *Amelanchier alnifolia* Nutt and *Amelanchier elliptica* A. Nels. are found.

*Fireberry hawthorn, Crataegus chrysocarpus* Ashe.—A shrub or dwarf tree with stout spines 1 to 2 inches long, toothed leaves and clusters of white flowers in May or June. The fruits called "haws" are red when ripe. Not very frequent in the park, but has been found on the rocky hills west of Moraine Park and along Mill Creek.

*Greenes mountain-ash, Sorbus scopulina* Greene (*Pyrus sambucifolia*) (fig. 46).—A beautiful shrub or tree, with handsome leaves and large clusters of white flowers, replaced later in the season by brilliant orange-red berries. Its pinnately compound leaves are composed of from 11 to 15 sharply serrate, feather-veined leaflets. At lower altitudes this plant grows into a small tree, and is often planted ornamentally. Its bark resembles that of an apple tree. In the park it is found occasionally as a shrub in the subalpine zone. There are a few bushes around Bear Lake and some in Prospect Canyon and along Cub Creek.

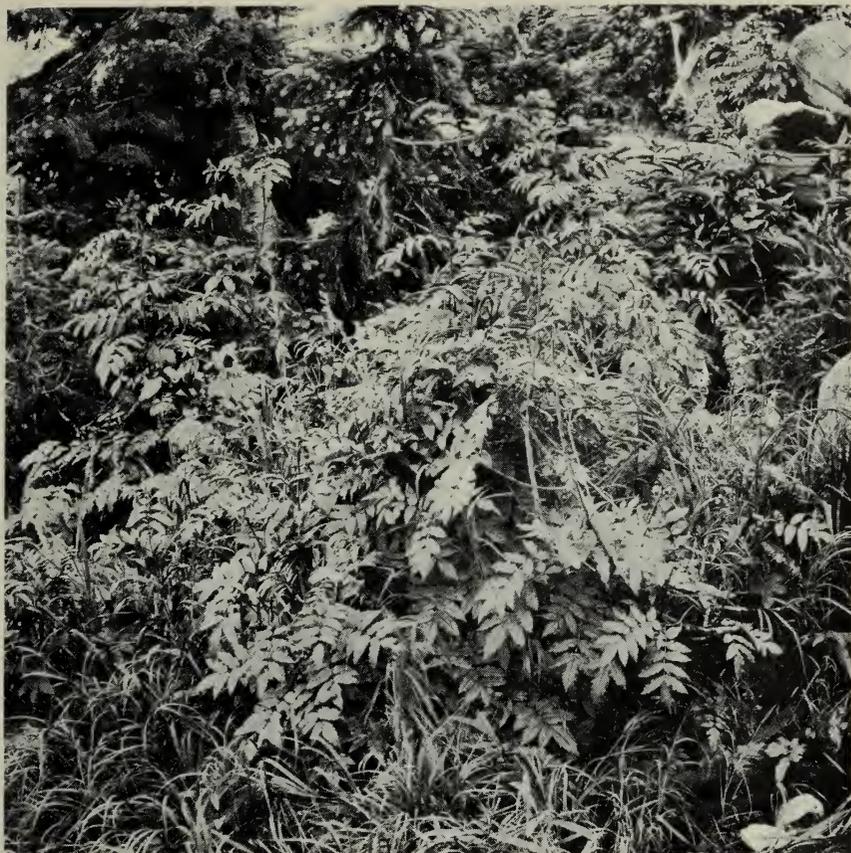


Figure 46.—MOUNTAIN-ASH. FLOWERS WHITE, IN LARGE CLUSTERS; BERRIES ORANGE-RED; LEAVES DISTINCTIVE, MADE UP OF TOOTHED LEAFLETS.

### 3. CHERRY SUBFAMILY.

This group is characterized by having simple, serrate leaves, bitter bark, leaves and seeds, and a fruit called a drupe, consisting of a fleshy or juicy covering over a single hard-shelled seed. The cherries, peaches, plums, and almonds belong to it.

*Chokecherry*, *Prunus melanocarpa* (A. Nels.) Rydb.—A shrub bearing racemes of fragrant white flowers, later replaced by dark red or black cherries (*melanocarpa* means “black-fruited”). Common along streams and on hillsides, where it often forms thickets and makes masses of red coloring in autumn. The *bird* or *pin cherry*, *Prunus pennsylvanica* L., a more slender shrub with a few white flowers in umbellike corymbs and acid red fruit, is occasionally found along streams and on stony hillsides.

## PEA FAMILY (LEGUMINOSAE)

This is one of the largest and most distinctive of plant families. It is easily recognized by its *papilionaceous* (butterflylike) flowers and beanlike fruits called legumes. All our plants whose flowers resemble the sweet pea belong to it. The two lower petals of these flowers are grown together and form what is called the *keel*. Leaves of all leguminous plants native in this region are compound. In economic importance this family ranks next to the grass family, for many food materials for both men and cattle are derived from it. It also is a soil enricher because the roots of many of its members harbor nitrogen-fixing bacteria, tiny organisms which are able to take free nitrogen from the air and combine it with other substances, thus making it available for plant food.

Leaves palmately compound.

Flowers in a close head.

Plants native, growing at high altitudes.

Flowers one to three . . . . . *Dwarf clover* (p. 99)

Flowers more than three.

Flowers rose-colored, fragrant, margins of leaves minutely toothed . . . . . *Rose clover* (p. 99)

Flowers yellowish with purple spot; margins of leaves entire  
*Alpine clover* (p. 99)

Plants introduced, escaped from cultivation.

Flowers rose-red . . . . . *Red clover* (p. 99)

Flowers white or pinkish . . . . . *White clover* (p. 99)

Flowers not in close heads but in spikelike racemes.

Flowers one-half inch long or less; pods one or two seeded; leaflets three.

Flowers white . . . . . *White sweetclover* (p. 99)

Flowers yellow . . . . . *Yellow sweetclover* (p. 99)

Flowers larger, conspicuous; pods several seeded.

Flowers yellow; leaflets three . . . . . *Golden banner* (p. 99)

Flowers blue or whitish; leaflets five or more.

Flowers definitely blue . . . . . *Mountain lupine* (p. 99)

Flowers dingy white or pale blue

*Small-flowered lupine* (p. 99)

Leaves pinnately compound.

Pod green-netted veined with spine-tipped margins; plant introduced around ranches . . . . . *Sainfoin* (p. 100)

Pod not as above, plants native.

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

Flowers bright reddish-purple.



fields and open hillsides of the montane zone. The leaves are pinnately compound of several narrow leaflets. It begins to bloom about the middle of June and is very conspicuous through July. It blooms again, though not so profusely, starting in late August and lasting until hard freezes set in. It has bloomed around the administration building as late as the middle of November.

*Rocky Mountain loco* or *Rocky Mountain crazyweed*, *Oxytropis saximontana* A. Nels. (fig. 47).—A plant similar to the last but usually taller, 10 to 18 inches high, with many-flowered racemes of whitish or lavender flowers, each with a purple spot on the keel. (*Aragallus albiflorus*).

*Whorled-leaf loco*, *Oxytropis splendens* Dougl., (*O. richardsonii*), a very silky-silvery, beautiful, plant with purple flowers and verticillate leaflets, has been found around Grand Lake.

*Few-flowered loco*, *Oxytropis multiceps* Nutt. (*Aragallus multiceps*), is a rare, dwarf, gray-hairy plant, with two or three purple flowers in each cluster, sometimes found in the montane zone. The calyx becomes inflated after flowering and wholly incloses the short pod.

*Vetch* or *milkvetch*.—A large group of plants with several representatives in the park. Many of them are rather similar and difficult to distinguish. They are separated from the loco plants, *Oxytropis*, by the shape of the keel, which in this group is blunt at the end. The leaves are all pinnately compound. *Limber vetch* or *flexible milkvetch*, *Astragalus flexuosus* Dougl., (*Homalobus flexuosus*) is a very common plant of the montane fields and hillsides, with spreading stems 6 to 20 inches long, racemes of small pink blossoms, and cylindrical, sometimes curved, pods 1 inch long or less.

*Parry vetch*, *Astragalus parryi* Gray, is a dwarf, very hairy plant of sandy or rocky soil, appearing early in spring, and it may be recognized by its small mats of pinnately compound gray leaves with oblong or roundish leaflets. In June it bears clusters of white blossoms close to the ground and, later, curved pods. Some plants of this genus are poisonous, but our ground squirrel has been seen holding the pods of this species in his paws and busily extracting the unripe seeds, which he ate with apparent impunity. Other species found here are *alpine vetch* or *alpine milkvetch*, *Astragalus alpinus* (L.) Rydb., (*Tium alpinum*); *field vetch* or *timber milkvetch*, *Astragalus campestris* (Nutt.) Gray, (*Homalobus decurrens*); *sulphur vetch*, *Astragalus sulphurescens* Rydb.; and *racemose vetch*, *Astragalus racemosus* Pursh, (*Tium racemosum*). Another member of the legume family which has been introduced into this region and may occasionally be found is *sainfoin*, *Onobrychis sativa* Lam, with pink blossoms and prickly pods with green veins. *American licorice*, *Glycyrrhiza lepidota* Pursh, occurs at lower altitudes and has been collected once.



Figure 47.—ROCKY MOUNTAIN LOCO. PLANTS 10 TO 18 INCHES HIGH. FLOWERS WHITISH OR LAVENDER. Photograph by Joseph Dixon.



Figure 48.—WILD PINK GERANIUM. PINK OR PURPLISH, ABOUT 1 INCH ACROSS. Photograph by Joseph Dixon.

### GERANIUM FAMILY (GERANIACEAE)

This family has contributed ornamental plants to cultivation, and is represented in the park by two native species. These plants have flowers with five petals, usually veined, five pistils united except at their tips, and lobed and toothed leaves.

*Wild pink geranium* or *Fremont geranium*, *Geranium fremontii* Torr. (fig. 48).—A plant of dry fields and open pine forests, often around rocks, with pink or purplish flowers, the petals usually with darker veins.

*Wild white geranium* or *Richardson geranium*, *Geranium richardsonii* F. & M. (fig. 49).—A taller, more slender plant with white flowers found frequently in meadows and aspen groves and on other moist ground. Another species, *Geranium nervosum* Rydb., has been found along streams of the western slope. It resembles the last in habit and foliage, but has pink or purplish petals.

### FLAX FAMILY (LINACEAE)

A family of great economic importance in the textile and paint industries. The flowers are regular and symmetrical with five parts in each cycle.

*Blue flax* or *Lewis flax*, *Linum lewisii* Pursh (fig. 50).—A plant with delicate sky-blue flowers about an inch across, borne on the ends of slender stems; common in fields and on hillsides of the montane zone. This plant was named in honor of Capt. Meriwether Lewis, of the Lewis and Clark Expedition.

#### POLYGALA FAMILY (POLYGALACEAE)

This family is characterized by “seemingly papilionaceous” flowers and stamens which are grown together and are also grown to the petals.

*White milkwort* or *white polygala*, *Polygala alba* Nutt., an introduced plant, is our only representative of this family. Sometimes found along roadsides; spike of small, irregular white flowers.

#### SPURGE FAMILY (EUPHORBIACEAE)

A family of rather curious plants including several showy ornamental species such as the poinsettia, and some species of *Euphorbia*, in which the very small and inconspicuous flowers are surrounded by brightly colored bracts. Most of these plants have a thick milky juice.

Figure 49.—WILD WHITE GERANIUM. 8 TO 15 INCHES HIGH. Photograph by Joseph Dixon.



Figure 50.—BLUE FLAX. LIGHT BLUE, ABOUT 1 INCH ACROSS; STEMS 1 TO 2 FEET HIGH. Photograph by Joseph Dixon.



*Spurge* or *robust euphorbia*, *Euphorbia robusta* (Engelm) Small.—A much-branched plant having several stout stems, 1 foot or less in height from a strong root, with milky juice and inconspicuous flowers. It is frequently found on rocky sunny slopes and fields of the montane zone. The leaves, which early wither and dry up, are alternate and oblong, but there are numerous opposite, sessile, heart-shaped, or rhomboid bracts. The much reduced flowers are surrounded by an involucre of green bracts, each involucre containing four crescent-shaped glands. *Euphorbia serpyllifolia* Pers., a small-leaved, prostrate plant with milky juice, is sometimes found on waste ground.

#### WATER STARWORT FAMILY (CALLITRICHACEAE)

A family of small aquatic plants with opposite, entire leaves and monoecious flowers reduced to one pistil or one stamen sometimes accompanied by two bracts. Only one species has been collected in the park. *Water starwort*, *Callitriche palustris* L., is frequently seen growing in shallow ponds or in mud in marshy places. When growing in water it develops two kinds of leaves, broad floating ones and very narrow submersed ones. The little round or obcordate pods are found in the leaf axils.

#### SUMAC FAMILY (ANACARDIACEAE)

A family of shrubs mostly confined to lower altitudes. The *three-leaf sumac*, *squaw bush*, or *skunkbush sumac*, *Rhus trilobata* Nutt. (*R. aromatica trilobata*), with shiny compound leaves of three crenately lobed leaflets, and a very distinctive odor, is occasionally found at the eastern edge of the park, below 8,000 feet. This plant also grows in California, where the long slender shoots are much used by Indian women in their basket making. They use the sticky red berries that occur in small clusters and have an acid flavor in making a drink similar to lemonade. This plant is not poisonous, but its relative, the *western poison-ivy*, *Toxicodendron radicans* (*R. toxicodendron*), with leaves of three entire leaflets, each 1 to 4 inches long, occurs very rarely on shady moist slopes in the montane zone and more abundantly at lower altitudes.

#### MAPLE FAMILY (ACERACEAE)

A family of beautiful and valuable trees with lobed and toothed (or rarely compound leaves) and sugary sap. The only representative in the park is the *Rocky Mountain maple*, *Acer glabrum* Torr., a several-stemmed shrub, sometimes of large size, usually found growing in rocks in the montane and lower subalpine zones, with gray bark and typical maple leaves. It turns a pale yellow in autumn.



Figure 51.—RYDBERG VIOLET. WHITE OR REDDISH-TINGED, PLANT ABOUT 6 INCHES HIGH. Photograph by Joseph Dixon.



Figure 52.—MANY-FLOWERED EVENING STAR. YELLOW, 1 TO 2 INCHES ACROSS. Photograph by Kenneth Hartley.

### STAFF TREE FAMILY (CELASTRACEAE)

A family of shrubs of which the bittersweet is the best known representative. The only species found in the park is *mountain lover* or *myrtle pachystima*, *Pachystima myrsinites* Raf., a small evergreen shrub with opposite, slightly toothed leaves. It grows abundantly in forests of the montane zone on the western slope and possibly may be found in Wild Basin.

### BUCKTHORN FAMILY (RHAMNACEAE)

A family of shrubs or trees most of which are thorny. The small flowers are in clusters and each petal has a narrow claw.

*Mountain balm* or *snowbrush ceanothus*, *Ceanothus velutinus* Dougl.—A low spreading shrub without thorns, with roundish or shiny (as if varnished) oval leaves and feathery panicles of small white flowers. This bush often makes large patches a foot or two high in open woods of the upper montane zone. It blooms in spring or in early summer, and frequently a second time in late summer.

*Fendler buckthorn* or *Fendler ceanothus*, *Ceanothus fendleri* Gray.—A dwarf spiny shrub with entire leaves, silky beneath, and simple terminal racemes

of small white flowers; found in the vicinity of Beaver Point and probably elsewhere at lowest altitudes. It usually winter-kills nearly to the ground and so always looks untidy because of the dead branches.

### MALLOW FAMILY (MALVACEAE)

Most members of this family are herbs and have gummy juice. The marshmallow of the candy makers was originally the juice of one species of mallow. The stamens are united into a column around the pistil.

*Modest mallow* or *white checkermallow*, *Sidalcea candida* Gray.—A plant bearing a spike of white thin-petaled flowers, and deeply lobed stem leaves is occasionally found in moist shady places and along streams.

*Wild hollyhock* or *New Mexican checkermallow*, *Sidalcea neo-mexicana* Gray.—A plant with slender racemes of rose-purple flowers resembling miniature hollyhocks. The basal leaves are roundish with rounded lobes and teeth. This grows on the western slope at lowest altitudes in the park.

*Scarlet mallow* or *scarlet globemallow*, *Sphaeralcea coccinea* (Pursh) Rydb., a charming, low-growing, gray-foliaged plant with salmon or tomato-colored, hollyhocklike flowers, common on the plains and foothills, has been found along roads in the park.

### ST. JOHNSWORT FAMILY (HYPERICACEAE)

A family of herbs (in this region) with opposite leaves, the leaves and petals with dark or translucent dots. *Southwestern St. Johnswort*, *Hypericum formosum* H. B. K. (*H. scouleri*). A smooth plant which is found in wet meadows of the montane zone, readily recognized by holding the leaves to the light so that the translucent dots appear. The yellow petals show small black dots.

### VIOLET FAMILY (VIOLACEAE)

A family of small herbs, with irregular flowers, which are easily recognized because of general familiarity with garden violets.

There are several kinds of violets in the park, but due to the fact that some of them bloom early in the season and most of them are modest in habit, as violets are expected to be, they are not a conspicuous part of the flora, and many people rarely or never see them. The commonest one is the *subalpine blue violet* or *daisyleaf violet*, *Viola bellidifolia* Greene, which is often abundant on stream banks and moist slopes at the higher elevations. The flower is light blue and the short, leafy stems are often clustered, giving the plant a tufted aspect. The *arctic yellow violet* or *twinsflower violet*, *Viola biflora* L., is a small rare plant usually found among rocks on the higher

peaks. This plant is also found in the arctic regions of the world. *Rydberg violet* or *Cheyenne violet*, *Viola rugulosa* Greene, (fig. 51), a leafy stemmed white- or reddish-flowered species, grows on stream banks and in moist groves of the montane zone. The *meadow violet* or *wanderer violet*, *Viola nephrophylla* Greene and the closely related *Viola cognata* Greene, both having blue or violet flowers, occur in the montane zone. *V. cognata*, with purplish tinged foliage, occupies the upper part of that zone.

Two white violets occur, *Viola renifolia* var. *brainerdii* Fernald, a plant of moist forests, and *Viola palustris* subsp. *brevipes* Baker (*V. pallens*), found on stream banks and meadows. The former is a more or less hairy plant without runners, and the latter is perfectly smooth and develops runners from the axils of the leaves after blooming.

Two subspecies of the *hook violet* are also occasionally found in the park in moist meadows and groves. These are related to the subalpine blue violet, and have, as it does, a leafy stem and an elongated, hooked spur. *Viola adunca* Sm. subsp. *ashtonae* Baker, was described from plants collected along the Cub Lake trail, and *Viola adunca* Sm. subsp. *radicosa* Baker from plants collected in Kawuneeche Valley north of Grand Lake.

Figure 53.—PRICKLYPEAR. LIGHT YELLOW, 2 TO 3 INCHES ACROSS. Photographed by Kenneth Hartley.



## LOASA FAMILY (LOASACEAE)

The plants of this family are covered with rough hairs. They grow along roadsides and on disturbed soil. The flowers have many stamens and 5 or 10 petals.

*Many-flowered evening star* or *desert mentzelia*, *Mentzelia multiflora* (Nutt.) Gray (fig. 52).—A plant with showy yellow flowers opening in late afternoon and shiny white stems is very common along our roadsides. The seed pod is cylindrical, an inch or more in length, crowned with the five narrow calyx divisions. *White evening star* or *bractless mentzelia*, *Mentzelia nuda* (Pursh) T. & G., and *showy evening star*, *Mentzelia speciosa* Osterh., have both been collected in this region. (These plants have been called by the following generic names by different botanists: *Hesperaster*, *Touthera*, *Bartonia*, and *Nuttallia*.)

## CACTUS FAMILY (CACTACEAE)

A family easily recognized by its thickened fleshy stems, covered with tufts of spines. The flowers have many petals and are usually very showy. These plants are well adapted to life in arid regions, where most of them grow. They are very abundant in the Southwest.

*Pincushion mountain cactus*, *Pediocactus simpsonii* var. *minor* Engelm.—The most common cactus in this region most aptly described by the name "pincushion." It is globular in shape, somewhat depressed, and covered with stout, radiating spines. In May and early June it is crowned with brilliant rose-colored flowers. It is frequently found on dry open slopes below 9,000 feet.

*Plains pricklypear*, *Opuntia polyacantha* Haw., (fig. 53).—Occasionally found in dry, sunny situations at lowest altitudes in the park, and more abundant lower. The joints of the stem are flattened. The satiny-petaled flowers which appear in June are pale yellow and often 2 or 3 inches broad.

## OLEASTER FAMILY (ELAEAGNACEAE)

A family of shrubs characterized by berrylike fruits and entire leaves covered, especially on the under side, with scales or starlike hairs. *Bitter buffaloberry* or *russet buffaloberry*, *Shepherdia canadensis* (L.), Nutt., is the only representative native to the park. It is a low shrub occasionally found on moist, shaded slopes of the montane zone. The dark green leaves are silvery-scurfy underneath and the twigs and buds are covered with rust-colored scales. The plant is conspicuous in winter and early spring by the clusters of little, round, rusty flower buds. The pale-yellow flowers open before the leaves appear and are followed in late summer by orange or red berries.

*EVENING-PRIMROSE FAMILY (ONAGRACEAE)*

A large family of plants characterized by having four petals and an inferior seed pod; that is, the seed pod is placed below the other flower parts instead of being surrounded by them. This should not be confused with the true primrose family (p. 118), which is distinctly different in all respects.

- A. Seeds tipped with a bunch of white hairs.
  - B. Flowers bright purple or magenta, 1 to 2 inches across.
    - a. Inflorescence a spikelike raceme; plant very common along roads and burned-over regions . . . . *Fireweed* (p. 108)
    - aa. Inflorescence axillary; plant rare
      - Broadleaved fireweed* (p. 109)
  - BB. Flowers white, pink or bluish, small; plants growing on wet ground . . . . . *Willow herb* (p. 109)
- AA. Seeds without a bunch of white hairs.
  - B. Flowers tiny, white fading reddish . . . . *Babysbreath* (p. 110)
  - BB. Flowers usually 1 inch broad or more.
    - a. Flowers yellow when fresh, opening in the evening
      - Yellow evening-primrose*, (p. 110)
    - aa. Flowers white when fresh, turning pink with age.
      - b. Flowers 2 inches across or more, fragrant; plant stemless . . . . . *Fragrant morning-primrose*, (p. 111)
      - bb. Flowers less than 2 inches across, opening in the morning; plant branched.
        - c. Leaves finely pinnately dissected
          - Common morning-primrose* (p. 111)
        - cc. Leaves not dissected; stem white and shining
          - Nuttall morning-primrose* (p. 111)

*Fireweed*, *Epilobium angustifolium* L. (*Chamaenerion. angustifolium*) (fig. 54).—One of our conspicuous and most interesting plants throughout its long blooming season from early July into September. The brilliant purplish-red or magenta-colored flowers borne in long graceful spikes are four-petaled and grow on the tip of the long seed pod. From this characteristic the genus takes its name *Epilobium*, which comes from the Greek words meaning “upon the pod.” The leaves of the more common form are narrow and pointed, giving the plant its specific name, *angustifolium*, narrow-leaved.

It may be seen anywhere along roadsides, along streams, in meadows, and in aspen groves; but it is most striking and abundant on the burned-over lands, where it is one of the first of the plant pioneers to invade those desolate regions. From that habit it receives its common name of “fireweed.” During the summer the burned hillsides around Bear Lake, on



Figure 54.—FIREWEED. BRIGHT PURPLISH-RED; PLANT 2 TO 4 FEET HIGH. Photograph by M. F. Boos.

Twin Sisters Mountain, and along the Lawn Lake trail, as well as many other localities, are brilliant with the blooms of this plant. In the fall its reddening leaves often add a distinct color note to the scenery. As the pods open, the numerous seeds, each on its tuft of white silky hairs, are carried far and wide by the wind.

*Broadleaved fireweed* or *red willowweed*, *Epilobium latifolium* L.—Has been found along streams on the western slope. This plant is not as tall as the first one, and has fewer but larger and more brilliant flowers and broader leaves. It is a widely distributed species of northern and mountainous regions, known from Greenland, Alaska, and the Himalayas, as well as from all the high ranges of North America. (*Chamaenerion latifolium*).

The *willow herbs* are mostly slender, inconspicuous plants found growing around springs and in moist places. The group as a whole is easily recognized because of the tiny (one-third inch across) four-petaled flowers of blue, pink, or white, placed just as those of the fireweed are, on the tip of the long slender pod. But even the experts have trouble distinguishing the species. The leaves are entire or slightly denticulate, the lower usually opposite, the upper ones sometimes alternate. When ripe the four-sided seed pods split open at the top, the sides curling backward, revealing rows

of tiny seeds, each with a tuft (*coma*) of white hairs at the tip. The plant owes its common name, "willow herb," to the appearance of these tufted seeds. Hybrids are frequent in this group, so that accurate determination is difficult. The following species have been identified in the park:

*Epilobium adenocaulon* Haussk., *E. anagallidifolium* Lam., *E. brevistylum* Barbey, *E. lactiflorum* Haussk., *E. drummondii* Haussk., *E. paniculatum* Nutt.

**Babysbreath** or **groundsmoke**.—A much-branched plant with narrow leaves, tiny white flowers which turn to red as they wither, and slightly curved, knobby pods; found around buildings and on open fields. Our two species are *Gayophytum ramosissimum* T. & G. and *Gayophytum nuttallii* T. & G.

**Evening-primroses**, *Oenothera* (includes *Onagra*, *Anogra* and *Pachylophus*).—A group of plants with showy yellow or white flowers, opening either in morning or evening, lasting only a few hours, and turning pink or reddish in age.

**Yellow evening-primrose** *Oenothera strigosa* (Rydb.). Mack. & Bush.—A coarse, unattractive plant with rather delicate, pale-yellow flowers opening in late afternoon. It grows along roadsides, around buildings, and on old plowed fields. (*O. biennis*).

Figure 55.—FRAGRANT MORNING-PRIMROSE. FLOWERS WHITE, 2 TO 3 INCHES ACROSS. Photograph by Joseph Dixon.



*Fragrant morning-primrose*, *Oenothera caespitosa* Nutt., (fig. 55).—Occasionally found on sunny, rocky slopes of the montane zone and lower. This plant grows in tufts among the rocks and bears large white flowers, 2 to 3 inches across, that turn pink with age. The flower has a very long, slender calyx-tube at the lower end of which will be found the tapering, ridged pod directly on the crown of the plant.

*Common morning-primrose*, *Oenothera coronopifolia* T. & G.—A low plant with pinnately cut leaves, somewhat fernlike in appearance, and white flowers 1 inch or less across. It grows along roadsides and on disturbed ground, blooming in June and July.

*Nuttall morning-primrose*, *Oenothera nuttallii* Sweet.—Flowers similar to the last, but the plant is a foot or more high with shining white stems, undivided leaves, and larger flowers. It grows along roadsides about Estes Park.

### WATER MILFOIL FAMILY (HALORAGIDACEAE)

Water plants with inconspicuous flowers and narrow, usually whorled, leaves, found growing in ponds or on marshy ground. *Marestail* or *bottle brush*, *Hippuris vulgaris* L. and *water milfoil* or *parrotfeather*, *Myriophyllum spicatum* L., both occur in the park.

### GINSENG FAMILY (ARALIACEAE)

This is represented in our region by only one species, the *wild-sarsaparilla*, *Aralia nudicaulis* L., found in moist woods of the montane zone. The underground stem sends up one or more long petioled compound leaves and one peduncle bearing two to seven umbels of small flowers. Each division of the leaf has, normally, five leaflets.

### PARSNIP FAMILY (UMBELLIFERAE)

This family is easily recognized but to distinguish the different individual species is a difficult matter. Some of them, the more common and conspicuous, can be learned quite easily. The family is characterized, as its Latin name implies, by having the flowers in umbels which are usually compound. It also has hollow stems and the leaves are mostly compound, or at least very much divided. Flowers are usually white or yellow. Economically, it is an important family, for many of our vegetables and spices, such as celery, parsley, carrot, parsnip, dill, and caraway, belong to it.

*Cow-parsnip* or *Hercules parsnip*, *Heracleum lanatum* Michx. (fig. 56).—A stout plant three to six feet high with thick stem, large compound leaves with three broad, lobed leaflets, and enormous umbels, 6 to 12 inches across, of small white flowers. It is commonly seen along stream banks in the montane and subalpine zones. Its name, *Heracleum*, refers to Hercules because of the great size of the plant.

*Mountain parsley*, *Harbouria trachyleura* (Gray) C. & R.—A plant with umbels of small yellow flowers and leaves several times ternately compound with linear segments. It is very abundant on fields and open slopes, beginning to bloom when barely out of the ground in May and continuing through June when it becomes 8 to 12 inches high.

*Alpine parsley* or *alpine oreoxis*, *Oreoxis alpina* (Gray) C. & R. (*Cymopterus alpinus*).—A dwarf, caespitose plant with yellow flowers, pinnate leaves with narrow segments and very short stem; found among rocks of the alpine zone.

*Angelica*, *Angelica ampla* A. Nels.—A stout plant of stream banks with white flowers in large umbels, often growing with the cow parsnip and distinguished from it by having the compound leaves three-branched and then twice pinnate with ovate or obovate, finely toothed leaflets. *Grays angelica*, *Angelica grayi* C. & R., a stout plant 6 inches to 2 feet high, similar to the last but growing in the subalpine and alpine zones; stems very thick and petioles much enlarged and sheathing the stems. It is frequent among rocks at very high altitudes and in thickets at about 10,000 feet.

Other species in this family which are found in the park are: *Lovage* or *ligusticum*, *Ligusticum simulans* C. & R., *hemlock-parsley*, *Conioselinum scopulorum* (Gray) C. & R., *sweet cicely*, *Washingtonia obtusa* C. & R., *wild yellow-parsley* or *pseudocymopterus*, *Pseudocymopterus montanus* (Gray) C. & R., and *Pseudocymopterus sylvaticus* A. Nels., *sanicle* or *snake-root*, *Sanicula marylandica* L., and *Oxypholis fendleri* (Gray) Heller.

## DOGWOOD FAMILY (CORNACEAE)

A family mostly made up of shrubs, some with very beautiful blooms. Flowers small, in clusters or heads, surrounded by petallike bracts; leaves opposite. Our only representative is the *western red-stemmed dogwood*, *Cornus stolonifera* Michx. (*C. instoloneus*), a shrub with dark-red bark occasionally found in the park in moist thickets and along streams, but much more abundant along streams at lower altitudes. It is closely related to the red osier dogwood of the East.

## HEATH FAMILY (ERICACEAE)

A very large family to which many beautiful ornamental shrubs belong. The corolla is united, or in the pyrolas, of separate petals; the stamens are



Figure 56.—COW-PARSNIP. WHITE CLUSTERS, 6 TO 12 INCHES ACROSS; PLANT 3 TO 6 FEET HIGH. Photograph by Joseph Dixon.

of the same number or twice as many as the corolla lobes and inserted on the receptacle with the other flower parts, not on the corolla; the leaves are often evergreen, and usually rather thick, never lobed or dissected. The following subfamilies are represented in our range:

#### 1. PYROLA SUBFAMILY

A group of small herbs with tough, shiny, evergreen leaves, and white or pink flowers with 5 thick petals, 10 stamens, and 1 conspicuous pistil. They are confined to moist coniferous forests and shady bogs. These species are found which may be distinguished by the following key: *Star-flowered* or *one-flowered pyrola* or *woodnymph*, *Moneses uniflora* (L.) Gray (fig. 57), *pipsissewa* or *princes pine*, *Chimaphila umbellata* Nutt. (fig. 58), *bog* or *alpine pyrola*, *Pyrola asarifolia* Michx., (*P. uliginosa*) (fig. 59), *one-sided pyrola*, *Pyrola secunda* L., (*Rameschia secunda*) *green-flowered pyrola*, *Pyrola virens* Schweigg. and *least pyrola*, *Pyrola minor* L., (*Erxlebenia minor*). The pyrolas are often called by the common name of "wintergreen," but they should not be confused with the aromatic wintergreen of the genus *Gaultheria*.

Figure 57.—STAR-FLOWERED PYROLA. WHITE AND FRAGRANT; 2 TO 4 INCHES HIGH. Photograph by Kenneth Hartley.



Figure 58.—PIPSISSEWA. PINK OR ROSE-COLORED; 6 TO 8 INCHES HIGH. Photograph by Kenneth Hartley.





Figure 59.—BOG PYROLA. PINK,  
6 TO 12 INCHES HIGH. Photograph  
by Kenneth Hartley.

- A. Flower solitary . . . . . *Star-flowered pyrola.*
- AA. Flowers several.
  - B. Flowers in an umbel . . . . . *Pipsissewa* or *princes pine.*
  - BB. Flowers in a simple raceme.
    - a. Flowers pink . . . . . *Bog pyrola.*
    - aa. Flowers white or greenish.
      - b. Racemes one-sided . . . . . *One-sided pyrola.*
      - bb. Raceme not one-sided.
        - c. Style long and declined . . . *Green-flowered pyrola.*
        - cc. Style short, stigma five-rayed . . . . *Least pyrola.*

## 2. HEATH SUBFAMILY

Petals united into an urn-shaped or cup-shaped corolla, stems woody (in *Gaultheria* very slender and creeping); leaves evergreen.



Figure 60.—KINNIKINNIC. FLOWERS WHITE OR PINK, BERRIES RED, STEMS TRAILING. Photograph by Kenneth Hartley.

*Kinnikinnic* or *bearberry*, *Arctostaphylos uva-ursi* (L) Spreng., (fig. 60).—A charming little evergreen prostrate shrub. It rarely grows more than 6 inches high but spreads out in a green carpet of glossy leaves. The shreddy, reddish bark of its trailing stems, as well as its dainty flowers and berries, suggest its close relationship to the more western manzanitas which belong to the same genus. In May and June, kinnikinnic is covered with waxy, pinkish bells, followed by shiny green berries, which turn scarlet in autumn. These are much relished by the small animals and are called “chipmunk apples” by the children. This plant is one of nature’s pioneers, ever advancing on the frontier of poor and rocky ground (pl. V b), or following the devastating forest fires.

*Aromatic wintergreen* or *Western wintergreen*, *Gaultheria humifusa* (Graham) Rydb.—A creeping evergreen plant growing pressed close to the ground, often in moss, and very inconspicuous except when dotted with its scarlet berries, which have a pleasant flavor. It is found in damp places in the subalpine zone.

*Dwarf mountain-laurel* or *bog kalmia*, *Kalmia polifolia* Wang., (*K. microphylla*) (fig. 61).—This little shrub is one of the loveliest plants of the subalpine zone, where it grows only a few inches high, but blooms profusely in July with clusters of rose-purple flowers similar in shape to those



Figure 61.—DWARF MOUNTAIN-LAUREL. ROSE-PURPLE; PLANT 2 TO 6 INCHES HIGH. Photograph by Kenneth Hartley.

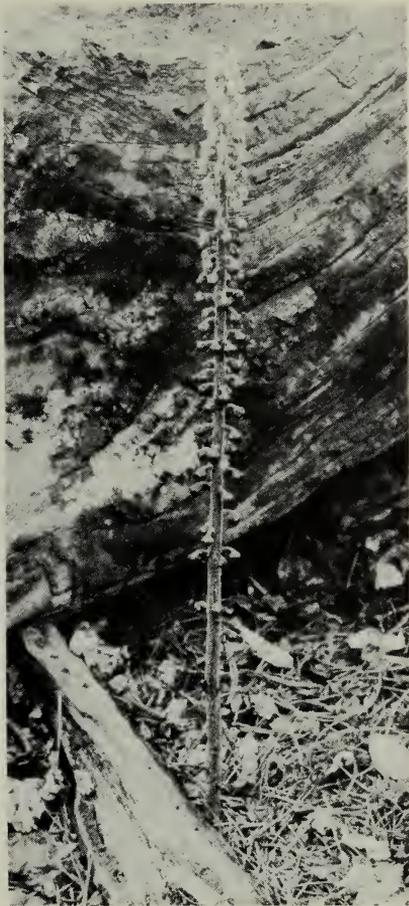


Figure 62.—PINEDROPS. WHOLE PLANT BROWNISH; 1 TO 3 FEET HIGH. Photograph by Kenneth Hartley.

of the mountain-laurel of the East. The margins of the opposite leaves are in-rolled. It is found along streams, often growing in moss, and around lake shores.

### 3. INDIANPIPE SUBFAMILY

A group of saprophytic plants without green coloring. *Pinedrops* or *woodland pinedrops*, *Pterospora andromedea* Nutt. (fig. 62).—A tall plant with brown, hairy stem, no leaves, and roundish blossoms hanging like bells is sometimes found in the coniferous forests.

## HUCKLEBERRY FAMILY (VACCINIACEAE)

A family of shrubs with blossoms similar in appearance to the last family, represented in the park by three species, abundant on the burned-over region of the sub-alpine zone.

*Black grouseberry* or *myrtle whortleberry*, *Vaccinium myrtillus* L. (*V. oreophilum*).—A small shrub with ovate leaves, brownish stems, usually less than a foot high, and large, sweet, blue-black berries is the most common. *Red grouseberry* or *grouse whortleberry*, *Vaccinium scoparium* Leiberg., with green, angled stems, smaller leaves, and small red berries is found with it. *Dwarf grouseberry* or *dwarf blueberry*, *Vaccinium caespitosum* Michx. may be distinguished from the above by its round, rather than angled branches and its more spreading habit. The berries are blue. It is found on the western slope.

## PRIMROSE FAMILY (PRIMULACEAE)

Plants having simple (undivided) leaves and united, five-lobed, regular corollas. The fruit is a capsule and the seeds are attached to a central placenta.

- A. Flower solitary, rose-colored; plant usually only 2 or 3 inches high; alpine zone . . . . . *Fairy primrose* (p. 118)
- AA. Flowers several in umbels or clusters.
  - B. Flowers in terminal umbels.
    - a. Umbel compound, made up of small umbels.
      - b. Plant common on montane fields, inconspicuous  
*Mountain androsace* (p. 119)
      - bb. Plant of alpine fields with numerous starlike, white flowers . . . . . *Alpine androsace* (p. 119)
    - aa. Umbel not compound.
      - b. Flowers white with yellow eye, fading pink, fragrant; small alpine plant . . . . . *Rockjasmine* (p. 120)
      - bb. Flowers pink or rose-purple.
        - c. Petals bent backwards; plant of montane meadows and stream sides. *Shooting star* (p. 121)
        - cc. Petals spreading; very conspicuous plant of subalpine and alpine stream sides and wet ground . . . . . *Parry primrose* (p. 119)
  - BB. Flowers in axillary clusters, yellow . *Tufted loosestrife* (p. 121)

*Fairy primrose* or *Colorado primrose*, *Primula angustifolia* Torr. (fig. 63).—An alpine plant only 2 to 4 inches high with bright rose-purple flowers with

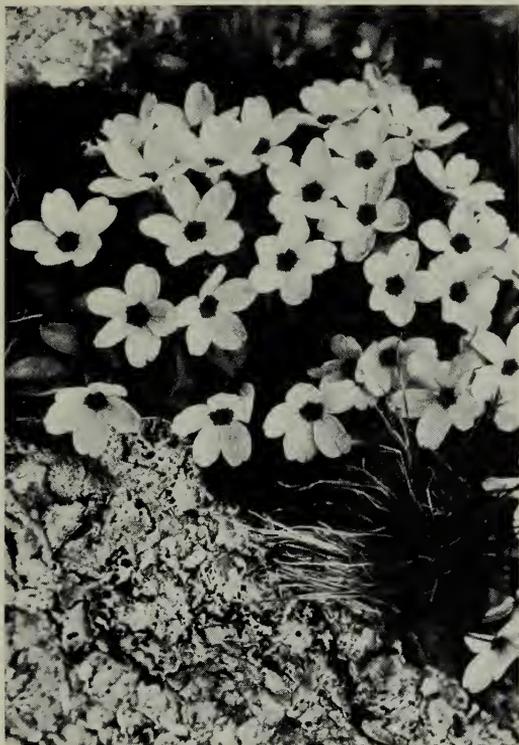


Figure 63.—FAIRY PRIMROSE. ROSE WITH YELLOW EYE; PLANTS 2 TO 4 INCHES HIGH, SOMETIMES SOLITARY. Photograph by Kenneth Hartley.

yellow eye, usually only one on each stem but the stems sometimes clustered. It blooms in July.

*Parry primrose*, *Primula parryi* Gray (fig. 64).—One of the most striking plants of the subalpine and lower alpine regions, growing nearly a foot tall and bearing dense clusters of brilliant rose-purple flowers. The thick, smooth, light-green leaves are spatulate oblong or oblanceolate, and all grow in a rosette at the base of the stem. These plants like water and are usually found along the edge of the alpine streams or on wet banks from which the snow has recently melted. They bloom in July and August. The odor of the flowers is heavily sweet at first but soon becomes rank.

*Alpine androsace*, *Androsace subumbellata* (A. Nels.) Small.—A small alpine plant with flower stems about 2 inches long from rosettes of basal leaves; inflorescence a compact and compound umbel with numerous tiny starlike white blossoms. It is frequently seen among rocks near Fall River Pass, along the summit of Trail Ridge, and on the high peaks.

*Mountain androsace*, *Androsace diffusa* Small, is abundant on montane fields and hillsides but is inconspicuous. The rays of the umbel are longer than the peduncles and the petals are shorter than the calyx lobes.



Figure 64.—PARRY PRIMROSE. ROSE PURPLE; 6 TO 12 INCHES HIGH. Photograph by Kenneth Hartley.

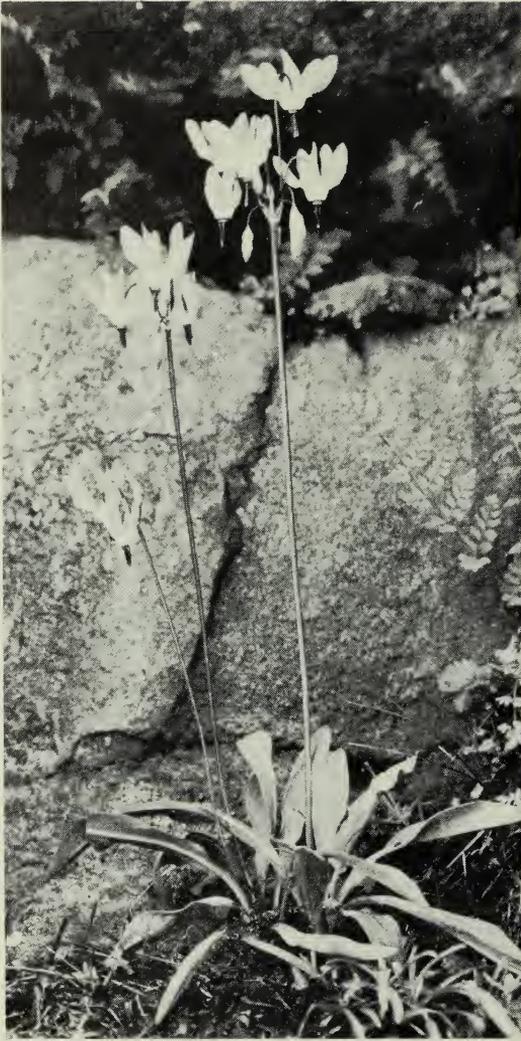
*Rockjasmine*, *Drosace carinata* (Torr.) A. Nels. (*Androsace carinata* Torr.) (fig.65).—A diminutive, caespitose plant with rosettes of small hairy leaves from each of which a stem 1 or 2 inches high is sent up. This bears a headlike umbel of fragrant white or cream-colored flowers. The eye of each flower is at first yellow but turns pink with age. This plant is abundant on rocky alpine slopes, blooming in July and sometimes later.



Figure 65.—ROCKJASMINE. WHITE OR CREAM-COLORED  $\frac{1}{2}$  TO 2 INCHES HIGH. Photograph by Kenneth Hartley.

*Shooting star* or *darkthroat shootingstar*, *Dodecatheon pauciflorum* (Durand) Greene (fig. 66).—This plant is easily recognized by the shape of its flower; the dark-colored, pointed anthers form the apex, and the turned-back corolla lobes give the effect of the “shooting star.” It is most abundant in wet meadows of the montane zone, but has also been seen growing in rock crevices above Chasm Falls, where it was constantly wet with the spray from the falls.

*Tufted loosestrife* or *water loosestrife*, *Naumbergia thrysiflora* (L.) Duby.—A marsh plant with opposite leaves and short, headlike spikes of yellowish, purple-dotted flowers, growing from the axils of the middle pairs of leaves.



*Figure 66.* — SHOOTING STAR.  
ROSE PINK; 6 TO 10 INCHES HIGH.  
*Photograph by Kenneth Hartley.*

The lower leaves are reduced to scales, the stem not branched. It grows in meadows around Estes Park and is widely distributed across our continent and in Europe and Asia.

#### *GENTIAN FAMILY (GENTIANACEAE)*

All the members of this family have smooth and opposite or whorled leaves. The corolla lobes in our members are four or five, the stamens inserted on the corolla tube. Many of them close the flower except in bright sunshine. These plants bloom mostly in late summer.

- A. Corolla saucer-shaped, four or five lobed.
  - B. Plant 2 to 4 feet high, stout, light green  
*Monument plant* (p. 123)
  - BB. Plant 18 inches tall or less, slender.
    - a. Flowers white . . . . . *Marsh felwort* (p. 124)
    - aa. Flowers dark blue, sometimes purplish  
*Star-gentian* (p. 124)
- AA. Corolla tubular or funnel-form, its lobes closed or spreading.
  - B. Flowers bright blue.
    - a. Plants very small, usually less than 4 inches high; alpine zone  
*Moss gentian* (p. 124)
    - aa. Plants taller, usually 6 inches tall or more.
      - b. Corolla four-lobed, more or less fringed.
        - c. Flower fragrant; plant perennial  
*Fragrant gentian* (p. 125)
        - cc. Flower not fragrant; plant annual  
*Rocky Mountain fringed gentian* (p. 123)
      - bb. Corolla usually five-lobed, never fringed.
        - c. Plants tufted, low and spreading, growing on open, dry fields; flowers usually closed  
*Bigelow gentian* (p. 125)
        - cc. Plants taller and erect, usually growing in moist meadows . . . . . *Blue marsh gentian* (p. 125)
  - BB. Flowers never bright blue, either pale blue, rose-tinged, whitish, or greenish.
    - a. Flowers several, white or greenish with dark markings; alpine zone . . . . . *Arctic gentian* (p. 125)
    - aa. Flowers not as above; usually with a fringed crown in corolla throat.
      - b. Flowers solitary.
        - c. Flower pale blue or whitish, borne on a slender terminal peduncle; small alpine plant, rare  
*One-flowered gentian* (p. 125)
        - cc. Flower lavender or rose-tinged  
*Dwarf rose gentian* (p. 125)
      - bb. Flowers several to many.
        - c. Flowers lavender or rose-tinged; plant slender  
*Rose gentian* (p. 125)
        - cc. Flowers dingy-white or bluish, very numerous in a dense, thick, spikelike inflorescence  
*Marsh gentian* (p. 125)

*Monument plant* or *showy fraseria*, *Swertia radicata* (Kellogg) Kuntze (*Frasera speciosa*) (fig. 67).—A tall stout plant found on open slopes at



Figure 67.—MONUMENT PLANT. GREENISH; PLANT 1 TO 4 FEET HIGH. Photograph by Joseph Dixon.



Figure 68.—ROCKY MOUNTAIN FRINGED GENTIAN. BRIGHT BLUE; FLOWER 1½ TO 2½ INCHES LONG. Photograph by Paul F. Shope.

all altitudes in the park. The leafy stem is 1 to 4 feet high, the upper part of it densely flowered with saucer-shaped flowers. The four-lobed corolla is greenish with dark spots and bears some fringed appendages.

*Star-gentian*, *Swertia perennis* L. (*S. palustris*).—Slender plants of subalpine and alpine marshes with dark bluish or purplish flowers. Corolla saucer-shaped, either four or five lobed.

*Marsh felwort*, *Lomatogonium rotatum* (L.) Fries, (*Pleurogyne fontana*, *P. rotata*).—A slender, rather rare plant of marshy ground with white, saucer-shaped, five-lobed corolla, each lobe with two scales at base.

*Moss gentian*, *Gentiana prostrata* Haenke (*Chondrophylla americana*).—A diminutive plant of the alpine grassland, also found in moss. Its stem is from one to a few inches long, very slender, bearing pairs of tiny, white-margined leaves and a tiny, deep blue, four- or five-lobed flower which

closes immediately on being picked or even touched. *Gentiana fremontii* Torr. has been seen near Longs Peak.

*Fragrant gentian* or *perennial fringed gentian*, *Gentiana barbellata* Engelm.—A rare plant with brilliant blue, four-lobed corolla and exquisite fragrance, found in damp woods and sometimes above timber line.

The corolla lobes are slightly fringed.

*Rocky Mountain fringed gentian*, *Gentiana elegans* A. Nels. (*G. thermalis*) (fig. 68).—A plant from a few inches to a foot or more in height, usually with a few erect branches, bearing exquisitely brilliant deep-blue flowers; the four corolla lobes are fringed on their margins. These plants are found in sunny places on wet ground of the subalpine zone. A dwarf, one-flowered form of this plant called *G. elegans unicaulis* A. Nels. is found at higher altitudes.

*Bigelow gentian* or *closed field gentian*, *Gentiana bigelovii* Gray.—A tufted plant with clusters of nearly closed blue flowers is found on fields of the montane zone, blooming in August.

*Blue marsh gentian* or *Rocky Mountain pleated gentian*, *Gentiana affinis* Griseb.—A plant with erect stem usually about a foot high, ovate or oblong leaves in pairs, and clusters of several or many deep blue, funnel-shaped flowers. Found on wet ground in the montane zone.

*Parry gentian*, *Gentiana parryi* Engelm. (fig. 69).—Similar to the last but usually larger; flowers one to five, bright, deep blue when open, blackish when closed. Found in meadows, and in a reduced form on stony slopes in the subalpine and alpine zones. If the sun disappears under a cloud, these flowers immediately close up tightly.

*Arctic gentian* or *Romanzoff gentian*, *Gentiana romanzovii* Ledeb., (*G. frigida* and *Dasystephana romanzovii*) (fig. 70).—The clusters of greenish white flowers spotted or streaked with dark purple identify this plant, which is abundant at and above timber line, blooming in August and September.

*One-flowered gentian*, *Gentiana monantha* A. Nels., (*G. tenella* and *Amarella monantha*).—A tiny, rare plant with white or pale bluish four-lobed flowers borne on the end of a comparatively long, slender peduncle rising from a short leafy stem.

*Amarella, rose gentian*, or *annual gentian*, *Gentiana amarella* L. (*G. plebeja*).—A plant with small, rose-lilac or lavender, four- or five-pointed flowers, each with a little crown of fringe around the throat. This is a common plant in moist and often shady situations throughout the park.

*Dwarf rose gentian*, *Gentiana plebeja holmii* Wettst. is a reduced alpine form with one or only a few flowers.

*Marsh gentian*, *Gentiana strictiflora* (Rydb.) A. Nels., (*G. amarella stricta* and *Amarella strictiflora*).—Stem with many erect branches, the plant densely flowered with white or blue-tinged flowers; corolla lobes usually four, sometimes five. Leaves and stem pale green. This is abundant in marshes of the mountane zone.



Figure 69.—PARRY GENTIAN. BRIGHT BLUE; PLANT 6 TO 15 INCHES HIGH. Photograph by Kenneth Hartley.



Figure 70.—ARCTIC GENTIAN. GREENISH WHITE WITH DARK STREAKS; FLOWERS 1 TO 2 INCHES LONG. Photograph by Kenneth Hartley.

### BUCKBEAN FAMILY (MENYANTHACEAE)

Represented in the park by the *buckbean*, *marsh trefoil* or *common bog-bean*, *Menyanthes trifoliata* L., a plant of cold lakes and bogs, circumpolar in distribution. It is found in some of the subalpine lakes and may be recognized by the cloverlike leaf of three oval leaflets. Its bloom is a headlike spike of small white or pinkish flowers.

### DOGBANE FAMILY (APOCYNACEAE)

*Indian-hemp* or *spreading dogbane*, *Apocynum androsaemifolium* L.—The only member found in the park. It is a branching plant 6 inches to a foot high, in our region, with ovate or oblong leaves, dark green and shiny above but pale beneath, and clusters of small pink flowers. The margins of the corolla lobes turn back. The stem is usually light brown or straw-colored, sometimes reddish. This plant is found in sunny, often rocky, locations of the montane zone. It is conspicuous in autumn because of its yellow coloration.

## MILKWEED FAMILY (ASCLEPIADACEAE)

*Showy milkweed*, *Asclepias speciosa* Torr., adventive along roads, is a tall stout plant with opposite, oval or oblong, light green leaves, milky juice, and rose-colored flowers.

## PHLOX FAMILY (POLEMONIACEAE)

A large family, well represented in our region. It is characterized by its regular five-merous flowers; that is, calyx, corolla lobes and stamens, five each. The stamens are attached to the corolla tube. The corolla varies from funnel-form to rotate (wheel-shaped), or salverform (as in the phlox where there is a long, slender tube abruptly spreading at its apex into broad flat lobes). Stigmas three and pod three-celled.

Flowers scarlet or pink, long exserted from the calyx . . . *Skyrocket gilia* (p.128)

Flowers blue, white, or pale yellow.

Corolla with narrow cylindrical tube and spreading lobes.

Plants of alpine zone, dwarf and cushionlike, never sticky; flowers pale blue or white . . . . . *Alpine phlox* (p.128)

Plants not as above.

Leaves simple and entire; flowers inconspicuous; calyx papery . . . . . *Collomia* (p.128)

Leaves lobed or divided, divisions narrow.

Flowers yellowish, some of the leaves with a few lobes, stem woolly . . . . . *Spicate gilia* (p.128)

Flowers bluish, leaves pinnatifid, stem sticky but not woolly  
*Pinnate-leaved gilia* (p.128)

Corolla funnel-form or wheel-shaped.

Lobes of the corolla shorter than the corolla tube, mostly plants of high altitudes.

Corolla bright blue, anthers orange . *Alpine polemonium* (p.128)

Corolla cream-colored . . . . . *Honey polemonium* (p.129)

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

Stems decumbent, clustered plant found abundantly in spruce forests . . . . . *Jacobs ladder* (p.129)

Stems erect.

Slender plant of bogs and wet ground in submontane and montane zones . . . . . *Western polemonium* (p.129)

Stout plant usually much branched, growing on fields and meadows, montane . . . . . *Leafy polemonium* (p.129)

*Skyrocket gilia* or *fairy trumpet*, *Gilia aggregata* (Pursh) Spreng.—A plant 1 to 2 feet high, usually with scarlet, flowers. The corolla trumpet-shaped, about an inch long with short, pointed spreading lobes; the leaves pinnately divided into linear divisions. This plant is frequently found on the western slope. Two inconspicuous gilies are found on the east side, *Gilia calcarea* M. E. Jones (*G. pinnatifida*) with pinnate leaves and bluish flowers, and *G. spicata* Nutt., with pale yellow flowers. Both grow on montane fields.

*Alpine phlox* or *tufted phlox*, *Phlox caespitosa* Nutt. (fig. 71).—An alpine cushion plant with short leafy stems, opposite leaves, and pale blue or almost white, stemless flowers. The stamens are attached to the corolla tube. In July the plant is sometimes entirely covered with flowers. *Phlox multiflora* A. Nels. a taller, less compact plant occurs in the Grand Lake region.

*Collomia* or *slenderleaf gilia*, *Collomia linearis* Nutt.—A weedy plant with narrow, pointed leaves and small lavender flowers in calyces which are thin, dry, and papery at the angles and which enlarge after flowering.

*Alpine polemonium*, *sky pilot*, or *sticky polemonium*, *Polemonium viscosum* Nutt. (*P. confertum* Gray) (fig. 72).—An alpine plant with large heads of funnel-shaped brilliant purplish-blue flowers, with bright orange anthers. The long, narrow leaves are pinnately compound with tiny oval leaflets in clusters along the midrib. This plant is found throughout the alpine zone, blooming from late June through August. It is well named "sky pilot," for it has been found above 13,000 feet on Longs Peak. *Polemonium*

Figure 71.—ALPINE PHLOX. PALE BLUE OR WHITE;  $\frac{1}{2}$  TO 1 INCH ACROSS; PLANT MATTED. Photograph by Kenneth Hartley.



Figure 72.—ALPINE POLEMONIUM. BRILLIANT BLUE, AN INCH OR MORE IN LENGTH. Photograph by Joseph Dixon.





Figure 73.—JACOBS LADDER. LIGHT BLUE, ABOUT  $\frac{1}{2}$  INCH IN LENGTH. Photograph by Paul E. Shope.

*grayanum* Rydb. is similar to it and is found in similar locations. Both have strong-scented foliage.

*Honey polemonium* or *cream polemonium*, *Polemonium mellitum* (Gray) A. Nels. has cream-colored flowers but otherwise is very similar to the last two.

*Jacobs ladder*, *Polemonium delicatum* Rydb. (fig. 73). (This has been erroneously called *P. pulcherrimum*)—One of the most abundant plants found under the spruce forests of the subalpine zone, where it is seen in company with mountain figwort and grouseberry. The flowers are light blue and the leaves are sometimes mistaken for ferns from the ladderlike arrangement of the numerous oblong or lanceolate leaflets. Its stem is weak and usually branched. The *Western polemonium*, *Polemonium occidentale* Greene, with erect, slender stem and flowers similar to the last, is found in some meadows and swamps. *Leafy polemonium*, *Polemonium foliosissimum* Gray, with similar flowers but stout and much-branched stem, is found at lower altitudes in meadows.



Figure 74.—PURPLE FRINGE. SPIKES 2 TO 8 INCHES LONG. Photograph by Paul F. Shope.

### WATERLEAF FAMILY (HYDROPHYLLACEAE)

Flowers similar in structure to those of the phlox family but seed pod usually two-celled, and the stamens usually exserted, giving the inflorescence a fringed appearance.

*Fendler waterleaf*, *Hydrophyllum fendleri* (Gray) Heller, (*H. occidentale fendleri*).—A plant about a foot high, or less, of moist, shady thickets, with leaves pinnately divided into 7 to 15 ovate-lanceolate, serrate divisions; flowers white, stamens and pistil protruding.

*Scorpionweed* or *varileaf phacelia*, *Phacelia heterophylla* Pursh.—Plant hairy with silky or stiff white hairs; stems 6 to 18 inches long, erect or spreading on the ground; leaves lanceolate or oblong, the lower ones sometimes with a few lobes; branches of the inflorescence curving, densely flowered, with white or pale-lavender blossoms.

*Sticky scorpionweed* or *glandular phacelia*, *Phacelia glandulosa* Nutt., a stout, homely weed of roadsides, 6 inches to 2 feet high, with divided leaves and clusters of dense, slightly curved spikes of lavender flowers and ripening

Pods. This plant is usually very grimy because the dust of the road sticks to it.

*Purple fringe* or *silky phacelia*, *Phacelia sericea* (Graham) Gray, (includes *P. ciliosa* Rydb.) (fig. 74).—Usually sends up several stems bearing many dense clusters of dark purple flowers, forming a narrowly oblong spikelike inflorescence. The slender stamens protrude from the flowers, giving the spike its “fringed” appearance. The leaves are much dissected and covered with silky hairs, which give them a grayish look. This plant is found throughout the park. In the montane zone the flowering stems are often a foot high; in the alpine only a few inches.

### BORAGE FAMILY (BORAGINACEAE)

The flowers in this family are similar in structure to those in the phlox family, but the fruit instead of being a seed-filled pod, consists of four seedlike nutlets each in a hard or prickly shell. At the time of flowering the four young nutlets may be seen at the base of the pistil. The calyx often enlarges after flowering, inclosing them. Often they are edged or covered with prickles which catch in one’s clothing or in the fur of animals. The plants thus become widely distributed, and are considered pests. The inflorescence of these plants is what is known as a “scorpioid cyme,” an elongated cluster which uncurls as the flowers open, similar to that of heliotrope.

Flowers yellow; seed smooth, white, and shining.

Flowers at least  $\frac{1}{2}$  inch broad and 1 inch long

*Narrow-leaved puccoon* (p. 132)

Flowers about  $\frac{1}{4}$  inch broad and 1 inch long or less

*Many-flowered puccoon* (p. 132)

Flowers blue or white.

Plant very small, cushionlike; foliage covered with numerous white hairs; flowers brilliant blue; alpine zone

*Alpine forget-me-not* (p. 132)

Plants larger, not cushionlike.

Flowers blue; buds often pinkish.

Flowers “forget-me-not” like; seed a small bur

*Tall stickseed* (p. 132)

Flowers bell-shaped or funnel-form . . . . *Mertensia* (p. 133)

Flowers white or very pale blue

Plant erect, stiff-hairy, usually unbranched; flowers white, numerous; seed without prickles . . . *Miners candle* (p. 136)

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

Nutlets burlike . . . . . *Stickseed* (p. 132)

Nutlets smooth and shining . . . . . *Cryptantha* (p. 136)

*Narrowleaf puccoon* or *narrowleaf gromwell*, *Lithospermum angustifolium* Michx.—The flowers of this plant are light yellow, the corolla has a long, slender tube and spreading lobes; corolla tube about an inch long spreading part one-half to three-fourth inch across; leaves linear and grayish with stiff hairs. A plant of the montane fields blooming in June. After the conspicuous flowers disappear the plant produces *cleistogamus* flowers; that is, "hidden" flowers, which produce good seed without the corolla opening. *Many-flower puccoon* or *manyflower gromwell*, *Lithospermum multiflorum* Torr., is similar but has a slightly later blooming season; the flowers are smaller, darker yellow, and more numerous; the plants often form clumps of several wandlike stems; leaves narrowly lanceolate or oblong; fields and open hillsides of the montane zone.

*Alpine forget-me-not* or *silverhaired forget-me-not*, *Eritrichium argenteum* Wight. (fig. 75).—One of the most charming of the high alpine cushion plants. Anyone who sees its patches of brilliant blue among the gray rocks of those bleak heights will never forget the thrill caused by their beauty.

*Stickseed*.—These plants have pale blue or whitish flowers, like forget-me-nots, and prickly seeds. Many of them are weeds, and ours are all found along roadsides or on waste ground. The following species grow in the park: *Tall stickseed* or *false-forget-me-not* *Lappula floribunda* (Lehm.) Greene, *Western stickseed* *Lappula occidentalis* (Wats.) Green, and *Lappula calycosa* Rydb.

Figure 75.—ALPINE FORGET-ME-NOT. BRIGHT BLUE OR SOMETIMES WHITE. PLANTS 1 TO 2 INCHES TALL. Photograph by Kenneth Hartley.





Figure 76.—TALL CHIMING BELLS. FLOWERS BLUE, PLANTS 18 INCHES TO 2 FEET HIGH. Photograph by Joseph Dixon.

*Mertensia*, *chiming bells*, or *American bluebells*.—These plants are easily recognized by their numerous pendent, bell-shaped blue blossoms. The buds are often pinkish or lavender. The “tube” is the cylindrical portion of the corolla below the point where it begins to expand. The commonest kinds are: *tall chiming bells* or *mountain bluebells*, *Mertensia ciliata* (James) G. Don; *greenleaf bluebells*, *Mertensia viridis* A. Nels., and *alpine bluebells*, *Mertensia alpina* (Torr.) G. Don; *field mertensia* or *lanceleaf bluebells*, *Mertensia lanceolata* (Pursh) A. DC. The species with their varieties occurring in the park may be distinguished by the following key.<sup>10</sup>

<sup>10</sup> Synonyms in *Mertensia*: as used in the 1933 edition of this bulletin; *M. ciliata* (*M. sibirica*), *M. alpina* (*M. tweedvi*), *M. viridis* (*M. ovata*), *M. viridis* var. *dilatata* (*M. coriacea*), *M. lanceolata* var. *secundorum* (*M. bakeri lateriflora*).



Figure 77.—FIELD MERTENSIA. FLOWERS LIGHT BLUE, PLANTS 6 TO 10 INCHES HIGH.  
 Photograph by Kenneth Hartley.

Plants with veiny leaves, stems usually over 1 foot tall, growing on stream banks and in wet, shady locations. . . . *M. ciliata* (James) G. Don (fig. 76)

Plants with leaves usually lacking conspicuous veins except for the midrib, usually less than 1 ft. tall, of open sunny hillsides or alpine situations.

Anthers included in the corolla tube. . . . *M. alpina* (Torr.) G. Don.

Anthers extending above the tube.

Plants of alpine or subalpine locations.

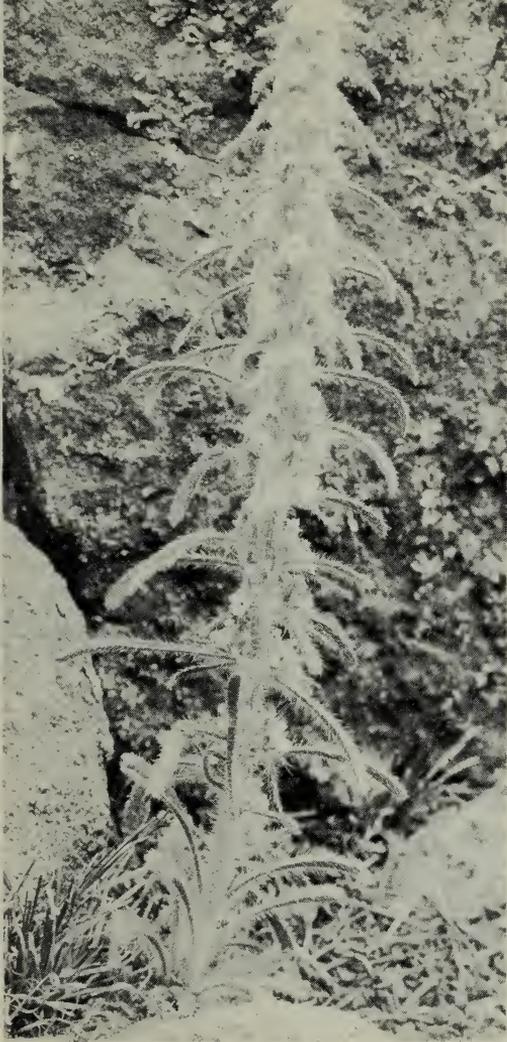


Figure 78.—MINERS CANDLE.  
FLOWERS WHITE, PLANT 8 TO 18  
INCHES HIGH. Photograph by  
Kenneth Hartley.

Leaves pubescent on both surfaces.

Stems more or less decumbent, leaves tending to be uni-  
lateral . . . . . *M. viridis* var. *cana* (Rydb.) Wms.

Stems erect, leaves not unilateral. . . . . *M. bakeri* Greene

Leaves glabrous at least beneath.

Leaves pubescent above . . . . . *M. viridis* A. Nels.

Leaves glabrous on both surfaces

*M. viridis* var. *dilatata* (A. Nels.) Wms.

Plants of open hillsides of the montane zone.

Leaves glabrous and glaucous

*M. lanceolata* var. *brachyloba* (Greene) A. Nels.

Leaves pubescent and dull green

*M. lanceolata* var. *secundorum* Ckll. (fig. 77)



Figure 79.—SKULLCAP. FLOWERS RICH, PURPLISH-BLUE, PLANT 6 TO 8 INCHES HIGH. Photograph by Kenneth Hartley.



Figure 80.—HORSEMINT. REDDISH PURPLE, CLUSTERS 2 TO 3 INCHES ACROSS. Photograph by Joseph Dixon.

*Miners candle*, *Cryptantha virgata* (Porter) Payson (fig. 78).—A plant with very hairy, almost prickly, foliage and clusters of white flowers, like forget-me-nots, close to a stout, erect stem. It is conspicuous on the montane fields and open slopes, blooming in late June and July. If the terminal bud is destroyed, there may be several stems. (*Oreocarya virgata*).

*Cryptantha*, *Cryptantha flexuosa* A. Nels., (*C. calycosa*).—A plant rather similar in appearance and habit to the stickseeds, but its nutlets are smooth; the whole plant, however, is prickly-hairy.

### VERBENA FAMILY (VERBENACEAE)

A family with opposite or whorled leaves and usually square stems. Our representative is *vervain* or *bigbract verbena*, *Verbena bracteosa* Michx., a weed found around buildings, with spreading, decumbent stems; foliage rough-hairy, leaves cut and toothed; flowers bluish, inconspicuous, in terminal, leafy-bracted spikes.

## MINT FAMILY (LABIATAE)

This family has flowers with four nutlets clustered at the base of the pistil similar to the last two, and two-lipped corollas; square stems; opposite leaves; whole plant usually aromatic.

Inflorescence axillary.

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

*Wild mint* (p.137)

Plant not aromatic; flowers two at each node, bluish-purple

*Brittons skullcap* (p.137)

Inflorescence terminal.

Flowers in a headlike cluster.

Flowers conspicuous, bright purplish-rose; plant strongly aromatic . . . . . *Horsemint*. (p.137)

Flowers small, blue or pink; plant not aromatic. *Dragonhead*. (p.137)

Flowers in a spikelike inflorescence.

Stamens equal in length; plant introduced . . . *Spearmint* (p.137)

Stamens unequal, one pair shorter; flowers often clustered; plant native . . . . . *Woundwort* (p.138)

*Wild mint* or *Canada mint*, *Mentha canadensis* L.—Easily recognized by its aromatic odor. The small pinkish flowers are borne in clusters in the axils of the leaves. *Spearmint*, *Mentha spicata* L., has been introduced from Europe into this country, and has been found on marshy ground near dwellings in the Longs Peak region.

*Brittons skullcap*, *Scutellaria brittonii* Porter (fig. 79).—Plant approximately 6 inches high; flowers in the leaf axils, a pair at each node, erect, 2-lipped, purplish-blue (or rarely pink), about an inch long: calyx short, with two rounded lips, caplike; leaves oblong or ovate, margins entire; found on open slopes and meadows of the montane zone. *Scutellaria epilobifolia* Ham. (*S. galericulata*), a taller plant with finely toothed leaves and smaller blossoms grows along streams.

*Horsemint* or *mintleaf beebalm*, *Monarda menthaefolia* Graham, (*M. fistulosa* L.) (fig. 80).—A pungent-smelling plant, 1 to 2 feet tall, growing usually in colonies on moist soil, often in or near aspen groves. Flowers in headlike clusters, purplish-rose or bluish, from which the stamens and pistils are exerted. The leaves are pointed and finely toothed.

*American dragonhead*, *Moldavica parviflora* (Nutt.) Britt, (*Dracocephalum parviflorum*).—A weedy plant with small flowers in leafy-bracted, terminal spikes found around dwellings and on waste ground, and becoming very abundant on the burned area on Twin Sisters Mountain. Some plants have blue flowers, some pink.

*Woundwort* or *marsh betony*, *Stachys palustris* L.).—Flowers clustered in the axils of the leaves, lavender or purplish, often with darker markings; leaves ovate or triangular, sessile, lower side pale; leaf-margins toothed; plant more or less hairy; found on moist soil. (*S. teucriiformis*.)

*Prunella* or *common selfheal*, *Prunella vulgaris* L.—A widely distributed weed found on damp soil around settlements.

### POTATO FAMILY (SOLANACEAE)

This is a large family, widely distributed in warm regions and includes many plants of economic importance, such as potato, tomato, eggplant, peppers, tobacco, and others. Only two species are found in the park.

*Cutleaf nightshade*, *Solanum triflorum* Nutt., a low, spreading plant of roadsides and waste ground, with pinnately lobed leaves and five-pointed white flowers followed by nodding green berries resembling tiny tomatoes.

*Black nightshade*, *Solanum nigrum* L.—Similar to the last in habit and flower but the leaves ovate, not lobed, and the berries black.

### FIGWORT FAMILY (SCROPHULARIACEAE)

This is a very large family, which includes many of our most showy and beautiful flowers, though some are inconspicuous. It is characterized by having the parts of both the calyx and the corolla united and at least the corolla irregular, usually more or less five-lobed, but the lobes arranged so as to form two lips. The leaves may be either opposite or alternate, entire, toothed, or pinnately divided. The united and irregular corolla is the best characteristic to rely upon in identifying members of this family. The only other group having this same character is the mint family (p. 137), and in addition to the irregular united corollas the mints are characterized in fruit by four tiny nutlets, while the fruit of the figworts is a two-celled capsule. The fox gloves, snapdragons, and penstemons of the gardens and greenhouses belong to this group.

Leaves alternate or mostly basal.

Stamens five; flowers yellow; plant 2 to 6 feet tall, densely woolly

*Mullein* (p. 146)

Stamens four or two; plant usually not densely woolly.

Stamens four; stems leafy.

Leaves fernlike; corolla usually with prolonged beak; bracts often present but never brightly colored *Lousewort* (p. 144)

Leaves never fernlike; flowers in dense spikes or heads often interspersed with bright-colored bracts.

Bracts brightly colored or white, more conspicuous than the flowers . . . . . *Paintbrush* (p. 140)

Bracts green or greenish, less conspicuous than the bright yellow flowers . . . . . *Gold tongue* (p. 143)

Stamens two; leaves mostly basal . . . . . *Kittentails* (p. 145)

Leaves mostly opposite, the lower ones always so.

Calyx five-parted; anther bearing stamens four, the fifth stamen sterile, often much reduced.

Sterile stamen as long as or longer than the others, either smooth or bearded; corolla blue or purple, rarely whitish. *Penstemon* (p. 140)

Sterile stamen shorter than the others, sometimes reduced to a small scale.

Plant a tall stout weed with inconspicuous greenish or brownish flowers . . . . . *Western figwort* (p. 146)

Plant 8 inches tall, or less.

Flowers cream-colored, in a short, dense, one-sided spike; alpine zone . . . . . *Snowlover* (p. 143)

Flowers not as above.

Flowers bright yellow. *Yellow monkey flower* (p. 143)

Flowers blue or blue and white. *Blue-eyed Mary* (p. 143)

Calyx and corolla four-parted; stamens two; flowers blue.

Flowers in a terminal cluster; stem erect . . . . *Veronica* (p. 146)

Flowers axillary; stem trailing . . . *American brooklime* (p. 146)

The *Penstemons* are easy to recognize by their showy, usually blue or purple flowers growing in spikelike racemes, or narrow panicles, on unbranched stems. The opposite leaves are usually sessile. The petals are joined into a lobed, somewhat two-lipped funnel-form or bell-shaped corolla. The five stamens which give this group its name are inserted on the inside of the corolla tube. One of these stamens is sterile; that is, it bears no anther, but instead is usually flattened at the tip and often bearded. From the latter characteristic is derived the name "beardtongue," often applied to many members of this group.

Flowers blue or bluish-purple.

Sterile stamen smooth; flowers blue with purple throats

*Tall penstemon* (p. 140)

Sterile stamen bearded.

Leaves pale, smooth and bluish, tapering; flowers purple

*Purple beardtongue* (p. 140)

Leaves decidedly green.

Blossoms large, three-fourths to 1 inch long and one-half inch or more across, bright blue . . . *Mountain beardtongue* (p. 140)

Blossoms smaller, one-half inch or less in length, about one-fourth inch across, dark blue.

- Plant tufted; flowers scattered or continuous along the stem . . . . . *Low penstemon* (p.140)
- Plant not usually tufted; flowers crowded in heads or in clusters along the stem . . . . . *Clustered penstemon* (p.140)
- Flowers dark reddish-purple, or whitish; subalpine and alpine zones  
*Dark penstemon* (p.140)

*Tall penstemon* or *oneside penstemon*, *Penstemon unilateralis* Rydb.—Abundant on fields and along roadsides between elevations of 7,000 and 8,500 feet; usually a foot or more tall, flowers purplish-blue; our most conspicuous species, blooming in July. So abundant some seasons that whole fields are blue with it.

*Purple beardtongue* or *sidebells penstemon*, *Penstemon secundiflorus* Benth.—On fields and hillsides of the montane zone in late June and early July, occurring with the above but not nearly so frequent; the purple color and pale glaucous foliage distinguish it.

*Mountain beardtongue*, *Penstemon alpinus* Torr. (fig. 81).—On open slopes of the montane zone and along roadsides. The stems are stout, from 6 inches to 1 foot high, often several forming a clump. The brilliant azure-blue flowers occur in a crowded spike. This is closely related to *Penstemon glaber* Pursh.

*Low penstemon*, *Penstemon virens* Pennell (*P. humilis*).—Abundant on rocks and in rocky places of the montane and subalpine zones; stems usually several to many, flowers dark blue, small; inflorescence hairy and sometimes slightly sticky. Blooms in June in the montane zone; a little later higher up.

*Clustered* or *tinybloom penstemon*, *Penstemon micranthus* Nutt. (*P. procerus*). Occasional in the subalpine zone, has been found around Bear Lake and in Glacier Gorge. The flowers are dark blue from  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch long, in compact heads or verticils; the lower lip as well as the sterile stamen bearded; plant smooth; blooms in August. *Large clustered penstemon* *Penstemon aggregatus* Pennell. Similar to the last, but stem and inflorescence downy, and whole plant considerably larger. Flowers  $\frac{1}{2}$  to  $\frac{3}{4}$  inch long; lower lip bearded within. ((*P. rydbergii*.)

*Dark penstemon*, *Penstemon whippleanus* Gray.—Frequent in the subalpine and timber-line region; the very dark reddish-purple color of the flowers distinguishes it. The corolla has some long dark hairs on the inside. One form of this has dingy white flowers (*P. glaucus stenosepalus*).

*Indian paintbrush*, *Castilleja* (fig. 82).—A group of very showy and beautiful plants, abundant in this region. They do not depend on their flowers, which are rather inconspicuous, for their beauty, but on numerous brightly colored bracts or leaves, which are crowded at the ends of the stems and among which the flowers are found. Many of these plants are partly parasitic and grow attached to the roots of sagebrush or some other plant.

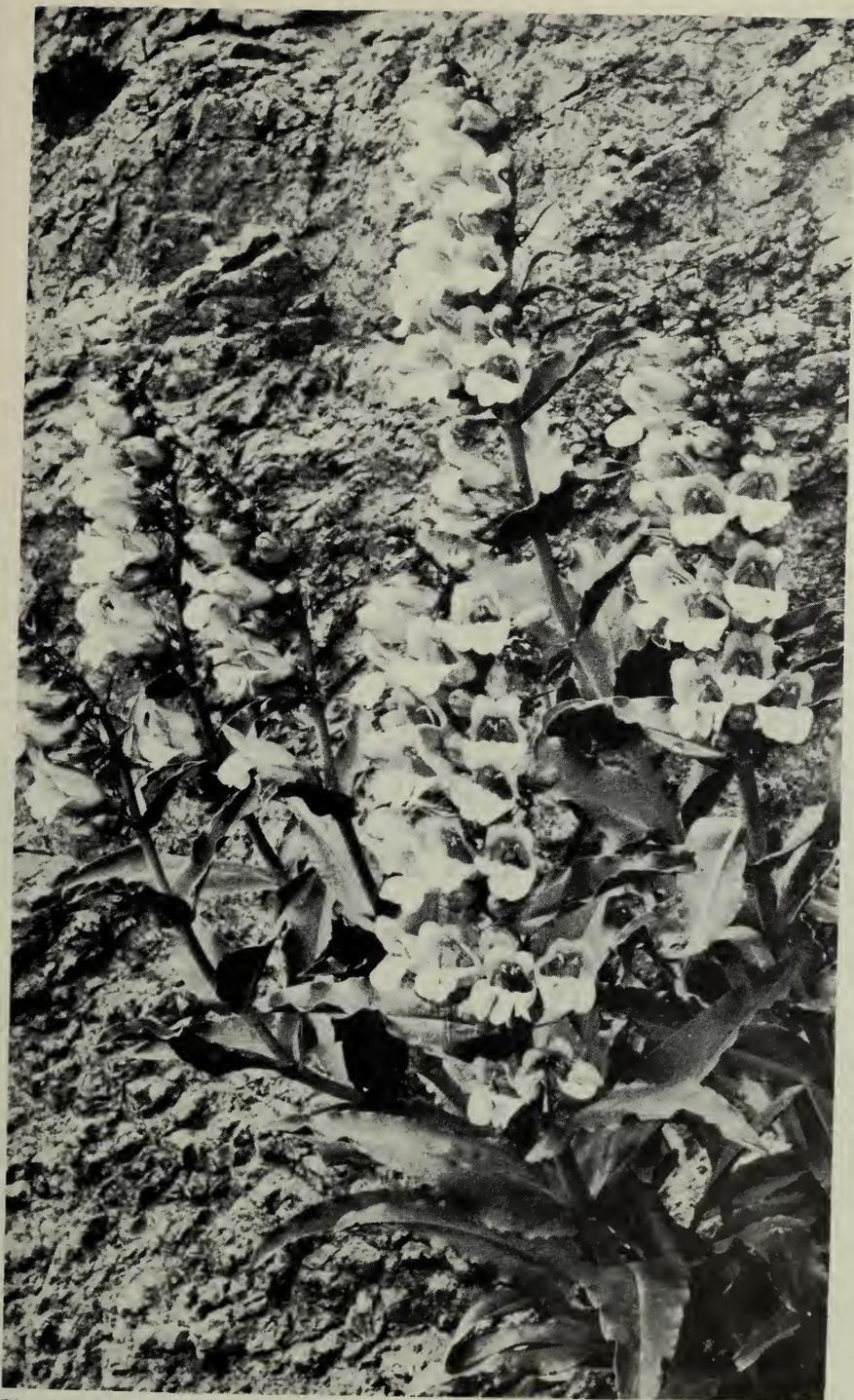


Figure 81.—MOUNTAIN BEARDTONGUE. FLOWERS AZURE BLUE, ABOUT  $1\frac{1}{2}$  INCHES LONG.  
Photograph by Kenneth Hartley.

Floral bracts red, rose-colored, purple, or pink.

Stem branched, flower-spike red.

Plant of montane zone and lower on dry hillsides, often with sagebrush; leaves narrow; flower-spike scarlet

*Narrow-leaved paintbrush* (p.143)

Plant of the upper montane and subalpine zones in moist situations; leaves broader; flower-spike rose-red

*Broad-leaved paintbrush* (p.143)

Stem not branched; plant of subalpine and alpine meadows; bracts pink to rose-purple . . . . . *Rosy paintbrush* (p.143)

Floral bracts white, yellow, or brownish.

Dwarf plant, 1 to 4 inches high, of exposed alpine fields; bracts brownish or yellowish . . . . . *Short-flowered paintbrush* (p.143)

Taller plants; bracts white, greenish, or yellow.

Bracts white or greenish; montane meadows; stem often branched.

*Northern paintbrush* (p.143)

Bracts yellow; subalpine and alpine meadows; stem never branched.

*Yellow paintbrush* (p.143)

Figure 82.—INDIAN PAINTBRUSH. BRACTS SCARLET, PLANTS 1 FOOT OR MORE IN HEIGHT. Photograph by Joseph Dixon.

Figure 83.—YELLOW PAINTBRUSH. CREAM TO SULPHUR YELLOW, 6 TO 12 INCHES TALL. Photograph by Kenneth Hartley.



Three red-flowered species are found in the park. The most common one, on dry slopes of the montane zone often growing with sagebrush or mountain sage, is the *narrow-leaved* or *Wyoming paintbrush*, *Castilleja linariaefolia* Benth. The corolla is usually green and protrudes from the red calyx and bracts; leaves narrow. Another species with broader leaves, found on moist ground of the subalpine zone, is the *broad-leaved paintbrush*, *Castilleja rhexifolia* Rydb. *Castilleja miniata* Dougl. with red-tipped bracts is found on moist ground of the montane zone.

*Yellow* or *Western paintbrush*, *Castilleja occidentalis* Torr. (fig. 83).—The common yellow-flowered species of the subalpine and alpine zones. The stems are unbranched 6 to 12 inches high and often grow in large clumps.

*Rosy* or *Yellowstone paintbrush*, *Castilleja lauta* A. Nels.—Similar in growth and habit to the last and considered by some botanists as a variety of it. The bracts and calyces vary in color through all shades of rose to bright purple. It is well named *lauta*, meaning gaudy. This plant is abundant in the upper subalpine and alpine zones.

*Northern paintbrush*, *Castilleja septentrionalis* Lindl.—This is the common white or yellowish species found in meadows and on moist ground of the montane zone. The stems are often branched.

*Short-flowered paintbrush*, *Castilleja brachyantha* Rydb.—A very small plant with stems only a few inches long, and brownish or yellowish bracts found in stony, exposed situations of the alpine zone. The bracts and calyx are covered with long hairs; the stems and leaves are often curved.

*Snowlover*, *Chionophila jamesii* Benth.—A small alpine plant with a short, dense, more or less one-sided spike of cream-colored two-lipped flowers and a tuft of basal leaves. It blooms in July and early August on the high alpine ridges.

*Blue-eyed-mary* or *littleflower collinsia*, *Collinsia parviflora* Dougl. (*C. tenella*).—A small plant, with opposite leaves and small blue flowers in the axils. Its dark purplish or reddish stems and leaves may be seen on open slopes and fields of the montane zone early in spring. The plants begin blooming in May and continue into June.

*Yellow monkeyflower*, *Mimulus tilingii* Regel.—Occasionally found on wet ground and along streams of the subalpine zone. The yellow flowers, about 1 inch long, are borne on slender pedicels; the distinctly two-lipped corolla sometimes has dark spots. The leaves are opposite; the stems weak and often rooting at the nodes. (*M. langsдорffii*, *M. guttatus*).

*Many-flowered monkeyflower*, *Mimulus floribundus* Dougl.—A sticky, spreading plant; has been found along banks in the montane zone.

*Gold-tongue* or *yellow owllover*, *Orthocarpus luteus* Nutt.—An erect plant, 6 to 12 inches tall, with a dense spike of yellow flowers interspersed with green bracts; very common on fields in the montane zone, blooming in middle and late July. The typical form is unbranched, but due to grazing

or some other cause which destroys the terminal bud, much-branched plants are common.

*Lousewort* or *pedicularis*.—This genus is well represented in the park by seven species. It is easily recognized by the alternate or mostly basal fernlike leaves of the majority of its members, and by its spikes of irregular flowers. The corolla is two-lipped, the upper lip hooded and sometimes extended into a beak.

Leaves undivided.

Flowers purple; plant of montane meadows *Purple lousewort* (p. 144)

Flowers white; plant of montane and subalpine forests; foliage often reddish . . . . . *Mountain figwort* (p. 144)

Leaves finely, pinnately divided, appearing fernlike.

Flowers rose-colored or purple.

Flowers with a long, slender, upcurved beak, resembling elephant heads; plants abundant in wet meadows. *Elephantella* (p. 144)

Flowers without a slender, upcurved beak; very rare alpine plants. *Alpine pedicularis*. (p. 145)

Flowers greenish or yellowish.

Plants of montane and subalpine woods; leaves bright green.

Flowers greenish; plant 2 to 4 feet high. *Giant lousewort* (p. 145)

Flowers yellow; plant 8 inches to 2 feet high

*Bracted lousewort* (p. 144)

Plants of alpine grassland; flowers white or cream-colored

*Parry lousewort* (p. 145)

*Purple lousewort* or *meadow pedicularis*, *Pedicularis crenulata* Benth.—A plant of mountain meadows with short dense spikes of purple flowers and narrowly oblong, crenate leaves; not very abundant in our region.

*Mountain figwort* or *sickletop pedicularis*, *Pedicularis racemosa* Dougl. (fig. 84).—A plant with one to several, more or less decumbent stems, each terminated by a spike of white or cream-colored flowers. The leaves are narrowly lanceolate and minutely toothed. The stems and leaves are often reddish in color. This plant is very frequently seen on moderately dry soil under pine and spruce forests in the subalpine zone.

*Elephantella*, *little red elephant*, or *elephanthead pedicularis*, *Pedicularis groenlandica* Retz. (fig. 85).—The most conspicuous member of this group, with its reddish-purple flowers simulating elephant heads. It is abundant on marshy ground in the upper montane and subalpine zones, blooming in the lower parts of its range in early June and at higher altitudes in July and August. (*Elephantella groenlandica*.)

*Bracted lousewort* or *bracted pedicularis*, *Pedicularis paysoniana* Pennell, (*P. bracteosa*).—A tall, erect plant, usually with a single stem and a rosette of large, fernlike leaves at the base, also a few on the lower part of the stem;

bears a dense spike of yellowish flowers interspersed with bracts; grows in moist forests below 10,500 feet. The *giant lousewort* or *Grays pedicularis*, *Pedicularis procera* Gray (*P. grayi*), which resembles the last but is much larger and has greenish flowers, is sometimes seen.

*Parry lousewort*, *Pedicularis parryi* Gray, a species with cream-colored flowers and leaves with comblike divisions (similar to those of elephantella) is found at high altitudes and occasionally in a taller form, in subalpine meadows. It is usually less than a foot in height, often only a few inches. A rare species, the *alpine pedicularis*, *Pedicularis scopulorum* Gray, with rose-purple flowers, has been found on Hagües Peak and on Trail Ridge.

*Kittentails*, *Besseya plantaginea* (Benth.) Rydb. (*Synthyris plantaginea*).— A plant usually having several erect stems bearing dense spikes of lavender

Figure 84.—MOUNTAIN FIGWORT. CREAMY WHITE. PLANTS 8 TO 12 INCHES TALL. Photograph by Joseph Dixon.



Figure 85.—ELEPHANTELLA. RED, PLANTS 6 TO 12 INCHES TALL. Photograph by Kenneth Hartley.



or pinkish flowers, from a rosette of oblong, or ovate, thick basal leaves. There are numerous sessile, oblong, or round bracts along the stem. These bracts and the leaves are at first woolly but become smooth with age. This plant is commonly seen in bloom on the hillsides around Estes Park in June.

*Alpine kittentails*, *Besseyia alpina* (Gray) Rydb. (*Synthyris alpina*).—Similar to the above but with bluish-purple flowers from which the stamens protrude; frequently found among rocks in the alpine zone. (The last two plants have been called by the generic name *Wulfenia*).

*Mullein* or *flannel mullein*, *Verbascum thapsus* L.—A tall plant, 2 to 5 feet high, of roadsides and waste ground, usually with unbranched stems but sometimes with a few erect branches. It has densely woolly leaves and long, dense spikes of yellow flowers. It is not native in this country but has been introduced.

*Western* or *lanceleaf figwort*, *Scrophularia lanceolata* Pursh, (*S. occidentalis*).—A stout weedy plant with opposite leaves and small greenish or chocolate-colored flowers; corolla five-lobed, the lower lobe bent down; anther bearing stamens four; occasionally found in the montane zone.

*Veronica* or *speedwell*, *Veronica wormskjoldii* R. & S. (*V. alpina*).—A small plant with a terminal spike or cluster of small blue flowers, bluish-green pods notched at the top, and opposite leaves; found in wet places of the alpine and subalpine zones. The corolla is four-lobed with nearly equal lobes.

*American brooklime* or *American speedwell*, *Veronica americana* (Raf.) Schwein.—A plant with axillary racemes of small blue or whitish flowers, opposite leaves, and weak stems which are often somewhat trailing; grows along brooks and in shallow water of the montane zone. The *annual veronica* or *purslane speedwell*, *Veronica peregrina*, var. *xalapensis* (H. B. K.) Pennell, a small erect plant with tiny axillary, white flowers, followed by rounded, somewhat notched pods, is occasionally seen on wet ground.

### BROOMRAPE FAMILY (OROBANCHACEAE)

A family of parasites growing on the roots of other plants. Our only representative is *broomrape*, *Orobanche fasciculata* Nutt. (*Thalesia fasciculata*), a hairy, brown plant with no green leaves and with two to several parallel stems each bearing a brownish-pink flower with two-lipped, five-lobed corolla.

### PLANTAIN FAMILY (PLANTAGINACEAE)

A family of inconspicuous plants, usually considered weeds, with ribbed, basal leaves and spikes of inconspicuous, 4-merous flowers. The seed pods of these flowers are small, pointed capsules which, when they



Figure 86.—TWINFLOWER. FLOWERS PINKISH ON STEMS 2 TO 3 INCHES HIGH. Photograph by Kenneth Hartley.

are ripe and ready to shed their seeds, split in a ring around the middle or below, so that the top comes off like a little elf's cap. The most frequent species is the *common plantain* or *rippleseed plantain*, *Plantago major* L., with roundish or heart-shaped leaves, a cosmopolitan plant found around buildings and settlements. *Tweedy plantain*, *Plantago tweedyi* Gray, with lanceolate, or long, narrow leaves, is native in the subalpine zone.

#### MADDER FAMILY (RUBIACEAE)

Our plants of this family are rough-hairy and have square stems, small white flowers, and whorled leaves. The fruit consists of a pair of hard nuts which separate when ripe. The coffee tree is related to them. The family also includes plants which yield valuable dyes.

*Bedstraw* or *northern cleavers*, *Galium boreale* L., is abundant nearly everywhere in the montane zone both on dry slopes and in meadows. It has numerous small white blossoms.



Figure 87.—REDBERRIED ELDER. A SHRUB WITH CLUSTERS OF WHITE FLOWERS FOLLOWED BY SMALL RED BERRIES.

*Three-flowered bedstraw* or *sweetscented bedstraw*, *Galium triflorum* Michx. is much more rare. It has decumbent stems, few flowers, broader leaves, and grows in wet, shady places on rich soil.

#### HONEYSUCKLE FAMILY (CAPRIFOLIACEAE)

The plants of this family are mostly shrubs, all have opposite leaves; the fruit of each one found in the park, except *Linnaea*, is a berry.

*Twinflower*, *Linnaea americana* Forbes (*L. borealis*.) (fig. 86).—A dainty little trailing plant with opposite evergreen leaves and upright flower stems, each bearing a pair of pink, bell-shaped flowers. This plant is frequent on moist ground in evergreen forests, where it often covers the ground with a mat of green foliage. It was named in honor of Linnaeus, the famous Swedish botanist.

*Twinberry*, *involucrated honeysuckle*, or *bearberry honeysuckle*, *Lonicera involucrata* Banks, (*Distegia involucrata*).—Our only true, native honeysuckle.

A shrub found on wet ground, especially in the subalpine zone, with large, ovate leaves 3 to 5 inches long, and pairs of yellow flowers, each pair surrounded by bracts which later enlarge, turn red, and inclose the two black, shiny berries.

**Redberried elder** or **bunchberry elder**, *Sambucus microbotrys* Rydb., (*S. racemosa*) (fig. 87).—A low shrub of the montane and subalpine zones, with large clusters of small white flowers in June and early July, followed in late August by numerous small scarlet berries. The opposite leaves of this plant are pinnately compound, of several toothed and pointed leaflets.

**Snowberry** or **buckbrush**, *Symphoricarpos albus* (L.) Blake (*S. racemosus*).—A low shrub along roadsides and on open slopes of the montane zone, with grayish, round or oblong leaves, and small pinkish flowers, followed by conspicuous white berries.

**Arrowwood**, **high-bush-cranberry**, or **mooseberry viburnum**, (*Viburnum pauciflorum* Pylaie.).—A rather rare shrub in this region, found in moist thickets of the montane zone. The opposite leaves are lobed and toothed, much resembling maple leaves; they also turn beautiful shades of red in autumn. The bush bears clusters of small white flowers in June, which are followed in August and September by red, acid berries. Often only two to three berries to a cluster mature.

#### MOSCHATEL FAMILY (ADOXACEAE)

A family of small slender, smooth herbs with opposite thrice-compound leaves, and small yellowish-green flowers in headlike clusters. *Adoxa moschatellina* L. has been found in a few places on moist ground.

#### BELLFLOWER FAMILY (CAMPANULACEAE)

Plants with alternate leaves and attractive bell-shaped blue flowers.

**Mountain harebell** or **bluebell**, *Campanula rotundifolia* L. (*C. petiolata*) (fig. 88).—A charming plant with several slender stems, each bearing a number of drooping blue bells. It is common throughout the mountainous region, and is especially at home among rocks. It begins to bloom about the middle of summer and continues late into the fall; occasionally a blossom is found in November. This is said to be the Scottish bluebell. At high altitudes dwarf plants with the normal size blossoms are found, as well as the **alpine harebell**, *Campanula uniflora* L., a tiny plant with more slender, darker blue flowers.

**Parry harebell** or **Parry bluebell**, *Campanula parryi* Gray.—A slender, usually one-stemmed plant, with an erect violet or purple, funnel-shaped flower; the points of the five-lobed corolla are spreading. It is found in meadows of the montane zone.



Figure 88.—MOUNTAIN HAREBELL. BLUE BELLS  $\frac{1}{2}$  TO 1 INCH ACROSS. Photograph by Joseph Dixon.



Figure 89.—EASTER-DAISY. WHITE OR PINKISH, 1 TO 2 INCHES ACROSS. Photograph by Kenneth Hartley.

*Venus looking-glass*, *Triodanis perfoliata* (L.) Nieuwl. (*Specularia perfoliata*) is found at the eastern edge of the park. Its purple, saucer-shaped flowers occur in the axils of the clasping leaves.

### VALERIAN FAMILY (VALERIANACEAE)

Tall plants with opposite leaves and small flowers. The characteristic thing about them is the arrangement of the corolla on top of the seed and the peculiar habit of the several long slender calyx lobes, which are tightly inrolled at the time of flowering and do not become evident until the seeds begin to ripen. Then they start to uncurl and become conspicuous, for their inner side is covered with white hairs. When ripe, the seed is crowned with a ring of 5 to 15 spreading, feathery bristles. Two species are found in the park. *Valeriana furfurescens* A. Nels. (*V. trachycarpa* and *V. edulis* in part), a plant 18 inches to 5 feet tall, usually half its height consisting of the open, spreading inflorescence which has opposite branching. Found on moist slopes and in meadows of the montane zone. Its leaves

are thick, apparently parallel-veined and usually pinnately lobed. *V. acutiloba* Rydb. (*V. sylvatica*), a plant with a dense, umbellike cluster of white or pinkish flowers, is found in swamps of the subalpine zone. Its root has a very strong and disagreeable odor.

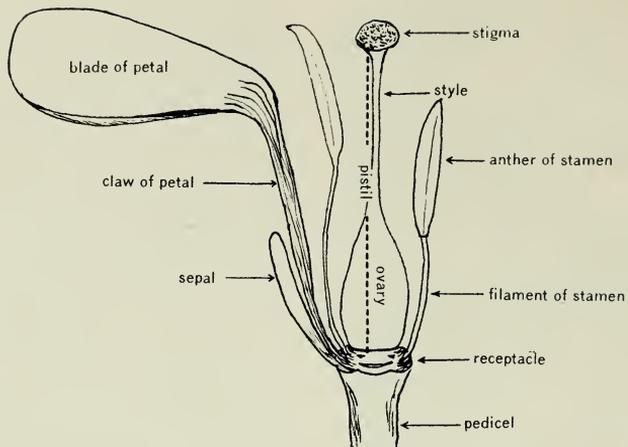
### COMPOSITE FAMILY (COMPOSITAE)

This is the largest of all the families of flowering plants and contains about one-fifth of all seed plants growing in 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 wild flowers. While apparently very different, all of these plants have a similar arrangement of the flowers. What appears to be the "flower" of a sunflower is in reality an inflorescence made up of numerous small flowers 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. (See Plate X—B, C, and D.)

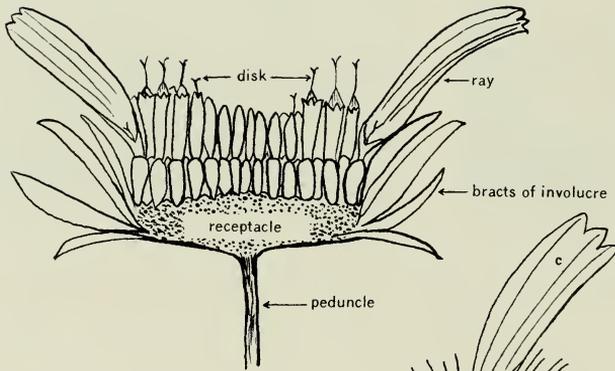
In plants of this family there are three different types of flower heads. On this basis the family is divided into three groups. The first group is made up of plants having two kinds of flowers. Around the margin of the head is a row of flowers with *ligulate* (i. e., strapshaped) corollas. These are called *ray flowers* and such flower heads are said to be *radiate*. The center of the head, called the *disk*, is made up of flowers with short tubular, five-toothed corollas, called *disk flowers*. The ray flowers are often spoken of as "petals" when the flower head is erroneously considered as one flower. The second group is composed of plants with flower heads, in which the flowers are all alike and are all disk flowers; all have tubular corollas. Such flower heads are said to be *discoïd*. The third group, which is considered by some botanists to be a separate family and called the *Cichoriaceae*, is made up of plants having flower heads with flowers all alike but all ligulate, that is all with long flat corollas. This group is called the Chicory tribe.

Sunflowers and asters are examples of the first group, gayfeather (*Liatris*) of the second, and dandelions of the third group. It is very easy to take a sunflower head apart and see the parts of each individual flower, but many members of this family have such tiny flowers that even the botanist can not tell much about them without the use of a magnifying glass.

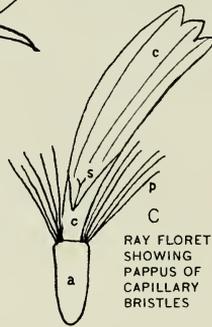
Composite plants have dry, one-seeded fruits which are technically called *achenes*. The calyx of the flower is a much modified structure called the *pappus*. It consists of a tuft of long soft hairs or of scales or bristles



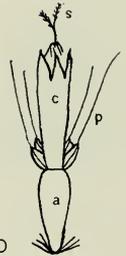
A PARTS OF A TYPICAL FLOWER



B TYPICAL HEAD OF RADIATE COMPOSITE



C RAY FLORET SHOWING PAPPUS OF CAPILLARY BRISTLES



D DISK FLORET SHOWING PAPPUS OF BRISTLE TIPPED SCALES

a, achene  
c, corolla  
p, pappus  
s, stigma

Plate X.—(A) PARTS OF A TYPICAL FLOWER. (B) TYPICAL HEAD OF RADIATE COMPOSITE. (C) RAY FLORET SHOWING PAPPUS OF CAPILLARY BRISTLES. (D) DISK FLORET SHOWING PAPPUS OF BRISTLE TIPPED SCALES.

attached to the apex of the achene. Sometimes it is hooked or barbed; or it may be small or entirely lacking. The pappus is often very conspicuous as the plant goes to seed. All these devices tend to insure wide distribution of the seeds, as any one who has watched dandelion or thistle seeds sail away on the wind can testify.

**A. HEADS WITH BOTH RAY FLOWERS AND DISK FLOWERS**

(AA, heads with only disk-flowers, p. 155; AAA, heads with only ligulate flowers, p. 156).

**B. Ray flowers white, blue, purple, or pinkish. (BB. Ray flowers yellow—(see below).**

a. Plants stemless, blooming in early spring; leaves linear, grayish  
*Easter-daisy* (p.158)

aa. Plants with evident stems, but sometimes dwarf.

b. Flower heads aggregate in dense clusters, disks and rays white, plant aromatic; leaves very finely divided . . . *Yarrow* (p.158)

bb. Flower heads not in dense clusters, disks yellow or reddish.

c. Rays comparatively broad and few, involucre bracts of different lengths in several rows and overlapping (pl. XI—B, C).

d. Involucre bracts with slender, recurved tips; rays reddish-purple . . . . . *Tansy aster* (p.158)

dd. Involucre bracts flat; rays blue, violet or white, rarely reddish-purple . . . . . *Aster* (p.159)

cc. Rays comparatively narrow, very numerous, bracts in one or two rows of equal length (pl. XI A) . . . *Daisy* (p.160)

**BB. Ray flowers yellow.**

a. Disk flowers dark red and base of rays sometimes reddish  
*Gaillardia* (p.166)

aa. Disk flowers yellow, brown, or nearly black.

b. Leaves opposite . . . . . *Arnica* (p.167)

bb. Leaves alternate.

c. Disk flowers yellow or orange (cc. Disk flowers brown or blackish, p. 154).

d. Lower leaves 8 to 12 inches long; heads 1 to 2 inches across, solitary or few . . . . . *Pyrocoma* (p.179)

dd. Lower leaves much shorter, or the heads many and small.

e. Plant either rough-hairy or sticky in some part.

f. Leaves deeply divided; stems slightly sticky; rays nearly as wide as long . . . *Babia* (p.168)

ff. Leaves not deeply divided, their margins entire, or wavy-toothed; rays much longer than wide.

g. Plant smooth below but buds very sticky; tips of involucre bracts bent out

*Curlycup gumweed* (p.168)

- gg. Plants rough-hairy throughout; tips of involucre bracts not bent out, sometimes slightly leafy . . . *Golden-aster* (p. 168)
- ee. Plants neither very rough nor sticky, but sometimes woolly or hairy.
  - f. Plants of alpine situations; heads usually solitary on each flowering stem.
    - g. Plants densely white woolly at least at base; ligules three-toothed at apex.
      - h. Flowers 2 to 3 inches across; leaves divided . . . . *Rydbergia* (p. 168)
      - hh. Flowers smaller; leaves undivided . . . *Woolly actinea* (p. 168)
    - gg. Plants not densely woolly; ligules entire at apex.
      - h. Plant woody at base  
*Tonestus* (p. 168)
      - hh. Plant soft and herbaceous at base  
*Dwarf senecio* (p. 173)
  - ff. Plants not confined to alpine regions; heads usually several to many.
    - g. Bracts of the involucre in one series often black-tipped  
*Ragworts* and *groundsels* (p. 169)
    - gg. Bracts of the involucre in two or more series, never black-tipped.
      - h. Bracts loose and leafy; flower pale yellow *Parry goldenrod* (p. 174)
      - hh. Bracts tightly appressed, never leafy, flowers orange-yellow  
*Goldenrod* (p. 174)
- cc. Disk-flowers brown or blackish, at least darker than the rays.
  - d. Disk elevated, cone-shaped, or cylindrical.
    - e. Disk cylindrical, its height greater than its width  
*Coneflower* (p. 179)
  - ee. Disk cone-shaped, its width greater than its height.
    - f. Plant rough-hairy, of medium size; leaves undivided; disk very dark brown  
*Black-eyed-susan* (p. 175)

- ff. Plant smooth, 3 to 6 feet high; leaves often lobed or divided; disk greenish or yellowish brown. . . . . *Goldenglow* (p. 175)
- dd. Disk flat or nearly so; at least some of the leaves opposite.
  - e. Plants perennial, native.
    - f. Plant bushy, many flowered; of sunny dry fields and hillsides . *Dwarf sunflower* (p. 176)
    - ff. Plant slender, mostly unbranched; of meadows and aspen thickets . . *Helianthella* (p. 176)
  - ee. Plant annual, escaped from cultivation around ranches and along roads  
*Annual sunflower* (p. 176).

**AA. HEADS WITH ONLY DISK FLOWERS**

(AAA. Heads with only ligulate flowers, p. 156)

- B. Foliage spine-tipped; corollas deeply cleft.
  - a. Heads purple . . . . . *Purple thistle* (p. 176)
  - aa. Heads cream-colored or dingy white . *Drummond thistle* (p. 176)
- BB. Foliage not spine-tipped.
  - a. Leaves opposite; plants 1 to 2 feet tall . . *Rayless arnica* (p. 168)
  - aa. Leaves alternate.
    - b. Heads erect, brightly colored or white.
      - c. Heads yellow.
        - d. Heads solitary, very compact; leaves three-parted  
*Gold buttons* (p. 165)
      - dd. Heads several to many.
        - e. Heads very small, numerous; a dwarf, fall-blooming shrub of open fields . . *Rabbit brush* (p. 176)
        - ee. Heads larger; plants never shrubs  
*Turnip-leaved senecio* (p. 172)
    - cc. Heads not yellow.
      - d. Heads white, cream-colored, pink, or brownish; flowers "everlasting."
        - e. Plants blooming in spring, usually less than 10 inches high . . . . . *Catspaw* (p. 177)
        - ee. Plants blooming in summer and fall, usually 1 foot or more high.
          - f. Heads pure white, papery  
*Pearl-everlasting* (p. 177)

- ff. Heads cream-colored, satiny . *Cudweed* (p.177)
- dd. Heads bright purple, not "everlasting"; plant of open fields . . . . . *Gayfeather* (p.177)
- bb. Heads drooping.
  - c. Plant silvery with silky hairs; foliage finely cut, aromatic .  
*Fringed mountain-sage* (p.178)
  - cc. Plant not silvery.
    - d. Leaves triangular and toothed; heads yellowish; bracts pale green . . . . . *Sheathflower* (p.179)
    - dd. Leaves not triangular; disk yellow or greenish.
      - e. Bracts thick and purplish  
*Bigelow groundsel* (p.172)
      - ee. Bracts normal, green; leaves entire  
*Nodding senecio* (p.172)

**AAA. HEADS WITH ONLY LIGULATE FLOWERS, JUICE MILKY**  
(Chicory tribe)

- B. Flower heads pink or purplish, never yellow.
  - a. Flowers pink, soon withering; heads solitary on the green, angled branches . . . . . *Milkpink* (p.179)
  - aa. Flowers purplish, in a long narrow raceme; stem unbranched  
*Rattlesnakeroot* (p.179)
- BB. Flower heads yellow or white.
  - a. Flower heads yellow.
    - b. Heads solitary, stems leafless.
      - c. Involucre with black hairs . . *Alpine hawkbeard.* (p.178)
      - cc. Involucre without black hairs.
        - d. Leaves entire margined, broadest near the apex and tapering to the base . . *False-dandelion.* (p.178)
        - dd. Leaves wavy-toothed, tapering to both ends  
*Common dandelion* (p.179)
    - bb. Heads several.
      - c. Pappus of soft, pure white hairs; involucre covered with light-colored, glandular hairs; plants of wet meadows and river banks . . . . . *Hawkbeard* (p.178)
      - cc. Pappus of soft, dingy hairs; involucre covered with black hairs; plants of hillsides and fields  
*Slender hawkweed* (p.179)
      - aa. Flowers white or cream-colored; basal leaves with long white hairs  
*White-flowered hawkweed* (p.179)

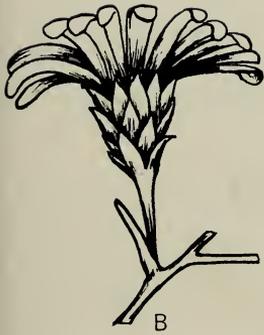


Plate XI.—COMPARISON OF INVOLUCRES OF TYPICAL COMPOSITES. (A) DAISY (*Erigeron*), (B) ASTER (*Aster*), (C) TANSY ASTER (*Machaeranthera*). Drawings by L. W. Durrell.



Figure 90.—TANSY ASTER. PURPLE WITH ORANGE CENTERS, ABOUT 1 INCH ACROSS.



Figure 91.—PORTER ASTER. WHITE WITH YELLOW OR DARK-REDDISH CENTERS, ABOUT ½ INCH ACROSS. Photograph by author.

*Easter-daisy* or *stemless townsendia*, *Townsendia exscapa* (Rich.) Porter (fig. 89).—Probably the earliest of all our flowers to bloom. It is found in late February on sunny sandy slopes in the foothills and may be expected in similar situations in April around Estes Park. In May it is at the height of its bloom. The blossoms, which are an inch or more across, are clustered on the crowns of the plant nestled among the narrow grayish leaves. The rays are pale pink or white. *Townsendia grandiflora* Nutt., a plant with larger blossoms and stems 2 to 8 inches high, occurs sparingly on open fields, blooming in June and July.

*Yarrow*, *Achillea millefolium* L.—A plant of roadsides and fields with flat-topped clusters of small white flower heads, and leaves very finely dissected into numerous threadlike divisions. From this leaf character it takes its specific name of *millefolium*, meaning thousand leaves. The foliage is very aromatic.

*Tansy-aster*, *Machaeranthera aspera* Greene and *Machaeranthera varians* Greene (fig. 90 and Plate XI—C).—Probably the most conspicuous purple aster, blooming profusely in late summer and fall. It has many spreading branches and many flowers with brilliant reddish-purple rays and yellow centers. The leaves are irregularly toothed. It grows abundantly in old fields, along roads and around buildings, for it seems to thrive especially on disturbed soil. The plants are biennial, blooming the second

year and then dying. The flowers begin to appear as early as the middle of July and some plants are still blooming in October. The two forms are quite variable and perhaps represent only one variable species.

*Aster*.—These plants are characterized by their imbricated involucre. (Plate XI—B.) The blue, purple, or white rays are comparatively few, often less than 30, and rather wide, usually one-eighth inch or more. The leaves are alternate and their margins entire.

- A. Ray flowers white or whitish.
  - B. Plants 2 to 5 feet tall; involucre bracts with prominent midribs; rays sometimes tinged pinkish or lavender; subalpine zone . . . . . *Engelmann aster* (p. 159)
  - BB. Plants less than 2 feet tall; involucre bracts without prominent midrib; montane zone.
    - a. Foliage entirely smooth; stems tufted; freely branched  
*Porter aster* (p. 159)
    - aa. Foliage minutely but entirely pubescent; stems usually single from a running rootstock, but forming colonies; branches few, erect . . . . . *Rough white aster* (p. 160)
- AA. Ray flowers blue, violet or purple.
  - B. Ray flowers brilliant, reddish-purple, sometimes violet, heads few.
    - a. Heads usually solitary, large; stems usually only a few inches high . . . . . *Sun-loving aster* (p. 160)
    - aa. Heads usually several; stems 6 inches high or more  
*Fremont aster* (p. 160)
  - BB. Ray flowers usually blue, violet or pale lavender.
    - a. Inflorescence a broad panicle, leaves narrow and sessile  
*Common aster* (p. 160)
    - aa. Inflorescence a constricted panicle.
      - b. Leaves as broad, or nearly so at the base as at the middle; rays light blue; pappus white or cream-colored; stems often reddish . . . . . *Sky-blue aster* (p. 160)
      - bb. Leaves much broader in the middle and tapering to both ends, the upper ones smaller . . . . . *Geyer aster* (p. 160)

*Engelmann aster*, *Aster engelmannii* Gray (*Eucephalus engelmannii*).—A coarse, stout plant 2 to 5 feet high, with leafy stems and clusters of white or lavender tinged flowers, found on wet ground in the subalpine zone, especially between Bear and Nymph Lakes. The *glaucous aster*, *Aster glaucus* (Nutt.) T. & G. (*Eucephalus glaucus*), a smaller plant with oblong obtuse, spreading, glaucous leaves, also occurs.

*Porter aster* or *smooth white aster*, *Aster porteri* Gray (fig. 91).—A branching plant 6 to 10 inches high, often growing in tufts, with smooth foliage and many flower heads with white rays and yellow centers which turn

dark red in age. It is abundant on open, sunny slopes and fields of the montane zone, blooming in August and September. Another white-rayed aster of less branching habit is the *rough white aster*, *Aster commutatus* T. & G., found on more moist soil and coming into bloom 2 or 3 weeks later. Its foliage is roughened with small hairs. It grows from a running rootstock.

*Sun-loving aster* or *alpine leafybract aster*, *Aster foliaceus* var. *apricus* Gray.—A dwarf alpine plant with large, usually solitary, head and brilliant rose-purple or violet rays, often forming mats. It grows in exposed, stony situations of the alpine and subalpine zones.

Two other varieties of *Aster foliaceus* occur in the park; var. *frondeus*, a taller plant with larger leaves and branched stem, each branch bearing one large head; and var. *canbyi* more often one-flowered but less caespitose than var. *apricus* and with long, narrow leaves. These two usually have violet rays. The bracts of the involucre of all in this group are loose and leafy, not well imbricated.

*Fremont aster* or *Western aster*, *Aster occidentalis* (Nutt.) T. & G. (*A. fremontii*), a medium tall aster with several (not many), heads to each stem. Its rays are often the same beautiful reddish-purple as those of the sun-loving aster, but as is also the case with it, they may be blue or violet. The involucre bracts of Fremont aster are well imbricated.

*Geyer* or *smooth aster*, *Aster laevis*, var. *geyeri* Gray, with bright blue blossoms and smooth foliage, the lower leaves with winged petioles, the upper much smaller and with heart-shaped, clasping base, is found in meadows of the montane zone.

*Common aster*, *Aster ascendens* Lindl., with lavender or blue flowers, much branched inflorescence, and small narrow leaves, is found on fields and hillsides and along roads.

*Sky-blue aster* or *willowleaf aster*, *Aster caeruleus* DC. (*A. salicifolius*).—A tall plant with beautiful sky-blue rays and long-oblong, pointed, sessile leaves; is common in meadows and along streams in the montane zone.

*Daisy* or *fleabane* (*Erigeron*).—A group of plants often mistaken for asters, from which they may be distinguished by the shape and arrangement of the involucre bracts (pl. XI—A), and by the numerous long and extremely narrow rays. The showy plants of this genus are usually few-flowered and little-branched and their stems are less rigid than those of the asters. The species may be distinguished by the following key:

- A. Ray flowers conspicuous, fully as long as the width of the disk.
  - B. Plant much-branched throughout, many-flowered; rays blue  
*Spreading daisy* (p. 162)
  - BB. Plants mostly unbranched except in the inflorescence, flowers one to several on each stem.

- a. Involucre densely covered with pink or purplish-black hairs.
  - b. Involucres covered with dark purplish or black hairs; rays usually white . . . . . *Black-headed daisy* (p. 162)
  - bb. Involucres densely pink-woolly, rays pink or lavender . . . . . *Beautiful daisy* (p. 162)
- aa. Involucres not woolly, or if densely hairy, hairs white.
  - b. Plants 10 inches to 2 feet tall,<sup>11</sup> usually not caespitose.
    - c. Leaves smooth.
      - d. Rays wide, few, 50-70, tips of bracts loose  
*Subalpine daisy* (p. 162)
      - dd. Rays narrow, tips of bracts usually appressed.
        - e. Stems leafy, upper leaves smaller, ovate and sessile, rays 75-100, blue or violet  
*Aspen daisy* (p. 162)
        - ee. Stems with few leaves, rays usually pale lavender, few, 40-80 . . . *Pale daisy* (p. 163)
    - cc. Leaves pubescent, or at least their margins ciliate, rays 75-150.
      - e. Rays white, bracts with long, slender, loose tips . . . . . *Coulter daisy* (p. 163)
      - ee. Rays blue or purplish, involucres glandular.
        - f. Upper leaves glandular, tips of bracts appressed . . . . . *Greenes daisy* (p. 163)
        - ff. Upper leaves not, or only slightly, glandular, tips of bracts loose  
*Dryland daisy* (p. 163)
  - bb. Plants usually less than 10 inches tall, often caespitose.
    - c. Leaves entire.
      - d. Plant spreading by runners, these not always evident early in the season, heads pink in the bud, white when open . *Whiplash daisy* (p. 163)
      - dd. Plant without runners, flowerheads never pink in bud.
        - e. Plants of montane zone, foliage hairy.
          - f. Rays white . . . . . *Dwarf daisy* (p. 164)
          - ff. Rays blue . . . . . *Early blue daisy* (p. 164)
        - ee. Plants of alpine zone.

<sup>11</sup> Heights given are intended to be average. There will always be some individuals which will fall outside the figures given.

- f. Involucre white-hairy  
*One-flowered daisy* (p.165)
- ff. Involucre and entire plant smooth  
*Rock-slide daisy* (p.165)
- cc. Leaves divided or definitely lobed.
  - d. Leaves three-parted, rays usually white  
*Cut-leaved daisy* (p.165)
  - dd. Leaves pinnately dissected, rays usually violet  
*Pinnate-leaved daisy* (p.165)
- AA. Ray flowers inconspicuous, shorter than the width of the disk.
  - B. Plant widely branched: inflorescence in a corymb or panicle . . . . . *Bitter fleabane* (p.165)
  - BB. Plant unbranched or with only a few, erect branches, inflorescence a raceme . . . . . *Long-leaved fleabane* (p.165)

*Spreading daisy, Erigeron divergens* T. & G.—A densely hairy plant branched from the base, with many blue-rayed flower heads, blooming in August and September along roadsides and on open slopes below 9,000 feet.

*Black-headed daisy, Erigeron melanocephalus* A. Nels.—A white-flowered daisy of the subalpine and alpine zones easily recognized because of the black or purplish woolly hairs which cover the involucre; the stems are one-flowered, the leaves entire. It is frequently seen as an alpine plant with stems only a few inches high, and is also sometimes found in subalpine meadows with stems nearly a foot high.

*Beautiful daisy* or *tall fleabane, Erigeron elatior* (Gray) Greene.—A lovely flower abundant in meadows of the subalpine zone, with large rose-colored heads; involucral bracts reddish and embedded in dense woolly hairs; rays numerous and very narrow; heads solitary or few. Blooms in August and is common at Bear Lake, Willow Park, Poudre Lakes, and elsewhere.

*Subalpine daisy* or *aster fleabane, Erigeron callianthemis* Greene, (*E. saluginosus, E. peregrinus* var. *eucallianthemis*) (fig. 92).—An exception in this genus because of its wide rays but easily recognized by the typical *Erigeron* involucre. (pl. XI—A.) It is one of the most conspicuous flowers of the subalpine meadows, where its lavender or violet rays and orange-yellow disk are seen on every side in late July and August. It is usually one- to three-flowered. Occasionally the rays are white.

*Aspen daisy* or *Oregon fleabane, Erigeron speciosus* (Lindl.) DC. (fig. 93).—The most common daisy of the montane zone; found in every moist aspen grove and in meadows. It has smooth foliage and lavender to violet narrow rays and yellow disk. The stems are usually several-flowered. The variety *macranthus* is the commonest form in our region, but the typical form with narrower leaves also occurs.



Figure 92.—SUBALPINE DAISY. PURPLE OR LAVENDER WITH ORANGE-YELLOW DISK, PLANTS 6 TO 12 INCHES TALL. Photograph by Joseph Dixon.

*Pale daisy*, *Erigeron superbus* Greene.—Commonly found in the subalpine zone with the beautiful and subalpine daisies, from which it may be distinguished by its paler color, its narrow rays, and lack of densely woolly involucre.

*Coulter daisy*, *Erigeron coulteri* Porter, with white rays and hairy white involucre is one of the rarer plants of the park on the west side.

*Greenes daisy*, *Erigeron formosissimus* Greene, a blue- or purplish-flowered daisy with leaves becoming smaller upwards, the uppermost are narrow with ciliate margins. The variety *viscidis* is similar but less hairy and more glandular.

*Dryland daisy* or *threenerve fleabane*, *Erigeron subtrinervis* Rydb., is similar in appearance to the aspen daisy but its stem and leaves are pubescent, its buds nod, and it grows in dryer situations. *Erigeron glabellus* Nutt. (*E. asper*) has also been found but seems quite rare.

*Whiplash daisy* or *trailing fleabane*, *Erigeron flagellaris* Gray.—One of the most common small daisies found below 10,000 feet. The rays are very narrow, almost threadlike, pink or red on the outside, so that the buds are always pink, but white when opened. The stems are slender and early in the season mostly leafless; the basal leaves are oblanceolate, acute, and



Figure 93.—ASPEN DAISY. LAVENDER, PLANTS 12 TO 18 INCHES TALL. Photograph by F. J. Francis.

entire. In June it blooms profusely and then starts to produce runners with leaves evenly spaced along their whole length, and tufts of leaves at the tips, where the runner takes root and starts a new plant. It continues to bloom sparingly all summer and through September.

*Dwarf daisy* or *low fleabane*, *Erigeron pumilus* Nutt.—A white-flowered daisy with exceedingly hairy leaves and stems, growing from a stout woody root. The leaves are linear. It is occasionally found on dry slopes of the montane zone.

*Early blue daisy*, *Erigeron vetensis* Rydb. (*E. glandulosus*, *E. porteri*).—Similar to the last, but with blue ray flowers and foliage slightly less hairy and often somewhat sticky. The branches are usually one-flowered. It is frequently seen on open slopes around Estes Park, blooming in June.



Figure 94.—ONE-FLOWERED  
DAISY. LAVENDER, PLANTS 3 TO  
6 INCHES HIGH. Photograph by  
Joseph Dixon.

*One-flowered daisy* or *Arctic fleabane*, *Erigeron simplex* Greene, (*E. uniflorus*) (fig. 94).—An alpine daisy with stems only a few inches high, one-flowered; rays violet and leaves entire; the involucre is covered with light-colored hairs. Found around most of the high lakes and on mountain tops.

*Rock-slide daisy*, *Erigeron leiomeris* Gray, is a low-growing plant of sub-alpine and alpine zones usually found in loose rocks where its long, stout taproot anchors itself at considerable depth. This is usually divided into several branches at the crown so that the plant is loosely caespitose. Its foliage is entirely smooth. Each flowering-stem bears a single, blue-rayed head.

*Cut-leaved daisy* or *fernleaf fleabane*, *Erigeron compositus* Pursh.—Growing in tufts throughout the montane zone and sometimes higher, with white ray flowers and hairy leaves three-forked at the apex. It blooms throughout the summer but is most abundant in June. *Gold buttons*, *Erigeron compositus discoideus* Gray, a variety without any ray flowers, is occasionally found growing with the species.

*Pinnate-leaved daisy* or *pinnate fleabane*, *Erigeron pinnatisectus* (Gray) A. Nels.—A beautiful blue or violet daisy with pinnately divided leaves found in the alpine and upper subalpine zones. The stems are often only an inch or so high but the flower heads are comparatively large, an inch or more across. Blooms in July and August.

In addition, the following *fleabane daisies* are found, but are less conspicuous because of their very short rays. They can be recognized by the characters given in the key on page 162.

*Bitter fleabane*, *Erigeron acris* L. (*E. yellowstonensis*). *Spearleaf fleabane*, *Erigeron lonchophyllus* Hook.



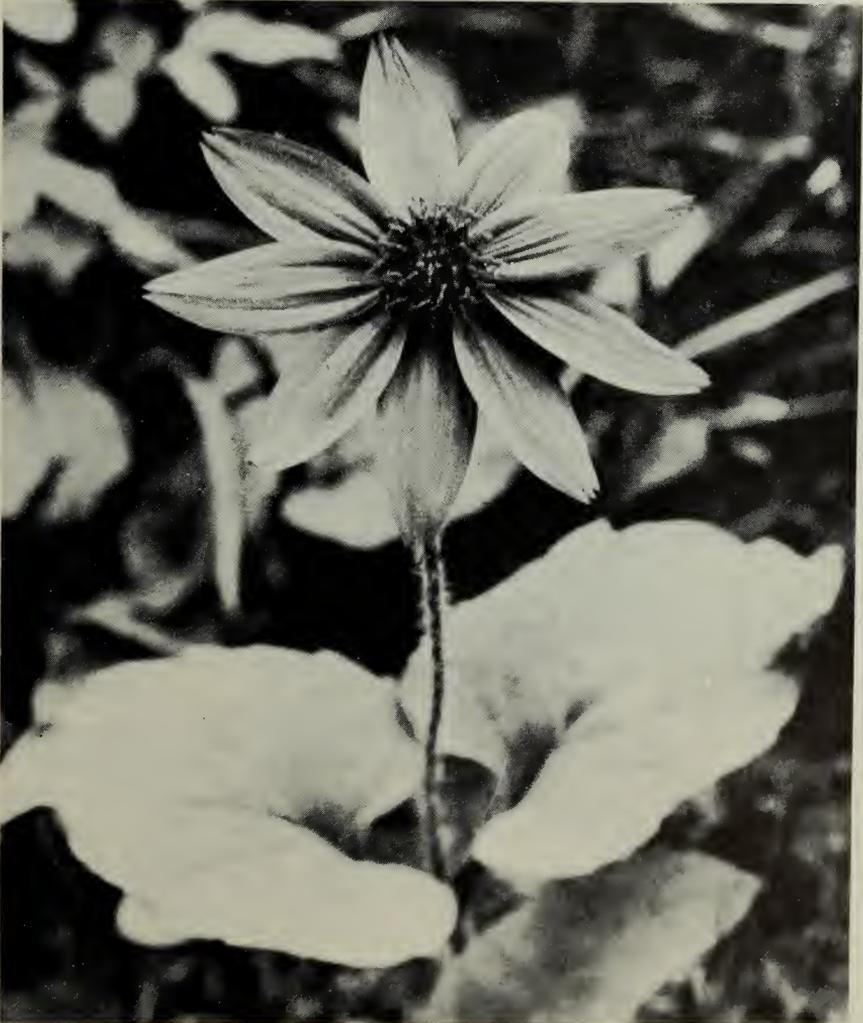
Figure 95.—GAILLARDIA. YELLOW WITH DARK RED CENTERS, 2 TO 4 INCHES ACROSS. Photograph by Joseph Dixon.

*Gaillardia* or *common perennial gaillardia*, *Gaillardia aristata* Pursh (fig. 95).—This plant is one of the showy mountain flowers. The heads are 2 to 4 inches across with deep red or brownish disk and brilliant yellow rays. The rays are wide, tapering to the base, and three-toothed at apex. The leaves and stems are rough-hairy. It begins to bloom in July and is found throughout the summer from the foothills to timber line.

*Arnica*.—Rays and disk both yellow, leaves opposite. The latter character distinguishes these plants from the other yellow-flowered composites. Several species are found, all of which vary so much that determination is difficult.

*Heartleaf arnica*, *Arnica cordifolia* Hook (fig. 96).—Large blossoms to 3 inches across and large basal, heart-shaped leaves; is very common in moist pine and spruce forests, blooming in May and June. The *daffodil arnica* or *broadleaf arnica*, *Arnica latifolia* Bongard, with similar flowers

Figure 96.—HEART-LEAVED ARNICA. YELLOW, 1 TO 3 INCHES ACROSS. Photograph by Joseph Dixon.



but smaller leaves, blooms abundantly in the subalpine zone in August and September. *Meadow arnica* or *orange arnica*, *Arnica fulgens* Pursh, a tall, one-flowered plant with narrow, strongly nerved leaves is common in montane meadows, and *Chamisso arnica*, *Arnica chamissonis* var. *foliosa* (Nutt.) Maguire, a plant 8 to 12 inches tall with several small heads (involucre about  $\frac{1}{2}$  inch high), in meadows of the montane and subalpine zones. Other species occurring in the park are: *Rayless arnica*, *Arnica parryi* Gray, and *Arnica mollis* Hook. (*S. subplumosa*).

*Wild-chrysanthemum* or *ragleaf bahia*, *Bahia dissecta* (Gray) Brit.—Plants 1 to 2 feet tall, branching, with golden yellow heads, the disk darker than the short, broad rays; leaves dissected into narrow segments; upper part of stem hairy and somewhat sticky. (*B. chrysanthemoides*.)

*Curlycup gumweed*, *Grindelia squarrosa* (Pursh) Dunal.—A branching plant with numerous yellow flowers, easily recognized by the roundish buds which are covered on top with a white sticky substance. The involucral bracts have narrow tips which are bent out somewhat, as those of the tansy aster. (See pl. XI—C.) *Grindelia subalpina* Greene and *Grindelia erecta* A. Nels. are similar. These plants look very untidy as they go to seed, because of the numerous large sticky involucre and persistent withered rays.

*Golden-aster* or *golden eye*.—Several species of this genus grow in the park, all rather similar. The flowers resemble asters but have yellow rays. The stems and leaves of most common kinds are covered with hairs, which give the plants a grayish color and make them rough to the touch. There are usually several stems from the root crown, each one more or less branched. These plants are abundant from the foothills to timber line, especially on dry, sunny fields and hillsides. The following species are found: *Chrysopsis arida* A. Nels., *Chrysopsis foliosa* Nutt., *Chrysopsis hirsutissima* Greene, *Chrysopsis pumila* Greene (*C. alpicala*), and *Chrysopsis resinolens* A. Nels.

*Rydbergia* or *graylocks actinea*, *Actinea grandiflora* (T. & G.) Kuntze (fig. 97).—One of the most striking plants of the rocky alpine ridges. Its lovely yellow flower heads are 2 to 4 inches across on stems usually less than 6 inches high, and sometimes only 1 or 2 inches high. The stems and the dissected leaves are covered with soft, loose white hairs. The yellow rays are three-toothed at apex.

*Woolly actinea*, *Actinea acaulis* var. *caespitosa* (A. Nels.) Parker, (*Tetranervis lanigera*) (fig. 98).—A smaller plant than the above with rather similar flower heads, the yellow ligules three-toothed, but with entire leaves, growing among rocks in exposed situations of the alpine zone.

*Tonestus Aplopappus pygmaeus* Gray (*Tonestus pygmaeus*).—Similar in appearance to *Actinea* but the rays entire at apex and the foliage not woolly. The stem is woody and the plant very dwarf, only a few inches high. Rays and disk yellow, and bracts of the involucre somewhat leafy.



Figure 97.—RYDBERGIA. YELLOW, 2 TO 4 INCHES ACROSS. Photograph by Kenneth Hartley.

*Ragwort, groundsel, or senecio.*—A large group of plants similar in appearance and difficult to distinguish. A few have no ray flowers; the remainder have yellow or orange rays. The involucre is made up of one row of equal bracts with sometimes a few shorter bractlets at the base. The bracts are often black-tipped. The following key should help to distinguish those species most frequently met with:



Figure 98.—WOOLLY ACTINEA. YELLOW, 1 TO 2 INCHES ACROSS. Photograph by Kenneth Hartley.

- A. Flower heads without rays.
  - B. Heads one-half inch broad or more, drooping  
*Bigelow groundsel* (p. 172)
  - BB. Heads  $\frac{1}{3}$  inch broad or less.
    - a. Heads somewhat drooping; leaves entire  
*Nodding senecio* (p. 172)
    - aa. Heads erect; margins of leaves toothed  
*Turnip-leaved senecio* (p. 172)
- AA. Flower heads with rays.
  - B. Plants tall, 2 to 5 feet high; leaf margins finely but sharply toothed.
    - a. Leaves long-triangular, broadest near the base  
*Triangle-leaved ragwort* (p. 172)
    - aa. Leaves narrow, broadest in the middle, tapering to each end  
*Toothed ragwort* (p. 172)
  - BB. Plants 2 feet or less in height.
    - a. Foliage silvery white, plant mostly alpine  
*Hoary senecio* (p. 173)
    - aa. Foliage green.
      - b. Plant alpine, usually not over 6 inches high; heads solitary or few, usually drooping  
*Dwarf senecio* (p. 173)
      - bb. Plants subalpine or montane, usually over 6 inches tall; heads erect.
        - c. Leaves with margins entire, or slightly wavy, or with a few small teeth.
        - d. Plant with no woolly or cottony hairs.
          - e. Flower heads few; plant of subalpine meadows  
*Thick-bracted senecio* (p. 173)
        - ee. Flower heads many; plant of montane roadsides and banks  
*Grass-leaved senecio* (p. 174)
      - dd. Plant usually somewhat woolly; leaves not linear.
        - e. Heads very numerous; involucre about  $\frac{1}{8}$  inch in diameter; bracts with conspicuous black tips . . . *Black-tipped senecio* (p. 174)
        - ee. Heads fewer; involucre about  $\frac{1}{4}$  inch in diameter or more; peduncle of central head short . . . *Lambstongue groundsel* (p. 174)

- cc. Leaves, at least some of them, lobed or coarsely toothed.
  - d. Leaves lobed half way to the midrib or deeper.
    - e. Foliage and stem woolly; leaves with regular, comblike lobes, usually folded  
*Fendler senecio* (p.174)
  - ee. Foliage and stem not woolly, leaves flat.
    - f. Leaves linear, sometimes with a few linear lobes  
*Grass-leaved senecio* (p.174)
    - ff. Leaves lanceolate in outline, pinnately dissected  
*Western golden ragwort* (p.174)
- dd. Leaves irregularly toothed or shallowly lobed; plants of subalpine or alpine zones.
  - e. Stems tufted, growing among rocks, rays yellow . . . . . *Rock ragwort* (p.174)
  - ee. Stems usually single, growing in meadows; rays orange . . . *Orange ragwort* (p.174)

*Bigelow groundsel*, *Senecio bigelovii* Gray.—A plant of meadows and moist forests of the subalpine zone, rather rare, with a few large rayless, drooping heads; bracts purplish, disk yellow.

*Nodding senecio*, *Senecio cernuus* Gray.—A plant with numerous small, light-yellow, or greenish heads, and dark-green leaves and stems. The lower leaves are broad, on long petioles, the upper leaves narrow and becoming sessile.

*Turnip-leaved senecio*, *Senecio rapifolius* Nutt.—Stems in groups, erect, each having a headlike, rounded cluster of small, erect, orange-yellow, discoid heads. The basal leaves are spatulate, or oblong, resembling turnip leaves, from which characteristic the plant takes its name. The middle and upper stem leaves are oblong, pointed, and sessile. All the leaves have sharply toothed margins.

*Triangle-leaved ragwort* or *arrowleaf groundsel*, *Senecio triangularis* Hook.—A tall plant often 3 feet or more high, usually growing in clumps in wet ground of the subalpine zone. The leaves are triangular and thickly toothed; the yellow, radiate heads are borne in corymblike clusters. This plant is often seen in August growing in dense clumps with the subalpine larkspur, the gold of the ragwort setting off the deep purple-blue of the larkspur. The *toothed ragwort* or *butterweed groundsel*, *Senecio serra* Hook. is similar, but its leaves are narrow and tapering.



Figure 99.—DWARF SENECIO.  
YELLOW WITH DARKER CENTER,  
3 TO 6 INCHES HIGH. Photograph  
by Joseph Dixon.

*Hoary ragwort*, *Senecio werneriaefolius* Gray, a beautiful silvery plant with many golden yellow flower heads, grows on stony or gravelly ground at high altitudes. Its leaves are quite entire.

*Dwarf or alpine senecio*, (*Senecio taraxacoides* (Gray) Greene (fig. 99).—A plant about 6 inches high, rather fleshy; leaves ovate or spatulate; margins toothed; midribs, petioles, and younger leaves purplish, sometimes woolly; heads one or few, large, an inch or more across; involucre purplish; rays light yellow, nearly one-fourth inch wide. A similar species with solitary heads and smaller spatulate leaves is *Senecio holmii* Greene. *Senecio soldanella* Gray is also found at very high altitudes. It has round or obovate leaves on long petioles and large solitary heads about 1 inch high.

*Thick-bracted senecio*, *Senecio crassulus* Gray.—Two to five orange-yellow flower heads; found in some subalpine meadows. Its basal leaves, when present, are spatulate or oblong with rounded apex; the remaining leaves acute at apex, the leaf margins mostly entire but occasionally showing a few very tiny teeth.

*Grass-leaved senecio* or *broom groundsel*, *Senecio spartioides* T. & G.—This rather bushy plant covered with numerous yellow-rayed flower heads is common along roadsides, around buildings, and on fields of the montane zone. Its leaves are very narrow and some of them have a few narrow pinnate lobes projecting at right angles. It begins to bloom in late July and continues into September.

*Black-tipped senecio*, *Senecio atratus* Greene.—Foliage and stem grayish with woolly hairs, leaves entire (or margins sometimes with very small teeth), flower heads very numerous and small; involucre bracts with conspicuous black tips. Found on hillsides of the subalpine zone.

*Lambstongue groundsel*, *Senecio perplexus* A. Nels.—A very variable plant, as its Latin name implies. The most constant character is the very short peduncle of the central head. The plant is usually woolly with loose white hairs, the leaves entire or with a few small irregularities. It is an early blooming species found on montane hillsides in May and June.

*Fendler senecio* or *Fendler groundsel*, *Senecio fendleri* Gray.—Somewhat similar to the last and often found with it, but the central peduncle not conspicuously shorter than the others, and the leaves pinnately lobed, the lobes resembling the teeth of a comb. In addition, the leaves are usually folded. This also begins to bloom in June in the montane zone and continues throughout the summer. It is frequently seen growing from the foothills to timber line.

*Western golden ragwort* or *desert groundsel*, *Senecio eremophilus* Rich.—This plant is conspicuous along the banks of the Bear Lake Road and on other roadsides and around dwellings. It is bushy and covered in mid-summer with bright yellow flower heads. When it goes to seed it is still conspicuous because of the white pappus of the achenes. The leaves are dark green, smooth, and deeply pinnately lobed. The *rock ragwort*, (*Senecio carthamoides* Greene), a rather similar plant found in subalpine and alpine rock slides, has tufts of leafy stems, each bearing one or more large flower heads with light yellow rays.

*Orange ragwort* or *saffron groundsel*, *Senecio crocatus* Rydb.—One of the most common plants in many wet subalpine meadows, where its orange rays make it conspicuous. The upper leaves clasp the stem by a broad base and are abruptly narrowed near the middle, with a tapering point. All the leaves are more or less lobed or toothed. A similar plant with yellow rays is *Senecio dimorphophyllus* Greene.

*Parry goldenrod* *Aplopappus parryi* Gray (*Oreochrysum parryi*).—A plant of lodgepole forests, meadows, and aspen groves; foliage light green; rays pale yellow; heads about one-half inch high, outer bracts rather loose and leafy; stems from a slender running rootstock; blooming season, August.

*Goldenrod*. The goldenrod species are difficult to distinguish in the field but easily recognized as a group. The common one seen among rocks and along trails at higher altitudes with the flower spray rounded, is *dwarf*



Figure 100.—BLACK-EYED SUSAN. YELLOW WITH VERY DARK BROWN CENTERS, PLANT 10 TO 18 INCHES HIGH. Photograph by Joseph Dixon.

*goldenrod*, *Solidago decumbens* Greene. The common species of roadsides with flower sprays somewhat one-sided and recurved is *Solidago nemoralis* Ait. (*S. concinna*, *S. pulcherrima*). The tall one of stream banks and wet meadows of the lower valleys is *giant goldenrod*, *Solidago gigantea* Ait. (*S. serotina*). In addition the following species occur in the park: *Solidago ciliosa* Greene in which the bases of the leaves are fringed with hairs, and *Solidago missouriensis* Nutt.

*Black-eyed-susan*, *Rudbeckia hirta* L. (*R. flava*) (fig. 100).—The well-known "Susan," with its large gold and chocolate flower heads and rough foliage is frequently seen in mountain meadows. It may be distinguished from *gaillardia*, which it is sometimes considered to resemble, by the shape of the rays which taper to the apex and the lack of the three distinct teeth of *gaillardia*, as well as the smooth cone-shaped disk.

*Goldenglow* or *cutleaf coneflower*, *Rudbeckia laciniata* L. (*R. ampla*).—A very tall, smooth plant with large flower heads 2 to 4 inches across, drooping yellow rays, and a raised, greenish-yellow disk. It is frequent along streams of the montane zone.

*Dwarf sunflower*, *Helianthus pumilus* Nutt.—A perennial bushy plant, very rough-hairy, bearing numerous “sunflowers” 1 to 2 inches across, with bright yellow rays and dull yellow or brownish disks. It is abundant on open rocky slopes below 9,000 feet. The *annual sunflower*, *Helianthus annuus* L. adventive in the park, a taller plant with larger heads, is seen along roadsides and around ranches.

*Aspen-sunflower* or *five-nerve helianthella*, *Helianthella quinquenervis* (Hook.) Gray.—A tall, slender plant with one or few large flower heads 3 to 4 inches across, pale-yellow rays, and brownish or greenish-yellow disk. The long, tapering leaves are mostly five-nerved. This plant is most frequently seen on damp soil in aspen groves of the montane zone, though it is occasionally found in meadows or in open spruce forests.

*Thistle*, *Cirsium* (*Carduus* or *Cnicus*).—Nearly everyone is familiar with these plants, which are easily recognized by the lobed and spiny leaves and by the typical thistle flower heads. These heads are discoid but the tubular corollas are exceptionally long and split into narrow divisions, so that the head has a looser appearance than most discoid flower heads.

*Purple thistle*, *Cirsium filipendulum* Engelm.—Frequently seen around buildings, along roadsides, and on open fields. Its foliage is whitened with woolly hairs, which disappear as the leaves get older, and the heads are a beautiful rose-purple.

*Drummond thistle*, *Cirsium drummondii* T. & G. (*C. coloradense*).—The several heads are whitish or cream-colored; found in meadows and along stream banks. Its variety, *Cirsium drummondii acaulescens* (Gray) Coville, the stemless thistle, with the flower heads sessile in a basal rosette of leaves, is found in rock slides of the subalpine and alpine zones, and occasionally in lower meadows.

Others found in the park are: *American thistle*, *Cirsium americanum* Gray, with medium-sized, whitish heads, the involucre bracts somewhat fringed along their edges; *Hooker thistle*, *Cirsium hookerianum* Nutt., with sessile heads, flowers pinkish or pale purple and woolly bracts with spines on their edges as well as one at the tip of each. The last is a high altitude plant and has much the same habit as the Drummond thistle, the stems sometimes being very short. They may be distinguished because the bracts of the latter lack the woolliness and lateral spines of the former. *Cirsium engelmannii* Rydb., with long-peduncled, rose-purple heads and *Cirsium bipinnatum* (Eastw.) Rydb. also with purple heads have been reported.

*Canada thistle*, *Cirsium arvense* (L.) Scop., a very troublesome weed which spreads from underground rootstocks has recently appeared along roadsides of the park. Its numerous, small, purple flower heads make masses of it rather attractive in appearance when in bloom.

*Dwarf rabbit brush*, *Chrysothamnus pumilus* Nutt.—This bushy plant, usually not over a foot high, becomes conspicuous in late August and September on open fields of the montane zone. Its leaves are linear and

often somewhat twisted; its numerous tiny yellow heads are held erect. *Chrysothamnus parryi* (Gray) Greene, is found at the edge of the park on the western side and *Chrysothamnus viscidiflorus* (Hook.) Nutt. grows near Eagle Cliff.

*Catspaw* or *pussytoes*.—Plants related to the everlasting flowers, with white or silvery foliage and oblong or oval flower heads, the inner bracts of which are papery, either white, pink, or brownish. They usually grow in mats and spread by leafy stolons.

*Rocky Mountain pussytoes*, *Antennaria aprica* Greene.—One of the most abundant plants of the open fields. It forms large mats of whitish foliage, and in May sends up short stems 2 to 4 inches high, bearing several heads with white or rarely pinkish, papery bracts. The leaves are rounded, tapering to a broad petiole, or spatulate-shaped. The *brownish catspaw* *Antennaria umbrinella* Rydb., similar to the above but with brownish bracts, has also been found.

*Showy pussytoes*, *Antennaria pulcherrima* (Hook. Greene).—A plant 6 to 10 inches tall having long whitish leaves with distinct parallel nerves; sometimes found on partly shaded hillsides, blooming in July and August.

*Pussytoes*, *Antennaria rosea* (Eat.) Greene.—Stems 4 to 8 inches tall; heads oval, inner bracts bright rose, pink, or white. In our region this plant seems to be most common in the subalpine zone.

*Antennaria media* Greene has been found on the summit of Flattop and *Antennaria corymbosa* E. Nels., also occurs.

*Pearl-everlasting*, *Anaphalis subalpina* (Gray) Rydb., (*A. margaritacea*).—Very abundant on the burned-over lands of the subalpine zone, especially around Bear Lake and along the upper part of the Fall River Road. The stems are usually about a foot high, the leaves narrowly lanceolate or linear, green above; the stems and under side of leaves are white with soft, loose cottony hairs; heads numerous, corymbosely clustered; bracts pure white, papery.

*Cudweed* or *clammy cudweed*, *Gnaphalium decurrens* Ives.—Less abundant than the preceding, but rather similar in general appearance. The stem is yellowish-green and sticky, at least on the lower part, rather than white-cottony, and the bracts are cream-colored and satiny. *Gnaphalium grayi* Nels. & Macb., a smaller, inconspicuous plant grows on wet ground. (*G. strictum*).

*Gayfeather* or *blazing star*, *Liatris punctata* Hook.—This plant grows in tufts on the open fields where its spikes of brilliant purple, feathery flower heads make it conspicuous. Another species with fewer but larger heads is *Liatris ligulistylis* A. Nels.

*Mountain-sage* or *wormwood*, *Artemisia*.—A very large genus with many representatives in this region. Most of them are inconspicuous, as their flower heads are very small and never brightly colored. They are in no way related to the true sage (*Salvia*) of which there are no representatives

in the park. Most of the wormwoods have a very bitter sap and many of them a pleasantly aromatic odor. The involucre bracts are often edged with dark brown or black. Many of these plants have very attractive silvery foliage.

*Sagebrush* or *big sagebrush*, *Artemisia tridentata* Nutt.—In a dwarf condition, this is found in colonies in a few places in the park on the eastern side of the Continental Divide, especially in Glacier Basin, on the south and west slopes of Deer Mountain, and around Horseshoe Park. It is a woody shrub rarely over a foot high in this vicinity, with wedge-shaped, three-toothed, silvery leaves. On the western slope around Grand Lake it is more abundant and grows to a greater size, and another species with longer, entire leaves, *Artemisia cana* Pursh, is found with it.

*Fringed mountain-sage*, *Artemisia frigida* Willd.—Tufts of silvery, fringed leaves and slender racemes of nodding yellow flower heads; abundant throughout the park, especially among rocks. The aromatic heads of this plant were used by the early mountaineers to make a very bitter tea which was considered an excellent tonic and a remedy for mountain fever. A somewhat similar species with less finely cut leaves, *Artemisia coloradensis* Osterh., is often found intermingled with it.

In addition, the following species grow in the park: *Artemisia pattersoni* Gray, *A. saxicola* Rydb., *A. scopulorum* Gray, *A. ludoviciana* Nutt. and var. *gnaphalodes*, *A. aromatica* A. Nels., *A. forwoodii* S. Wats. (*A. canadensis*). *A. arbuscula* Nutt. and *A. nova* A. Nels., have been reported.

*Alpine hawksbeard*, *Crepis alpicola* (Rydb.) A. Nels.—A plant of the alpine zone usually with only one flower head and no leaves on the stem. The yellow flowers are all ligulate, the involucre covered with black hairs. Another species of *hawksbeard* found in the park, usually in montane meadows, is *Crepis runcinata* T. & G.

*Burnt-orange-dandelion* or *orange agoseris*, *Agoseris aurantiaca* (Hook.) Greene, (*Troximon aurantiacum*).—The flowers are dark orange, the leaves dark green and entire. The plant is found on moist soil of the subalpine zone.

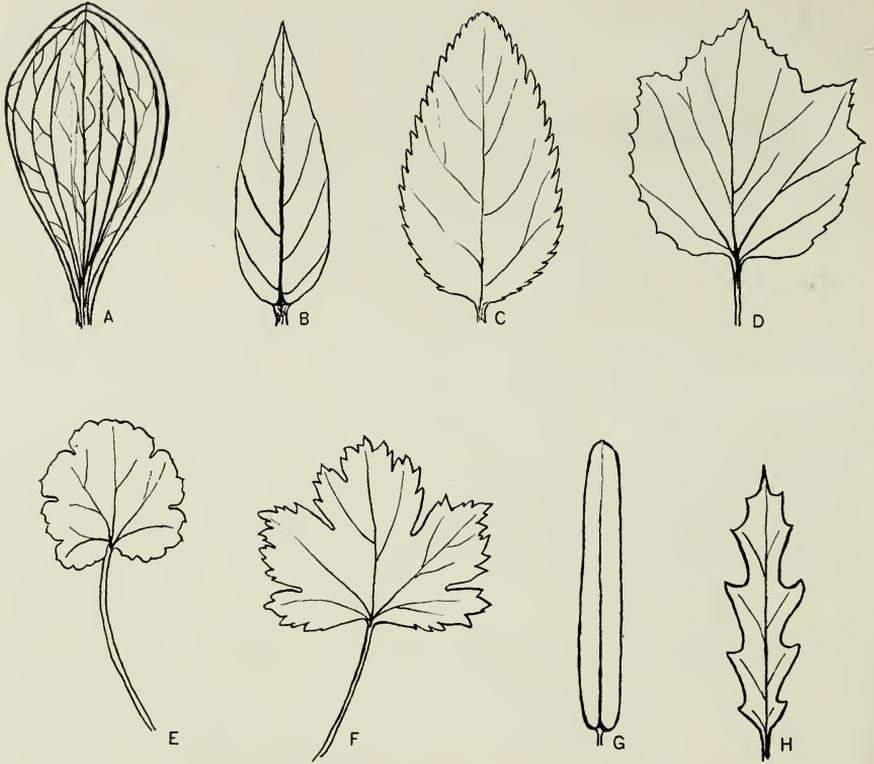
*Tall false-dandelion* or *pale agoseris*, *Agoseris glauca* (Nutt.) Greene (*Troximon glaucum*).—Large yellow heads resembling the common dandelion, but with leaves pale green and usually not much lobed; found around ranches and roadsides below 9,000 feet. *Agoseris laciniata* (Nutt.) Greene, resembling the last, but smaller and having the leaves distinctly toothed, also occurs. The hairy *false-dandelion*, *Agoseris villosa* Rydb. (*Troximon villosum*), similar but more or less hairy and with involucre bracts spotted with black, is found in the subalpine zone.

*Rock dandelion*, *Taraxacum scopulorum* (Gray) Rydb.—A diminutive plant, stem usually less than 2 inches high, with leaves resembling the common dandelion, and small yellow heads is sometimes found among rocks in the high alpine region.

*Common dandelion*, *Taraxacum officinale* Weber has been introduced into this region, where it thrives well and is very abundant around dwellings and in meadows.

*Slender hawkweed*, *Hieracium gracile* Hook.—A plant with a basal rosette of obovate or spatulate leaves from which rises a slender stem bearing one to three pale yellow flower heads with black-hairy involucre. *White-flowered hawkweed*, *Hieracium albiflorum* Hook. is similar but has no black hairs. Its flowers are whitish and the basal leaves have long white hairs.

In addition, the following composite plants, either inconspicuous or rarely seen, have been identified in the park, and most of them may be recognized by characters given in the key: *Coneflower* or *prairie-coneflower*, *Ratibida columnaris* (Sims) Don.; *sheathflower* or *tasselflower brickellia*, *Brickellia grandiflora* Nutt. (*Coleosanthus grandiflora*); *milkpink* or *skeleton weed*, *Lygodesmia juncea* Don; *rattlesnakeroot*, *Prenanthes racemosa* Michx. (*Nabalus racemosus*); *carelessweed*, *horseweed* or *sumpweed*, *Iva xanthifolia* Nutt.; *salsify*, *Tragopogon dubius* Scop.; *spiny-sow-thistle*, *Sonchus asper* (L.) Hill. and *golden curlyhead*, *Pyrrocoma crocea* (Gray) Greene. To date, the last has been found only on the western slope.



*Plate XII.*—SIMPLE LEAVES; (A) OBOVATE WITH ENTIRE MARGIN AND OBTUSE APEX; (B) LANCEOLATE WITH ENTIRE MARGIN AND ACUTE APEX; (C) OVATE WITH SERRATE MARGIN; (D) BROADLY OVATE, SHALLOWLY LOBED AND TOOTHED (ARROW-WOOD); (E) ROUNDISH WITH ROUNDED LOBES (SMALL-LEAVED ALUMROOT); (F) PALMATELY LOBED AND TOOTHED OR CUT; (G) LINEAR WITH ENTIRE MARGIN AND OBTUSE APEX; (H) PINNATELY LOBED.



*Plate XIII.*—(A), (B), AND (C), COMPOUND LEAVES: (A) PALMATELY COMPOUND LEAF (LUPINE); (B) TRIFOLIATE LEAF (BUCKBEAN), SHOWING SHEATHING BASE OF PETIOLE; (C) PINNATELY COMPOUND LEAF (ROSE), SHOWING STIPULES AT BASE OF PETIOLE. (D) AND (E), LEAF ARRANGEMENT: (D) ALTERNATE; (E) OPPOSITE. *Drawings by L. W. Durrell.*

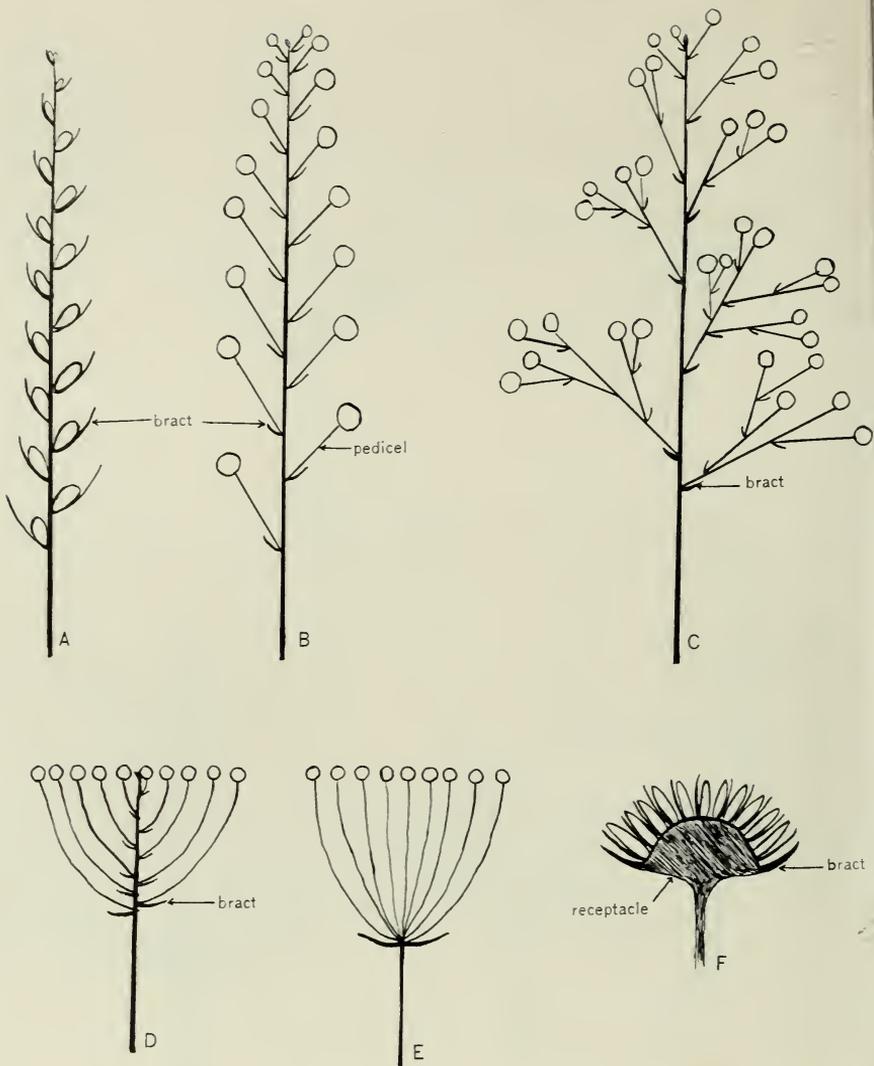


Plate XIV.—DIAGRAMS OF TYPES OF INFLORESCENCE. (A) SPIKE; (B) RACEME; (C) PANICLE (D) CORYMB; (E) UMBEL; (F) HEAD.

# Glossary



*Achene.* A small, dry, hard, one-celled, one-seeded, nonsplitting fruit.

*Acuminate.* Taper-pointed.

*Acute.* Sharp-pointed or ending in a point less than a right angle.

*Adnate.* United in growth; the calyx is adnate to the seed pod in the bluebell family.

*Adventive.* Plants of foreign origin becoming naturalized in our region.

*Alpine zone.* That region above timber line, usually above 11,500 feet.

*Alternate.* (Used of leaves, branches, etc.) Occurring singly at the nodes. Plate XIII, D.

*Ament.* See catkin.

*Annual.* Of only 1 year's duration.

*Anther.* The essential part of the stamen, which contains the pollen.

*Aquatic.* Growing in water.

*Awl-shaped.* Sharp-pointed from a broader base.

*Axillary.* Occurring in the axils.

*Axil.* The upper angle between a leaf and the stem.

*Axis.* The central line of any body; the organ round which others are attached.

*Bract.* In general the leaves of an inflorescence, more or less different from ordinary leaves; always sessile; specially the small leaf or scale in the axil of which a flower or its pedicel stands.

*Bulblet.* A small bulb, especially one borne upon the stem or in the inflorescence.

*Caespitose.* Growing in turflike patches or tufts.

*Calyx.* The outer circle of floral leaves, made up of the *sepals* which may be either distinct or joined together. If only one circle is present, it is called a calyx even

though it is showy and appears like a corolla.

*Carpel.* The unit of structure of the pistil, which may consist of a single carpel or of several carpels.

*Catkin.* A scaly spike of small flowers of which the pussy willow is a typical example. Also called an ament.:

*Ciliate.* Beset on the margin with a fringe of hairs.

*Corolla.* The inner circle of floral leaves, usually showy. It is made up of *petals*, which may be either united or separate. It is always surrounded by a calyx.

*Corymb.* A flat or convex flower cluster, with branches arising at different levels and flowers blooming at the outer edges first. Plate XIV, D.

*Cotyledons.* The seed leaves, the first leaves of the embryo.

*Crenate.* (Of margins of leaves and petals.) With rounded teeth.

*Deciduous.* Falling off or subject to fall; applied to plants whose leaves fall in autumn.

*Decumbent.* Reclined on the ground, the summit tending to rise.

*Dentate.* Toothed.

*Dicotyledonous.* Used of plants which have a pair of cotyledons in the embryo.

*Dioecious.* Unisexual, with the two kinds of flowers on separate plants.

*Disk.* The face of any flat body; the central region of a head of flowers, like the sunflower, as opposed to the *ray* or margin; a fleshy expansion of the receptacle of a flower.

*Dissected.* Cut deeply into many lobes or divisions.

*Ecology.* The study of plants in relation to their surroundings and environment.

*Entire.* The margin not at all toothed, notched or divided. Plate XII—A, B, and G.

*Evergreen.* Holding the leaves over winter or longer, until new ones appear.

*Exserted.* Protruding out of, as the stamens out of the corolla.

*Fertile.* Fruit bearing, or capable of producing fruit; also applied to anthers when they produce good pollen.

*Filament.* The stalk of a stamen; also any slender thread-shaped appendage.

*Floret.* A small flower, usually one of a dense cluster.

*Fronde.* The leaf of ferns.

*Genus, plural Genera.* A group of plants made up of closely related species.

*Glabrous.* Smooth, having no hairs, bristles, or other pubescence.

*Glaucous.* Covered with a fine white powder that rubs off (bloom), like that on a fresh plum or a cabbage leaf. It often gives foliage a bluish appearance.

*Habitat.* The situation in which a plant grows in a wild state.

*Herb.* A plant with no persistent woody stem above ground.

*Herbaceous.* With the texture of common herbage; not woody. Applied to plants which are herbs as distinguished from those which are shrubs or trees.

*Imbricated.* Overlapping (as shingles on a roof), either vertically or spirally, where the lower piece covers the base of the next higher; or laterally as in the arrangement of a calyx or corolla, where at least one piece must be wholly external and one internal.

*Imperfect flowers.* Lacking either stamens or pistils.

*Indusium.* The shield or covering of the sorus ("fruit-dot") of a fern.

*Inferior.* Applied to the seed pod when the calyx and corolla are placed on top of it instead of being inserted at its base inclosing it.

*Inflorescence.* The flowering part of a plant and especially the mode of its arrangement. Plate XIV.

*Involucre.* A whorl or set of bracts around a flower, umbel, or head.

*Irregular.* Used to describe a calyx or corolla in which all the parts are not alike. Violets and sweetpeas are examples of irregular flowers, while a wild rose is a regular flower.

*Keel.* Used to describe the two lower petals of flowers of the pea family; also any projecting ridge on a surface, like the keel of a boat.

*Lanceolate.* Lance-shaped. Plate XII—B.

*Leaflet.* One of the divisions or blades of a compound leaf.

*Linear.* Narrow and flat, the margins parallel. Plate XII—G.

*Lobe.* Any projection or division (especially a rounded one) of a leaf, etc.; used also of the divisions of a united corolla.

*-merous.* Referring to the number of parts of the flower.

*Midrib.* The middle or main rib of a leaf.

*Monocotyledonous.* Used of plants which only have one cotyledon in the embryo.

*Montane zone.* The region between 6,000 and 9,000 feet, which contains mostly a mixed forest of western yellow pine and Douglas-fir, with lodgepole pine coming in on burned areas above 8,000 feet, also aspen groves and many open fields and hillsides.

*Naturalized.* Introduced from a foreign country, but growing wild and propagating freely by seed.

*Needle-shaped.* Long, slender and rigid, like the leaves of pines.

*Node.* A knot; the joints of a stem, from which the leaves arise.

*Obovate.* The broad end upward, inversely ovate. Plate XII—A.

*Opposite.* Applied to leaves and branches when an opposing pair occurs at each node. Plate XIII—E.

*Ovary.* That part of the pistil which contains the ovules (young seeds).

*Ovate.* Shaped like the section of an egg, with the broader end downward. Plate XII—C.

*Palmate.* Applied to a leaf whose leaflets, divisions, or main ribs all spread from the apex of the petiole, like a hand with outspread fingers. Plates XII—F, and XIII—A.

*Panicle.* An open or dense cluster in which the secondary branches are branched again. Is usually used of an inflorescence. Plate XIV—C.

*Papilionaceous.* Butterfly-shaped; applies to such a corolla as that of the pea or bean.

*Pedicel.* The stalk of each particular flower of a cluster.

*Peduncle.* A flowerstalk, whether of a single flower or of a flower cluster.

*Pendent.* Hanging.

*Perennial.* Lasting from year to year.

*Perfect.* A flower containing both pistil and stamens. The calyx and corolla are not necessarily present.

*Perianth.* The floral envelopes of the flower; especially when the sepals and petals can not be distinguished, as in many plants of the lily family.

*Petal.* A constituent member of the corolla. (See *corolla*).

*Petaloid.* Petallike; resembling or colored like petals.

*Petiole.* The leaf-stalk.

*Pinna, plural pinnae.* One of the divisions of a pinnately divided leaf, used especially of ferns.

*Pinnate (Leaf).* Leaflets disposed along the main axis of the leaf; feather-veined (secondary veins arising from a midrib). Plate XIII—C.

*Pinnately lobed, cleft, parted, divided, etc.* The varying depths of division of a pinnate (feather-veined) leaf. Plate XII—H.

*Pistil.* The seed-bearing organ of the flower. It is made up of the *ovary*, which becomes the seed pod, the *style*, and the *stigma*.

*Plumose.* Plumed or feathery.

*Pollen.* Pollen grains; the male element in flowering plants which must be deposited on the stigma of the pistil in order that the ovules may be fertilized and develop into seeds.

*Polygamous.* With both perfect and imperfect flowers on the same plant.

*Produced.* Extended or projecting, as the upper sepal of a larkspur is *produced* above into a spur.

*Pubescent.* Fine and soft hairs.

*Pubescent.* Covered with fine, soft hairs.

*Raceme.* A flower cluster with one-flowered pedicels along the axis of inflorescence. Plate XIV—B.

*Rachis.* An axis bearing close-set organs; especially the midrib of a fern frond.

*Radiate.* Furnished with ray flowers.

*Ray.* The marginal flower of a head or cluster when different from the rest, especially when ligulate; the branch of an umbel.

*Receptacle.* The more or less expanded or produced end of an axis which bears the organs of a flower or the collected flowers of a head.

*Reflexed.* Bent outward or backward.

*Regular.* Used to describe a calyx or corolla in which all the parts are similar.

*Rudimentary.* Imperfectly developed, or in an early stage of development.

*Runner.* A slender and prostrate branch rooting at the end or at the joints. Strawberries are examples of plants having such *runners*.

*Sepal.* A constituent member of the calyx.

*Serrate. Serrated.* With margin cut into teeth pointing forward. Plate XII—C.

*Sessile.* Without any stalk, as a leaf destitute of petiole, a flower destitute of pedicel, or an anther destitute of filament.

*Shrub.* A woody perennial, smaller than a tree, usually with several stems.

*Silky.* Glossy with a coat of soft fine, close-appressed, straight hairs.

*Silvery.* Shining white or bluish gray, usually from a silky pubescence.

*Simple.* Of one piece, opposed to compound.

*Sorus, plural sori.* The "fruit-dots" of ferns, a cluster of little sacs, each of which contains many spores. Sori usually occur in characteristic arrangement on the back of the fertile frond.

*Spatulate.* Gradually narrowed downward from a rounded summit.

*Species.* A group containing all the individuals of a particular kind of plant.

*Spicate.* Arranged in or resembling a spike.

*Spike.* A form of simple inflorescence with the flowers sessile or nearly so upon a more or less elongated common axis. Plate XIV—A.

*Stamen.* The pollen-bearing organ, made up of the *filament* and the *anther* which contains the pollen.

*Stigma.* The region of the pistil which receives the pollen.

*Stipules.* The appendages on each side of the base of certain leaves. Plate XIII—C.

*Style.* The beaklike prolongation of the pistil above the ovary, which bears the stigma.

*Subalpine zone.* The region between 9,000 feet and timber line containing heavy Engelmann spruce-alpine fir forest, meadows, and bogs. On the exposed ridges will be found a stunted growth of limber pine, and on the burned areas lodgepole pine. In general this zone supports the

most luxuriant plant life of the mountains.

*Superior.* Used of the ovary when the other parts of the flower are inserted at its base or below it, as in the buttercup family.

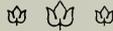
*Ternate.* Arranged in threes.

*Timber line.* The region on mountains where tree growth stops due to severe climatic conditions, and above which only herbs and dwarf shrubs are found. The last trees are often much deformed by the high winds and quite frequently become prostrate.

*Umbel.* The umbrellalike form of inflorescence in which the peduncles or pedicels all arise from one point. Plate XIV—E.

*Whorl.* A group of three or more similar organs radiating from a node.

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# General Index



- Acer—103.  
Aceraceae—103.  
Achillea—158.  
Acomastylis—93.  
Aconitum—77.  
Acrapteris—34.  
Actaea—77.  
Actinea—168; graylocks—168; woolly (fig. 98)—154, 168.  
Adaptation to Environment—9.  
Adoxa—149.  
Adoxaceae—149.  
Agoseris—178; orange—178; pale—178.  
Agrimonia—92.  
Agrimony—92; roadside—92.  
Alder (fig. 18)—56; thinleaf—56.  
Algae—15.  
Alisma—38.  
Alismaceae—38.  
Allionia—64.  
Allium—45.  
Alnus—56.  
Alpine fir—6, 9, 37.  
Alpine (life zone) (Pls. I a, IV)—5.  
Alplily (fig. 10)—49.  
Alsine—67.  
Alsinopsis—66.  
Alumroot (fig. 42)—15, 85, 87; Halls—87; littleleaf—87.  
Amaranth family—redroot—64; 64.  
Amaranthus—64.  
Amaranthaceae—64.  
Amarella—125.  
Amelanchier—96.  
Anacardiaceae—103.  
Anacharis—38.  
Anaphalis—177.  
Androsace—119, 120; alpine—118, 119; mountain—118, 119.  
Anemone—69, 73, 75; alpine (fig. 31)—74, 75; meadow—75; narcissus—75; northern—75; Pacific—75.  
Angelica—112; Grays—112.  
Anogra—110.  
Antelope brush—6, 94.  
Antennaria—177.  
Aplopappus—168, 174.  
Apocynaceae—126.  
Apocynum—126.  
Apple subfamily—89, 96.  
Aquilegia—69, 75.  
Arabis—80.  
Aragallus—99, 100.  
Aralia—111.  
Araliaceae—111.  
Arceuthobium—58.  
Arctic-alpine (life zone)—5.  
Arctosaphylos (fig. 60)—116.  
Arenaria—66.  
Argemone—78.  
Argentina—94.  
Arnica—153, 167; broadleaf—168; chamisso—168; daffodil—167; heartleaf (fig. 96)—167; meadow—168; orange—168; rayless—168.  
Arrowgrass family—38; swamp—38.  
Arrowhead—38.  
Arrowwood—149.  
Artemisia—177, 178.  
Asclepiadaceae—127.  
Asclepias—127.  
Aspen, quaking—54.  
Aspens (Pl. VII)—15, 17.  
Aspen-sunflower—176.  
Aspidium (fig. 4.)—34.  
Asplenium—34.  
Aster—153, 159; alpine leafy bract—160; common—159, 160; Englemann—159; Fremont—159, 160; Geyer—159, 160; glaucous—159; Porter (fig. 91)—159; rough white—159, 160; sky-blue—159, 160; smooth—160; smooth white—159; sun-loving—159, 160; western—160; willowleaf—160.  
    aster, golden—154, 168; Tansy (fig. 90, Pl. XI c)—20, 153, 158.

- Astragalus—100.  
 Athyrium—32, 34.  
 Atragene—73.  
 Avens, alpine (fig. 44)—93; brook—93;  
   bur—93; largeleaf—93; water—93.  
 Babysbreath—108, 110.  
 Bahia—153, 168; ragleaf—168.  
 Baneberry—69, 77.  
 Barberry family—77.  
 Bartonnia—107.  
 Batrachium—72.  
 Bearberry (fig. 60)—116.  
 Beardtongue—139; mountain (fig. 81)—  
   139, 140; purple—139, 140.  
 Bedstraw—147; sweetscented—148; three-  
   flowered—148.  
 Bee plant, Rocky Mountain—82.  
 Beebalm, mintleaf (fig. 80)—137.  
 Bellflower family—149.  
 Belvisia—34.  
 Berberidaceae—77.  
 Berberis—78.  
 Besseyia—145.  
 Betony, marsh—138.  
 Betula—56.  
 Betulaceae—56.  
 Bibliography—187.  
 Bindweed, black—59, 60.  
 Birch, bog—56; family—56; mountain  
   (fig. 17)—56; Rocky Mountain—6;  
   water—56.  
 Bishops cap—87.  
 Bistort—59; American (fig. 22)—62.  
 Bistort, slender—62; viviparous—62.  
 Bistorta (fig. 22)—62.  
 Bittercress, heartleaf—80.  
 Black-eyed-susan (fig. 10)—154, 175.  
 Bladderfern, brittle—32.  
 Bladderpod—81.  
 Blazing star—177.  
 Blitum—63.  
 Blue-eyed-grass (fig. 14)—51.  
 Blue-eyed Mary—139, 143.  
 Blue flag (fig. 13)—51.  
 Blue spruce—12.  
 Bluebell—149; Parry—149.  
 Bluebells, alpine—133; American—133;  
   greenleaf—133; lanceleaf—133; moun-  
   tain—133.  
 Blueberry, dwarf—118.  
 Bluegrass—40.  
 Bog orchid—51; white—53; bracted—53.  
 Bogbean, common—126.  
 Borage family—131.  
 Boraginaceae—131.  
 Bossekia—96.  
 Bottle brush—111.  
 Bouteloua—39.  
 Boykinia—87; James (fig. 41)—87.  
 Brake, eagle—32; rock—34.  
 Bracken, western (fig. 3)—32.  
 Brickellia—179; tasselflower—179.  
 Brittlebrush, antelope—94.  
 Brook-cress (fig. 35)—6, 80.  
 Brooklime, American—139, 146.  
 Broomrape—146; family—146.  
 Buckbean—126; family—126.  
 Buckbrush—149.  
 Buckthorn family—104; Fendler—104.  
 Buckwheat, alpine golden—59, 60; family—  
   59; golden—59, 60; subalpine—59, 60;  
   water (fig. 21)—59, 60; winged—59, 60.  
 Buffaloberry, bitter—107; russet—107.  
 Bulrush, alkali—44.  
 Bur-reed family—38; narrow-leaf—38.  
 Bursa—82.  
 Buttercup—69; alkali—71; alpine—71;  
   caltha-flowered—71; family—69; nutt-  
   all—71; pygmy—71; shore—71; snow (fig.  
   29)—9, 71; trailing—71  
 Buttercups—71.  
 Cactaceae—107.  
 Cactus family—107; pincushion moun-  
   tain—107.  
 Callitrichaceae—103.  
 Callitriche—103.  
 Calochortus—46.  
 Caltha—70.  
 Calypso (fig. 15)—52.  
 Campanula—149.  
 Campanulaceae—149.  
 Champion—67; evening—67; moss (fig.  
   26)—67.  
 Canadian (life zone)—5.  
 Candytuft—80; Colorado—81; Fendler—  
   81; glaucous—81; wild—80.  
 Caper family—82.  
 Capnoides—78.  
 Capparidaceae—82.  
 Caprifoliaceae—148  
 Capsella—82.  
 Cardamine—80.  
 Carduus—176.

- Carelessweed—179.  
 Carex, see list—43.  
 Caryophyllaceae—65.  
 Castilleja (fig. 82)—140.  
 Catchfly, Hall—67.  
 Catspaw—155, 177; brownish—177.  
 Cattail—37; family—37.  
 Ceanothus—104; Fendler—104; snow-brush—104.  
 Celastraceae—104.  
 Cerastium—66, 67.  
 Chamaenerion—108, 109.  
 Checkermallow, New Mexican—105; white—105.  
 Cheilanthes—34.  
 Cheiranthus—81.  
 Cheirinia—81.  
 Chenopod, Fremont—63.  
 Chenopodiaceae—62.  
 Chenopodium—63.  
 Cherry, bird—97; choke—97; pin—97; subfamily—97.  
 Chickweed—65; blunt-leaved—67; mouse-ear—65, 66.  
 Chickaweeds—67.  
 Chicory tribe—151, 156.  
 Chimaphila (fig. 58)—114.  
 Chiming bells—133; tall (fig. 76)—133.  
 Chionophila—143.  
 Chokeycherry—97.  
 Chondrophylla—124.  
 Chrysobotrya—88.  
 Chrysopsis—168.  
 Chrysosplenium—87.  
 Chrysothamnus—176.  
 Cicely, sweet—112.  
 Chichoriaceae—151.  
 Cinquefoil—90, 93; beauty—94; big-flower—94; blueleaf—93; bush—94; glaucous—93; gold cup—93; leafy—94; northwest—93; Saskatchewan—93; shrubby—94; silverweed—94; silvery—93; singleflower—94.  
 Cirsium—176.  
 Claytonia—64, 65.  
 Cleavers, northern—147.  
 Clematis—69, 72; bush—73; Columbian rock—73; Douglas—73; Rocky Mountain—73; subalpine—73; white—72.  
 Clementsia—83.  
 Cleome—82.  
 Cliffbrake, Brewers—34.  
 Clover—98, 99; alpine—98, 99; dwarf—98, 99; red—98, 99; rose—98, 99; Rydberg—99; Parry—99; whiproot—99; white—98, 99.  
 Clubmoss, family—36; fir—36.  
 Clubmosses, little—36.  
 Cnicus—176.  
 Cockle, Drummond—67; white—67.  
 Coeloglossum—53.  
 Coleosanthus—179.  
 Collinsia—143; littleflower—143.  
 Collomia—128.  
 Colorado, mountains of—2.  
 Colorado A. and M. College—2.  
 Colorado blue spruce (Pl. II b)—6, 37.  
 Columbine—69; Colorado (fig. 32)—75; dwarf blue—75; Rocky Mountain—75; star-flowered—75; western red—75.  
 Compositae (Pl. X, XI)—151.  
 Composite family (Pl. X, XI)—151.  
 Coneflower—154, 179; cutleaf—175; prairie—179.  
 Conioselinum—112.  
 Continental Divide (Pl. III b)—2.  
 Convallariaceae—44.  
 Corallorhiza—53.  
 Coralroot—51, 53; spotted—53.  
 Cornaceae—112.  
 Cornbind, dullseed—60.  
 Cornus—112.  
 Corydalis—78; golden—78.  
 Cottongrass—44.  
 Cottonsedge, narrowleaf—44.  
 Cottonwood, narrowleaf—53.  
 Cow-parsnip (fig. 56)—112.  
 Cowlily, Rocky Mountain—69.  
 Cranberry, high-bush—149.  
 Crassulaceae—83.  
 Crateaeus—96.  
 Crazyweed, Lambert—99; Rocky Mountain (fig. 47)—100.  
 Crepis—178.  
 Cress—82; blister—81; rock—81. cress, brook (fig. 35)—80.  
 Crowfoot, water—72.  
 Cruciferae—78.  
 Cryptantha—131, 136.  
 Cryptogramma—34.  
 Cudweed—156; 177; clammy—177.  
 Curlyhead, golden—179.  
 Currant, clove—88; Colorado—88; golden—88; gooseberry—88; prickly—88; Roth-rock—88; squaw—88; subalpine black—88; wax—88; Wolfs—88.

- Cymopterus—112.  
 Cyperaceae—43.  
 Cyripedium—52, 53.  
 Cyrtorhyncha—71.  
 Cystopteris—32.  
 Cytharea—52.
- Daisy (Pl. XI a)—153, 160; aspen (fig. 93)—161, 162; beautiful—161, 162; black-headed—161, 162; Coulter—161, 163; cut-leaved—162, 165; dry-land—161, 163; dwarf—161, 164; early blue—161, 164; Greenes—161, 163; one flowered (fig. 94) 162, 165; pale—161, 163; pinnate-leaved—162, 165; rock-slide—162, 165; spreading—160, 162; subalpine (fig. 92)—161, 162; whiplash—161, 163.
- Daisies, fleabane—165.
- Dandelion, common—20, 179; rock—178. dandelion, burnt-orange—178; false—156, 178; tall false—178.
- Dandelions—151.
- Dasiphora—94.
- Dasystephana—125.
- Deathcamas, mountain—49.
- Delphinium—69, 75, 77.
- Descurania—82.
- Disporum—49.
- Distegia—148.
- Dock—59; curly—60; Mexican—60.
- Dodecatheon (fig. 66)—121.
- Dogbane family—126; spreading—126.
- Dogwood family—112; western red-stemmed—112.
- Douglas-fir—6, 15, 17, 37.
- Draba—80, 81, golden—81; shiny—81; showy—81; thick-leaved—81; twisted pod—81; yellow—81.
- Dracocephalum—137.
- Dragonhead, American—137.
- Drosace (fig. 65)—120.
- Dryad, mountain (fig. 43)—9, 90.
- Dryas (fig. 43)—90.
- Drymocallis—94.
- Dryopteris—34.
- Duckweed family—44; star—44.
- Easter-daisy—153, 158.
- Edwinia—88.
- Elacagnacae—107.
- Elder—17; bunchberry 149; redberried (fig. 87)—149.
- Eleocharis—44.
- Elephantella (fig. 85)—144.
- Elkslip—70.
- Elodea—38.
- Englemann spruce (Pl. VIII)—37.
- Epilobium—108, 109, 110.
- Equisetaceae—35.
- Equisetum—36.
- Ericaceae—112.
- Erigeron—162, 163, 164, 165, 166.
- Eriogonum, subalpine—60; sulphur—60; wing—60; yellow—60.
- Eriophorum—44.
- Eritrichium (fig. 75)—132.
- Erxlebenia—114.
- Erysimum—81; plains—81.
- Erythronium (fig. 7)—46.
- Eucephalus—159.
- Euphorbia—102.
- Euphorbiaceae—102.
- Evening-primrose family—108; yellow—108, 110.
- Evening-primroses—110.
- Evening star, many flowered (fig. 52)—107; showy—107; white—107.
- Everlasting, pearl—6, 155, 177.
- Fairybells—45, 49; wartberry—49.
- Fairy slipper (fig. 15)—6, 51, 52.
- Fairy stars—88.
- Fairy trumpet—128.
- False-dandelion—156, 178.
- Families of plants—31.
- Fawn lily—46.
- Felwort, marsh—123, 124.
- Fern, brittle—32; family—31; grass-leaved—34; Holly—34; lip—34; oak—34; parsley—34; shield (fig. 4)—34.
- Fescue—40.
- Festuca—40.
- Figwort family—138; lanceleaf—146; mountain (fig. 84)—144; western—139, 146.
- Filix—32.
- Fir, alpine—6, 9, 37; Douglas—6, 15, 17, 37.
- Fire, forest—15, 17.
- Fireberry hawthorn—96.
- Fireweed, (fig. 54)—15, 17, 108; broad-leaved—108, 109.
- Flax, blue (fig. 50)—102; family—101; Lewis—102.

- Fleabane, arctic (fig. 94)—165; aster (fig. 92)—162; bitter—162, 165; daisies—165; fernleaf—165; long-leaved—162; low—164; Oregon—162; pinnate—165; tall—162; threenerve—163; trailing—163.
- Flower, parts of (Pl. X)—152.
- Forest, climax—17; Douglas fir—6; Englemann spruce-alpine fir—6; fire—15, 17; lodgepole—17; lodgepole Douglas-fir—6; mixed—17; Ponderosa pine—6.
- Forget-me-not, alpine (fig. 75)—9, 12, 132; false—132; silverhaired—132.
- Four o'clock family—64; wild—64.
- Fragaria—91.
- Fraseria—123; showy (fig. 67)—123.
- Frenchweed—81.
- Frontier forest—9.
- Fumariaceae—78.
- Fumitory family—78.
- Gaillardia (fig. 95)—153, 166; common perennial—166.
- Galium—147, 148.
- Gaultheria—116.
- Gayfeather—151, 156, 177.
- Gayophytum—110.
- Gentian, annual—125; arctic (fig. 70)—123, 125; Bigelow—123, 125; blue marsh—123, 125; closed field—125; dwarf rose—123, 125; family—122; fragrant—123, 125; marsh—123, 125; moss—123, 124; one-flowered—123, 125; perennial fringed—125; Parry (fig. 69)—125; Rocky Mountain fringed (fig. 68)—123, 125; Rocky Mountain pleated—125; Romanzoff—125; rose—123, 125; star—123, 124.
- Gentiana—124, 125.
- Gentianaceae—122.
- Geraniaceae—101.
- Geranium—101; family—101; Fremont—101; Richardson (fig. 49)—101; wild pink (fig. 48)—6, 15, 101; wild white (fig. 49)—101.
- Geum—93.
- Gilia—128; pinnate-leaved—127, 128; sky-rocket—127; slenderleaf—128; spicate—127.
- Ginseng family—111.
- Globeflower (fig. 28)—69, 70; white—70.
- Globemallow, scarlet—105.
- Glossary—183.
- Glycyrrhiza—100.
- Gnaphalium—177.
- Gold buttons—155, 162.
- Gold cup—93.
- Gold-saxifrage—87.
- Gold-tongue—139, 143.
- Golden-aster—154, 168.
- Golden banner—15, 17, 98, 99.
- Golden eye—168.
- Golden smoke—78.
- Goldenglow—155, 175.
- Goldenrod—154, 174; dwarf—174; giant—175; Parry—154, 174.
- Goodyera—53.
- Gooseberry-currant—88.
- Gooseberry family—88; mountain—88; redshoot—88.
- Goosefoot, blite—63; family—62.
- Gramma grass (fig. 5)—20, 39; blue—39.
- Gramineae—38.
- Grass, grama—20, 39; family—38; see list—40.
- Grasses—15; swamp—15.
- Grindelia (Pl. XI c)—168.
- Gromwell, manyflower—132; narrowleaf—132.
- Grossulariaceae—88.
- Groundsel—169; arrowleaf—172; butterweed—172; Bigelow—156, 171, 172; broom—174; desert—174; Fendler—174; lambstongue—171, 174; saffron—174.
- Groundsels—154.
- Groundsmoke—110.
- Groundpine—36.
- Grouseberry—15, 17; black—118; dwarf—118; red—118.
- Gumweed—20; curlycup (Pl. XI c)—153, 168.
- Gyrostachys—53.
- Habenaria—53; northern green—53; satyr—53.
- Halerpestes—71.
- Haloragidaceae—111.
- Harbouria—112.
- Harebell, alpine—149; mountain (fig. 88)—149; Parry—149.
- Hawksbeard—156, 178; alpine—156, 178.
- Hawkweed, slender—156, 179; white—156, 179.
- Hawthorn, fireberry—96.
- Heath family—112; subfamily—115.
- Helianthella—155, 176; fivenerve—176.

- Helianthus—176.  
 Hemlock-parsley—112.  
 Heracleum (fig. 56)—112.  
 Hesperaster—107.  
 Heuchera (fig. 42)—87.  
 Hieracium—179.  
 Hippuris—111.  
 Hollyfern, mountain—34.  
 Hollygrape—78.  
 Hollyhock, wild—105.  
 Holodiscus—94.  
 Homalobus—100.  
 Honeysuckle, bearberry—148; family—148; involucred—6, 148.  
 Horsemint (fig. 80)—137.  
 Horsetail family—35; smooth—36.  
 Horseweed—179.  
 Huckleberry family—118.  
 Hudsonian (life zone)—5.  
 Hydrangea family—88.  
 Hydrangeaceae—88.  
 Hydrocharitaceae—38.  
 Hydrophyllaceae—130.  
 Hydrophyllum—130.  
 Hypericaceae—105.  
 Hypericum—105.  
 Ibidium—53.  
 Illebraceae—65.  
 Indian-hemp—126.  
 Indian Paintbrush (fig. 82).—140.  
 Indianpipe subfamily—117.  
 Iridaceae—51.  
 Iris—51; family—51; Rocky Mountain (fig. 13)—51.  
 Iva—179.  
 Jacobs ladder (fig. 73)—127, 129.  
 Jamesia—15, 88.  
 Juncaceae—44.  
 Juncaginaceae—38.  
 Juncoides—44.  
 Juncus, see list—44.  
 Juniper—15; dwarf (fig. 2)—37; Rocky Mountain (Pl. II a)—6, 37.  
 Kalmia—116; bog (fig. 61)—116.  
 Kings crown (fig. 37)—83.  
 Kinnikinnic (fig. 60; Pl. V b)—6, 12, 15, 17, 116.  
 Kittenails—139, 145; alpine—146.  
 Knotweed—59, 60; dooryard—60.  
 Knotweeds—59.  
 Kunzia—94.  
 Labiatae—137.  
 Ladies-tresses—6; continental—53.  
 Lady Fern, alpine—32; common—34.  
 Ladyslipper, yellow (fig. 16)—51, 52; brownie—51, 53.  
 Ladysthumb, water—60.  
 Lambsquarters—63.  
 Lappula—132.  
 Larkspur—70, 75; Barbey—77; mountain—75; Nelson—75; subalpine (fig. 33)—77.  
 Leather-flower—73.  
 Leguminosae—98.  
 Lemna—44.  
 Lemnaceae—44.  
 Lepidium—82.  
 Leptasea—85.  
 Lesquerella—80, 81.  
 Leucocrinum—47.  
 Lewisia—65; least—65.  
 Liatris—151, 177.  
 Lichens—12; crustaceous—12; foliose—15; leafy—15.  
 Licorice, American—100.  
 Life zones—5, 6; in Rocky Mountain National Park—6; alpine (Pl. IV)—5, 9; arctic-alpine—5; Canadian 5; Hudsonian—5; montane (Pl. II)—5, 6, 15; Sonoran—5; subalpine (Pl. I a, VIII)—5, 6, 15; transition—5.  
 Ligusticum—112.  
 Liliaceae—44.  
 Lilium—47.  
 Lily family—44; alplily (fig. 10)—49; mariposa (fig. 6)—45, 46; sand—45, 47; snow (fig. 7)—45, 46; wand—45, 49; western orange cup—47; wood (fig. 9)—45, 47.  
 Limnobotrya—88.  
 Limnorchis—53.  
 Linaceae—101.  
 Linnaea (fig. 86)—148.  
 Linum—102.  
 Lipfern, Fendler—34.  
 Listera—53.  
 Lithophragma—88.  
 Lithospermum—132.  
 Little red elephant (fig. 85)—144.  
 Lloydia—45, 49.  
 Loasa family—107.  
 Loasaceae—107.  
 Localities, index to—201.

- Loco, Colorado—99; few-flowered—100; Rocky Mountain (fig. 47)—99, 100; whorled-leaf—99, 100.
- Lodgepole Pine (Pl. VI)—37; forest—17.
- Lomatogonium—124.
- Lonicera—148.
- Loosestrife, tufted—118, 121; water—121.
- Loranthaceae—57.
- Lousewort—138, 144; bracted—144; giant—144, 145; Parry—144, 145; purple—144.
- Lovage—112.
- Lupine—17; mountain—98, 99; small flowered—98, 99; stemless—99.
- Luzula—44.
- Lychnis—65, 67.
- Lycopodiaceae—36.
- Lycopodium—36.
- Lygodesmia—179.
- Lysiella—53.
- Machaeranthera (Pl. XI c; fig. 90)—158.
- Madder family—147.
- Mahonia—78; creeping (fig. 34)—78.
- Mallow family—105; modest—105; scarlet—105.
- Malvaceae—105.
- Maple family—103; Rocky Mountain—103.
- Marestalk—111.
- Mariposa-lily, (fig. 6)—45, 46; Gunnison—46.
- Marsh felwort—123, 124.
- Marsh-marigold—69; white (fig. 27)—9, 70.
- Marsh trefoil—126.
- Meadowrue—69; alpine—73; Fendler—73; few-flowered—73; veiny—73; western—73.
- Meadowsweet, false—94.
- Melanthaceae—44.
- Melilotus—99.
- Mentha—137.
- Mentzelia (fig. 52)—107; bractless—107; desert—107.
- Menyanthaceae—126.
- Menyanthes—126.
- Mertensia—131, 133; field (fig. 77)—133.
- Micranthes—87.
- Milkpink—179.
- Milkvetch—100; alpine—100; flexible—100; timber—100.
- Milkweed family—127; showy—127.
- Milkwort, white—102.
- Mimulus—143.
- Miners candle (fig. 78)—12, 131, 136.
- Mint, Canada—137; family—137; wild—137.
- Mistletoe (fig. 19)—58; family—57; lesser—57; Pine—57.
- Mitella—87.
- Mitrewort—85, 87; common—87; five-stamen—87.
- Moehringia—67.
- Moldavica—137.
- Monarda (fig. 80)—137.
- Moneses—114.
- Monkey flower, many-flowered—143; yellow—139, 143.
- Monkshood—70, 77; American—77; Columbia—77.
- Monolepis—63.
- Montane (life zone) (Pls. I b; II; VII)—5, 6, 15.
- Montia—65.
- Monument plant (fig. 67)—123.
- Morning-primrose, common—108, 111; fragrant (fig. 55)—108, 111; nuttal—108, 111.
- Moschatel family—149.
- Mosses—15.
- Mountain-ash (fig. 46)—6; Greenes—96.
- Mountain balm—104.
- Mountain-laurel, dwarf (fig. 61)—116.
- Mountain lover—12, 104.
- Mountain-sage—177; fringed—20, 156, 178.
- Mountain spray—94.
- Mousetail—70.
- Mullein—138, 146; flannel—146.
- Mustard family—78.
- mustard, tansy—82; tumble—82.
- Myosurus—70.
- Myriophyllum—111.
- Nabalus—179.
- Naiadaceae—38.
- Nailwort, James—65; Rocky Mountain—65.
- Naumbergia—121.
- Nettle, family—57; tall—57.
- Nightshade, black—138; cutleaf—138.
- Ninebark, mountain—94.
- Nomenclature—2, 3.
- Norta—82.
- Nuphar—69.
- Nuttallia—107.
- Nyctaginaceae—64.

- Nymphaceae—67.  
 Nymphaea—69.  
 Odostemon—78.  
 Oenothera—110.  
 Oleaster family—107.  
 Onagra—110.  
 Onagraceae—108.  
 Onion—45; nodding—45; Pikes Peak—45; purple—45; wild—45.  
 Onobrychis—100.  
 Ophrys—53.  
 Opulaster—94.  
 Opuntia (fig. 53)—107.  
 Orchid family—51; oneleaved—51.  
 Orchidaceae—51.  
 Oreobatus—96.  
 Oreobroma—65.  
 Oreocarya—136.  
 Oreoxis—112; alpine—112.  
 Orobanchaceae—146.  
 Orobanche—146.  
 Orthocarpus—143.  
 Owlclover, yellow—143.  
 Oxybaphus—64.  
 Oxypolis—112.  
 Oxyria (fig. 20)—60.  
 Oxytropis—99, 100.  
 Ozomelis—87.  
 Pachylophus—110.  
 Pachystima—104; myrtle—104.  
 Paintbrush—139; broad-leaved—142, 143; Indian (fig. 82)—140; narrow-leaved—142, 143; northern—142, 143; rosy—142, 143; short-flowered—142, 143; western—143; Wyoming—143; yellow (fig. 83)—142, 143; Yellowstone—143.  
 Papaveraceae—78.  
 Parnassia—87; fringed—6, 85, 87; Rocky Mountain—87; smallflower—87.  
 Parnassus, Grass of—87.  
 Paronychia—65.  
 Parrotfeather—111.  
 Parsley, alpine—112; hemlock—112; mountain—112; wild yellow—112.  
 Parsnip, cow (fig. 56)—112; family—111; Hercules—112.  
 Pasque flower (fig. 30), American—73.  
 Pea family—98; golden—99.  
 Pearl-everlasting—155, 177.  
 Pearlwort—65, 67; arctic—67.  
 Pectianthia—87.  
 Pedicularis—144, 145; alpine—144, 145; bracted—144; elephanthead (fig. 85)—144; Grays—145; meadow—144; sickle-top—144.  
 Pediocactus—107.  
 Pellaea—34.  
 Pennycress—80; blue—81; Fendler—81; field—81.  
 Penstemon—139, 140; clustered—140; dark—140; large clustered—140; low—140; oneside—140; sidebells—140; tall—6, 139, 140; tinybloom—140.  
 Penstemons—139.  
 Peppergrass—82.  
 Peranium—53.  
 Peritonia—82.  
 Persicaria—60.  
 Phacelia—130; glandular—130; silky (fig. 74)—131; varileaf—130.  
 Philotria—38.  
 Phleum—40.  
 Phlox—128; alpine (fig. 71)—127, 128; family—127; tufted—128.  
 Physocarpus—94.  
 Pigweed, rough—64.  
 Pinaceae—37.  
 Pincushion mountain cactus—107.  
 Pine—17; family—37; limber—6, 9, 37; lodgepole (Pl. VI)—6, 9, 15, 18, 37; Ponderosa (Pl. I b)—15, 37; seedlings of—15.  
 Pinedrops, woodland (fig. 62)—117.  
 Pink family—65; mountain—67.  
 Pink plumes—90, 93.  
 Pipsisewa (fig. 58)—6, 114.  
 Plant succession (Pl. V)—12, 15.  
 Plantaginaceae—146.  
 Plantago—147.  
 Plantain, common—147; family—146; rip-pleseed—147; Tweedy—147.  
 Pleurogyne—124.  
 Poa—40.  
 Podgrass, arrow—38.  
 Poison-ivy, western—103.  
 Polemoniaceae—127.  
 Polemonium—128; alpine (fig. 72)—127, 128; cream—129; honey—127, 129; leafy—127, 129; sticky—128; western—127, 129.  
 Polygala—102; family—102; white—102.  
 Polygalaceae—102.  
 Polygonaceae—59.

- Polygonum—60.  
 Polypodiaceae—31.  
 Polypodium—34.  
 Polypody, western—34.  
 Polystichum—34.  
 Pondlily, yellow—69.  
 Pondweed family—38.  
 Pondweeds—38.  
 Poplar, balsam—54.  
 Poppy, alpine—78; family—78.  
 Populus—53, 54.  
 Portulacaceae—64.  
 Potamogeton—38.  
 Potato family—138.  
 Potentilla—93.  
 Prenanthes—179.  
 Pricklypear, plains (fig. 53)—107.  
 Pricklepoppy—78.  
 Primrose, Colorado—118; fairy (fig. 63)—118; family—118; Parry (fig. 64)—118, 119.  
 Primula—118.  
 Primulaceae—118.  
 Princes pine (fig. 58)—114.  
 Prunella—138.  
 Prunus—97.  
 Pseudocymopterus—112.  
 Pteridium—32.  
 Pteris—32.  
 Pterospora (fig. 62)—117.  
 Puccoon, many-flowered—131, 132; narrow-leaved—131, 132.  
 Pulsatilla (fig. 30)—73.  
 Purple fringe (fig. 74)—131.  
 Purshia—94.  
 Purslane family—64.  
 Pusytoes—177; Rocky Mountain—177; showy—177.  
 Pussy willow—55; silver—55.  
 Pyrola—114; alpine—114; bog (fig. 59)—114, 115; green-flowered—114, 115; least—114, 115; one-flowered—114, 115; one-sided—6, 114, 115; star-flowered (fig. 57)—6, 114, 115; subfamily—114.  
 Pyrrocoma—153, 179.  
 Pyrus—96.  
 Rabbit brush—155; dwarf—176.  
 Ragwort—169; hoary—171, 173; orange—172, 174; rock—172, 174; toothed—171, 172; triangle-leaved—171, 172; western golden—172, 174.  
 Ragworts—154.  
 Rameschia—114.  
 Ranunculaceae—69.  
 Ranunculus—69, 71, 72.  
 Raspberry, boulder (fig. 45)—96; wild red—96.  
 Ratibida—179.  
 Rattlesnake-plantain—51; western 53.  
 Rattlesnake-root—156, 179.  
 Razoumowskya—58.  
 Red cedar, western (Pl. IIa)—6.  
 Rhamnaceae—104.  
 Rhodiola—83.  
 Rhus—103.  
 Ribes—88.  
 Rockbrake, American—34.  
 Rockcress—80.  
 Rockjasmine (fig. 65)—9, 118, 120.  
 Rockspirea, bush—94.  
 Rocky Mountain Herbarium—2.  
 Rocky Mountain juniper—37.  
 Roripa—82.  
 Rosa—96.  
 Rosaceae—89.  
 Rose crown (fig. 36)—6, 83.  
 Rose family—89; subfamily—90; wild—96.  
 Rubiaceae—147.  
 Rubus—96.  
 Rudbeckia—175.  
 Rumex—60.  
 Rush family—44.  
 Rushes, see list page—44.  
 Russianthistle—20; tumbling—63.  
 Rydbergia (fig. 97)—9, 12, 154, 168.  
 Sagebrush—178; big—178.  
 Sagina—67.  
 Sagittaria—38.  
 Sain-foin—100.  
 St. Johnswort family—105; southwestern—105.  
 Salicaceae—53.  
 Salix—54, 55, 56.  
 Salsify—179.  
 Salsola—63.  
 Sambucus (fig. 87)—149.  
 Sandlily (fig. 8)—45, 47.  
 Sandwort—66; alpine (fig. 25)—66; equal-stemmed—66; Fendler—66.  
 Sanicle—112.  
 Sanicula—112.  
 Sarsaparilla, wild—111.  
 Saxifraga—85.  
 Saxifragaceae—83.

- Saxifrage, brook—85, 87; diamondleaf—87; dotted (fig. 39)—83, 85; family—83; gold—87; goldbloom—85; nodding—83, 85; purple (fig. 41)—83, 87; snowball (fig. 40)—85; 87; weak-stemmed—85; whiplash—83, 85; yellow alpine (fig. 38)—83, 85.
- Scientific names—3.
- Scirpus—44.
- Scorpionweed—12, 130; sticky—130.
- Scouringrush, Brauns—36.
- Scouringrushes—35.
- Scrophularia—146.
- Scrophulariaceae—138.
- Scutellaria—137.
- Sedge family—43.
- Sedges—15, 43.
- Sedum—83; wormleaf—83.
- Seedlings—17; Englemann spruce—17; lodgepole pine—17.
- Selaginella—36.
- Selaginellaceae—36.
- Selfheal, common—138.
- Senecio—169–174; alpine—173; black-tipped—171, 175; dwarf (fig. 99)—171, 173; Fendler—172, 174; grass-leaved—172, 174; hoary—171, 173; nodding—156, 171, 172; thick-bracted—171, 173; turnip leaved—155, 171, 172.
- Seriocotheca—94.
- Serviceberry—96.
- Shadbush—96.
- Sheathflower—156, 179.
- Shepherdia—107.
- Shepherds purse—82.
- Shooting star (fig. 66)—6, 118, 121; dark-throat—121.
- Sibbaldia—90, 92.
- Sidalcea—105.
- Sidewalk weed—60.
- Sieversia—93; golden (fig. 44)—93; prairie-smoke—93.
- Silene—65, 67; moss (fig. 26)—67.
- Silverweed—94.
- Sisymbrium—82.
- Sisyrinchium (fig. 14)—51.
- Skeleton weed—179.
- Skullcap, Brittons (fig. 79)—137.
- Sky pilot (fig. 72)—128.
- Skyrocket gilia—127, 128.
- Smilacina—49, 50.
- Snake-root—112.
- Snowlily (fig. 7)—45, 46.
- Snowberry—149.
- Snowlover—139, 143.
- Solanaceae—138.
- Solanum—138.
- Solidago—175.
- Solomonplume—45, 50; starry—49.
- Sonchus—179.
- Sonoran (life zone)—5.
- Sophia—82.
- Sorbus (fig. 46)—96.
- Sorrel, alpine mountain (fig. 20)—60; sheep—60.
- Sow-thistle, spiny—179.
- Sparganiaceae—38.
- Sparganium—38.
- Spearmint—137.
- Specularia—150.
- Speedwell—146; American—146; purslane—146.
- Sphaeralcea—105.
- Spiderflower, bee—82.
- Spikemoss family—36.
- Spikemosses—36.
- Spikerush, few-flowered—44.
- Spikesedge, few-flowered—44.
- Spiranthes—51, 53.
- Spleenwort, maidenhair—34.
- Springbeauty, alpine—65; big-rooted (fig. 24)—65; lanceleaf—64; water—65.
- Spruce, Colorado blue (Pl. II b)—6, 37; Douglas—see Douglas fir; Englemann (Pl. VIII)—6, 9, 17, 37.
- Spurge—103; family—102.
- Squaw bush—103.
- Squaw-currant—6.
- Squawpaint (fig. 23)—63.
- Stachys—138.
- Staff tree family—104.
- Star-gentian—117, 188.
- Starwort, water—103.
- Starworts—67.
- Stellaria—67.
- Stickseed—20, 131, 132; tall—131, 132; western—132.
- Stoncrop family—83; yellow—83.
- Strawberry—90; wild—91.
- Streptopus—50.
- Subalpine (life zone) (Pl. I a, VIII)—5, 15.
- Succession, plant—12.
- Sulphur flower—12, 59, 60.
- Sumac family—103; skunkbush—103; three-leaf—103.

- Sumpweed—179.  
 Sunflower, annual—155, 176; aspen—176;  
   dwarf—155, 176.  
 Sunflowers—151.  
 Sweet cicely—112.  
 Sweetclover, white—98, 99; yellow—98, 99.  
 Swertia—123, 124.  
 Symphoricarpos—149.  
 Synthyris—145, 146.
- Tansy-aster (fig. 90; Pl. XI c)—20, 153, 158.  
 Tansy-mustard—82.  
 Taraxacum—178, 179.  
 Telesonix—87.  
 Tellima—88.  
 Tetraneuris—168.  
 Thalesia—146.  
 Thalictrum—73.  
 Thelypodium—82.  
 Thelypody—82.  
 Thermopsis—99.  
 Thimbleberry (fig. 45)—6, 15, 96.  
 Thistle—176; American—176; Canada—  
   176; Drummond—155, 176; Hooker—  
   176; purple—155, 176.  
 Thlaspi—80, 81.  
 Timber line (Pl. III, IX)—5, 6; altitude  
   of—3; irregularity of—3.  
 Timothy, alpine—40; mountain—40.  
 Tium—100.  
 Tonestus—154, 168.  
 Touterea—107.  
 Townsendia—158; stemless—158.  
 Toxicodendron—103.  
 Tragopogon—179.  
 Transition (life zone)—5.  
 Trifolium—99.  
 Triglochin—38.  
 Triodanis—150.  
 Trollius—70.  
 Troximom—178.  
 Tumblemustard—82.  
 Twayblade—51; heart-leaved—53; north-  
   ern—53.  
 Twinberry—6, 148.  
 Twinflower (fig. 86)—6, 148.  
 Twisted stalk (fig. 12)—45, 50; claspleaf—  
   50.  
 Typha—37.  
 Typhaceae—37.
- Umbelliferae—111.  
 Urtica—57.
- Urticaceae—57.  
 Vacciniaceae—118.  
 Vaccinium—118.  
 Vagnera—49, 50.  
 Valerian family—150.  
 Valeriana—150.  
 Valerianaceae—150.  
 Venus looking-glass—150.  
 Verbenna—136; bigbract—136; family—  
   136.  
 Verbenaceae—136.  
 Verbascum—146.  
 Veronica—139, 146; annual—146.  
 Vervain—136.  
 Vetch—99, 100; alpine—100; field—100;  
   limber—100; Parry—100; racemose—  
   100; sulphur—100.  
 Viburnum—149; mooseberry—149.  
 Viola—105, 106.  
 Violaceae—105.  
 Violet, arctic yellow—105; Cheyenne—106;  
   daisyleaf—105; family—105; hook—106;  
   meadow—106; Rydberg (fig. 51)—106;  
   subalpine blue—105; twinflower—105;  
   wanderer—106; white—106.  
 Viorna—73.  
 Virgins bower—72; western—72.
- Wahlbergella—67.  
 Wallflower—81; alpine—80, 81; western—  
   80, 81; Wheeler—80, 81.  
 Wandlily (fig. 11)—45, 49.  
 Washingtonia—112.  
 Water milfoil—111; family—111.  
 Water starwort—103; family—103.  
 Waterleaf family—130; Fendler—130.  
 Waterlily family—67.  
 Waterplantain family—38; American—38.  
 Waterweed family—38.  
 Wax flower—88.  
 Weeds—17.  
 Whitlow grass—81.  
 Whitlow-wort—65; family—65; James—65.  
 Whortleberry, grouse—118; myrtle—118.  
 Wild-chrysanthemum—168.  
 Willow—6, 15, 54; Bebb—55; cascade—56;  
   caudate-leaved—55; family—53; mono  
   piper—55; mountain—55; Nelsons—55;  
   pussy—55; rock—56; Scouler—55; silver  
   pussy—55; skyland—56; snow—56; sub-  
   alpine—55; whiplash—55.

- Willow herb—108, 109, 110.  
 Willows—54.  
 Willowweed, red—109.  
 Wind flower—75.  
 Wintergreen, aromatic—116; western—116.  
 Witches brooms (fig. 19)—58.  
 Wood lily (fig. 9)—45, 47.  
 Woodfern, mountain (fig. 4)—34.  
 Woodlandstar, slender—88.  
 Woodnymph (fig. 57)—114.  
 Woodsia, Rocky Mountain—34; Oregon—  
 34.
- Woodsias—34.  
 Wormwood—177.  
 Woundwort—138.  
 Wulfenia—146.  
 Wyoming, southern—2.
- Yarrow—153, 158.  
 Yellow-parsley, wild—112.
- Zone indicators—5.  
 Zones (see life zones)—5; climatic—3.  
 Zygadenus (fig. 11)—49.

# *Index to Localities*



- Baldpate Inn—17.  
Bear Lake—17, 34, 53, 55, 96, 108, 140, 159, 162, 177.  
Bear Lake Road—174.  
Beaver Point—55, 56, 105.  
Brinwood, the—49.  
Chasm Falls—121.  
Continental Divide (Pl. IIIb)—2.  
Cow Creek (foot of Twin Sisters)—71.  
Cub Creek—96.  
Cub Lake Trail—34, 49, 106.  
Deer Mountain—178.  
Devil's Gulch Road—51.  
Dream Lake—32, 34, 55.  
Emerald Lake—32.  
Estes Park—2, 20, 34, 47, 55, 64, 73, 81, 88, 93, 99, 111, 122, 146, 158, 164.  
Eagle Cliff—177.  
Fall River Pass—9, 56, 119.  
Fall River Road—177.  
Fall River Valley—5.  
Fern Lake—88.  
Fern Lake Trail—32, 54, 77.  
Flattop Mountain—9, 177.  
Glacier Basin—178.  
Glacier Gorge—34, 140.  
Grand Lake—55, 73, 99, 100, 106, 128, 178.  
Hagues Peak—145.  
Hidden Valley—5.  
Horseshoe Park—51, 55, 71, 94, 178.  
Kawuneeche Valley—106.  
Lake of Glass—32.  
Lawn Lake Trail—109.  
Loch Vale Trail—53.  
Longs Peak—9, 70, 99, 125, 128, 137.  
Longs Peak Inn—17.  
Longs Peak Road—51.  
Mill Creek—17, 96.  
Moraine Park—51, 96.  
Mount Copeland—71.  
Mount Evans—85.  
National Park Administration Building—100.  
Nymph Lake—53, 159.  
Pool, The—32.  
Poudre Lakes—56, 162.  
Prospect Canyon—96.  
Specimen Mountain—32, 47.  
South St. Vrain Road—17.  
Stanley Hotel Grounds—55.  
Trail Ridge—9, 32, 56, 67, 119, 145.  
Trail Ridge Road—5, 55.  
Twin Sisters—9, 71, 78.  
Twin Sisters Mountain—17, 46, 73, 109, 137.  
Twin Sisters Trail—99.  
Wild Basin—32, 47, 54, 55, 64, 104.  
Willow Park—162.





