while the basal leaves tend to be spatulate.

Cryptantha flavoculata Nelson; cordilleran; submontane; Iola, P&Ha 4128 (1951) COCO. Also a plant of the sagebrush zone, this species is confusable with C. Bakeri. But the corolla is yellow rather than white, and both throat and limb of the corolla protrude from the thyrse, giving quite a different appearance.

Cryptantha thyrsiflora (Greene) Payson; cordilleran; submontane; Parlin, E (1888) COLO. This species has the largest thyrse of the four thyrsoid cryptanthas, but the largeness of the thyrse is not the plant's most striking characteristic. The overwhelming impression is of the setose hairs which are in such profusion that the species seems more porcupine than plant.

Cryptantha Weberi Johnston; Coloradan; montane; Cochetopa Park, W 5778 (1950) COLO (ISOTYPE); Cathedral, S 62-55 RMBL. Here the thyrse is the slenderest, and the flowers are the whitest, of the four species. But the real diagnostic is to be found in the leaves, which are linear, whether basal or cauline.

The one in between

Cryptantha Jamesii (Torrey) Payson; cordilleran; submontane-montane; Almont, C 1136 (1960) RMBL; Hartman Rocks, B 118-65; Powderhorn, B&S 27-62. The class of the "one in between" is not evidence of the failure of the classes on either side, but a class in its own right, a class sui generis, insuring the usefulness of the other two classes while serving to distinguish the individuals included within itself. Thus C. Jamesii (which is a perennial like the thyrsoid cryptanthas, but a weedy-looking plant like the scorpioid annuals) flowers in a number of nondescript panicles neither thyrsoid nor scorpioid. It is probably the leafiest cryptantha in the Basin, its leaves being long and oblanceolate.

The scorpioid cryptanthas

Cryptantha Fendleri (Gray) Greene; cordilleran; submontane-montane; Sapinero, W 4848 (1949) COLO; Almont, B 200-52; Gold Basin Creek drainage, B 116-65 RMBL; Cathedral, B&S 319-62. This cryptantha is probably the most frequent in the Gunnison Basin. Like many annuals, it can be found flowering when only a couple of inches high, and again when a small bush nearly a foot high and a foot across. The flowers are very small, hardly more than an eighth of an inch long, and can always be found somewhere on the plant unrolling themselves in a small scorpioid raceme.

Cryptantha Watsonii (Gray) Greene; cordilleran; submontane; Gunnison, Be (1897) CS. In this annual cryptantha, the scorpioid racemes can be very short, and are apt to be at the ends of two short, forked branches. This forking characteristic is perhaps the most striking character of the plant.

Cynoglossum L., The Houndstongues

Cynoglossum officinale L.; adventive; montane; Smith Hill, Lo 7/9/61 RMBL; Slate River, S 66-155. This plant may be recognized, not by the large, elliptical leaves from which both the popular and the scientific names have been derived, but by its dark-red blossoms when in flower, and by the star-shaped calyces when in fruit. The two locations cited compose essentially a single station about three miles northwest of Crested Butte, and it is curious that the plant seems not to have spread from the spot where presumably it was introduced.

Eritrichium Schrader, The Alpine Forget-me-nots

Eritrichium elongatum (Rydberg) Wight; cordilleran; alpine; North Italian Mtn., L 444 (1949) COLO; Baldy Chato, B&S 271-62; Trallala Peak, B 239-65. Since the lowland forget-me-not is also a borage, the popular name of this alpine species is particularly appropriate and will, in fact, identify it to one who knows the blue-flowered lowland plant. There is no other alpine plant confusable with it.

Hackelia Opiz, The False Forget-me-nots

Hackelia floribunda (Lehmann) Johnston; cordilleran; montane-submontane; Gothic, B 129-52; Cathedral, B&S 310-62; Goose Creek, B&S 104-65; Sapinero, Wh 431 (1898) COLO. Here the popular name is not quite so appropriate, for although H. floribunda is equally a blue-flowered borage it is also a rather coarse-stemmed plant as much as two feet tall!

Hackelia leptophylla (Rydberg) Johnston; cordilleran; montane; Cochetopa Park, H 9073 (1959) CS. H. leptophylla is similar to H. floribunda, but the flowers and fruit clusters are so much smaller that there is really no need of confusion. Furthermore it is as infrequent in the Gunnison Basin as the other species is frequent.

Lappula Moench, The Stickseeds

Lappula Redowskii (Hornemann) Greene; cordilleran; submontane-montane; Cement Creek Valley, L 114 (1949) COLO; Ohio Creek Valley, B 104-66; Lake Fork Canyon, B 56-65; Cochetopa Pass, W 5777 (1950) COLO. Here is one of the scraggliest of native weeds, an invader of dry, waste places everywhere in its respective zones. An annual, it also has the habit of coming to flower whether a couple of inches or a couple of feet in height, and can closely resemble Cryptantha Fendleri. But a glance will show that L. Redowskii never has any racemes that are truly scorpioid. The plant's boraginaceous flowers can be blue or white.

Lappula echinata Gilibert; adventive; submontane; Parlin, W 9452 (1955) COLO. Also an annual, this plant stands to L. Redowskii as Hackelia leptophylla stands to H. floribunda. Its leaves and fruits are so conspicuously smaller than those of L. Redowskii that there is no need of confusion between the two species. Similarly, it is as infrequent as L. Redowskii is frequent. In fact this difference in frequency between these two species of the same genus is a beautiful example of the overwhelming superiority which in the Gunnison Basin the native plant enjoys in comparison with the adventive plant.

Lithospermum L., The Puccoons

Lithospermum incisum Lehmann; cordilleran; submontane; Sapinero, Wh 622 (1898) COLO; Willow Creek Mesa, B 51-65; Powderhorn, B 11-64. An infrequent plant in the Gunnison Basin, this species is easy to determine. The edges of its bright-yellow corollas are wavy, and the tube and throat of the flower can be an inch and a quarter long.

Lithospermum multiflorum Torrey; cordilleran; montane; Black Sage Pass, B 55-55; Razor Creek Valley, B&S 63-66; Cathedral, B&S 131-62; Elk Creek Valley, B 126-61 CS. This is the frequent puccoon of the Basin, with its numerous yellow flowers apparently never more than half an inch long. From its dried roots it emanates a mauve dye that penetrates adjacent herbarium sheets both above and below.

Lithospermum ruderale Douglas; cordilleran; montane; Soap Creek Valley, B 41-65 RMBL; Sapinero Guard Station, B 69-65 RMBL. Known only from what is essentially a single station on the western margin of the Gunnison Basin, this is one plant that may have migrated over the mesas from the west since the retreat of the last glaciation. The small yellow flowers and the fruits are nearly hidden in the axils of the leaves, and the species is unmistakable.

Mertensia Roth, The Mertensias

The tall mertensias

Mertensia ciliata (James) G. Don; cordilleran; montane-subalpine; Gothic, B 95b-57; Cathedral, B&S 209-62; Spring Creek, B&S 50-66. Of course, the division of the Gunnison Basin mertensias into tall and short can be relative only. Even so, M. ciliata is a tall plant, approaching in favored sites a height of two feet, and growing basal leaves eight inches in length and five in

diameter. It is also the most glabrous of the Gunnison Basin species, and in the opinion of many the most beautiful. Certainly, with its hanging clusters of blue flowers and the peculiar sheen of its gray-green leaves it is always the first collected. Whether in shade or in the open, it grows only in moist places.

Mertensia Bakeri Greene; cordilleran; montane-alpine; Conundrum Pass, B 46a-54 RMBL; Mt. Ouray, B&S 123-66; Cochetopa Park, B 81-55 RMBL; Cathedral, B 123-62; Pasture Creek Valley, B 83-65; Slumgullion Gulch, B 55-61. M. Bakeri has been so frequently confused with M. viridis that a series of characters in parallel columns will be given under the latter species. The two species have the same altitudinal range; but M. Bakeri is more tolerant of drought and hence more widely distributed. It is also more hostile to moisture. Nevertheless, southwest of Cathedral, under the blue-spruce and Douglas-fir forest of the escarpment of Dry Lake Park, the two species can be found growing together, M. viridis in large circular patches, scattered individuals of M. Bakeri on the fringes like hangers-on or poor relations.

Mertensia viridis Nelson; cordilleran; montane-alpine; Conundrum Pass, B 215-61 RMBL; Baldy Chato, B&S 479-62; Cathedral, B 122-62.

M. Bakeri	M. viridis
sepals conspicuous because of strigillose backs	sepals inconspicuous because of glabrous backs
flowers tending to dry purple, and the leaves brownish	flowers tending to dry blue, and the leaves greenish
leaves occasionally secund	leaves not occasionally secund
rootstocks inclined to be vertical	rootstocks inclined to be horizontal
style enlarged at base	style not enlarged at base

The short mertensias

Mertensia franciscana Heller; southwestern; montane-alpine; North Italian Mtn., L 3957 (1954) COLO; Goose Creek, B 99-65. The second station cited, a moist shady place in the lowermost montane zone, is more typical of this southwestern species than the first, a moist open place in the lowermost alpine zone. The plant may be told by its lanceolate leaves (the basal on long petioles), which are glabrous on the undersides, slightly strigillose above. The sepals have glabrous backs with short-ciliate margins.

Mertensia fusiformis Greene; cordilleran; montane-subalpine; Gothic, B 74-61 CS; Hot Springs Creek Valley, B 18-66; Powderhorn, B 23-65; Red Creek Valley, B 58-65 RMBL. Here is another mertensia with glabrous undersurfaces of the leaves and strigillose upper-surfaces. But interestingly enough, whereas in M. franciscana the hairs point toward the apices of the leaves, in M. fusiformis they point toward the sides. Nevertheless, the real diagnostic of the latter species is the long, fusiform (or spindle-shaped) root, which needs only to be seen to furnish positive identification.

Mertensia brevistyla Watson; cordilleran; submontane; Sapinero, Wh 448 (1898) COLO. Here the leaf surfaces, both top and bottom, are like those of M. fusiformis except for the fact that the strigillosity is two or three times as dense. The fusiform root is also lacking, and the anthers (if one wants to look) will be found almost entirely within the tube of the flower, that is, in the cylindrical portion below the widening that precedes the flaring of the corolla lobes.

Plagiobothrys Fischer & Meyer, The Popcorn Flowers

Plagiobothrys scopulorum (Greene) Johnston; cordilleran; montane-submontane; Gothic, B 29-55; Devil's Hole, B&S 150-62; Powderhorn, B&S 494-62; Sapinero, Wh 524 (1898) COLO; Washington Gulch, S 64-123. As is so often the case when a genus is represented by a

single species, this little annual is like no other plant in the Gunnison Basin and rather easily recognized. It branches low, taking on the habit of a miniature bush, and is always more conspicuous vegetatively than floristically. Its small, white, boraginaceous flowers are much like those of Cryptantha, and it is found in moist places.

CACTACEAE, The Cactus Family

Cactuses are difficult to convert into dried specimens, requiring special presses and special (although not difficult) techniques. As a result, and in spite of all intentions to the contrary, fewer collections of cactuses are made than of other plants. Thus information as to their frequency and distribution is meagre to say the least. But on the basis of what information there is, there appear to be three species in the Gunnison Basin, representing three different genera.

Echinocereus Engelmann, The Cylindrical Cactuses

Echinocereus coccineus Engelmann; southwestern; montane-submontane; Little Iron Mtn., B 89-64; Kezar Basin, S 65-36 RMBL. Not only is this the only cylindrical cactus thus far collected in the Gunnison Basin, but it is the only red-flowered cactus. Although occurring in the sagebrush desert, it seems to prefer the partial shade and greater moisture of more montane elevations.

Mamillaria Haworth, The Ball Cactuses

Mamillaria vivipara (Nuttall) Haworth; relict of the plains; submontane; Jack's Cabin Pass, B 111-61; Dry Lake Park, B 20-64. The flowers of this ball cactus are pink (or pale purple), and only about half the size of the red flowers of the preceding species. It prefers the sagebrush desert, but climbs to nearly 10,000 feet in open, brushy places.

Opuntia Miller, The Prickly Pears

Opuntia polyacantha Haworth; cordilleran; submontane; Gunnison, Ke 7/49 WS; Gold Basin Creek Valley, B 113-61. This is the hunger cactus of the Great Plains, and it seems to flourish in the drier, rockier parts of the sagebrush zone. It is apparently the only prickly pear to be found in the Gunnison Basin, and its bright-yellow flowers are equal in size to those of the red cylindrical cactus.

CALLITRICHACEAE, The Water Starwort Family

Callitriche L., The Water Starworts

Callitriche hermaphroditica L.; boreal; montane-subalpine; Gothic, W 9366 (1955) COLO; Peeler Lake, B 324-61; Fish Creek, B&S 557-62. Of the three species that have been collected in the Gunnison Basin, this is the only one that suggests the popular name of "starwort." Its paired leaves are all linear, all submerged, and grow in at least two vertical planes so that in the water each branch seems to be a long, vertical "star." As in the other species, the flowers (or fruits) are found in the axils of the leaves.

Callitriche heterophylla Pursh; widespread North American; montane; Crested Butte, H&M 7171 (1952) CS. In this species and the next, the leaves are of two kinds, broad and floating, linear and submerged. At the end of the season the latter may largely have disappeared, so that underneath the rosette of floating leaves long stems trail down without leaves, bearing the fruits in the former axils. In C. heterophylla, the fruits are rotund rather than cylindrical; in C. palustris, cylindrical rather than rotund.

Callitriche palustris L.; boreal; montane-subalpine; Gothic, L 444-48 COLO; The Craters, B&S 193-66. For differentiation, see the two preceding species.

CAMPANULACEAE, The Bellflower Family

Campanula L., The Bellflowers

Campanula Parryi Gray; cordilleran; montane-submontane; Gothic, L 328 (1949) COLO; Gunnison, B 199-61; Cathedral, S 62-38. Intermediate in height between the two other species of the Gunnison Basin, Parry's bellflower directs its solitary blossoms toward the sky.

Campanula rotundifolia L.; boreal; montane-alpine; Cochetopa Park, H 8985 (1959) CS; Spring Creek (north), Ke 7/20/49 WS; Avery Peak, L 366 (1949) COLO. This is the species of the legendary bluebells of Scotland, and is characterized by rotund basal leaves (which soon wither) and linear cauline leaves. Its blossoms, anything but solitary, are usually nodding.

Campanula uniflora L.; boreal; alpine; Mt. Belleview, B 55-57; Cumberland Pass, Sh 56-56 RMBL; Rough Creek Pass, B&S 621-62. This rare alpine plant also blooms solitarily, but its blossoms are much narrower than those of Parry's bellflower, and its low, sinuous stems barely get off the ground in its alpine habitat.

CAPPARIDACEAE, The Caper Family

Cleome L., The Beeplants

Cleome serrulata Pursh; cordilleran; montane-submontane; Pitkin, O 7/7/58 RMBL; Powderhorn, B 141-65 RMBL; Sapinero, Wh 609 (1898) COLO; Jack's Cabin, B 194-52. The Rocky Mountain beeplant is as widespread in the Gunnison Basin as in the Rocky Mountains. Conspicuous along the roadsides, it can be recognized by its dome of pink flowers with protruding stamens, by its trifoliate leaves, and later in the season, by its dangling pods. It is a vigorous annual.

Polanisia Rafinesque, The Clammy Weeds

Polanisia trachysperma Torrey & Gray; cordilleran; submontane; Gunnison, Sto (1952) WS. This plant is also a bushy, trifoliate annual with prominent stamens. But the glandular, pea-like pods are erect, not dangling, and the white-flowered inflorescence is not particularly dome-like.

CAPRIFOLIACEAE, The Honeysuckle Family

Linnaea L., The Twinflower

Linnaea borealis L.; boreal; montane-subalpine; Mt. Whetstone, B 174-60; Pitkin, P 4504 (1955) COCO; Fish Creek Valley, B&S 337-62. Surely, the plant that was a favorite with Linnaeus and was named for him by Gronovius ought to be known to all students of botany. In the Gunnison Basin, it is a denizen of dryish, lightly wooded habitats, having an especial fondness for lodgepole-pine forest. There, its runners, with their small opposite leaves, criss-cross various portions of the forest floor and, at intervals, send up the peduncles that bear the pair of nodding pink blossoms at the top.

Lonicera L., The Honeysuckles

Lonicera involucrata (Richardson) Banks; boreal; submontane-subalpine; Sapinero, Wh 602 (1898) COLO; Gothic, B 31-52; Marshall Pass, Fe (1902) COLO; Fish Creek, B&S 73-62; Henson Creek, B 46-61. No shrub in the Gunnison Basin is more distinctive. The leaves are opposite, as in all the Caprifoliaceae, and at the ends of the branchlets peduncles arise from the paired leaf-axils. In its turn, each peduncle bears a pair of yellow flowers that emerge from a purplish involucre, or cup, which gives the plant its specific name.

Sambucus L., The Elders

Sambucus microbotrys Rydberg [S. pubens Michaux]; cordilleran; montane-submontane; Schofield Pass, B 56-52; Fish Creek, B&S 72-62; Lake City, B 58-61; Sapinero, Wh 531 (1898) COLO. Toward the end of the summer,

this shrub, with its clusters of bright-red berries, catches the eye of housewives and photographers as well as of botanists. But in the spring, the small mounds of white flowers at the ends of the branches are really less conspicuous than the leaves, which are compound, although still opposite.

Sambucus coerulea Rafinesque; cordilleran; montane; Taylor River, Ke (1949) WS. Similar to S. microbotrys both in habit and in habitat, this species nevertheless has narrower, almost willowlike leaflets, a flat-topped inflorescence, and blue, glaucous berries.

Symphoricarpos Duhamel, The Snowberries

Symphoricarpos oreophilus Gray; cordilleran; montane-submontane; Gothic, B 30a-54; Black Sage Pass, B 52-55; Doyleville, B 699-62; Beaver Creek (south), B&S 609-62; Sapinero, Wh 418 (1898) COLO. This vigorous shrub, widely distributed in the Gunnison Basin, has received half a dozen different names in the course of the years. But I am sure that a careful student of the genus would agree that in the Gunnison Basin it is represented by only one species, best known as S. oreophilus. The branchlets of this shrub bear small paired leaves, and at the ends of the branchlets occur the white to pink blossoms in pairs or in short racemes, and less than half an inch long.

CARYOPHYLLACEAE, The Pink Family

Arenaria L., The Sandworts or Arenarias

The open-country arenarias

Arenaria congesta Nuttall; cordilleran; submontane-subalpine; Gold Basin Creek drainage, B 6a-60; Quartz Creek Valley, B 91-60 RMBL; Gothic, Br 5325b (1957) RMBL; Emerald Lake, R 10050 (1959) CS. This is the only capitate, or headed, sandwort in the Gunnison Basin, and as such is unmistakable. Apparently most at home in the sagebrush country of the submontane zone, it is found in similar habitats as high as the subalpine zone.

Arenaria Fendleri Gray; cordilleran; submontane-alpine; Parlin, E (1889) COLO; Cochetopa Park, H 8986 (1959) CS; Cathedral, B&S 418-62; Alpine Plateau, B 119-61; Cumberland Pass, Sh 56-37 RMBL. A. Fendleri seems likewise to be most at home in the sagebrush country of the submontane zone; but it reaches the alpine zone in its climb upward, and is also somewhat more frequent. It is an open, brushy, cymose plant with leaves as fine as the finest grass, and although a foot or more high in the submontane zone, shrinks to a matter of a few inches in the alpine zone.

The woods arenarias

Arenaria lateriflora L.; boreal; montane; Slate River Valley, B 137-60 RMBL; Fish Canyon, B&S 394-62; North Beaver Creek (south), B&S 583-62. In the Gunnison Basin a delicate, reclining plant of moist shady places, this species may be recognized by its opposite elliptical leaves and small flowers at the end of capillary pedicels.

Arenaria macrophylla Hooker; boreal; subalpine; Ohio Peak, B 31-55; Castle Pass, B 72-59. The elliptical leaves of this similar species are acute rather than blunt, the flowers are larger, and the plant generally more robust. It seeks the shade of relatively dry spruce-fir forest in the subalpine zone, and is apparently limited to the West Elks section of the Gunnison Basin.

Arenaria saxosa Gray; southwestern; montane-subalpine; Bondholder Meadows, B&S 461-62; Alpine Counting Corrals, B 117-61; Quartz Campground, W 9150 (1955) COLO. This arenaria is frequent in the dry forests of the southern half of the Basin, the Quartz Campground station being an isolated station in the northern half. Spreading its stems out in a rosette from the central root, and displaying its wide petals to the sun, the plant can be recognized from horseback to be different from any other sandwort in the Gunnison Basin. Its pointed,

paired leaves are short but relatively wide, and the stems have the short pubescence of many dryland species.

The alpine arenarias

Arenaria macrantha (Rydberg) Nelson; Coloradan; alpine; Fossil Ridge, L 1361 (1951) COLO; Bald Mtn., L 3968 (1954) COLO; Cement Creek, W&L 9520 (1955) COLO. To be discussed with the next species.

Arenaria obtusiloba (Rydberg) Fernald; boreal; alpine; Ohio Peak, B 70-57; Cumberland Pass, B 103-57; Baldy Chato, B&S 274-62; Slumgullion Mesa, B 247-65. This and the above species are confusable in the field. Both are cushion plants, and both attract the eye of the collector by their large white blossoms spread over the mound of small green leaves. In the herbarium, many differences between the two species will be noted. But in the field it is sufficient to observe that A. macrantha is entirely glabrous, A. obtusiloba conspicuously glandular-pubescent. Curiously, whereas A. obtusiloba is widely distributed in the Basin, A. macrantha seems to be restricted to the northeastern quarter where, in addition to its alpine distribution, a relict population has been discovered in the montane zone.

Arenaria rubella (Wahlenberg) Smith; boreal; alpine; Ohio Peak, B 50-55; Alpine Pass, Fe (1905) COLO; Sawtooth Mtn., B&S 66-90; Lake City, B&S 247-62. This plant is glandular-pubescent like A. obtusifolia, but is utterly unconfusable with it. In the first place its petals, although as wide as those of A. obtusifolia, are shorter than the sepals and hence never displayed. In the second place, A. rubella is not a cushion plant but a tufted plant, that is, a plant of individual stems rising from a caudex. A relict population of A. rubella has also been collected in the montane zone, on a sandbar just west of Lake City.

Arenaria uliginosa Schleicher; boreal; alpine; North Italian Mtn., L 455 in part (1949) COLO. This rare alpine plant, known only from the above station in the Gunnison Basin (although from two other sites in Colorado), resembles the preceding species in its low habit and in

the fact that its petals are shorter than the sepals and hence not displayed. Nevertheless, the plant is glabrous, and hence as sharply distinguished from A. rubella as A. macrantha is from A. obtusiloba.

Cerastium L., The Mouse-ear Chickweeds

The alpine mouse-ear chickweeds

Cerastium arvense L.; boreal; alpine-montane; Cumberland Pass, B 39a-54; Gothic, B 34-59; Slumgullion Mesa, B 255-65; Mineral Mtn., B&S 531-62. With its notched white petals twice as large as the sepals and held as high as six inches above the ground, this species accounts for one of the chief displays of the upland herb community in the Gunnison Basin. Square yards at a time can be white with the blossoms.

Cerastium beeringianum Chamisso & Schlechtendal; boreal; alpine; Conundrum Pass, B 44-54, B 226-61; Mt. Belleview, B 55e-57; Uncompahgre Peak, S 66-113a. Whereas C. arvense is a singularly upright plant, this mouse-ear chickweed is a sprawler, seldom rising above three inches, and sometimes forming mats. Its white blossoms protrude far less beyond the calyx; and its paired, sessile leaves are lanceolate, if not triangular, while those of C. arvense are linear. It is also interesting to note that whereas C. arvense descends frequently to the montane zone, C. beeringianum seldom if ever leaves the alpine zone.

The lowland mouse-ear chickweeds

Cerastium nutans Rafinesque; widespread North American; montane; Beaver Creek (south), B&S 611-62. The paired lanceolate leaves of this plant are conspicuously sessile; but the distinctive character lies in the pedicels which go straight (and usually erect) for a distance and then nod at the base of the flower. The plant is glandular-viscid, and collects both plant débris and insects.

Cerastium brachypodum (Engelmann) Robinson; wide-

spread North American; montane; Cochetopa Park, Jo 22 (1960) CS. Much resembling the preceding, this species is also an annual; but it is an inhabitant of moist open places, whereas C. nutans is a plant of moist shady places. Furthermore the pedicels of C. brachypodum are not only shorter, but more frequently reflexed.

Cerastium vulgatum L.; adventive; montane-submontane; Glacier, S 65-118 RMBL; Gunnison, B 67-60; Lujan Creek Valley, H 9044 (1959) CS. This plant, naturalized from Europe, is a biennial or short-lived perennial, and makes more of an impression vegetatively than florally. In fact, since the petals are a bit shorter than the sepals, it makes no floral display at all, and with its predilection for moist places is a rather retiring weed in the Gunnison Basin. The cymose inflorescence is loose and open, with the flowers in small clusters on rather long peduncles.

Lychnis L., The Lychnises

Usually, the local botanist has to guard against parochialism and must continually remind himself that the part is not equal to the whole. But sometimes it works the other way, and the whole fails miserably to account for the part. Thus in most keys, Lychnis is separated from Silene by its tendency to have five styles, Silene from Lychnis by its tendency to have three styles. At the same time it is commonly deplored that Lychnis Drummondii more resembles a silene than a lychnis and is difficult to separate from Silene Scouleri.* But in the Gunnison Basin one never has to count styles to separate the two genera, the silenes all looking of a piece, and the lychnises likewise. Furthermore Lychnis Drummondii is distinguishable from Silene Scouleri by a number of other characters including a total difference in habitat.

Lychnis alba Miller; adventive; montane-submontane;

* Cf. Hitchcock & Cronquist, Vascular Plants of the Pacific Northwest, Seattle, 1964, 2, 273; Weber, W.A., Rocky Mountain Flora, Boulder 1967, 90.

Glacier, B 253-61; Gunnison, Ke 7/18/49 WS. A rather coarse, pubescent weed a foot or more in height, the evening lychnis, as it is called, displays its notched, white petals at nightfall, when it catches the eye of moth and of passing botanist alike.

Lychnis apetala L.; boreal; alpine; Teocalli Mtn., L 901 (1950) COLO; Conundrum Pass, B 47-54; North Italian Mtn., B 78a-54. This species is confusable with L. Kingii, and will be discussed with it.

Lychnis Drummondii (Hooker) Watson; cordilleran; subalpine-alpine; Gothic Natural Area, B 278-61; Dorchester Pass, B 12-67; Alpine Tunnel, Hs 8/18/05 COLO. This species has been confused with Silene Scouleri, and will be discussed with it.

Lychnis Kingii (Watson) Rydberg; cordilleran; alpine; Ohio Peak, W&B 9206 (1955) COLO; Mt. Belleview, B 56b-57; Sawtooth Mtn., B&S 66-87; Carson Pass, B&S 267-65. In this species, the flowers are usually upright in anthesis (with the corolla protruding from the calyx), the flowering stems are conspicuously leafy, and the root tends to be vertical. In L. apetala, the flowers are usually nodding in anthesis (although upright and inflated in fruit), the corolla does not protrude from the calyx, the flowering stems are inconspicuously leafy, and the root tends to be horizontal.

Paronychia Adanson, The Whitlow Worts

This is a genus characterized by scarious stipules and bracts that look like hangnails. In fact, because the plant has so many appendages that look like hangnails, by the doctrine of signatures it was supposed to be good for ailments of the fingers (paronychias and whitlows), and thus received the name which Adanson formally gave it in the eighteenth century.

Paronychia sessiliflora Nuttall; cordilleran; submontane-alpine; Gunnison, Ke 7/18/49 WS; Cottonwood Pass, I 19181 (1961); Mt. Ouray, B&S 66-150; Cochetopa Park,

W 11062 (1960) COLO; Sun Creek Valley, B 179-65. As it grows on the arid floor of the Basin from Cochetopa Park to Sapinero, P. sessiliflora is recognizable by its low cushions of small green leaves amid which, in season, can be seen the diminutive yellow flowers. Dug up, the plant appears to be a small umbrella upon the top of its taproot or handle. Curiously, three or four thousand feet higher, a similar plant, long called P. pulvinata, presents much the same appearance except that there is a great increase of support structure underneath the umbrella and also a merging of umbrellas so as to form small carpets between the rocks. This was the situation until in his third Additions to the Flora of Colorado,* W. A. Weber reported that P. pulvinata grown in the greenhouse turned out to be P. sessiliflora! In other words, and in accordance with the theory of this flora, the long ambiguous "species" of the alpine zone turned out to be a mere phenotype of the well-known plant of the montane and submontane zones. Actually, the above-cited collection of Weber's from Cochetopa Park forms a perfect morphological transition, showing three inches of support structure between the taproot and the umbrella, or rather carpet, above.

Sagina L., The Pearlworts

Sagina saginoides (L.) Britton; boreal; subalpine-montane; Crested Butte, Li 8/13/37 COCO; Henson Creek, S 64-56 RMBL; Spring Creek, B 132-65. Although under a handlens the paired, linear leaves immediately suggest a member of the pink family, leaves and flowers are so small that the plant, on a wet, shady bank in the forest, must frequently pass for a moss. Not surprisingly, the plant is more easily recognizable when the last year's capsules rise a couple of millimeters above the tops of the sepals which the petals more often never reach.

* Boulder, Colorado, 1961, page 11.

Saponaria L., The Soapworts

Saponaria officinalis L.; adventive; submontane-montane; Gunnison, B 321-61. This plant, commonly known as Bouncing Bet, and appearing in the Gunnison Basin in its double-flowered form, is well established in divers places in the submontane and montane zones. I must confess that it was the double-flowered form of this plant that first made me perceive, in spite of the magnificent summer weather, that in driving geographically south to get to the Gunnison Basin I had travelled floristically north.

Silene L., The Campions

Silene acaulis L.; boreal; alpine; East Maroon Pass, C 1082 (1960) RMBL; Trallala Peak, B 236-65. This species forms small carpets rather than cushions in the alpine zone. With its innumerable small "pinks" elevated above the carpet, each on its own pedicel, it is one of the first noted and longest remembered of the Basin's alpine plants.

Silene Menziesii Hooker; cordilleran; montane-subalpine; Gothic, B 97-52; Cement Creek Valley, B 204-61; Mineral Creek Valley, B 150-65 RMBL. This is a woods plant, growing to a height of only three or four inches in open, rocky places; to a height of six inches in the partial shade of aspens; and to a height of seven or eight inches in spruce forest. It has the small white flowers and relatively large green leaves of a typical woods plant.

Silene Scouleri Hooker; cordilleran; montane-alpine; Cathedral, B 172-66; Brush Creek Valley (south), B&S 646-62; North Italian Mtn., W&L 9277 (1955) COLO. A confusion between this species and Lychnis Drummondii is hard to understand in the Gunnison Basin since S. Scouleri is a plant of dry habitats, L. Drummondii a plant of moist habitats, even of streamsides! There are other differences also. The leaves of S. Scouleri

tend to be narrow, even linear; those of L. Drummondii are much broader, some of the deciduous basal leaves even being petioled and oblanceolate. Finally, if one wishes to dissect the flower, he will find that the capsule of S. Scouleri is distinctly stipitate, that of L. Drummondii barely so.

Stellaria L., The Chickweeds

Like the cerastiums, their closest of kin, the stellarias have deeply notched or divided petals. On the other hand, a striking difference between the two genera is that the capsule of the stellarias is short and straight, that of the cerastiums long and bent toward the top. Since the capsule is the largest and most persistent part of the flower, this makes a good differentia.

Stellaria irrigua Bunge; cordilleran; alpine; Mt. Belleview, B 171-60 COLO, CS. The collection of this plant on the very edge of the topographic Gunnison Basin (but a mile or two within the floristic Basin) not only solved a problem in Colorado botany but led to a search for the original plant that makes fascinating reading in that number of the Additions to the Flora of Colorado already referred to.* It took the help of Hultén of Sweden and of Porsild of Canada to locate the type in Leningrad and to establish the fact that the species is one and the same although the two known localities are as far apart as the Rocky Mountains of Colorado and the Altai Mountains of Siberia. The plant itself is an alpine about three and one-half inches high, with opposite, sessile, almost succulent leaves, and with deeply cleft petals which nevertheless are shorter than the sepals.

Stellaria Jamesiana Torrey; cordilleran; submontane-subalpine; Sapinero, Wh 538 (1898) COLO; Lake Fork Canyon, B&S 109-62; Goose Creek Valley, B 101-65; Ruby Mountains, B 35-55. Here the notched petals are

* Boulder, Col., 1961, pp. 12-15; see above, p. 72.

not included within the calyx but extend conspicuously beyond it. Nevertheless, the striking character of this plant is the horizontality of the disproportionately long and wide pairs of stemleaves. The stem itself is almost capillary, but the leaves can be a quarter of an inch wide and three inches long!

Stellaria longifolia Muhlenberg; boreal; montane; Lujan Creek Valley, H 9047 (1959) CS; Crested Butte, R 10396 (1959) CS. Less frequent than the next species (with which it can be confused), this plant has a more diffuse, less erect inflorescence, and its leaf edges are rough instead of smooth.

Stellaria longipes Goldie; boreal; submontane-alpine; Sapinero, Wh 412 (1898) COLO; Gothic, B 117-59; Alpine Pass, Fe (1905) COLO; Cathedral, B 19-64; Rough Creek Cirque, B&S 592-62. This is not only one of the most frequent and widespread of plants in the Gunnison Basin but one of the most adaptive. I have collected it in full flower in an open, rubber-boot bog; and again in full flower on the floor of a Douglas-fir and Colorado-spruce forest in the midst of an intense drought. The plant flowers at the height of nine inches or of one. But I think its most striking trait is its verticality. The paired leaves tend to grow upward like the branches of a Lombardy popular, and so do the branches of the inflorescence. In fact, as a sort of acme of verticality, the plant sometimes bears only a single flower at the top of a flowering stem.

Stellaria umbellata Turczaninow; cordilleran; montane-subalpine; Mt. Whetstone, B 179a-60; Slate River, B 109-61; Schofield Pass, B 170-60 CS. This is a woods plant, ranging in its choice of habitat from lodgepole-pine forest to spruce-fir. It can be told by its umbellate inflorescence if it is remembered that the umbel is not that of the parsley family but an asymmetrical group of peduncles and pedicels gathered together at the top of the flowering stem.

CELASTRACEAE, The Bittersweet Family

Pachystima Rafinesque, The Boxleafs

Pachystima Myrsinites (Pursh) Rafinesque; cordilleran; montane; Gothic, B 43-52; Mt. Whetstone, B 61-61; Signal Peak Ridge, B 17-61; Iron Mtn., B 137-65. When a family in a given area is represented by a single species, it should not be surprising that sometimes identification is almost absurdly easy. The roots of this small shrub are yellow, the leaves are like the leaves of the box, and the four petals of the minute blossoms are red.

CHENOPODIACEAE, The Goosefoot Family

Atriplex L., The Saltbushes

It is interesting that with the exception of A. hortensis, the garden orache, the four species listed here are the four species listed in St. John's well-known flora of the Palouse region.* It is also interesting that A. confertifolia, the saltbush par excellence of the Great Basin proper, occurs neither in the Palouse region nor in the Gunnison Basin. True, these facts may be just oddities; but at least they furnish another parallel between the Gunnison Basin and the northern Great Basin,** and cannot help attracting the notice of the plant geographer.

Atriplex canescens (Pursh) Nuttall; cordilleran; montane; Little Iron Mtn., W 7/30/64 COLO; B 65-64 (= W 7/30/64). Since the four-wing saltbush is well known to be tolerant both of saline and nonsaline soils, it is not surprising that the only known station for the plant in the Gunnison Basin should be in nonsaline soil. But it may be of interest that the two Iron Mountains, near Powderhorn, compose the most heavily mineralized

* St. John, Harold, Flora of Southeastern Washington and of Adjacent Idaho, 3rd edition, Escondido, California, 1963.

** See above, p. 46.

region of the Basin. The plant is known to grow immediately south and west of the Basin, and is easily identified by the four wings of its fruits.

Atriplex hortensis L.; adventive; submontane; Gunnison, B 290-61. The garden orache, which is occasionally found along a fence in Gunnison, may be only an escape from a Mexican vegetable garden. It may be recognized by its leaves, which are like obtuse isosceles triangles and relatively large.

Atriplex patula L.; boreal; submontane; Cebolla Hot Springs, B&S 672-62. Cebolla Hot Springs, near Powderhorn, is the only saline region of any extent in the Gunnison Basin, and hence is the only known station for a number of halophytes. A. patula is one of them, and may be known by its smallish hastate leaves and very narrow, cylindrical spikes of fruits.

Atriplex truncata (Torrey) Gray; cordilleran; submontane; Cebolla Hot Springs, B&S 671-62. This atriplex with its pink stems and small oblong leaves is easily separated from A. patula. The two bracts of its fruits are something like the cup of an acorn, rounded at the stem-end, and scalloped on the sides and bottom. The two bracts of A. patula are hastate like the leaves, often broadly so.

Atriplex rosea L.; adventive; submontane; Cebolla Hot Springs, B&S 668-62, B 165-64. This introduced atriplex is well established in the Powderhorn Valley near the hot springs, and may be told by its largish, crenulate leaves and short spikes which are occasionally roseate.

Chenopodium L., The Chenopods

The native chenopods (all annual)

Chenopodium capitatum (L.) Ascherson; boreal; montane; Gold Creek, B 156-60 CS; Beaver Creek (south), B&S 614-62; Fish Creek Valley, B&S 413-62. With its

heavy spikes of large, deep-red glomerules, this is surely one of the most recognizable species in the Gunnison Basin. The leaves are broadly triangular.

Chenopodium Overi Aellen; cordilleran; montane; Gothic, B 161-60 RMBL; Razor Creek Park, B&S 69a-66; Fish Creek Valley, B&S 342-62. In this species, which has been confused with the preceding, the glomerules are neither heavy nor large nor red, while the leaves are more narrowly triangular. With respect to color, the small glomerules remain green until darkened by the maturation of the fruits.

Chenopodium Fremontii Watson; cordilleran; montane-submontane; Gothic, L 1455 (1951) COLO; Gunnison, B 152-61; Cathedral, B&S 437-62. Widely distributed in the Gunnison Basin, this grayish-green herb has an unusual leaf. The top is rounded like a bell curve, but the bottom slopes to its petiole. Between the bell-curve top and the wedgelike bottom there is usually a tooth, whether large or small, on either side. The plant is commonly found in the shade of cottonwoods or of montane conifers.

Chenopodium leptophyllum (Moquin-Tandon) Watson; cordilleran; submontane-montane; Parlin, W 9446 (1955) COLO; Cathedral, B 164-64. If the preceding species has the broad leaf of a shade-loving plant, this species has the narrow leaf of a sun-loving plant. It sends out numerous branches from the base (which never quite catch up to the central axis), and both branches and axis bear the countless small spikes of gray flowers which, later, contain the solitary dark fruits. The mealy granules which characterize the genus and made the preceding species grayish-green make this plant scurfy.

The adventive chenopods (both annual)

Chenopodium album L.; adventive; submontane-montane; Gunnison, Ke 7/17/49 WS; Meridian Lake, Ka&C 1088 (1964) RMBL; Cathedral, S 65-154 RMBL. The common pigweed of farmyards and vegetable gardens, this plant ought to be known to most people. It is a plant with green stems, green leaves, and green flowers,

the leaves in the main being rhombic, but irregularly toothed or even entire. The tiny flowers are borne in small glomerules at the ends of the branches; and later in the summer, one should look at a flower with a lens and see the small pumpkinlike fruit resting within its five enclosing sepals.

Chenopodium glaucum L.; adventive; submontane-montane; Parlin, W 9447 (1955) COLO; Beaver Creek (south), B&S 615-62. This plant, in general appearance and size, is much like the preceding. But its small, oaklike leaves are surprisingly uniform--two or three centimeters long and regularly dentate on both sides. Here the calyx is unable to enclose the fruit which, besides resting horizontally, disconcertingly stands on edge. The habitat also is different, being composed of moist places, especially the margins of drying ponds.

Eurotia Adanson, The White Sages

Eurotia lanata (Pursh) Moquin-Tandon; cordilleran; submontane; Sapinero Mesa, B 16-67; Hierro, B&S 66-64; Gold Basin Creek Valley, B 57a-57 RMBL; Cochetopa Park, W 9428 (1955) COLO. This is a plant like no other in the Gunnison Basin. As many as two dozen grayish stems can be seen rising vertically from the branching top of a single taproot. And as if this were not striking enough, each flowering spike at the summit of each stem is set off by innumerable red anthers. The species is as intolerant of alkaline soil as is its ecological counterpart, Artemisia tridentata, the black sage, and I have never understood its infrequency in the Gunnison Basin where there is almost no alkaline soil and endless stretches of sagebrush. The plant is reputed to constitute an excellent winter browse.

Kochia Roth, The Summer Cypresses

Kochia scoparia (L.) Roth; adventive; submontane; Gunnison, B 291-61; Cebolla Hot Springs, B&S 673-62. What was pointed out with respect to the bittersweet

family* is equally true of a genus. If a genus in a particular region is represented by a single species only, then the species is apt to be unusually easy to identify. Such is the case with the summer cypress. It is a tall weedy plant characterized by the acute, linear bracts of the inflorescence, and by the acute, linear leaves of the plant as a whole, which gives the species a raggedy, tattered appearance.

Monolepis Schrader, The Poverty Weeds

Monolepis Nuttalliana (Schultes) Greene; cordilleran; montane-submontane; Gothic, R 10517 (1959) RMBL; Sapinero, W 7450 (1952) COLO; Cochetopa Park, Jo 16 (1960) CS; Cathedral, B&S 86-62. Here is another solitary representative in the Gunnison Basin of a chenopodiaceous genus. It is a low plant of disturbed soil where it bushes out like a small tumbleweed. It may be told by its halberd-shaped leaves and bracts.

Salsola L., The Russian Thistles

Salsola Kali L., adventive; submontane-montane; Biebel's Springs, B 187-60 RMBL; Parlin, W 9441 (1955) COLO; Cathedral, B&S 439-62. One of the most conspicuous weeds of western North America and perhaps the chief tumbleweed of the Great Plains, it would seem as if this species needs little description. Its threadlike leaves are sharp-pointed (as seen under a lens), and so are the bracts, which may be mistaken for sepals. Looked at from a distance, the plant seems to be made of wire, without a decent leaf to its name, forbidding to man and beast alike.

Sarcobatus Nees, The Greasewoods

Sarcobatus vermiculatus (Hooker) Torrey; cordilleran; montane; Madeira Siding, B 120-65 RMBL; Doyleville,

* See above, p. 76, and Plagiobothrys, pp. 61-62.

B&S 66-141. Long before the fruits with their curious collars below the two styles are evident on the pistillate plants, this species can be told by the white branches and twigs supporting the short linear leaves. The species is a deep-rooted, moisture-loving halophyte, and is infrequent in the Gunnison Basin. Neither of the two known stations supports a large population.

Suaeda Forsskål, The Sea Blites

Suaeda occidentalis Watson; cordilleran; montane; Cebolla Hot Springs, B&S 670-62, B 132-64. This is a plant with the habit, and something of the appearance, of Salsola Kali. But the leaves are very short (too short, one would think, for the metabolic work of the plant), and the chief impression is not of leaves but of branches and glomerules. The cucullate sepals are uneven, and the flower itself is asymmetrical.

COMPOSITAE, The Sunflower Family

In general, this flora assumes knowledge of the genera and families and goes on from there. And it would seem nowhere to be more justified than in the case of the composites. Everybody knows the genus of the asters, the goldenrods, or the thistles; let alone the family to which they belong. But in the case of the composites, as with the sedges and grasses to a greater degree, to enter the family is to be presented with a number of terms more or less restricted to the family. True, they can be looked up in the glossary at the end of the volume. But it does seem as if a few words of explanation might be helpful to some of the users of this book.

In the composites, the flowers are aggregated into a head which may be regarded as a much-condensed raceme, the bracts of the individual blossoms uniting to form a cup or involucre around the head. Called either bracts or phyllaries, these show a great deal of differentiation, and are of much use in separating the species.

As in the grasses and sedges, the individual flowers are usually called florets, and are of two kinds: tubular florets (such as compose the disk of the sunflower) and ray florets. The latter are often called simply rays, but sometimes ligules. Needless to say, the heads of the different species can be totally of one kind of floret or the other; but more commonly, they combine the two kinds, as in the sunflower. The individual florets can also be perfect, staminate, pistillate, or even vegetative. The floret has one last peculiarity called a pappus. For the corolla rests upon an achene and on the summit of the achene, surrounding the corolla, frequently appear vestiges of the former calyx--scales, bristles, plumes, which can sometimes be in two rows, sometimes only in one.

Achillea L., The Milfoils

Achillea Millefolium L.; boreal; submontane-alpine; Sapinero, Wh 586 (1898) COLO; Cathedral, B&S 215-62 RMBL; Cumberland Pass, O 7/7/58 RMBL; Scarp Ridge, B 58-54. It would seem that the common yarrow, which is widely distributed in North America, needs little description here. No plant could be more native to the Gunnison Basin, where it flourishes equally in exposed places in the alpine zone and in favored spots in the lowlands.

Agoseris Rafinesque, The Mountain Dandelions

Agoseris aurantiaca (Hooker) Greene; cordilleran; montane-alpine; Gothic, B 222-60; Powderhorn Park, B 59-64; Rough Creek Pass, B&S 656-62. This is the highest-ranging of the three Gunnison Basin species. Its rays are orange (drying to purple), and the phyllaries from the beginning are colored with purple. On a single plant, the glabrous, ribbed achenes can be seen on mature heads standing behind the phyllaries like miniature ninepins, while at the same time less mature heads are just coming into flower.

Agoseris glauca (Pursh) D. Dietrich; cordilleran; montane-submontane; Gothic, B 31a-54; Cathedral, B&S 552-62; Gunnison, B 153-61, 55-64. Intermediate in range, this is the largest of the three Gunnison Basin species. Its scapes can be twenty inches tall, and its heads nearly two inches in diameter. The rays are yellow, drying to a straw color, and the leaves and stems are glabrous.

Agoseris pumila (Nuttall) Rydberg; cordilleran; submontane; Soap Creek Valley, W 7443 (1952) COLO; Gold Basin Creek drainage, B 18-60; Vulcan, B 23-64. Restricted as it is to the sagebrush community, this is the lowest-ranging agoseris in the Gunnison Basin. It is also so subject to wilt that I regard it as the most difficult plant in the Basin to collect. In fact, on a warm June day, I could secure satisfactory specimens only by transferring the plant from the soil to the press in a single motion of the arm. Its leaves are narrow and laciniate, the beaks between the achene and the pappus are disproportionately long, and the yellow flowers take on a purplish tint when they fade. The plant has been regarded as a variety of A. glauca; but actually, it seems closer to A. aurantiaca.

Anaphalis D.C., The Pearly Everlastings

Anaphalis margaritacea (L.) Bentham & Hooker; boreal; submontane-subalpine; Sapinero, Wh 461 (1898) COLO; Big Soap Park, B&S 114-65 RMBL; Schofield Pass, B 306-61. Like its near relative, the European edelweiss, this plant is strongly rhizomatous, which enables it to be told from the gnaphaliums. Again, its woolly bicolored leaves are evenly distributed up and down the stem, which helps separate it from the antennarias. The species is essentially dioecious; but the chief character of the plant is given by the involucres of the heads, which are not green but pearly white and scarious.

Antennaria Gaertner, The Antennarias

The antennarias are notable for being strictly dioecious. In the Gunnison Basin, staminate as well as pistillate plants have been collected of all species with the exception of A. parvifolia.

Antennaria alpina (L.) Gaertner; boreal; alpine; Rustler's Gulch, B 313-61; Virginia Basin, Bro 7/31/60 RMBL; Cumberland Pass, Sh 56-46 RMBL. Forming mats and rising usually to less than an inch above the ground, this alpine species is immediately recognized by its blackish-green (and commonly pointed) scarious phyllaries.

Antennaria anaphaloides Rydberg; cordilleran; montane-subalpine; Little Soap Park, B 37-65; Gothic, Bro 7/18/60; Waunita Hot Springs, E (1888) COLO; Marshall Pass, B 129-60 RMBL. This antennaria much resembles Anaphalis margaritacea, and was well named by Rydberg. But the plant is not rhizomatous, the leaves are not bicolored, and the stems are not so equably leafy. Note the magenta stem bases.

Antennaria corymbosa E. Nelson; cordilleran; montane; Gothic Natural Area, La 33 (1950) COLO; Gothic, Sh 56-3. In the manuals, the dark spot at the base of the phyllaries is frequently used as the chief diagnostic of this species. Unfortunately, this spot fades with time; but there are other characters that separate the plant from A. rosea, the only species with which it is really confusable. The stemleaves of A. rosea are surprisingly uniform; those of A. corymbosa decrease in length from bottom to top. Again, the inflorescence of A. corymbosa is more truly corymbose; that of A. rosea is really only capitate-corymbose. Finally, the basal leaves of A. corymbosa are about a centimeter longer than those of A. rosea, and of a more greenish hue.

Antennaria dimorpha (Nuttall) Torrey & Gray; cordilleran; submontane; Soap Creek Valley, B 42-65 RMBL. This dimorphic species is surely one of the most easily

recognized in the Gunnison Basin. Both pistillate and staminate plants are low and squat, and both plants show the peculiar leaf base that looks like a small cocoon. But the pistillate heads are long and (until they open) tubular; the staminate heads are short and cup-shaped.

Antennaria formosa Greene [A. microphylla Rydberg]; cordilleran; montane-subalpine; Cathedral, B&S 554-62 RMBL; Dry Lake, B 92-64; Copper Creek Valley, L 829 (1950) CS; Marshall Pass, Fe (1902) CS. According to Rydberg's Flora of the Rocky Mountains and Adjacent Plains,* the chief differentiating characters of A. microphylla are the greenish phyllaries and the glandular hairiness of the inflorescence and upper stemleaves. But the ground leaves, also, are very small; and in the Dry Lake collection cited above (which must closely approximate Rydberg's plant), the pistillate flower stems are taller than the staminate. But Rydberg's name was preoccupied, and the next synonym is apparently A. formosa, which Rydberg recognized as representing a slightly larger form of the plant.

Now here is an interesting thing. The staminate Cathedral collection cited above (which comes from a station a thousand feet lower than the Dry Lake station) matches the TYPE of A. formosa in the Greene Herbarium down to the hairs with reddish crosswalls which no one has ever bothered to mention. Nay more. The TYPE also comes from the Gunnison Basin (or Watershed, as it was formerly called), and being a pistillate plant is taller than the staminate Cathedral collection by the expected amount.

Antennaria obovata E. Nelson; cordilleran; montane; West Pass, H 9004 (1959) CS. This antennaria has the corymbose habit and tall height of A. formosa, but the basal leaves are larger, not smaller, than the stemleaves, and the pubescence of the involucre and upper stemleaves is not glandular.

Antennaria parvifolia Nuttall; cordilleran; submon-

* N.Y., 1917, pp. 916-919.

tane-subalpine; Soap Creek Campground, S 64-112 RMBL; Fish Canyon Flats, B 31a-66; Gothic, Bro 7/17/60; Emerald Lake, R 10052 (1959) CS. The chief differentiating character of this species is the disproportionately large, capitate-corymbiform inflorescence. It is possible to find an inflorescence an inch and a quarter in diameter elevated on a stem of no more than equal height. Inflorescences are found even larger than this; but the plants are always low, seldom more than four inches high.

Antennaria rosea Greene; cordilleran; submontane-alpine; Gunnison, B 185-61; Mineral Creek Valley, B 34-65; Cochetopa Pass, Ra&Ga 16916 (1939) COLO; Virginia Col, K 1286 (1948) DBG. This is the most frequent and widespread antennaria in the Gunnison Basin. On account of its bright, red or pink inflorescences, it is also the most collected. But white forms occur, and in the Mineral Creek collection cited above, white staminate, pink staminate, and white pistillate plants composed equal elements in a large population.

Antennaria rosulata Rydberg; southwestern; submontane-montane; Cochetopa Park, B 27-57 RMBL; Buck Meadow, B 145-61; Dry Lake Park, B 96-65. Known only from Saguache and Hinsdale Counties, this is nevertheless one of the handsomest antennarias in the Gunnison Basin. It forms carpets over the dry soil, the bright, white heads giving a design to the carpet in an unforgettable manner. The inflorescence is glandular-hairy, as was the case with A. formosa, and many of the leaves are glandular in addition to their general hairiness.

Antennaria umbrinella Rydberg; cordilleran; alpine; East Maroon Pass, B 188-59 RMBL; Rustler's Gulch, B 315-61; Mineral Mtn., B&S 529-62 RMBL. The phyllaries of this species tend to be blackish-green and pointed as is the case with A. alpina. But here the similarity ends, for A. umbrinella lifts its corymbs two to four inches above the ground, and does not form mats in the manner of A. alpina.

Arnica L., The Arnicas

Arnica Chamissonis Lessing; cordilleran; submontane-montane; Soap Creek Campground, S 64-111; Cathedral, B&S 282-62; Parlin, B 108-60 RMBL; Crested Butte, B 151a-60 RMBL. A. Chamissonis is a strongly rhizomatous plant of riverbanks and moist meadows. Its stems are leafy with at least five pairs of leaves, and its terminal head matures first, then the next lower pair of heads, and so on. The rays are a bright yellow.

Arnica cordifolia Hooker; cordilleran; submontane-alpine; Sapinero, Wh 641 (1898) COLO; Gothic, B 66-52; Midway, B 15-64; Marshall Pass, B 29-66; Slumgullion Mesa, B 249-65. This is the most frequent and widespread of the Gunnison Basin arnicas, and may be told by its heart-shaped leaves, of which there are commonly only two pairs and never more than four. There is usually only one head to a flowering stem, although there may be several stems to a root.

Arnica latifolia Bongard; cordilleran; montane-subalpine; Gothic, B 22-54; Ohio Peak, B 50b-55; Marshall Pass, Fe (1902) CS. Although A. latifolia is as infrequent as A. cordifolia is frequent, the two have been confused. Yet they should not be. For although A. latifolia similarly bears but one head to a stem, and commonly has only two pairs of leaves, nevertheless these leaves are not heart-shaped, but rather, bluntly triangular. In any event, they are not lobed at the base, but truncate or even cuneate.

Arnica longifolia D.C.Eaton; cordilleran; alpine; Conundrum Pass, B 48-54. This plant is quickly recognized by its pairs of elongate, narrow leaves--as much as five inches long. It so happens that on a trip when I had camera but not collecting equipment I saw this plant in the Ruby Basin and was able to photograph it. So it is not restricted to the above station in the lower alpine approaches to Conundrum Pass. But apparently the plant is restricted to the Elk Mountains section of the Gunnison Basin. The plant has the habit of many arnicas of maturing the terminal head first and then successively the lower pairs of heads.

Arnica mollis Hooker; boreal; subalpine-alpine; Mill Creek (south), B&S 250-62 RMBL; Schofield Pass, B 65-54; Queen Basin, B 68d-54; Rustler's Gulch, B 311-61. Although apparently confined to the upper two zones of the Gunnison Basin, A. mollis is frequent in these zones and variable, especially in leaf shape. For instance, its leaf may look like that of A. latifolia. But it has the flowering habit of A. Chamissonis and A. longifolia, not the monocephalic habit of A. cordifolia and A. latifolia. However, the character I use for this plant is found in the acuminate, darkened, often twisted tips of the phyllaries. It is interesting that above 12,000 feet the plant gives off the same resinous fragrance, and much resembles, A. mollis as it grows in Tuckerman's Ravine in the White Mountains of New Hampshire.

Arnica Rydbergii Greene; cordilleran; subalpine-alpine; Virginia Basin, Sh 56-82 RMBL; Spring Creek Valley (north), D 14690 (1963) RMBL; Cumberland Pass, B 40-54; Fossil Ridge, L 1367 (1951) COLO. It will be noted that this species has the same altitudinal range as the preceding. But a greater contrast could hardly be offered by two plants of the same genus. A. Rydbergii seems to have about half the size and vigor; its leaves are narrow and linear; and it is usually monocephalic. In any event, the collector will note that the tips of its phyllaries do not remotely resemble those of A. mollis.

Arnica Parryi Gray; cordilleran; subalpine-alpine; Lake Irwin, B 219-52; Queen Basin, S 64-213 RMBL; North Italian Mtn., L 925 (1950) COLO. Here is a last arnica apparently limited to the upper two zones of the Gunnison Basin. But in this case the differentiation is easy: A. Parryi has no rays! The paired leaves of the genus are there; even the familiar flowering habit of a more mature terminal head and some pairs of less mature lower heads. But the yellow rays are lacking and the plant is unmistakable.

Artemisia L., The Artemisias

The four sagebrushes

As far as I know, these four are the only artemisias in the Gunnison Basin called by the name of sagebrush. They are confusable, but would not be if A. tridentata were not the commonest plant in the Basin. Yet A. cana, which has the same general appearance, can be seen even from a passing automobile to have entire leaves; and as for the sagebrushes with tridentate leaves, if A. tridentata is regarded as central, then a gap of many characters separates it from A. Rothrockii on the one hand, and from A. nova on the other. Thus in the collections of the author cited below, which were similarly collected and occupy the same proportion of paper on the herbarium sheet, A. nova has around 55 flowering stalks (with a dozen left over from the year before), A. tridentata has around 20, and A. Rothrockii only 7.

Artemisia cana Pursh; cordilleran; montane; Soldiers Park, B&S 66-39; Waunita Pass, B&S 66-142. This sagebrush, separated from A. tridentata by its entire leaves, occupies moister sites, and will frequently be found clothing the bottom of a dry gully while A. tridentata covers both of the sides.

Artemisia nova Nelson; cordilleran; submontane; Gunnison, W 9327 (1955) COLO; Sapinero Mesa, B 17-67. A good common name for this sagebrush would be "minute," for that describes both the leaves and the heads of this low shrub.

Artemisia tridentata Nuttall; cordilleran; submontane-alpine; Gothic, W 9485 (1955) COLO; Gunnison, W 9328 (1955) COLO; Powderhorn, B&S 648-62. This is the common sagebrush of the West and the norm, inevitably, by which the other sagebrushes are judged.

Artemisia Rothrockii Gray; cordilleran; montane; Gothic, B 235-52; Crested Butte, P 4759 (1956) COCO. Here the flowering stalks are more truly spicate (paniculate in A. tridentata, racemose in A. nova), and

the heads are twice the size of those of A. tridentata.

Three alpine artemisias

These three artemisias make their home in the alpine zone although the second of them is also found in the subalpine zone, and the third in the montane zone as well.

Artemisia Michauxiana Besser; cordilleran; alpine; Baldy Chato, B&S 482-62 RMBL. This is the only known station for the plant in the Gunnison Basin; elevation around 12,700 feet.

Artemisia scopulorum Gray; cordilleran; alpine-subalpine; North Italian Mtn., W&L 9309 (1955) COLO; Copper Lake, B 37h-55; Slumgullion Mesa, B 261-65. Both this plant and A. Michauxiana have finely dissected leaves, but in A. scopulorum they are concentrated at the base with only a few on the flowering stems; in A. Michauxiana they are, if anything, more profuse on the flowering stems than at the base. Furthermore the heads of A. scopulorum have a stylish dark edging to their phyllaries, and are twice the size of those of A. Michauxiana.

Artemisia borealis Pallas; boreal; alpine-montane; Dorchester Pass, B 35-54; Cathedral, B&S 417-62. This artemisia is characterized by the pubescence of the whole plant, and by the redness of the vertical stems and tips of the disk corollas. Even the partial shade of ponderosa pines cannot eradicate this redness.

Two wasteland artemisias

Artemisia canadensis Michaux; boreal; montane; Cathedral, S 62-61, B 19-67. Phylogenetically, this artemisia is related to the last, but is not confusable with it. Its heads are only half as large, it is green rather than red, and it is but slightly pubescent. Furthermore it has a spreading rather than vertical habit, and in fact sends out conspicuous lateral rhizomes.

Artemisia frigida Willdenow; cordilleran; subalpine-

submontane; Mill Creek (south), B 143-61; Granite Basin, L 1531 (1951) COLO; Gunnison, Ke 7/20/49 WS. The fringed, or mountain, sage is a much more common wasteland plant than the Canadian sage, since it is tolerant of drought. It is a low, gray, aromatic plant with fringed leaves, and is known to nearly every one.

The ubiquitous artemisia

Artemisia ludoviciana Nuttall; cordilleran; alpine-submontane; Virginia Ridge, B 70e-54; Schofield Pass, B 65b-54; Capitol City, S 64-167; Almont, B 237-60 RMBL; Gunnison, W 9459 (1955) COLO. Although occasionally called the prairie sage, this plant is surely of cordilleran origins, and climbs as high as 12,400 feet in the Gunnison Basin. Yet it is also found in the neighborhood of Gunnison, and in fact everywhere in the Basin. It is infinitely variable, but somewhere, if only toward the base, there is usually present the characteristic leaf with two, often back-swept, large pinnae on either side of the rachis.

The four remaining artemisias

Artemisia Absinthium L.; adventive; subalpine; Wager Gulch, B&S 270-65 RMBL. This plant may be known by its triangular, dissected leaf unlike that of any other plant in the Gunnison Basin. The classical wormwood, and source of absinth, it is amazing that it should have been collected at all in the Gunnison Basin, let alone in company with Trisetum montanum amid luxuriant native vegetation in the subalpine zone of Wager Gulch.

Artemisia biennis Willdenow; cordilleran; montane-submontane; Crested Butte, B 298-61; Parlin, W 9450 (1955) COLO. A raggedy native weed that may be known by its leggy pink stems, A. biennis has very small heads and finely dissected leaves ending in sharp callous points.

Artemisia Carruthii Wood; southwestern; montane; Sargents, H&M 7140 (1952) CS. This species is much like A. ludoviciana, and may seem to be a diminutive

variant of it. But the edges of its delicate pinnate leaves are conspicuously revolute, outlining the white undersides, and giving the plant a distinctive appearance.

Artemisia Dracunculus L.; cordilleran; montane-submontane; Gothic, L 531-48 COLO; Horn Gulch, Ba 41 (1954) CS; Cathedral, B&S 502-62 RMBL; Sapinero, Wh 428 (1898) COLO. This plant might be called the grass artemisia since not only are its leaves grasslike but its favorite habitat is among grasses. Yet nearly always, if one looks toward the bottom of the plant, he will find a tridentate leaf that is telltale of the species.

Aster L., The Asters

The subalpine aster

Aster Engelmannii (D.C.Eaton) Gray; cordilleran; subalpine; Schofield Pass, B 65d-54; Gothic Natural Area, B 67g-54. This is the aster most reminiscent in the Gunnison Basin of the tall, woods asters of eastern North America. The leaves, only cauline, decrease in size toward top and bottom, but in the middle they are large, green, thin, and slightly dentate. The fairly large heads have squarrose, herbaceous, fringed phyllaries.

The montane asters

Aster oregonus (Nuttall) Torrey & Gray; cordilleran; montane; Coal Creek Valley, P 4080 (1950) COCO; Slate River, B 155-60 CS, RMBL. This vigorous plant, a foot or two high, is easily one of the handsomest asters in the Gunnison Basin. The red stems are stout (and puberulent above), and the glabrous, lance-linear leaves are frequently also tinged with red. The heads, as much as an inch in diameter when their white or pink rays are spread, are striking, especially when the rays are immature and of a deep-rose color. The outer phyllaries are frequently as tall as the inner and entirely green. The plant appears in several manuals as A. Eatonii (Gray) Howell.

Aster foliaceus Lindley; cordilleran; montane-subalpine; Gothic, B 61-54 RMBL; Schofield Pass, B 197-60; Cathedral, S 62-68a. For a discussion of the variation of this species the reader is referred to pages 15 and 16 of the Introduction. The specific name comes, not from the leaves, but from the phyllaries, which are broad, blunt, and leaflike. Like A. oregonus, the stems show a tendency to redden, and the thin, red rhizomes are characteristic of the species. The leaves are glabrous, but extremely rough on the edges.

Aster glaucodes Blake; cordilleran; montane-submontane; Cement Mtn., B 66-54 RMBL; Meridian Lake, Ka&C 1106 (1964); Gateview, B&S 507-62 RMBL; Cochetopa Creek Canyon, B 197-66. The oblong, pale-green leaves of this plant are glabrous and net-veined and similar to those of no other aster in the Basin. Like the leaves of A. foliaceus, they too are rough on the edges, The phyllaries are as distinctive as the leaves. They are boat-shaped with a keel down the back, and are glabrous, with ciliate rather than rough edges. The species is found in dryish places.

Aster Bigelovii Gray; southwestern; montane-submontane; Taylor Park, B 40d-54; Smith Hill, B 269-61; Cathedral, B 691-62, B 692-62; Cochetopa Park, B 126-64. This is one of the most easily recognized plants in the Gunnison Basin. The rays are blue, the heads disproportionately large, and the glandular phyllaries conspicuous for their dark, bent-over tips. The species is variable in size and in the smoothness or pubescence of the foliage. In Cochetopa Park, the plant elsewhere nearly two feet high, shrinks to about five inches in height, and the small, green, glandular-pubescent leaves become hollylike.

Aster occidentalis (Nuttall) Torrey & Gray; cordilleran; montane-submontane; Cathedral, B 101-64; Cebolla Hot Springs, B 67-64; Gunnison, B 332-61; Jack's Cabin, B 216-60; Cement Creek, B 207-61. A. occidentalis is confusable with A. adscendens, and I know of no two plants where ecology and geography are of greater help to taxonomy. The standard morphologic distinction be-

tween the two species is that the phyllaries of A. occidentalis are only weakly graduated as to length and remain acute, while those of A. adscendens are strongly graduated and toward the base of the involucre tend to become obtuse. But the trouble with this morphology in the Gunnison Basin is that A. occidentalis, a much wider-ranging species of moist habitats, approaches A. ascendens in its phyllaries as it accommodates itself, if not to xeric, at least to median soil conditions. The discussion of the two species will be continued under A. adscendens.

The submontane asters

Aster adscendens Lindley; cordilleran; submontane; Blue Mesa, B 64c-54 RMBL; Gunnison, B 257-60 CS, B 288-61; Biebel's Springs, B 184-60 CS. A. adscendens seems to be a plant strictly of the submontane zone. True, the first collection cited above comes from 8,300 feet. But although at this station one can see the aspen groves in the distance against the cliffs of rhyolite, the plant was collected in the belt of sagebrush that is continuous over the summit of Blue Mesa. The plant's intolerance of moisture seems to restrict it to the company of sagebrush and juniper, and furnishes a criterion of great value in separating it from A. occidentalis. There is also a macroscopic morphologic difference that should be mentioned. Nearly always, in A. adscendens, there are two or three inches of flowering stem in which the leaves are remarkably uniform both as to length and linear shape. In fact, this uniformity frequently extends to the greatest uniformity of all, that of the leaves being secund along one side of the stem. Needless to say, none of this is true of A. occidentalis.

Aster commutatus (Torrey & Gray) Gray; cordilleran; submontane-montane; Gunnison, B 319-61; Parlin, P 4756 (1956) COCO; Powderhorn, B 135-64. This is a bushy, many-headed aster with white rays which grows to a height of twelve or fifteen inches. The leaves are linear, in the submontane zone often averaging only a centimeter in length, but reaching two or three centimeters in moist pastures of the montane zone. The

squarrose phyllaries are each armed with a sharp point.

Aster hesperius Gray; cordilleran; submontane; Parlin, P 4757 (1956) COCO. Like A. occidentalis, this aster is commonly found along irrigation ditches, and like that aster it grows to a height of a foot and a half or more. But whereas A. occidentalis has a few large heads and much stem (so that it is frequently taken for an erigeron), A. hesperius is distinctly "asterish," with many small heads and a great quantity of lance-linear leaves. The leaves and phyllaries are essentially glabrous, but ciliolate, and the cilia run in striking lines and columns down the stem from the leaf bases. The rays are a pale lilac-white.

Aster canescens Pursh; cordilleran; submontane; Blue Mesa, B 64b-54; Gold Basin Creek drainage, B 88a-57 RMBL; Sheep Gulch drainage, B 251-60 RMBL. A. canescens is confusable with A. Bigelovii; but fortunately their territories do not overlap. The line of demarcation between them is subtle but distinct, and in fact suggests soil conditions as well as the need of A. Bigelovii for greater rainfall. Morphologically, the two species are quite dissimilar. The narrow, linear leaves of A. canescens are gray-green (not green as in A. Bigelovii), the heads are small-sized, and the phyllaries are mostly colorless and chartaceous, only the small tips being green, and these not much bent over.

Aster coloradensis Gray; Coloradan; submontane; Cochetopa Park, B 79-55, B 89c-55 RMBL, B&S 509a-62. A. coloradensis is related to A. canescens and A. Bigelovii; but whereas those two species are annual (or at the most biennial) plants, A. coloradensis is low, caespitose, and perennial. Its hollylike leaves are pubescent and gray-green, the teeth being armed with sharp points, while the heads are large and handsome with rose-colored rays.

Aster pauciflorus Nuttall; cordilleran; submontane; Cebolla Hot Springs, B&S 498-62 RMBL. This aster has the narrowest leaves of any in the Basin; in fact many of them are threadlike, as if to match the thin rhizomes

which the plant sends out to the sides. The heads are few to a plant (whence the specific name), and the involucres and stem-summits are glandular. A halophyte, this plant is known from no other station in the Basin.

Aster arenosus (Heller) Blake; southwestern; submontane; Sapinero, Wh 498 (1898) COLO. With the possible exception of A. coloradensis in Cochetopa Park, this is the most desert-looking of the Gunnison Basin asters. Much of the plant is underground, and the small bushes that pop up here and there bear single, small, white-rayed heads at the ends of the stems. The linear leaves, about a centimeter long, are hispid-ciliate and reduced toward the summits of the stems.

Bahia Lagasca, The Wild Chrysanthemums

Bahia dissecta (Gray) Britton; cordilleran; montane; Roaring Judy Gulch, L 466 (1949) COLO; McIntyre Gulch, B 196-65; Cathedral, B 689-62 RMBL; Cochetopa Pass, B 75c-55. The highly dissected leaves of this yellow-rayed plant are ternately divided, while the plant itself grows to the height of a foot or two. It can be told by two oddities: its flowers have no pappus, and its phyllaries end in a peculiar tail-like appendage. It would seem to be a perfect example of a cordilleran plant of Sierra Madrean origins. For the species still exists in Chihuahua; and it evidently spread north to Wyoming, west across New Mexico and Arizona to the mountains of Southern California.

Balsamorrhiza Hooker, The Balsamroots

Balsamorrhiza sagittata (Pursh) Nuttall; cordilleran; submontane-montane; Sapinero, Wh 470 (1898) COLO; Soap Mesa, B 43-65 RMBL; Sapinero Guard Station, B 71-65 RMBL. This species, so characteristic of the northern Great Basin, occurs only on the western edge of the Gunnison Basin in what is essentially a single station, although situated partly in the submontane, partly in the montane, zone. Hence one wonders whether the

plant has just arrived from the west, or whether this is the last stand of a plant once more widely distributed in the Basin. This is the sort of speculative query that our general theory helps solve. For the species is not a cordilleran plant of Sierra Madrean origins like Bahia dissecta but a cordilleran plant of northern origins and the second possibility has the greater probability. The Soap Mesa station is probably the last site in the Gunnison Basin where the particular requirements of this species may be found, and it must be said that the plant is flourishing there. What these requirements may be would make an interesting object of inquiry. But here it can only be pointed out to the person seeking acquaintance with the plant that the single-headed peduncles and the petioles of the gray-green, arrow-shaped leaves rise a foot or two from the large perennial root, and that when the two-inch-wide golden heads are in full display there is surely no more striking plant in the Gunnison Basin.

Bidens L., The Beggarticks

Bidens tenuisecta Gray; cordilleran; submontane; Gunnison, Ke 7/49 WS, B 333-61. The leaves of this plant, like those of Bahia dissecta, are highly dissected, but pinnately so rather than ternately. One should also note the inner, hirsute phyllaries and the outer, more or less glabrous ones. But especially noticeable are the dark-brown, ribbed achenes, each surmounted by a pair of retrorsely barbed awns. No wonder that a popular name for the plant is Spanish needles.

Brickellia Elliott, The Tasselflowers

Brickellia grandiflora (Hooker) Nuttall; cordilleran; subalpine-submontane; Gothic Mtn., C 1196 (1960) RMBL; Cement Creek Valley, Ke 7/26/49 WS; Sargents, H&M 7142 (1952) CS; Fish Creek Valley, B&S 562-62 RMBL; Cathedral, B 690-62; Sapinero, Wh 935 (1898) COLO. With respect to the three zones in which it grows,

B. grandiflora seems to show a preference for the montane by a proportion of four to one. In that zone, the plant is commonly seen as a small bush in open, rocky places, its small heads, without rays and often in groups of three, hanging like so many tassels. The petiolate leaves are rather small, and triangular or hastate. The long, fusiform roots are extraordinary, if one can ever dig them up.

Carduus L., The Buck Thistles

Carduus nutans L.; adventive; submontane; Pine Creek, S 65-145 RMBL. The eye of the collector seeing this plant for the first time will be caught by the disproportionately large, cushionlike, nodding heads atop the slender stems. He will recognize it as a kind of thistle, but surely not a member of the genus Cirsium, which comprises our native thistles (and one or two European migrants). Certainly, there is no other plant like this in the Gunnison Basin.

Chaenactis DC., The Pincushion Plants

Chaenactis Douglasii (Hooker) Hooker & Arnott; cordilleran; submontane-alpine; Hartman Rocks, B 2-61; Cathedral, B&S 312-62; Engineer Pass, B 139-64; Jack's Cabin B 35d-57 RMBL; North Italian Mtn., S 64-235a; Mt. Belleview, B 173-60 CS. Here is one of the widest-ranging plants in the Gunnison Basin. It grows everywhere and at all altitudes if the place is open enough and the soil loose enough. An herbaceous perennial, the leaves are pinnatifid (or bipinnatifid), and the heads (the biggest one always at the summit of a central stem) look like top-shaped pincushions, if such a thing can be imagined. The linear phyllaries are not imbricated, and the heads are without rayflowers. The plant is so responsive to habitat that alpine forms can be found trailing as vines over a bank. But the taxonomic remarks given here will still hold, and should be enough to distinguish the species.

Chrysanthemum L., The Chrysanthemums

Chrysanthemum Balsamita L.; adventive; montane; Crested Butte cemetery, B 363-61. Like the cemeteries of many small Western towns, the Crested Butte cemetery, although never irrigated, has been fenced for the better part of a century and is, in fact, an artificially created natural area. Thus it is interesting to see this adventive plant and Rudbeckia montana, endemic to the particular region of Crested Butte, growing to equal size and with equal vigor. This is the rayless form of C. Balsamita (in fact the heads are very much like those of Artemisia), and hence it may not have been planted. The large, petioled basal leaves are the chief diagnostic of the species. They are elliptical, with crenulate margins, and the bottoms are slabbed off in a striking manner.

Chrysanthemum Leucanthemum L.; adventive; montane-submontane; Cement Creek Valley, B 209-61; Ohio City, W 9149 (1955) COLO; Gunnison, Ke 7/29/49 WS. The common daisy certainly needs no identifying remarks. The odd thing is that in the Gunnison Basin it should be as infrequent as it is.

Chrysopsis Nuttall, The Golden Asters

Chrysopsis villosa (Pursh) Nuttall; cordilleran; alpine-submontane; Queen Basin, B 68f-54; Los Pinos Pass, B 124-64; Gothic, B 36g-54; Almont, B 36-54; Lake Fork Canyon, B&S 120-62. This is an extremely widespread (and variable) species in the Gunnison Basin. But here the names, both popular and scientific, certainly help. For the plant does suggest an aster that unaccountably has produced golden rays, and it certainly is villous. Look, for instance, at the slender, acuminate, imbricated phyllaries. They could scarcely be more villous than they are. In general, the plant seems like a very small shrub, with many wiry stems, which bear the plant's numerous leaves and considerably fewer heads.

Chrysothamnus Nuttall, The Rabbitbrushes

The generic name Chrysothamnus means golden shrub, and in fact, if the plants are regarded as shrubby goldenrods, the impression they give will be pretty well conveyed. Indeed they look so much like shrubby goldenrods that many persons do not notice that the flowers are rayless, although most goldenrods have conspicuous rays.

Chrysothamnus depressus Nuttall; southwestern; submontane; Almont, B 352-61 CS, B 356-61. Curiously, this plant is the least goldenrod-looking of all the Gunnison Basin chrysothamnuses, the reason being that each inflorescence is spread out in a symmetrical umbellate cyme. This peculiarity by itself serves to characterize this small, woody shrub.

Chrysothamnus viscidiflorus (Hooker) Nuttall; cordilleran; montane-submontane; Cathedral, B 688-62 RMBL; Parlin, Ba 17 (1952) CS; Sapinero, Wh 561 (1898) COLO; Jack's Cabin, B 60c-54; Crested Butte, B 342-61. This species, too, has a dense cymose inflorescence, but no one would think it symmetrically umbellate, and besides, its phyllaries are not in strict vertical ranks, as are those of C. depressus. The leaves of C. viscidiflorus are more or less twisted, and it is probably the most prevalent chrysothamnus in the Gunnison Basin.

Chrysothamnus Vaseyi (Gray) Greene; cordilleran; submontane; Almont, B 354-61. This plant is something like C. viscidiflorus; but it is more woody below, and yet altogether more delicate in its inflorescence and foliaceous part. The phyllaries also have a more conspicuous green spot at their tip, and the achenes are glabrous. The plant is probably the least frequent of the Gunnison Basin species.

Chrysothamnus Parryi (Gray) Greene; cordilleran; montane-submontane; Crested Butte, B 59-54; Gunnison, B 329-61; Powderhorn, B&S 649-62; Summit Park, B&S 676-62; Dry Lake Park, B 678-62. Even from a passing automobile, the impression of this species is of an unusual verticality. The branches rise vertically, and the heads are in vertical, paniculate racemes. No other chrysothamnus in the Basin resembles it in this respect; and besides, the stems are white, or whitish.

Chrysothamnus nauseosus (Pallas) Britton; cordilleran; montane-submontane; Dry Lake Park, B 677-62 RMBL; Cochetopa Park, B 187-66; Gunnison, B 340-61. Even though the plant observer may think that the branches of this species are prevailingly vertical, he will note that a cymose, rounded inflorescence terminates each branch, with no leaves extending beyond to continue the vertical impression; and here the branches are green, or greenish. Furthermore the species seems to be limited to the southern half of the Basin.

Cirsium Hill, The Thistles

For the separation of species, the reader is referred to pages 49 and 50 of the Introduction.

Cirsium arvense (L.) Scopoli; adventive; submontane-montane; Gunnison, B 296-61 CS; Powderhorn, B&S 573-62 RMBL; Fish Creek, B&S 556-62 RMBL.

Cirsium Drummondii Torrey & Gray; cordilleran; submontane-montane; Gunnison, B 53-64; Cochetopa Creek, B 73-55; Cathedral, B&S 354-62; Gothic, Wi 10480 (1954).

Cirsium hesperium (Eastwood) Rydberg; Coloradan; alpine-subalpine; Mineral Mtn., B&S 532-62; Rough Creek Cirque, B&S 603-62; Mesa Seco, B 97-64; Wood Gulch, B 225-65; Trallala Peak, B 243-65; Long Branch Baldy Lake, B&S 112-66. As indicated by the collections cited, this species seems partial to the southern half of the Basin, where I have seen it descending to the upper montane zone, but never except on rockslides. This habitat makes the plant virtually impossible to collect with roots, since crowbar and pickax are not part of the collector's equipment in high places. Horses are so fond of the plant that I have heard it called the horses' ice cream cones.