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CONTRIBUTIONS TOWARD A
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ROSACEAE OF NEVADA

by
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The Rosaceae, or Rose Family, although not one of the largest plant families, is one of the most important to man, especially in the Temperate Zones, where a large part of the edible fruits which are available for use are those of members of this group. The Rose Family is also important because of the large number of ornamental shrubs and trees which it supplies to gardens and parks. The family is sometimes divided into a number of segregate families which differ from each other chiefly in fruit characters, but these are all linked closely together by uniformity of floral structure and vegetative features and I feel that it serves no good purpose to separate them. For the sake of convenience as well as for the reason of thus indicating its presumed evolutionary connections, the Rosaceae is best considered as a single family.

The members of the Rosaceae are most easily recognized by the flowers, which are usually perfect and regular, with 4 or 5 showy distinct petals. The petals, together with the 4 or 5 sepals and the usually numerous (20 or more) stamens, are borne on the margin of a disklike or cuplike receptacle. The leaves are usually alternate, with small or sometimes leafy stipules.

The fruits of the Rosaceae are exceedingly variable, the carpels either few or solitary or sometimes very numerous. The fruit itself may be a follicle (a dry pod splitting down one side, as in Spiraea and related genera), a dry indehiscent seedlike achene (as in Fragaria and Potentilla), a drupe (a stone-fruit with fleshy or leathery covering, as in plums and peaches), a hip (as in the genus Rosa, where the achenes are borne on the inside of the cuplike receptacle), or a pome (an apple-like fruit, in which the fleshy part is formed from enlarged tissues of the receptacle and stem). The styles are as many as the carpels, sometimes connate at base.

Plants of this family are various in aspect, some of them being herbaceous or shrubby and others forming large trees. The woody members are often thorny. There are in all more than 2,000 species, distributed among about 100 genera.

KEY TO GENERA

(Based upon plants in flowering condition)

1. Plants definitely shrubby or treelike, with woody stems; stems sometimes prostrate and matted 2
 2. Leaves opposite, entire, 15 m m. long or less; dense spinescent shrub with solitary apetalous flowers with 4 calyxlobes 10. Coleogyne
 2. Leaves alternate or apparently whorled; flowers usually numerous and petaliferous, but if solitary or apetalous then 5-parted 3
 3. Petals none; pistil 1, surrounded by a slender pedicel-like tube expanded near summit into a cuplike calyx which is soon deciduous; flowers solitary or in small fascicles 15. Cercocarpus

- 3. Petals present; receptacle and calyx not as above 4
 - 4. Calyx-lobes 5, alternating with an equal number of bractlets, so that the calyx appears 10-parted..... 5
 - 5. Leaves pinnately lobed, waxy-glandular; flowers white, solitary on long whitish peduncles; stamens about 10012. Fallugia
 - 5. Leaves pinnately compound, strigose; flowers bright yellow, solitary or in small cymes, the branchlets reddish-brown; stamens about 25 6. Potentilla
 - 4. Bractlets wanting, the calyx-lobes 5 6
 - 6. Leaves compound, with 3 or more definite leaflets..... 7
 - 7. Leaves 2 to 7 cm. long, bipinnate or the leaflets merely pinnatifid, the blades so dissected as to appear fernlike; flowers white, in terminal panicles3. Chamaebatiaria
 - 7. Leaves once pinnate or palmate, the leaflets tooth-ed..... 8
 - 8. Plants prickly or bristly, shrubby 9
 - 9. Leaves glabrous beneath or essentially so; ovary appearing inferior; petals pink, 1 to 2.5 cm. long 17. Rosa
 - 9. Leaves grayish- or whitish-tomentose beneath; ovary superior; petals white or pinkish, about 1 cm. long or less 16. Rubus
 - 8. Plants shrubby or tree-like, neither bristly nor prickly 19. Sorbus
 - 6. Leaves simple, sometimes deeply pinnatifid but if so not over 1.5 cm. long 10
 - 10. Leaves 1.5 cm. long or less, deeply pinnatifid, or cuneate and 3-lobed at apex; flowers solitary, nearly sessile, yellow or creamy white 11
 - 11. Stamens 20 to 25; pistils 1 or 2; petals 4 to 6 mm. long 14. Purshia
 - 11. Stamens about 60; pistils usually 5 to 10; petals 6 to 10 mm. long 13. Cowania

- 10. Leaves various in size, the margins entire or toothed but not deeply pinnatifid; nor trilobed at apex12
- 12. Leaves palmately veined and lobed13
 - 13. Petals white, 1.5 to 3 cm. long; plants bearing simple hairs and stalked glands16. Rubus
 - 13. Petals white or creamy, 0.5 cm. long or less; plants stellate-pubescent, eglandular ...1. Physocarpus
- 12. Leaves pinnately veined14
 - 14. Styles 1 only18. Prunus
 - 14. Styles 2 to 5, often united at base15
 - 15. Ovaries superior; pistils usually 5, distinct; stipules wanting16
 - 16. Stamens well exerted; plants silky, with matted prostrate stems, or nearly glabrous, but not glandular2. Spiraea
 - 16. Stamens scarcely exerted; leaves more or less beset with glandular atoms on the lower surface4. Holodiscus
 - 15. Ovary inferior, the 2 to 5 carpels fused; summit of the ovary surmounted by the more or less united styles; stipules present, often deciduous17
 - 17. Branches armed with stout axillary spines; winter-buds spherical or nearly so, glabrous and shining; calyx glabrous or essentially so, the lobes glandular-margined20. Crataegus
 - 17. Branches unarmed; winter-buds elongated, pointed, often dull and hairy; calyx pubescent or silky or, if glabrous, the lobes entire18
 - 18. Flowers solitary or in umbel-like corymbs of 2 to 5 flowers each; leaves entire or nearly so, narrow, 3 to 5 times as long as wide, sessile or essentially so; calyx-lobes obscurely

glandular-margined21. Peraphyllum

- 18. Flowers in racemes, these sometimes short and subcorymbose, and then bearing not more than 5 or 6 flowers; leaves usually not more than twice as long as broad, distinctly petiolate; calyx-lobes entire22. Amelanchier

1. Plants with herbaceous stems, the perennial rootstocks sometimes woody and long-persistent19

19. Leaves entire; stems woody, prostrate, matted, only the flowering stems erect and herbaceous..2. Spiraea

19. Leaves toothed, lobed or compound20

20. Leaves simple, palmately lobed ... 16. Rubus

20. Leaves compound21

21. Plants prickly or bristly, shrubby at maturity16. Rubus

21. Plants unarmed, definitely herbaceous22

22. Calyx without bractlets alternating with the lobes9. Purpusia

22. Calyx with 5 bractlets alternating with the lobes23

23. Plants spreading by long aerial stolons; leaves basal, trifoliate; flowering stems scapose; petals white5. Fragaria

23. Plants without aerial stolons or, if these are present, the leaves long-pinnate and the yellow flowers solitary; stems usually leafy24

24. Style forming an integral part of the pistil, not articulated at base nor deciduous from the achene; middle

- of style often with an abrupt bend or joint; style often plumose .
.....11. Gaum
- 24. Style articulated at base, deciduous from the achene, neither
plumose nor jointed near the middle25
- 25. Stamens 1026
 - 26. Petals white or pinkish; filaments flattened and
dilated at base8. Forketia
 - 26. Petals yellow; filaments not dilated
.....6. Potentilla
- 25. Stamens 20 or more numerous, or 5 or 15, never 10; fila-
ments narrow or filiform, never dilated27
 - 27. Stamens 528
 - 28. Style subterminal7. Ivesia
 - 28. Style lateral; leaves trifoliolate; petals
yellow6. Potentilla
 - 27. Stamens 15 or more numerous29
 - 29. Petals linear, yellow, 1.3 to 2 mm. long ...
.....7. Ivesia
 - 29. Petals spatulate or broader, white or yellow. 30
 - 30. Pistils 2 to 9; leaves pinnate, the basal
leaves with 12 to 35 crowded pairs of
leaflets7. Ivesia
 - 30. Pistils usually more numerous; leaves
pinnate or palmate, if pinnate with fewer
leaflets6. Potentilla

KEY TO GENERA

(Based upon plants in fruiting condition)

- 1. Plants definitely woody, shrubby or tree-like; stems sometimes
prostrate and matted2
 - 2. Leaves opposite, entire, 15 mm. long or less; dense spines-
cent shrub with solitary 4-parted flowers
.....10. Coleogyne
 - 2. Leaves alternate or apparently whorled; calyx-lobes usually
53

3. Styles much elongated and plumose in fruit; fruit an achene tipped by the style which is 3 to 9 cm. long4
4. Pistil 1, closely enveloped by a narrow cylindrical receptacle; leaves entire or toothed15. Cercocarpus
4. Pistils several or many (rarely 1 only), the receptacle or calyx-tube campanulate or hemispheric; leaves deeply pinnatifid.....5
5. Flowers nearly sessile; bractlets of the calyx none; branchlets chestnut-brown13. Cowania
5. Flowers on long peduncles; bractlets of the calyx 5, alternating with the lobes; young branchlets whitish.....12. Fallugia
3. Styles not elongate and plumose in fruit; fruit various6
6. Leaves compound, with 3 or more definite leaflets; flowers numerous in cymes or panicles or, if only one or two, then the stems prickly or the flowers distinctly pedicellate7
7. Leaves 2 to 7 cm. long, bipinnate or the leaflets merely pinnatifid, the blades so dissected as to appear fernlike; fruit a tough dehiscent pod about 5 mm. long3. Chamaebatiaria
7. Leaves once pinnate or palmate, the leaflets entire or toothed8
8. Fruit a dry achene; plant an unarmed shrub; calyx bracteolate6. Potentilla
8. Fruit fleshy; shrubs or trees; calyx not bracteolate9
9. Prickly or bristly shrubs10
10. Leaves glabrous beneath or essentially so; fruit an enlarged receptacle ("hip" enclosing numerous achenes17. Rosa
10. Leaves grayish- or whitish-tomentose beneath; fruit an aggregate of several juicy drupelets16. Rubus

9. Plants shrubby or tree-like, neither quickly nor
bristly19. Sorbus

6. Leaves simple, sometimes deeply pinnatifid but if so not over
1.5 cm. long.11

11. Leaves 1.5 cm. long or less, cuneate and 3-lobed at apex,
or deeply pinnatifid; flowers solitary, sessile or
essentially so; fruit an exserted pubescent achene 12 to 20
mm. long including the style14. Furshia

11. Leaves various, the margins entire or toothed but not
deeply pinnatifid nor trilobed at apex; fruit various...
.....12

12. Leaves palmately veined and lobed13

13. Plants pubescent with simple hairs and stalked
glands; fruit an aggregate of several fleshy
drupelets16. Rubus

13. Plants at least pubescent; fruit of several
small, inflated 2- to 4-seeded pods.....
.....1. Physocarpus

12. Leaves pinnately veined14

14. Ovary superior; calyx below the fruit at maturity,
or wanting15

15. Pistil 1; fruit a fleshy or leathery 1-seeded
drupe 18. Prunus

15. Pistils 2 to 5, distinct; fruit consisting
of small coriaceous follicles or 1-seeded
indehiscent pods16

16. Plants silky, with matted prostrate
stems, or nearly glabrous, but not
glandular; fruit follicular or sometimes
adhescent along both sutures.....
.....2. Spiraea

16. Leaves more or less beset with glandular
atoms on the lower surface; pods achene-
like, indehiscent.....
.....4. Holdisicus

14. Ovary inferior; fruit fleshy or rarely dry, sur-
mounted by the persistent calyx-lobes or these
falling off at full maturity17

- 17. Branches armed with stout axillary spines; fruit fleshy, containing 2 to 5 hard bony nutlets.....20. Crataegus

- 17. Branches unarmed; fruit fleshy or sometimes dry, 6- to 10-seeded, the carpel walls papery or leathery, never bony18

- 18. Leaves entire or nearly so, narrow, 3 to 5 times as long as wide, sessile or essentially so; fruits solitary or 2 to 5 together, juicy, yellow with reddish cheek, very bitter and astringent21. Peraphyllum

- 18. Leaves toothed or less often entire, usually not more than twice as long as broad, distinctly petiolate; fruits in short racemes, juicy or leathery and dry, purplish to black (or drying orange-brown before full maturity), sweet or insipid...22. Amelanchier

- 1. Plants with herbaceous stems, the perennial rootstocks sometimes woody and long-persistent19
 - 19. Leaves entire; stems woody, prostrate, matted, only the flowering stems erect and herbaceous..2. Spiraea
 - 19. Leaves toothed, lobed or compound; plants various..20
 - 20. Leaves simple, palmately lobed16. Rubus
 - 20. Leaves compound21
 - 21. Plants prickly or bristly, shrubby at maturity16. Rubus
 - 21. Plants unarmed, definitely herbaceous.....22
 - 22. Calyx without bractlets alternating with the lobes9. Purpusia
 - 22. Calyx with 5 bractlets alternating with the lobes23
 - 23. Receptacle enlarged, red and juicy at maturity, bearing the numerous achenes on its surface; plants with long aerial stolons and basal trifoliate leaves5. Fragaria
 - 25. Receptacle dry and not enlarged at maturity; plants various, not as above.24

- 24. Style, at least the base, enlarged and persistent in fruit, forming an integral part of the achene; style often elongated and plumose in fruit 11. Gaura
- 25. Style articulated at base, deciduous from the mature achene, neither elongated nor plumose 25
- 25. Stamens 10 26
 - 25. Filaments flattened and dilated at base; leaves pinnate with 5 to many leaflets, the uppermost leaflets confluent 8. Horkelia
 - 26. Filaments not dilated; leaves ternate, the leaflets distinct 6. Potentilla
- 25. Stamens 20 or more numerous, or 5 or 15, never 10; filaments narrow or filiform, never dilated 27
- 27. Stamens 5 28
 - 28. Style subterminal 7. Ivesia
 - 28. Style lateral; leaves trifoliolate 6. Potentilla
- 27. Stamens 15 or more numerous 29
 - 29. Pistils 3 to 9; leaves pinnate, the basal leaves with 12 to 35 crowded pairs of leaflets (except in Ivesia Jaegeri which has 4 to 8 pairs) 7. Ivesia
 - 29. Pistils usually more numerous 6. Potentilla

SUBFAMILY ROSEOIDEAE

Tribe 1. NEILLIEAE This small tribe comprises about 5 genera, from one of which, Neillia, it takes its name. Members of the tribe are all shrubs, with alternate leaves and stipules, and 1 to 5 more or less distinct pistils which form small podlike fruits. The seeds are typically hard-coated and possess endosperm. Our only genus of this tribe is Physocarpus, most of the species of which are North American.

1. *Physocarpus* (Camb.) Maxim.

¹ Spiraea sect. *Physocarpos* Camb. Ann. Sci. Nat. 1: 239. 1824.

Shrubs with exfoliating bark, alternate, palmately veined, lobed leaves and conspicuous flat stipules. Flowers in terminal corymbs, which are often crowded and subumbellate. Pubescence usually present and stellate. Hypanthium usually hemispheric; sepals 5, persistent, stellate-tomentose. Petals 5, usually white, spreading. Stamens 20 or more, inserted on a disk. Pistils 1-5, more or less united at the base; ovules 2-4. Pods more or less inflated, tardily dehiscent along both sutures, each usually with 2 pyriform shining seeds. The name Physocarpus (published in 1879) is conserved by international agreement over Opulaster Medik. (1799).

KEY TO THE SPECIES

- 1. Leaf-blades 0.7-1.5 cm. long, rounded, even those on vigorous shoots not acute; petioles 4-6 mm. long or less; carpel usually 1 only; filaments alternately long and short1. P. alternans
- 1. Leaf-blades (1) 2-6 cm. long, usually slightly longer than broad, the tips rounded or acute; petioles (at least the longer) 1 cm. long or more; carpels normally 2; filaments all alike or essentially so.....2
 - 2. Styles erect in flower and fruit, their bases approximate and the tips of the carpels not divergent2. P. malvaceus
 - 2. Styles divergent in flower and (especially) in fruit, their bases widely separated even before maturity because of the divergence of the distal parts of the carpels3. P. monogynus

1. PHYSOCARPUS ALTERNANS (M.E.Jones) J.T.Howell, Proc. Calif. Acad. 20: 130. 1931.

¹/ The citations of volumes, pages and dates, made in this paper, have been taken directly from the original publications, with the following exceptions: The citations for Cercocarpus montanus Raf., Sieversia triflora R.Br. ex Richards., Sieversia Rossii R.Br., Rosa Woodsii Lindl., Potentilla Hippiana var. diffusa Lehm., and P. glaucophylla Lehm. have been taken from Rydberg's treatments in North American Flora.

Neillia monogyna var. alternans M.E. Jones, Zoe 4:42. 1893.

Copulaster alternans Heller, Cat. N. Am. Pl. ed. 2. 5. 1900.

A low stout much-branched stellate-pubescent shrub up to about 1 m. high, with yellowish-brown bark that becomes gray and sheds off the second year; branchlets brown, pubescent. Leaves green and pubescent above, pale and tomentose beneath, the veins beneath brownish, rather prominent. Blades cordate at base, with three rounded lobes, the lobes more or less incised with obtuse divisions; blades usually definitely rounded in outline, the lobes all about equal in size. Corymbs pubescent, nearly sessile, 1- to 3- (10-) flowered, the flowers on pedicels 4-6 (10) mm. long. Hypanthium 2.5- 3.5 mm. wide. Sepals ovate, obtuse, 2-2.5 mm. long. Petals white, glabrous, about equalling the sepals. Stamens about 20. Pod 3-4.5 mm. long, somewhat flattened, densely tomentose; style erect, about 1 mm. long. Seeds about 1.7 mm. long.

Flowers in Nevada from May to July; fruit matures from July to August.

A plant of the central Great Basin, ranging from northeastern Utah to eastern Nevada, where it has been collected chiefly at elevations from 1800 to 2400 meters. It grows on dry rocky slopes, in canyons and in crevices on cliffs. The type was collected in the Shell Creek Range, White Pine County, Nevada. A variety occurs in the desert ranges of southern California.

(1) NEVADA: ELKO: Ferguson Spr., M.E. Jones 6289, June 14, 1900 (US);

East Humboldt Mts., S. Watson 304 (US); ridge above Cave Creek P.O., Ruby Mts., A.A.Heller 9507 (US); near Wells, E.J.Palmer 38027 (US). WHITE PINE: Ely, A.E.Hitchcock 1236 (US). LANDER: 16 mi. s.e. of Austin in Birch Creek Can., Goodner & Henning 308 (USNA); Bunker Hill, Toiyabe Range, P.E. Kennedy 4226 (Stan). NYE: Moray Peak, 6-7000 ft., C.A.Purpus 6367 (US); Troy Canyon, Grant Range, McVough 6090 (USNA). LINCOLN: Meadow Valley Wash, near Caliente, L.N.Goodding 929 (US). CLARK CO.: Deadman Can., Sheep Mts., 7100 ft., A.M.Alexander 1617 (Calif.).

2. PHYSOCARPUS MALVACEUS (Greene) Ktze. Rev.Gen.Pl. 219. 1891.

Neillia malvacea Greene, Pittonia 2: 30. 1889.

Copulaster malvaceus Ktze. Rev.Gen.Pl. 949. 1891.

A shrub 1-2 m. high, with yellowish-brown bark that becomes gray

(1) In the following pages the citations of locality and collector pertaining to herbarium specimens are followed in each case by initials inclosed by parentheses. These initials refer to the herbarium or herbaria in which I have seen the specimen in question. The initials, with their meanings, are as follows: (Calif), The University of California at Berkeley; (Stan), The Dudley Herbarium of Stanford University; (Nev), The University of Nevada, Reno; (US), United States National Herbarium, Washington, D.C.; (USNA), Herbarium of the United States National Arboretum, Washington.

and shreds off the second or third year; branchlets brown, nearly glabrous. Leaves nearly glabrous, green, paler beneath; blades mostly 2.5-6 cm. long, cordate at base, usually prominently 3-lobed with the middle lobe longest so that the blade as a whole is longer than wide. Inflorescence somewhat pubescent, the corymbs 15-flowered or fewer; the pedicels 1-2 cm. long. Hypanthium 4-5 mm. wide; sepals ovate, acute or obtuse, 3-5 mm. long; petals (according to Rydberg) up to 5mm. long. Stamens 25-30. "Follicles" usually 2, tomentose, united to above the middle, forming a flattened keeled pod 3-5 mm. long which is raised on a short stalk above the base of the hypanthium. Styles about 2.5 mm. long. Seeds about 2 mm. long.

Flowers in June (?); fruit matures in northern Nevada in August.

Mountains, hillsides and rocky banks, British Columbia to Montana, Wyoming, northern Utah and northern Nevada, and Oregon, at elevations up to at least 2000 meters.

NEVADA: ELKO: Lamoille Can. east of Lamoille, Ruby Mts., at 6700 ft., A.A.Heller 9350 (US).

3. PHYSOCARPUS MONOGYNUS (Torr.) Coult. Contr.U.S.Nat.Herb. 2: 104. 1891.

Spiraea monogyna Torr. Ann. Lyc. N.Y. 2: 194. 1827.

Opulaster monogynus Ktze. Rev. Gen. Pl. 949. 1891.

A shrub which differs from the preceding species in having smaller leaves (1-3 cm. long) and smaller flowers (petals about 3 mm. long). It was reported from Nevada by Rydberg (N. Am. Fl. 22: 244. 1908), but I have seen no specimens from the State. The range of the species is from South Dakota to Texas, west to Wyoming and New Mexico.

Tribe 2. SPIRAEAE. A tribe of about seven or eight genera, including both shrubs and herbs. The largest genus, Spiraea, comprises more than 50 species, all native in the north temperate zone. The Spiraceae differ from the Neillioae merely in having no stipules, in having little or no endosperm in the seeds which are thincoted, and in having the pistils distinct rather than partially united. The only genus represented in the Nevada flora is Spiraea; I can see no justification for the maintenance of the genus Petrophytum, as the chief difference between it and Spiraea, except for the marked difference in habit, lies in the follicles, which in "Petrophytum" are said to be dehiscent along both sutures while in Spiraea they are said to be dehiscent along the ventral suture only. Examination of fruiting material of "Petrophytum" and Spiraea shows that the difference is simply one of degree; the follicles of Spiraea (Petrophytum) caespitosa usually split about half-way down the dorsal suture after splitting on the ventral side, while other species, usually included

in Spiraea normally split at least a part of the way down the dorsal suture; there appears to be no sharp line where the two can reasonably be separated.

2. Spiraea L.

Shrubs or subshrubs with alternate leaves and no stipules. Flowers in racemes, panicles or corymbs, usually small and densely crowded. Hypanthium campanulate or hemispheric; sepals 5. Petals 5, white to rose-colored. Stamens numerous, inserted in one or more series between the disk and the sepals. Pistils 3-5 (usually 5), distinct; follicles dehiscent along the ventral suture and often splitting part way down the dorsal side. Seeds few (usually 4), oblong or linear. Styles terminal or essentially so.

KEY TO THE SPECIES

- 1. Erect shrubs with serrate deciduous leaves; flowers pinkish or pale purple, in small corymbs1. S. splendens.
- 1. Subshrubs with prostrate branches and entire leaves in evergreen rosettes; flowers white, the inflorescence spikelike, scapiform....
.....2. S. caespitosa

1. SPIRAEA SPLENDENS Laumann ex K. Koch, Monats.Ver.Bef. Gartenb. Preuss. 18: 294. 1875.

Spiraea densiflora Mutt. ex Torr. & Gray Fl.N.Am. 1: 414, as a synonyme 1840:

Spiraea artuscula Greene, Erythra 3: 25. 1895.

Spiraea Helleri Rydb. N.Am.Fl. 22: 246. 1908.

Low shrub 20 - 120 cm. high, with red or brownish smooth (or slightly pubescent) bark which exfoliates the second year. Leaves glabrous or nearly so, on petioles 2 mm. long or less. Blades green above, slightly lighter in color beneath, elliptic or oval, usually rounded at both ends, more or less crenate or sharply serrate (if sharply serrate, the apex often acute), 1.5- 2.5 (6) cm. long. Corymbs glabrous or slightly pubescent, 2-4 cm. broad and high, pedunculate or the lowermost branches leafy-bracted. Hypanthium hemispheric, glabrous or nearly so, 1-1.5 mm. deep; pedicels bracteolate, the bracteoles filiform, persistent, about 1.5 mm. long. Sepals entire, triangular, acute or slightly blunt at tip, erect or slightly spreading, about 1 mm. long. Petals obovate, 1-1.5 mm. long, surpassed by the filaments. Stamens about 20. Follicles shining, brown, 1.5-2 mm. long; style slender, about 2 mm. long. Seeds nearly linear, about 1 mm. long.

Flowers from early July to August.

Rocky slopes, often in crevices, at elevations of 1500 to 3000 meters, British Columbia to Montana, south to the mountains of Wyoming, Oregon, northern California and in the Sierra Nevada of western Nevada.

NEVADA: WASHOE: Hunter Cr., 6000 ft., P.B.Kennedy 1890 (US).

Note: This species has usually been treated under the name of Spiraea densiflora Nutt., a binomial which is untenable unless taken up subsequent to the publication of Torrey & Gray's Flora of North America. So far as I am aware this was not done before the publication of the name Spiraea splendens; if, as I believe to be the case, the two names are synonymous, the latter must be taken up for the species.

2. SPIRAEA CAESPITOSA Nutt. in Torr. & Gray, Fl.N.Am. 1: 418. 1840.

Spiraea caespitosa var. elatior S.Wats. in King, Geol. Expl. 40th Par. 5: 81. 1871.

Petrophyton caespitosum Rydb. Mem.N.Y.Bot.Gard. 1: 206. 1900.

Petrophyton elatior Heller, Cat.N.Am.Pl. ed.2. 5. 1900.

A low and slow-growing undershrub, forming large flat patches appressed to the rocks. Leaves oblanceolate or spatulate, acute, sparsely or densely silky-pubescent, 1-ribbed, 0.3-3 cm. long, including the attenuate base, 1-5 mm. wide. Peduncles 3-20 cm. long, with appressed silky pubescence, bearing 2-7 bract-like leaves up to about 1 cm. long below the spike. Spike 0.7-1.3 cm. in diameter, 1-10 cm. long, the flowers 75 or fewer, densely aggregated or the lower ones more distant; peduncle sometimes branching, the lateral spikes up to about 3 cm. long, on peduncles about the same length. Hypanthium hemispheric or campanulate, 1-1.5 mm. deep; sepals erect, silky, acute, 1.5-2 mm. long; pedicels 1-2 (?) mm. long, each bearing a filiform bracteole about 1.5 mm. long. Petals pilose within, 1.7-2.3 mm. long, 0.5-0.8 mm. wide, oblanceolate, the tips slightly erose, obtuse. Stamens about 20. Styles about 3.5 mm. long, exceeding the stamens, pilose near base. Follicles slightly more than 2 mm. long, brown, lustrous, slightly pilose, dehiscent on the ventral suture and usually splitting about halfway down the dorsal side. Seeds linear, about 1 mm. long.

Flowers in Nevada from July to September; the follicles may persist on the plants until the following year.

Exposed limestone rocks and cliffs, at elevations of 1800 (1200?) to 3000 meters, South Dakota to western Texas, west to Arizona, southern California, eastern and southern Nevada, and Idaho.

NEVADA: ELKO: Lamaille Can., e. of Lamaille, A.A.Heller 9336 (US); Smith Cr., Ruby Mts., P.Train, Aug. 4, 1936 (US); Furlong Lake trail, Ruby Mts., Train, July 12, 1936 (USNA); Cave Cr., 15 mi. s. of Gardner Ranch, Ruby Valley, Train 955 (USNA); East Humboldt Mts., 7000 ft., S. Watson 306 (US). WHITE PINE: 7 mi. c. of Little Antelope Summit, McVaugh 6106 (USNA); Steptoe Cr. near mouth of Cave Cr., Shell Creek Range, Train 1006 (USNA); Ely, A.E.Hitchcock 1212 (US); near headquarters Lohman Cave Nat. Mon., Snake Range, Train 1139 (USNA). LANDER: near Kingston Ranger Sta., E.V.A. Murphey

512 (USNA). LINCOLN: Half Moon Mine Can., 9 mi. from Pioche, Train 2550 (USNA); Mt. Irish, C. A. Purpus 5350 (US); Ursine, A. F. Sander, 10/21/1951 (Stan). IVE: Abundant in Troy Canyon, Grant Range. CLARK: Los Can., Charleston Mts., Haller 11064 (Stan, US); Deer Cr., Charleston Mts., I. W. Coker 5513 (USNA). ESMERALDA (MINERAL?): Soda Spring Can., W. E. Shockley 384 (US); Pilot Mt., Shockley, 7/23/1888. MINERAL: Miller Mt., Shockley, according to Jepsen (Fl. Calif., 2: 165, 1936)

Note: The plant included by Tidestrom (Contr. U.S. Nat. Herb. 25: 266, 1925) as Pentstemon elatius (Spiraea caespitosa var. elatior S. Wats.) appears to be no more than a robust form of the species, in which the inflorescence is branched and the habit of growth is more open. Such forms are to be expected in favorable situations and do not seem to merit nomenclatural recognition.

EXCLUDED SPECIES

SPIRAEA LUCIDA Dougl., included by Tidestrom in the Flora of Utah and Nevada (Contr. U.S. Nat. Herb. 25: 266, 1925), apparently does not occur in this state. Hultén has recently shown (Kungl. Sv. Vet. Akad. Handl. ser. 3, 81: 41, 1929) that the correct name for this species is probably Spiraea betulifolia Pall.

Tribe 3. SORBARIEAE. A group of about four genera of herbs and shrubs with pinnately dissected leaves and persistent stipules. It differs from the two preceding tribes by having the 5 distinct pistils opposite the sepals rather than the petals. The seeds have endosperm. Our only genus is the monotypic Chamaebatiaria.

3. Chamaebatiaria (Porter) Maxim.

Spiraea sect. Chamaebatiaria Porter in Brewer & Watson, Bot. Calif. 1: 170, 1876.

Shrub 1-3 m. high, with reddish-brown bark which becomes very rough on old trunks; branchlets of the current season yellowish- or reddish-brown, densely covered with long-stalked glands and appearing scurfy; whole plant strongly aromatic. Leaves fernlike, deciduous, oblong-lanceolate in outline, twice-pinnate, the ultimate segments 1-2 mm. long, entire, often not wholly distinct, very numerous. Blades glabrous or essentially so above, stellate-pubescent with soft hairs on the margins of the segments, on the lower surface and on the rachis. Leaves 2-7 cm. long; stipules green, more or less persistent and becoming yellowish, linear, entire, pubescent and glandular, up to 8 mm. long. Flowers numerous, white, in terminal panicle-like inflorescences up to about 30 cm. long, the inflorescence stellate-pubescent and densely glandular. Hypanthium turbinate or campanulate, 5-5 mm. across, about as broad as high, glandular and more or less densely stellate-tomentose without, glabrous within. Sepals 5,

entire, bluntly triangular or oblong, 2-4 mm. long, pubescent like the hypanthium without, sparsely pubescent to glabrate within. Petals white, orbicular or nearly so, about 4-5 mm. long. Stamens about 30-60, slightly shorter than the petals. Pistils 5, united at base, the styles glabrous except at very base, filiform, about equalling the stamens. Follicles 5-6 mm. long, pubescent, appearing mucronate (the style deciduous or the basal part sometimes persistent), rounded on the base, splitting down the ventral side and about halfway down the dorsal. Seeds few.

1. CHAMAEBATIARIA MILLEFOLIUM (Torr.) Maxim. Act.Hort.Petrop. 6: 225. 1879.

Spiraea Millefolium Torr. Pacific Rail. Rep. 4: 83. 1857.

Chamaebatiaria glutinosa Rydb. N.Am.Fl. 22: 258. 1908 (type from the Mammoth Range, a few miles from Ellsworth, Nye Co., Nevada, M.B.Howard).

Spiraea glutinosa Fedde, Just Bot.Jahrb. 36²: 489. 1910.

This is the only known species. In Nevada the flowering season is from late June to mid-September; the fruits often persist on the plant until the following season. The common names of this bush are "Fernbush" and (according to Jepson) "Desert-sweet."

Rocky slopes, desert canyons, often on limestone; a shrub which is most characteristic of the western part of the Great Basin; it is found throughout southern Nevada but becomes infrequent at the north; it extends its range to the mountains of eastern California and sparingly to southern Oregon and Idaho, to Utah and to Arizona. It is found at elevations of 1000-3000 meters.

NEVADA: CLARK: Between Kyle Can. and Deer Cr., Charleston Mts., I.W. & C.B. Clokey 7143 (Pl.Exs.Gray. 716) (US, USNA); Deadman Can., Desert Game Range, J.A.Allen 39 (USNA); mouth of Deadman Can., P.Train 1788 (USNA). LINCOLN: Deer Lodge, Pinyon Mt., Desma Hall, June 23, 1935 (USNA) and Aug. 15, 1935 (USNA); Beaver Dam Wash, 40 mi. e. of Panaca on the Utah line, P.Train 2503 (USNA); Highland Range & Juniper Mts., C.A.Purpus 6250 (US). NYE: North Fork of Twin River Can., 10 mi. s. of Millet, W.H. Henning 103 (USNA); Troy Canyon, Grant Range, McVaugh 6085 (USNA). WHITE PINE: 7 mi. e. of Little Antelope Summit, McVaugh 6107 (USNA); Steptoe Cr. near mouth of Cave Cr., Shell Creek Range, P.Train 1000 (USNA); Ely, A.E.Hitchcock 1208 (US). ELKO: 1 mi. w. of Pequop Summit, Pequop Mts., McVaugh 6421 (USNA). EUREKA: Windfall Can., Eureka, P. Train in 1936 (US; USNA); Eureka, I. Tidestrom 11000 (US). LANDER: Kingston Can., Tidestrom 10956 (US); Bunker Hill, Toiyabe Forest, A.E.Hitchcock 889 (US). ESMERALDA: Miller Mt., W.H. Shockley 305 (US); Chiatovitch Cr., V. Duran 3103 (Calif); Pilot Mt., W.H. Shockley 305 (Stan). MINERAL: Corey Can., Wassuk Mts., Tidestrom 10121 (US); east slopes of Wassuk Range, above Cory Can., W.A.Archer 6977 (USNA); WASHOE: W.P.A. Botanical Garden W. of Reno, J. Henricks 198 (USNA); Catnip Mt., Sheldon Antelope Range, O.J.Murie 2874 (USNA).

Tribe 4. HOLODISCOEAE! A single genus, chiefly confined to western North America. The species of Holodiscus are shrubs or small trees without stipules, the 5 pistils alternate with the sepals and giving rise to flat stipitate indehiscent one-seeded pods; endosperm is very scant. This tribe differs from the Spiraeaceae chiefly in the indehiscent fruits.

4. Holodiscus (K.Koch) Maxim.

Spiraea sect. Holodiscus K. Koch, Dendr. 1: 309. 1869.

Large or small shrubs with alternate simple leaves and no stipules. Inflorescence paniculate. Hypanthium hemispheric or flattened. Sepals 5, persistent. Petals 5, white or pinkish. Stamens about 20, inserted on a disk. Pistils 5; alternate with the sepals, pubescent or glandular; ovules 2. Pod indehiscent, laterally flattened, 1- (or 2-) seeded, short-stipitate. The name Holodiscus (published in 1879) is conserved by international agreement over Sericotheca Raf. (1838).

1. HOLODISCUS DISCOLOR (Pursh) Maxim. Act.Hort.Petrop. 6: 254.1879.

Spiraea discolor Pursh, Fl.Am.Sept. 342. 1814.

Sericotheca discolor Rydb. N.Am.Fl. 22: 262. 1908.

The typical form of Holodiscus discolor is found from northern California to British Columbia, east to Idaho. It is a large shrub up to 4.5 m. high, with broad diffusely branched panicles up to 25 cm. long and broad. The leaves are distinctly petiolate, the blades abruptly contracted at base. The blades are 8-10 cm. long, sparingly pubescent, usually with the lower surface sparingly silky or crisp-pubescent; the lower surface may be somewhat glandular-dotted. This form is apparently not native to Nevada, although similar smaller-leaved forms occur in the mountains south and west of Reno, near the California line. Many other species have been described in the genus, all of which seem to differ from H. discolor by somewhat trivial characters. The forms found in Nevada, therefore, are all regarded here as varieties of that species (see also Jepson, W.L., Fl.Calif. 2: 166-167. 1936).

KEY TO THE VARIETIES

1. Leaves dotted with minute yellowish-brown glandular particles, especially beneath; blades sparsely pubescent or tomentose beneath, the glandular particles not obscured by the hairs; foliage usually yellowish-green when dryla. var. glabrescens

1. Leaves without (or with very few) glandular particles, the blades tomentose or silky beneath, the hairs often obscuring the surface and the glandularity (if any); lower surface of the leaves often strongly whitenedlb. var. dumosus
- 1a. var. GLABRESCENS (Greenm.) Heller ex Jeps. Man.Fl.Pl.Calif. 479. 1925.
Spiraea discolor var. glabrescens Greenm. Erythca 7: 116. 1899.
Holodiscus glabrescens Heller, Muhlenbergia 1: 40. 1904.
Sericotheca obovata Rydb. N.Am.Fl. 22: 264. 1908.
Sericotheca glabrescens Rydb. N.Am.Fl. 22: 265. 1908.

A shrub 0.6-2 m. high; old bark reddish-brown, the outer layers gray, shredding off the second or third year; branchlets yellow or yellowish-brown, pubescent. Leaves green both sides, the lower surface sometimes paler. Blades glabrous or strigose and glandular above, 0.5-1.5 (2.5) cm. long, cuneate at base and scarcely differentiated from the petiolar base, 0.3-1 cm. wide, rounded at tip, coarsely 5- to 7-toothed above the middle, the serrations sharp, ascending, sometimes toothed. Inflorescences terminal on laterals of the current season, paniculate, sometimes 10 cm. long and wide, but more often reduced (sometimes spike-like), 3-7 cm. long and 1-5 cm. wide. Hypanthium and calyx-lobes strongly crisp-pubescent without, the latter glabrous within, ovate, acute, entire, 1.5-2 mm. long. Petals obovate, white, 1.5-2 mm. long, glabrous. Pod about 2 mm. long, straight on the ventral edge, strongly bowed out on the dorsal, glandular on the sides and densely pilose with stiff whitish hairs about 1 mm. long. Style about 1 mm. long, erect or slightly recurved.

Flowers in Nevada from late June to early August; fruit matures from August to September.

This is a plant of the Great Basin; its range is from southern Oregon to Colorado, south to northern New Mexico and Arizona and west to the eastern borders of California (chiefly east of Sierra Nevada), at elevations of 1200 to 3000 meters. It is found on dry slopes and cliffs, often in rocky soil or in crevices in limestone. In northern and western Nevada, chiefly along the eastern slopes of the Sierra Nevada, there occur some plants with heavy tomentum, suggesting intermediates between this variety and var. dumosus.

NEVADA: WASHOE: Slide Mt., near Franktown, Tidestrom 10504 (US); the leaves of this specimen suggest those of typical H. discolor, but do not exceed 3 cm. in length); Hunter Creek Can., Heller 10353 (US); Hunter's Can., A.E.Hitchcock 566 (US); 10.5 mi. e.n.e. of Red Rock, C.A.Graham 429 (USNA); 3/4 mi. s.s.e. of Five Mile House, T.C.Adams 128 (USNA); Jones Cr., 2 mi. n. of Galena Cr., in the Sierra Nevada, Archer 6510 (USNA). STOREY: near Virginia City, H.G.Bloomer in 1863-64 (US); Six Mile Can., 1 mi. s.e. of Virginia City, R.A.Allen 172 (USNA). LYON: Desert Cr., 11 mi. n.w. of Sweetwater, Moore & Franklin 860 (USNA). Humboldt: Pine Forest Mts., Griffiths & Morris 196, 254 (both US); Summit Lake Region,

Griffiths & Morris 399 (US); Canyon Creek summit, Santa Rosa Range, Train 592 (USNA). MINERAL: Miller Mt., W.E. Shoddeley 560 (US); 5 mi. up Cory Cr., Wassuk Range, Archer 6909 (USNA); Big Indian Mt., Wassuk Range, Archer 7128 (USNA). LANDER: Spring above Austin, E.O. Wooton, July 2, 1927 (USNA); Lewis Can., 15 mi. s. of Battle Mountain, Goodner & Henning 1072 (USNA); Big Cr., Kingston Can., A.E. Hitchcock 777 (US). NYE: 18-20 mi. n. of Cloverdale, road to Dieringer, W.E. Henning 193 (USNA). ELKO: Head of Copper Creek Basin, Jarbidge Mts., Train 556 (USNA); Jarbidge Cr., Train 801 (USNA); Jarbidge R.S., W.W. Eggleston (14119a ?) (US); Ruby Mts., near Blaine P.O., Heller 11089 (US); Clover Mountain range near Death, Heller 9113 (US); western slope of Harrison Pass, Ruby Mts., Heller 9452 (US); Lone Mt., 25 mi. n. of Elko, A.E. Hitchcock 1001 (US); Pequop Mts., J.H. Robertson 169 (USNA). WHITE PINE: Ely, A.E. Hitchcock 1252 (US); Bird Cr., Shell Creek Range, Train 1098 (USNA); ridge e. of Sherman Pk., s. end of Ruby Range, Hitchcock & Martin 5627 (USNA).

lb. var. JUMOSUS (Nutt.) Maxim. ex Coult. Man.Bot.Rocky Mt. Reg. 79. 1885.

Spiraea dumosa Nutt. ex Hook. Lond.Jour.Bot. 6: 217. 1847.

Holodiscus dumosus Heller, Cat.N.Am.Pl. 4. 1898.

Sericotheca dumosa Rydb. N.Am.Fl. 22: 263. 1908.

Sericotheca concolor Rydb. N.Am.Fl. 22: 264. 1908 (Type from Mt. Davidson, Nevada, J. Torrey 134).

Holodiscus microphyllus Rydb. Bull.Torr.Club 31: 559. 1904.

Holodiscus discolor var. microphyllus Jeps. Fl.Calif. 2: 166. 1936.

This variety is little different from the preceding one except in the pubescence of the leaves; in the Rocky Mountain region, where it is abundantly represented, the leaves are usually larger than those of var. glabrescens (length of blades 2-5 cm.). Typical var. dumosus probably does not occur in Nevada, but I have seen the following specimens, which have the leaves heavily tomentose and very sparingly glandular; the blades are larger than usual in var. glabrescens and are more abruptly contracted to the base:

NEVADA: CRUSEBY: Clear Creek Can., C.F. Baker 1431 (US). ELKO: E. Humboldt Mts., S. Watson 305, July 1868 (US).

I am also including under var. dumosus the aggregation of small-leaved plants which are abundant at high altitudes in southern Nevada, and which are seemingly to be referred to var. microphyllus (Rydb.) Jeps. This variety is characterized by the small leaves (usually not more than 1.5 cm. long), which have the lower surfaces densely silky, the long silvery silky hairs often quite obscuring the tomentum beneath them. I cannot accord the variety formal recognition, as I am unable to separate it from the series of plants which are found in the mountains of Arizona and New Mexico and which seem to be merely unusually silvery forms of var.

dumosus; there appears to be a complete series of leaf-forms, from the small ones of var. microphyllus to the larger and slightly less silvery ones of var. dumosus. In Nevada "var. microphyllus" is found at elevations of 2000 to 3000 meters.

NEVADA: CLARK: Lee Can., Charleston Mts., A.A.Heller 11006 (US); near head of Lee Can., 10000 ft., Train 2314 (USNA); Griffiths Mine, Charleston Mts., I.W.Clokey 7969 (USNA); Scout Can., Charleston Mts., Clokey 7556 (USNA); Big Falls, Charleston Mts., Clokey 7138 (USNA); Dead Man Can., Desert Game Range, J.C. Allen 27 (USNA). CLARK (LINCOLN?) Sheep Mts., Desert Game Range, S.A.Jewett 46 (USNA). NYE: Troy Canyon, Grant Range, McVaugh 6086 (USNA); intermediate, toward var. glabrescens).

Tribe 5. POTENTILLEAE. This tribe, as understood by Rydberg (N.Am.Fl. 22: 269. 1908), included 17 genera. Other students have generally recognized fewer genera, but the number of species is large and generic characters are rather indefinite, so that generic limits have become largely a matter of opinion. Members of the tribe are mostly perennial herbs, with digitate or pinnate leaves and persistent stipules. The calyx-lobes are usually subtended by a set of bractlets of the same number. The pistils are usually several or many, distinct, forming achenes in fruit. The Nevada flora, in my opinion, should logically include not more than three genera of this tribe, Fragaria, Purpusia and Potentilla. The characters upon which Ivesia, Horkelia, Sibbaldia and other genera have been maintained by recent authors are not sufficiently clear-cut and the generic units set up under these names do not show sufficient uniformity of structure to justify their maintenance in view of the large numbers of intermediate and puzzling species which are assigned to one group or the other only by rather arbitrary methods. The necessary combinations under the genus Potentilla are not all available at this time, however, so that I am keeping the genera Ivesia and Horkelia although not convinced of the wisdom of this course.

5. Fragaria L.

Perennial herbs with leaves and flower-scapes in a basal tuft, and producing runners which root at the tips and form new plants. Leaves ternate, 3-foliolate, with cuneate or obovate leaflets. Flowers white, in cymes on a naked scape; petals, sepals and bractlets normally 5 each. Stamens about 20, in three series. Hypanthium almost flat; receptacle hemispheric or conic, in fruit much enlarged, juicy, usually bright red, bearing very numerous minute seedlike achenes. Styles filiform, somewhat persistent, attached near the middle of the ovaries.

1. FRAGARIA VIRGINIANA Duchesne, Hist.Nat.Frais. 204. 1766.

Rootstock short and thick, often woody, sometimes 5-6 cm. long. Leaves 3-10, the blades glabrate above, silky and pale beneath, usually

usually plainly glaucous, firm in texture. Leaflets 2-10 cm. long, usually petiolulate, but this varying with the season at which they are produced. Scapes 10-20 cm. long, usually much shorter than the leaves, few- to about 10- flowered, the inflorescence rather compact and subumbellate. Flowers mostly 1-2 cm. in diameter; fruit subglobose, 1-1.5 cm. in diameter, the achenes set in pits in the receptacle.

KEY TO THE VARIETIES

- 1. Pubescence of the petioles and scapes spreading at right angles or even somewhat deflexedla. var. platypetala
- 1. Pubescence of the petioles and scapes more or less appressed ... lb. var. glauca
- la. var. PLATYPETALA (Rydb.) Hall, Univ. Calif. Publ. Bot. 4: 198. 1912.

Fragaria platypetala Rydb. Mem. Dept. Bot. Columbia Univ. 2: 177. 1898.

Fragaria truncata Rydb. l.c.

This, the Sierran form of the so-called Virginian Strawberry, flowers in western Nevada from mid-June until early July. It occurs from Alaska to California and (according to Rydberg) east to Wyoming and Montana. In Nevada and California it is confined to meadows and stream-borders, at elevations of 1200 to 2500 meters. Like the rest of the genus Fragaria, this group is in need of a thorough taxonomic revision; the characters of the several species and varieties have not been adequately worked out. It is possible that this variety is identical with var. illinoensis A. Gray (Man. ed. 5. 155. 1867), and if so Gray's name will have to be taken up.

NEVADA: WASHOE: Franktown, A.A. Heller 10397 (US); Lake Tahoe near Incline, J. Henrichs 250 (USNA); 2 mi. e. of Incline, L.R. Miller 148 (USNA).

- lb. var. GLAUCA S. Wats. in King, Geol. Expl. 40th Par. 5: 85. 1871.

Fragaria glauca (S. Wats.) Rydb. Mem. Dept. Bot. Columbia Univ. 2: 183. 1898.

Apparently differs from the eastern form of F. virginiana chiefly in the rather strongly glaucous leaves. Known from Nevada only through a sterile specimen without locality data, collected by Lt. Wheeler in 1872, and named Fragaria glauca by Rydberg (US). The range of var. glauca extends east to the Rockies and north to Mackenzie, according to Rydberg.

EXCLUDED SPECIES

FRAGARIA BRACTEATA Heller, Bull.Torr.Club 25: 194. 1898. Included by Tidestrom (Contr.U.S.Nat.Herb. 25: 275. 1925), but no Nevada specimens have been seen. This is the Pacific representative of Fragaria vesca (Fragaria americana), and may be looked for in the mountains of northern and western Nevada. Collectors should be on the lookout for fruiting plants of all species of Fragaria and should make notes on the fruits before pressing; it is important to know whether the achenes are superficial on the receptacle or are sunken in pits.

6. POTENTILLA L.

A group which probably includes about 200 species, widely distributed in temperate regions but reaching its greatest development in the North Temperate Zone. The species are mostly perennial herbs with elongated scaly rootstocks, but some are annuals or shrubs. The leaves are compound, usually with cleft or serrate leaflets. The flowers are yellow or white (rarely purple) in terminal cymes or rarely solitary; petals, sepals and bractlets are normally 5 each, the former usually broad and deciduous. Stamens are usually 20 in number, in three series (10, 5 and 5) with the filaments neither flattened nor dilated. The hypanthium is saucer-shaped or deeper; the receptacle is conic or elevated, dry and not enlarged in fruit, bearing numerous (in a few species from 5 to 20) achenes. The styles are filiform or thickened at base, articulated at base and deciduous, attached basally, laterally or terminally.

KEY TO THE SPECIES

- 1. Plants shrubby, usually about 1 m. high; flowers bright yellow; achenes hairy22. P. fruticosa
- 1. Plants herbaceous, the underground rootstocks often woody and long-persistent; flowers white or yellow; achenes glabrous2
- 2. Flowers solitary on long peduncles from basal tufts of leaves; plants spreading by slender aerial stolons; leaves interruptedly pinnate with 9 to 31 principal leaflets.....21. P. Anserina
- 2. Flowers variously disposed in terminal cymes, not from basal tufts; plants not stoloniferous; leaves various3
- 3. Plants annual or biennial, lacking perennial rootstocks and usually without rosettes of basal leaves; cymes very leafy, many-flowered; styles somewhat thickened and glandular at base4

- 4. Leaves ternate5
- 5. Stamens 10; petals usually much shorter than the calyx-lobes1. P. biennis
- 5. Stamens 15 to 20; petals about as long as the calyx-lobes3. P. norvegica
- 4. Lower leaves pinnate with 2 approximate pairs of leaflets; upper leaves ternate; stamens about 103. P. rivalis
- 5. Plants perennial, with stout rootstocks which are often thick and woody and bear persistent bases of leaves of previous years; rosette of basal leaves usually present; cymes usually few-flowered, often bracted but not conspicuously leafy6
- 6. Stamens 5; style inserted laterally on the achene; leaves trifoliolate20. P. Sibbaldi
- 6. Stamens usually 20 or more; insertion of style and leaves various7
- 7. Style thickened and glandular at base; leaves usually pinnate8
- 8. Styles inserted near the base of the achene; leaves elongate, definitely pinnate, with broad toothed leaflets9
- 9. Petals white; cymes short, dense; stems stout, densely viscid-villous; stolons usually absent24. P. arguta
- 9. Petals yellow or cream-color (or nearly white); cymes open or, if condensed, the stems not stout nor densely viscid-villous; stolons often present23. P. glandulosa
- 9. Styles terminal or nearly so on the achenes; leaves pinnate or sub-palmate, with pinnatifid or deeply incised-toothed leaflets10
- 10. Leaves green, the 5 to 15 leaflets pinnatifid with more or less inrolled margins19. P. pennsylvanica
- 10. Leaves white-tomentose beneath, the blades flat; leaflets 5 (rarely 3), incised-toothed18. P. pseudosericea (see also P. nivea).

7. Style glabrous and filiform, much exceeding the mature achene, neither thickened nor glandular at base; leaves various11
11. Plants glabrous or essentially so but thickly beset, especially in the inflorescence, with small stalked glands; leaflets 3 or 5, 2- to 3-cleft and crenate, suborbicular.16. P. brevifolia
11. Plants definitely pubescent or, if nearly glabrous, the glandularity and leaflets not as above12
12. Basal leaves 3-foliolate, densely white-tomentose; alpine dwarfs....17. P. nivea
12. Basal leaves 5- to 13-foliolate13
13. Basal leaves palmate14
14. Leaflets of the basal leaves divided two-thirds of the way to the midrib or more into linear segments.....15
15. Stems prostrate or nearly so, 10 to 15 cm. long; leaflets cleft into 3 to 5 (9) lobes; flowers few, usually 10 or fewer.....15. P. multisecta
15. Stems usually erect, 20 cm. high or more; leaflets usually with 9 to 15 lobes; flowers usually 20 to 4016
16. Leaflets usually 5 to 10 cm. long, strongly discolorous, densely white-tomentose beneath, dark green above; blades, if sericeous, so along the veins only; lobes of leaflets not pectinately crowded but spreading, often subfalcate, usually lanceolate and tapering from base to apex, often 1 to 1.5 (2) cm. long11. P. flabelliformis
16. Leaflets 3 to 5 (7) cm. long, scarcely discolorous, densely silky and beneath often more or less tomentose, gray-green, pectinately lobed, the lobes crowded, more or less parallel; usually parallel-sided and abruptly acute at tip, 5 to 9 mm. long10. P. pectinisecta

- 14. Leaflets crenate or serrate or merely toothed at apex or, if toothed halfway to the midrib the segments broader, neither linear nor crowded.17
- 17. Leaflets white-tomentose beneath.....18
 - 16. Leaves with 5 leaflets, often pinnate; blades white beneath, silky and greenish above but not strongly discolorous; stems prostrate or essentially so, few- to 10-flowered.....6. P. concinna
 - 18. Leaves with 7 leaflets, mostly palmate; stems erect or strongly ascending, usually with 20 or more flowers.....19
 - 19. Leaves prominently discolorous, green above, white-tomentose beneath; leaflets shallowly and obtusely serrate, broadly oblanceolate or obovate, palmate or subpinnate.....8. P. pulcherrima
 - 19. Leaves little or not at all discolorous, the blades pilose, hirsute, or tomentulose to glabrate, variously cut, strictly palmate.....9. P. gracilis
- 17. Leaflets hairy or glabrate beneath, not white-tomentose.....20
 - 20. Anthers ovate to lance-cordate, longer than broad, mostly 0.7 to 1 mm. long; leaves strictly palmate.....9. P. gracilis
 - 20. Anthers subround or oval, 0.5 to 0.7 mm. long; leaves palmate or often subpinnate.....7. P. diversifolia
- 13. Basal leaves pinnate.....21
 - 21. Leaflets, at least the basal pair or pairs, dissected into linear or oblong divisions.....22
 - 22. Leaf-blades suborbicular or orbicular-ovate in outline; leaflets gray-green, villous or pilose especially when young but not permanently nor strongly whitened; leaflets 2 to 4 pairs, closely approximate.....23
 - 23. Leaflets all dissected into linear or narrow divisions; blades usually palmate, the lowest pinnae scarcely if at all separated from the rest.....15. P. multisecta

- 23. Basal pair of leaflets usually divided to base, the others toothed or incised; blades definitely pinnate, the pinnae usually distinctly separated along the rachis14. P. Drummondii
- 22. Leaf-blade oblong in outline, much longer than broad; pubescence various; leaflets 3 to 6 pairs, usually approximate, several pairs usually divided to the base24
- 24. Leaflets conspicuously and more or less permanently white-tomentose; range in California and adjacent Sierra Nevada in Nevada13. P. Breweri
- 24. Leaflets strigose or glabrate, rarely tomentose; a plant of the high mountains of eastern Nevada and eastward12. P. plattensis
- 21. Leaflets varying from nearly entire to crenate or serrate, or lobed, never dissected into deep narrow divisions25
- 25. Leaves white-tomentose, at least beneath26
- 26. Leaves strictly pinnate, with 7 to 11 (usually 9) leaflets4. P. leucophylla
- 26. Leaves palmate or subpinnate or, if definitely pinnate, with 5 leaflets27
- 27. Leaflets usually 5 (rarely 6 or 7), white beneath, silky and greenish above but not strongly discolored; stems prostrate or essentially so, few-to 10-flowered.....6. P. concinna
- 27. Leaflets usually 7, strongly discolored, green above, white beneath; stems erect or strongly ascending, usually with 20 or more flowers8. P. pulcherrima
- 25. Leaves not tomentose, the blades strigose to glabrate or silky28
- 28. Leaves strictly pinnate, with 9 to 13 (usually 11) leaflets5. P. crinita
- 28. Leaves palmate or subpinnate, with 5 or 7 (rarely 9) leaflets7. P. diversifolia

1. FOENICELLA BEHNII Gr. ex., Fl. Franciscana 1: 95. 1891.

Plants erect, biennial from a taproot, the stems coarse, up to about 5 m. in diameter and 60 cm. high, often reddish, divaricately branched from the middle or below, sparsely viscid-villous. Leaves cauline and basal, all ternate, the petioles 4 cm. long or less, the 2 adults broadly ovate to suborbicular, 1-4 cm. long, coarsely serrate with acute, rounded or acute teeth. Cymes many-flowered, normally divaricately branched or (often) becoming elongated and falsely increase through suppression of one branch at each fork. Bracts of the inflorescence leafy, ternate or rarely toothed, the divisions ovate etc. Hypanthium and calyx-lobes sparsely villous and glabrous, the lobes broadly ovate or triangular, about 2-3 (6) mm. long; bractlets linear or oblong, 2 mm. long or less. Petals golden yellow, pale yellow or "brassish," obovate, 1-2.5 mm. long, shorter than the calyx-lobes. Stamens 10; filaments not dilated, about 0.7-1.0 mm. long; anthers about 0.5 mm. long; styles narrowly obovate, glandularly beak, 0.5-0.7 mm. long. Achenes numerous, about 0.8 mm. long, pale greenish-white.

Flowers and fruits in northern and western Nevada from June to September.

This is a semi-woody species of moist soils along streams and meadows, from British Columbia to Arizona and Baja California. Its altitudinal range in Nevada is from 1500 to 2700 meters.

NEVADA: WASHOE: Yeo, Moore & Franklin 939 (USNA); along Galena Cr., 7 mi. w. of Reno Hot Sp., Anchor 5201 (USNA); Jones Cr. 2 mi. n. of Galena Cr., Anchor 6508 (USNA); Hunters' Can., A.E.Hitchcock 495 (US); Hunter Cr., P.E.Hornsbury 1103 (US); Sparks, A.E.Hitchcock 416 (US). SIERRA: Near "Jumbo Canyon Road," 2 mi. s.w. of Virginia City, R.A. Allen 129 (USNA); Gold & Curry ravine near Virginia City, H.G. Bloomer in 1893-4 (US). DOUGLAS: Glenbrook, I. Illstrom 10297 (US). LYON: Near Wickham, Moore & Franklin 884 (USNA). MINERAL: Jerry Cr., Messitt Range, Anchor 6817 (USNA) and 7025 (USNA); 1 mi. s.w. of Sweetwater, G.A.Graham 27 (Calif.). HUMBOLDT: Thomas Cr., 7 mi. s.e. of Winnemucca, Train 117 (USNA); Big Cr., Pine Forest Range, Train, July 15, 1888 (USNA); Santa Rosa Forest, E.O.Wootton, July 25, 1897 (USNA). CHURCHILL: Whitson Ranch, near Eastgate, R.A. Allen 336 (USNA). EUREKA: Palisade, S.G.Stokes, June 17, 1903 (US). LANDER: Battle Mountain, A.E.Hitchcock 607 (US); Lewis Can., 15 mi. s. of Battle Mountain, Goodner & Henning 1059 (USNA); Birch Cr., s. of Austin, Goodner & Henning 153 (USNA); between Austin and Carter's Ranch, A.E.Hitchcock 781 (US). WYOMING: Upper Reese River Canyon Rd., 9 mi. s. of Dorringer, Goodner & Henning 703 (USNA). ELKO: 8 mi. w. of North Fork, Nichols & Lund 317 (USNA); Elko, A.E.Hitchcock 941 (US); Gold Creek, Pine Mt., A.E.Hitchcock 1139 (US); Star Valley, near Death, Holler 9077 (US).

2. POTENTILLA RIVALIS Nutt. in Torr. & Gray, Fl.N.Am. 1: 437. 1840.

This species is very close to the preceding, differing from it chiefly in the basal leaves, which are usually 5-foliolate and pinnate; the leaflets are narrower than in P. biennis, varying from oblanceolate to elliptic. The whole plant in P. rivalis is somewhat hirsute. According to Rydberg (N.Am.Fl. 22: 305. 1908) P. rivalis is a plant of river valleys from British Columbia to Saskatchewan and Mexico; from the examination of a considerable series of herbarium specimens it appears that the species is more or less confined to the Pacific states. I have seen the following specimens, apparently referable here, from Nevada:

HUMBOLDT: Winnemucca, Griffiths & Morris 50 (US). EUREKA: Palisade, S.G.Stokes, June 17, 1903 (US).

Note: I am unable to recognize P. millegrana Engelm. ex Lehm. (P. leurocarpa Rydb.) as a member of the Nevada flora, as I have seen no specimens referable to this species; all the annual and biennial Potentillas from this state appear to be forms of a single species, with the possible exception of the two collections just cited, and I would even hazard a guess that the plants described as P. rivalis, P. millegrana (P. leurocarpa), and P. biennis are all forms of a single species. There appears to be no sharp distinction between the forms with five leaflets and those with three, and the characters of habit, leaf-shape and vestiture which are used to separate P. biennis and P. leurocarpa are not definitive even when applied with care. If all are to be united, the earliest specific name is P. rivalis. "P. leurocarpa" (P. millegrana Engelm. ex Lehm.) has been reported from Nevada (Candelaria, where collected by Shockley, according to Jepson, Fl. Calif. 2: 183. 1936). According to Munz (Man. South. Calif.Bot. 233. 1935) P. biennis is a plant of moist places in the mountains, at elevations of 4500 to 7500 feet, while P. millegrana occurs in moist places on the desert. When additional collections of this group of Potentilla are made in southern Nevada, they should be studied carefully in an effort to determine their relationship to P. biennis Greene, which is relatively common in the northern part of the state. The differences between P. millegrana and P. biennis are summarized by Munz as follows:

<u>P. biennis</u>	<u>P. millegrana</u>
Stems erect or strictly ascending	Stems spreading and diffusely branched from base
Herbage dull green, somewhat glandular	Herbage light-green, not glandular
Leaflets of cauline leaves cuneate-obovate	Leaflets of cauline leaves cuneate-oblong

If, as seems to me advisable, these two forms are to be regarded merely as races of the same species, the name P. millegrana, being the older, must be taken up for the combined entity (if such an entity be

Wetland (var. P. nitida).

3. POTENTILLA NORVEGICA L. Sp.Pl. 499. 1753.

Potentilla mansbelicensis L. Sp.Pl. 499. 1753.

Stems coarse, leafy, erect, up to about 80 cm. high, often strongly tinged with red, hirsute with long and spreading hairs, arising singly or several together from a stout annual or biennial root. Leaves all distinctly 3-foliate, the lower with long hirsute petioles, the upper nearly sessile. Leaflets obovate or elliptic, 3-10 cm. long; those of the upper leaves toothed nearly their whole length. Cymes many-flowered, repeatedly divaricately branched, becoming spreading and leafy; hypanthium and calyx-lobes hirsute and very sparsely glandular, the lobes ovate, 3-6 mm. long; bractlets about equalling or sometimes longer than the sepals, sometimes toothed. Petals yellow, 2-3 mm. long. Stamens 15-20; filaments 0.5-1.5 mm. long, of several lengths in the same flower. Anthers about 0.5 mm. long. Styles about as in P. biennis. Pistils numerous (up to at least 150); achenes about as in P. biennis.

This species, in various forms, is widely distributed in temperate climates in the northern hemisphere. It is relatively uncommon in the United States west of the Rocky Mountains; according to Jepson it is always introduced in California, and it is probable that it is likewise an introduction at the single Nevada locality known to me. It is common and widely distributed in eastern United States and is occasionally found in cultivated and waste grounds in the western part of the country. In North America the chief representative of the species is said to be the indigenous var. hirsuta (Michx.) Lohm., while typical P. norvegica is sparingly introduced, especially in the eastern states.

NEVADA: LYON: Near Sweetwater, L.R. Mill, June 10, 1933 (Univ. of Nevada No. 1693).

4. POTENTILLA LEUCOPHYLLA Torr. & James ex Bot. Beech. Ed. 5. 344. 1829.

Potentilla leucophylla Torr. Ann. Lyc. N.Y. 2: 197. 1827. Not P. leucophylla Fall., 1773.

Potentilla hirsuta Lohm. Stirp. Pugill. 2: 7. 1830.

Potentilla diffusa A. Gray, Mem. An. Acad. Ser. 2, 4: 41. 1849. Not P. diffusa Willd., 1803.

Potentilla Hippiana var. diffusa Lohm., Delict. Sem. Hort. Hamb. 1849; 6. 1849; Ann. Sci. Nat. Ser. 3, 13: 347. 1849.

Potentilla Hippiana propinqua Rydb. Bull. Torr. Club 24: 3. 1897.

Potentilla propinqua Rydb. Bull. Torr. Club 28: 170. 1901.

Perennial, from stout upright branched woody rootstocks. Flowering stems several, 20-50 cm. high, erect or ascending, silky. Leaves mostly basal, pinnate, with 7-11 leaflets (usually 9), 20 cm. long or less, the petioles exceeding the blades. Leaflets oblanceolate, cuneate at base, rounded or acute at tip, more or less silky but green above, densely silky and white-tomentose beneath, 1-6 cm. long, with 3-7 coarse acute teeth on each edge, the serration sometimes extending nearly to base; distal pair (or two pairs) of leaflets decurrent on the rachis; cyme open, spreading, not leafy-bracted, the flowers few to 40 in number; hypanthium and calyx-lobes silky-pubescent, the lobes triangular, acute, 3-5 mm. long, considerably exceeding the bractlets (in typical P. Hippiana of the Rocky Mountain region the bractlets often longer); petals yellow, obovate, retuse, 6-8 mm. long; stamens about 20; pistils about 25; achenes 1.8-2 mm. long.

Flowers in southern Nevada in July.

This species ranges from Saskatchewan and Alberta to New Mexico and Arizona, chiefly in the Rocky Mountain region. It reaches one of its most western stations in Lee Canyon in the Charleston Mountains, between 2500 and 2700 meters elevation, where it occurs in meadows and on hillsides among pines.

NEVADA: CLARK: Lee Can., Charleston Mts., 2550 m., Clokey & Anderson 5509 (US); Lee Can., 2670 m., Clokey 8395 (USNA); Lee Can., 1/2 mi. below Boy Scout Camp, 8400 ft., P. Train 2084 (USNA).

Note: The typical form of this species, with leaves almost equally whitened on both sides, apparently does not occur in Nevada, although its range in general coincides with that of the green-leaved plant which does occur here and which Rydberg called P. Hippiana var. propinqua. The species as a whole has usually been called P. Hippiana Lehm., although Rydberg pointed out in 1897 (Bull. Torr. Club 24: 2. 1897) that P. leucophylla was published a year earlier than P. Hippiana. He argued that P. leucophylla was doubtless a misprint for leucophylla (Torrey's name which had to be abandoned because of an earlier P. leucophylla). Upon examination of the literature, however, I can not justify his cursory dismissal of the name leucophylla. It was published in 1829, in Eaton's Manual (edition 5) and was continued in the sixth and seventh editions of the Manual, as well as in the so-called eighth edition, by Eaton and Wright. At the time of its publication, in the fifth edition, the authority for the binomial was given as Torrey & James (not simply Torrey), whereas in Torrey's original description of leucophylla there is no indication that James (the collector of the original material) was the co-author of the binomial. Since Eaton does not cite the place of publication of P. leucophylla nor refer directly to it, we are forced to regard the name P. leucophylla Torr. & James as having been published independently and validly. It is not, moreover, a combination of nonsense syllables, but means "woolly-leaved," which is appropriate for the species described. Unless it can be shown, by direct quotation from literature or some unpublished manuscript, that Eaton actually maintained the spelling leucophylla over a period of 11

years, through four editions of his flora, under a misapprehension, it seems to me that under the existing Rules of Nomenclature, the name cannot be dropped.

5. POTENTILLA CRINITA A. Gray, Men.An.Acad. ser. 2, 4: 41. 1849.

Ivesia Lemmoni S. Wats. Proc.An. Acad. 20: 365. 1885.

Potentilla Lemmoni Greene, Pittonia 1: 104. 1887.

Potentilla crinita var. Lemmoni Kearney & Peebles, Journ. Wash.Acad.Sci. 29: 480. 1939.

Exactly simulating the preceding species in habit and general morphology, and distinguished from it by leaf-characters only. In P. crinita the leaflets are often more or less parallel-sided, and toothed toward the apex only; this second character is inconstant, however, both toothed and untoothed leaflets often being found on the same plant. The principal distinction lies in the fact that in P. crinita the leaflets are silky beneath (often densely so and much whitened), but are without the crisped tomentum which characterizes P. leneophylla. The number of leaflets in P. crinita varies from 9 to 13; the usual number is 11. The soft silky pubescence may be wholly lacking, the leaflets then more or less covered with stiff white hairs, especially on the veins. The number of pistils varies from 5 to 25.

Flowers in southern Nevada from early July to early August.

P. crinita is a native of the southern Rocky Mountain region, from Colorado to New Mexico, west to Utah, Arizona and southern Nevada. In Nevada it is found on dry hillsides and canyon slopes, often in pine forests, at elevations of 2000 to 2500 meters.

NEVADA: CLARK: Lee Can., Charleston Mts., A.A. Heller 10983 (US); Lee Can., Clokey & Anderson 5512 (US); Charleston Park, Charleston Mts., Clokey 5514 (US); Charleston Park, head of Kyle Can., P. Train 2231 (USNA); Charleston Park, C.S. Scofield 23 (USNA); Charleston Park, Clokey 7544 (Pl. Exsicc. Gray, distr. as P. Lemmoni) (USNA); Hidden Can., Sheep Mts. LaRivers & Hancock 595 (USNA); Sheep Mts., Desert Game Range, S.G. Jewett 48 (USNA).

Note: I have not distinguished P. Lemmoni (P. crinita var. Lemmoni) from typical P. crinita, as the number of teeth per leaflet appears to be related to the size and vigor of the leaves and this in turn is related to the habitat. The relation between petal-length and sepal-length mentioned by Kearney & Peebles does not seem to apply to Nevada material; the petals usually surpass the sepals both in luxuriant and starved forms. The chief difficulty in this group is to distinguish the luxuriant forms of P. crinita, which have toothed leaflets and usually dense silky pubescence, from P. leneophylla. The two grow in close proximity in southern Nevada, although P. leneophylla is ordinarily found at higher elevations.

6. *POTENTILLA CONCINNA* Richards. in Franklin Journ. App. 739. 1823.

Potentilla Beanii Clokey, Bull. So. Calif. Acad. Sci. 38: 4. 1939
(type from the Charleston Mts., Clokey 7974)

Plant perennial, from a thick woody rootstock; flowering stems several, prostrate or nearly so, more or less tomentose, up to about 20 cm. long; leaves green and strigose above, strongly whitened and tomentose beneath, up to about 10 cm. long. Blades pinnate or palmate, with 5 (rarely 7) leaflets, the leaflets oblong or obovate, often cuneate, up to about 2 cm. long, 3- to 5-toothed above the middle or (in the form from the Charleston Mountains) toothed to the middle or below. Cymes divaricately branched, few- to 10-flowered. Hypanthium and calyx-lobes densely silky-villous, the latter ovate, acute, 3-5 mm. long, somewhat exceeding the narrower bractlets. Petals yellow, 5-8 mm. long, broadly rounded or obcordate. Stamens about 20; anthers 0.6-0.8 mm. long. Styles about 2 mm. long, filiform and smooth.

Flowers in the mountains of Nevada from late June to early August. It grows in alpine meadows and on rocky slopes, at elevations from 2900 to 3400 meters. The range is from South Dakota to New Mexico, Alberta and southern Nevada.

NEVADA: WHITE PINE: Alpine slopes above Timber Creek, Shell Creek Range, McVaugh 6008b, 6011 (USNA); north base of Wheeler Peak, 9000 ft., Moore & Franklin 544 (USNA). CLARK: Head of Lee Can., A.A. Heller 11069 (US, Stanford); the specimen at Stanford determined by Keck as *P. diversifolia*; south ridge of Kyle Can., 3 mi. s.e. of Charleston Peak, LaRivers & Hancock 537 (USNA); trail to Charleston Peak, Clokey 7144 (USNA); Charleston Peak Trail, Train 2267 (USNA); ridge to Charleston Peak, 3270 m., Clokey 7974 (USNA, isotype of *P. Beanii*).

UTAH: BEAVER OR PIUTE: Mt. Belknap, Rydberg & Carlton 1344 (US).

The Nevada material which I am now referring to *P. concinna* also shows undoubted affinities to the group of *P. diversifolia*. It matches almost exactly, however, material of *P. concinna* from the region of the Rocky Mountains and from further east. The leaves are regularly pinnate and tomentose, with the pinnae tending to be toothed at the ends only; in the form described as *P. Beanii* some of the leaves are regularly palmate, and the leaflets are often toothed further toward the base. I can see no valid differences between it and *P. concinna*; those given by Clokey (Bull. So. Calif. Acad. 38: 5. 1939) are chiefly concerned with minor differences in size of flower-parts and I judge they are of no more than varietal significance.

7. *POTENTILLA DIVERSIFOLIA* Lehm. Stirp. Pugill. 2: 9. Aug. 1830.

Potentilla glaucophylla Lehm. Delect. Sem. Hort. Bot. Hamb. 1836:
7.1836; Linnaea 12: lit. 83.1836.

Potentilla intermittens Rydb. N.An.Fl. 22: 518. 1908.

Perennial, 10-40 cm. high, from a stout woody rootstock which may be much branched. Leaves mostly basal, 10 cm. long or less, digitately (or sometimes pinnately) 5-foliolate; leaflets 1-3 cm. long, oblanceolate, cuneate at base, more or less rounded and 3- to 7-toothed or incised above the middle, silky-strigose to glabrous and glaucescent, little if at all whitened on either surface. Cymes rather dense in anthesis, few- to 10-flowered, up to about 10 cm. long in fruit, the branches ascending, not leafy-bracted. Hypanthium and calyx sparsely silky and sparingly glandular; calyx-lobes triangular, acute, 2-5 mm. long; bractlets narrower, shorter. Petals yellow, 6-8 mm. long, broadly obovate. Stamens 20; anthers 0.5-0.7 mm. long, usually broadest in the middle and about as wide as long. Achenes about 1.3 mm. long.

Flowers in Nevada from mid-June to August.

Yukon and British Columbia southward, in alpine habitats, especially near tree line and above, to Colorado, Arizona and the southern Sierra Nevada of California. In Nevada it grows in alpine meadows and on rocky slopes at elevations of 3000 meters and above.

NEVADA: ELKO: Lamoille L., Ruby Mts., Train, July 21, 1936 (US, USNA); East Humboldt Mts., S. Watson 327, Aug. 1868 (US); East Humboldt Mts., M.E. Jones 6295, July 27, 1900 (US); Canyon at head of south fork of the Humboldt R., Ruby Mts., Heller 9403 (US).
WHITE PINE: Stella Lake, near Lehman Caves, Moore & Franklin 518 (USNA); "Wheeler Peak, 13500 ft. alt.", Vernon Bailey, July 25, 1904 (US; the specimen is headed "Plants of New Mexico" but this appears to be an error); Alpine slopes n. of Timber Creek, Shell Creek Range, McVaugh 6015 (USNA); Wheeler Peak, near Stella Lake, McVaugh 6042 (USNA).

8. POTENTILLA PULCHERRIMA Lehm. Stirp. Pugill. 2: 10. Aug. 1830.

Potentilla filipes Rydb. Bull. Torr. Club 28: 174. 1901.

Potentilla gracilis var. pulcherrima Fern. Rhodora 42: 213.
1940.

Perennial up to about 0.6 m. high, resembling P. pectinisecta and P. gracilis in size and habit. Leaves up to about 20 cm. long, the petioles up to about 15 cm. long, loosely pilose with spreading or reflexed hairs, often glabrate. Leaflets usually 7, 5 cm. long or less, obovate or oblanceolate, usually rounded at apex, dark green and sparsely silky-strigose above, conspicuously white-tomentose beneath. Teeth ovate to oblong or linear, abruptly rounded to apiculate, usually cut somewhat less than halfway to the midrib. Lower 1 or 2 pairs of leaflets sometimes separated from the others, the blades thus appearing pinnate. Inflorescence like that of P. pectinisecta usually not more than 20-flowered, the branches spreading; sepals and hypanthium very sparsely strigose, green, the sepals and bractlets

strongly glandular, not at all tomentose. Achenes about 1.5 mm. long.

Flowers in northeastern Nevada from mid-June to early August.

Range (according to Keck, Carneg.Inst.Wash.Publ. 520: 133 and map, p. 131) from northern Alberta and British Columbia to New Mexico, Arizona and eastern Nevada, in mountainous regions, at elevations up to 3500 meters. Its habitat is like that of P. gracilis and P. pectinisecta.

NEVADA: ELKO: East Humboldt Mts., 6500 ft., S. Watson 333, July 1868 (US, det. Rydberg); Lamoille Can., Nichols & Lund 581 (USNA); Log Cabin Cr., Jarbidge Mts., Train 763 (USNA). WHITE PINE: 7 mi. e. of Ely, 2400-3000 m., A.E.Hitchcock 1273 (US, det. Keck); 5 mi. n. of Lund, Moore & Franklin 730 (USNA); Baker Cr., 4 mi. w. of Baker, Moore & Franklin 623 (USNA).

Note: The plants most closely related to Potentilla gracilis, namely those discussed under P. flabelliformis, P. pectinisecta, P. gracilis and P. pulcherrima, are very similar and difficult to distinguish. The exception, at least in Nevada, is P. pulcherrima, which always appears distinct by virtue of its strongly bi-colored leaves and its almost glabrous and strongly glandular calyx, which is in striking contrast to the generally white-tomentose foliage. In all the other species mentioned the calyx is uniformly densely strigose almost exactly like the leaves and usually non-glandular; the glands, if any, are usually obscured by the pubescence.

All these species, possibly including P. diversifolia as well, might be included by some students in a single broad species, P. gracilis Dougl. ex Hook. Bot.Mag. 57: t. 2984. May 1830. The most recent monographic students of the group, however, consider them as distinct, but belonging to a single inclusive "Genospecies" (Carneg. Inst.Wash.Publ. 520: 128-129. 1940).

9. POTENTILLA GRACILIS Dougl. ex Hook., ssp. NUTTALLII (Lehm.)
Keck, Carneg.Inst.Wash.Publ. 520: 134, 1940.

Potentilla Nuttallii Lehm. Stirp.Pugill. 9:44. 1851.

Potentilla rigida Nutt. Journ.Acad.Phil. 7: 20. 1834. Not
Potentilla rigida Wall., ex G. Don. 1832.

Potentilla fastigiata Nutt. in Torr. & Gray, Fl.N.Am. 1: 440.
1840.

Potentilla Blaschkeana Turcz. ex Lehm. Hamb. Gart. & Blumenz.
9: 506. 1853.

Potentilla etomentosa Rydb. Bull.Torr.Club 24: 8. 1897.

Potentilla glomerata A.Nels. Bull.Torr.Club 26: 480. 1899.

Potentilla jucunda A.Nels. Bull. Torr. Club 27: 52. 1900.

Potentilla grosseserrata Rydb. N. Am. Fl. 22: 312. 1908.

Potentilla dichroa Rydb. N. Am. Fl. 22: 319. 1908.

This species is similar to the next, differing from it chiefly in the leaflets, which in the various forms of P. gracilis are toothed rather than deeply lobed, the teeth rarely extending more than halfway to the midrib; in forms with elongated teeth, the blade is usually broad, its width about equalling the length of the lobes. The leaflets in ssp. Nuttallii are strigose or silky on both surfaces; the lower surface is more densely pubescent than the upper, but is tomentose only rarely. The inflorescence may reach a length of 30 cm. and bear about 100 flowers, but is usually smaller than this.

Flowers in northern and central Nevada from late June to September, the flowering period apparently slightly earlier than that of P. pectinisecta.

Alaska and Alberta to South Dakota, Colorado, Utah and the mountains of southern California; most abundant north and west of the Great Basin. It grows in meadows and along streams, at altitudes (in Nevada) from 1800 to 2700 meters.

NEVADA: WASHOE: Sheldon Antelope Refuge, McVaugh 6277 (USNA); Marlette L., C.F. Baker 1383 (US); Marlette L., R.A. Allen 537 (USNA); Washoe L., C.F. Baker 1170 (US, det. Keck); near Incline, T.L. Breene 505 (USNA); 1 mi. s. of Verdi, R.A. Allen 21 (USNA); along Galena Cr., west of Reno Hot Spgs., Archer 5635a (USNA) and 5702 (USNA); n. side of Slide Mt., Heller 10949 (US). DOUGLAS: Glenbrook, near Lake Tahoe, Tidestrom 10326 (US) and 10363 (US). MINERAL: East slopes of Wassuk Range, above Cory Can., Archer 6970 (USNA). HUMBOLDT: Canyon Creek summit region, Santa Rosa Range, Train 502 (USNA); Hinkey Summit, Santa Rosa Range, Train 286 (USNA). CHURCHILL: Edwards Creek Ranch, 22 mi. n. of Eastgate, R.A. Allen 393 (USNA). LANDER: 8 mi. e. of Austin, Goodner & Henning 618 (USNA); Austin, A.E. Hitchcock 712 (US). EUREKA: Vicinity of The Willows, about 34 mi. w. of Eureka, Goodner & Henning 579a (USNA). WHITE PINE: Ely, Dutch Creek, Paine's Ranch, A.E. Hitchcock 1357 (US; apparently a form approaching P. pectinisecta); n. base of Wheeler Peak, below Stella Lake, McVaugh 6045 (USNA). ELKO: Coon Creek R.S., Jarbidge Mts., Train 679 (USNA); 5 mi. s.w. of Rowland on Meadow Cr., Nichols & Lund 548 (USNA); 3 mi. s. of Idaho line on Sheep Cr., Nichols & Lund 428 (USNA); 4 mi. n.w. of Gold Creek, Nichols & Lund 499 (USNA; a form approaching P. pectinisecta ?); Gold Creek, A.E. Hitchcock 1064 (US); Pine Mt., vicinity of Gold Creek, A.E. Hitchcock 1118 (US); Wm. Smiley's Ranch near Death, Heller 9207 (US, det. by Keck in 1938 as ssp. Nuttallii, "toward P. pectinisecta"); upper end of Star Valley near Death, Heller 9079 (US; a tomentose form suggesting P. pulcherrima but with long narrow leaflets and linear lobes); Ruby Valley, S. Watson 339 (US). COUNTY UNKNOWN: "Nevada," Lt. Wheeler in 1873 (US).

10. POTENTILLA PECTINISECTA Rydb. Bull.Torr.Club 24:7.1897.

Potentilla candida Rydb. Bull.Torr.Club 24: 6. 1897.

The type; Watson 337, came from the Diamond Valley, Eureka County, Nevada, where collected by the King Expedition in July 1868 (U.S. National Herbarium).

Potentilla Bakeri Rydb. Bull.Torr.Club 31: 560. 1904.

A coarse erect perennial up to about 0.6 m. high, the 1 or several flowering stems produced from a heavy erect woody root-stock. Leaves mostly basal, 10 or fewer, the leaflets usually 7, 2-5 cm. long, on silky-strigose petioles up to 20 cm. long. Leaflets oblanceolate to obovate in outline, cuneate at base, rounded to acute at tip, more or less appressed-silky on both sides, each with 9 to 15 acute or rounded lobes which are linear or oblong, 1-2 mm. wide at base, and more or less parallel to each other. Cyme dense in flower, elongating and becoming 10-15 cm. long in fruit, up to about 40-flowered, the branches strictly erect or strongly ascending, not leafy-bracted except at the base of the inflorescence. Hypanthium and calyx-lobes silky-strigose without, the latter broadly lanceolate to ovate, acuminate, 5-8 mm. long; bractlets linear-lanceolate, acute, 3-5 mm. long. Petals yellow, obovate or obcordate, 6-8 mm. long. Stamens 20; anthers ovate-cordate, about 0.7 mm. wide by 0.7-1 mm. long. Achenes smooth, pale brown, 0.7-1.2 mm. long.

Flowers in northern and central Nevada from mid-June to early August or even into September. It occurs in mountainous areas in the Great Basin, from Montana to Oregon, south to New Mexico, southern Utah, central Nevada and southern California. It is a plant of moist sandy or gravelly soil, in meadows and along streams or on moist wooded slopes. Its altitudinal range in Nevada is from 1600 to 2700 meters.

NEVADA: WASHOE: No specimens seen. LYON: 14 mi. s.s.e. of Wellington, Moore & Franklin 841 (USNA). MINERAL: E. slopes of Wassuk Range, above Cory Can., W.A. Archer 6970 (USNA). ESMEERALDA: Chiatovitch Cr., White Mts., V. Duran 2777 (US). LANDER: Kingston Can., I. Tidestrom 10955 (US; det. Keck); Skull Cr., near Grass Valley Ranch, Goodner & Henning 457a (USNA); 6 mi. n.e. of Austin, Goodner & Henning 1137 (USNA); Smiths Creek Can., 44 mi. w. of Austin, Goodner & Henning 648 (USNA). EUREKA: Vicinity of The Willows, about 34 mi. w. of Eureka, Goodner & Henning 579 (USNA); Pine Creek Camp Grounds, Goodner & Henning 315 (USNA); Sora Ranch, Fish Creek Sprs., P. Train, June 20, 1936 (US; det. Keck) WHITE PINE: Paine's Ranch, Duck Creek, near Ely, A.E. Hitchcock 1363 (US); 1 mi. s. of Lehman Caves R. S., Moore & Franklin 583 (USNA). ELKO: North slope Merit Mt., 15 mi. n.e. of Mountain City, Nichols & Lund 442a (USNA); Coon Creek R. S., Jarbidge Mts., P. Train 689 (USNA); 8 mi. w. of North Fork, Nichols & Lund 289a (USNA); Independence Valley, 2 mi. s. of Tuszarora, Nichols & Lund 268 (USNA); 1.5-2 mi. w. of Owyhee, T. L. Breone 354 (USNA); south end of Starr Valley, Nichols & Lund 155a (USNA); meadows of

Prunty Ranch, headwaters of Brunson River, Trein 539 (USNA); Gold Creek, Nelson & McBride 2102 (US), and A.E.Hitchcock 1062 (US); Death (and vicinity), Heller 9008 (US; det Keck), 10556 (US; det. Keck) and 10567 (US); Park's Sta., 25 mi. n. of Elko, A.E.Hitchcock 974 (US) and 982 (US; det. Keck).

11. POTENTILLA FLABELLIFORMIS Lehm. Stirp. Pugill. 2: 12. Aug. 1830.

A coarse erect perennial up to 0.6 m. high, with a silky-striate stem. Leaflets usually 7, at least the principal ones more than 5 cm. long; lobes 9-15 (19), 1-5 mm. wide at base. Cyme many-flowered; flowers 10-15 mm. across; petals yellow, obovate, a little longer than the calyx-lobes. Stamens 20.

A plant of the northern Great Basin, ranging from Saskatchewan (see Canad. Inst. Wash. Publ. 500: 132 and map. p.131) to southernmost British Columbia, south to Wyoming, central Idaho and the mountains of eastern California. Its range approaches Nevada in the vicinity of Lake Tahoe, where it is said to be rare; it probably occurs also, as indicated below, in the northern part of the state.

NEVADA: HUMBOLDT: Havallah Mts. (now Sonoma Range), 6000 ft., S. Watson 538, June 1868 (US: this specimen was examined by Keck in 1958 and noted by him. It appears to be typical P. flabelliformis as currently interpreted by Keck, but his map does not indicate its occurrence in this part of Nevada). WASHOE: Incline, near Lake Tahoe, P. B. Kennedy 1427 (US: this collection is represented in Washington by two sheets, neither of which bears basal leaves but both of which appear to be closer to P. flabelliformis than to P. gracilis ssp. Nuttallii, which occurs in the same region.

12. POTENTILLA PLATTENSIS Nutt. in Torr. & Gray Fl. N. Am. 1: 439.

Potentilla ovina J.M. Macoun, Can. Rec. Sci. 6: 464. 1896.

Potentilla diversifolia var. pinnatisecta S. Wats. in King, Geol. Expl. 40th Par. 5: 87. 1871. I have not seen nos. 331 and 332 of the plants of the King Expedition, upon which this variety was based, but Watson suggests that it may be identical with P. plattensis, and his description bears out this suggestion. Part of no. 331 is said to have come from the East Humboldt (now Ruby) Mountains, and part of 332 from the Clover (now East Humboldt) Mountains.

Potentilla pinnatisecta A. Nels. Wyo. Exp. Sta. Bull. 28: 104.
1896.

Perennial from a thick upright woody rootstock; flowering stems several, erect, ascending or prostrate, 10-15 cm. high (in alpine situations in Nevada), villous or glabrate. Leaves mostly basal, pinnate; 2-8 cm. long. Blades 1-4 cm. long, 1-2.5 cm. wide, glabrous to white-tomentose. Leaflets 3-5 pairs, incised to the midrib or nearly so into linear or narrowly elliptic lobes. Petioles hairy or glabrate. Cymes divaricately branched, 2- to 10-flowered. Hypanthium and calyx-lobes strigose, the latter lance-ovate, acute, 4-5 mm. long; bractlets linear or narrowly elliptic, 2-3 mm. long. Petals bright yellow, with an orange-yellow spot at base, rounded or obovate or obcordate, about 6 mm. long. Stamens about 20, anthers ovate, longer than broad, 0.6-0.8 mm. long. Styles glabrous, filiform, about 2 mm. long.

Flowers in Nevada in July and August.

The range of this species is from South Dakota to New Mexico, west to Alberta and the mountains of Montana, Utah, Nevada and Arizona. In Nevada it is chiefly restricted to alpine meadows and rocky slopes, at elevations of 2700 meters and above.

NEVADA: WHITE PINE: Wheeler Peak, at about 3300 meters, McVaugh 6030 (USNA); rocky slopes above Timber Creek, Shell Creek Range, McVaugh 6004 (USNA); same locality, McVaugh 6008a, 6014 (USNA). LANDER: moist pasture at Reese R., 10 mi. w. of Austin, Hitchcock & Martin 5586, July 31, 1939 (Calif).

Note: I am unable to distinguish clearly between P. plattensis and P. Breweri; the former is usually tomentose or even nearly glabrous and is more or less confined to the Rocky Mountain region, while the latter is a white-tomentose form of Oregon and California. I am inclined, after a somewhat superficial resumé of the species involved, to consider these two conspecific; my own collections from Nevada, with the exception of number 6008a, agree well with material of P. plattensis from further east; number 6008a, on the other hand, although associated in nature with nearly glabrous plants and seeming to differ from them in the pubescence only, has the white tomentum of P. Breweri and is otherwise a good match for that species. I have seen, moreover, specimens from Stein's Mountain, Oregon, which were identical with my nearly glabrous Nevada specimens (nos. 6004, 6014 and 6030) and which were determined as P. breweri by Fr. Keck, who has recently studied this species in detail. Keck says, indeed: "Our experimental studies have been concerned with the Pacific Coast representatives of this group only, but further investigation would doubtless show that certain scarcely distinguishable forms of the Rocky Mountains of Wyoming and Colorado, and of the Uintas of Utah, belong likewise in this cenospecies" (Carneg. Inst. Wash. Publ. 520: 176-177. 1940). If P. plattensis, P. Breweri and P. Drummondii prove to be conspecific the latter, being the oldest name, must be taken up. Until more detailed studies of the whole group are available, however, they may be considered separately.

13. *POTENTILLA BREWERI* S. Wats. Proc.Amer.Acad. 8: 555. 1873.

In habit and general appearance similar to the preceding species. Stems mostly 10-30 cm. long, more or less arachnoid-villous. Leaves about 10 cm. long or less (often about 6 cm.), the blades mostly 3-4 (5) cm. long, 1-2 cm. wide; petioles more or less tomentose except at base. Leaflets appearing palmately divided with 3-6 linear or oblong lobes; length of leaflets 5-10 (25) mm.

Flowers in western Nevada in July, according to the collections seen.

Potentilla Breweri is a plant of alpine meadows, at elevations of 1600 to 3650 meters, from Oregon to Tulare County, California. It occurs in Nevada, so far as known, only in southern Washoe County.

NEVADA: WASHOE: Mt. Rose, 9650 ft., A.A.Heller 9902 (US; Stan., et. Keck); Mt. Rose, 10,200 ft., Train 4445 (USNA).

14. *POTENTILLA DRUMMONDII* Lehm., ssp. *BRUCEAE* (Rydb.) Keck, Carneg. Inst.Wash.Publ. 520: 180. 1940.

Potentilla Bruceae Rydb., N.Am.Fl. 22: 342. 1908.

Perennial from a thick woody rootstock; flowering stems several, erect or decumbent, up to about 25 (40) cm. high, villous or glabrate. Leaves mostly basal, pinnate, 2-5 (10) cm. long, up to about 8 in number, the petioles up to about 3 (5) cm. long, soon glabrous. Blades 1-3 (6) cm. long, 1-2 (3) cm. wide; stipules broad, leafy, those of the reduced cauline leaves often 10 mm. long (as long as the blades themselves or nearly so) and giving the stem a leafy appearance. Leaflets broadly obovate in outline, sharply and irregularly 5- to 6-toothed or incised, 10-20 (35) mm. long. Cymes divaricately branched, few to 10 (20?) cm. long at maturity, few- to 15-flowered. Hypanthium more or less tomentose; calyx-lobes pubescent, lance-ovate, acute, 3-3 mm. long; bractlets 1-2.5 mm. long. Petals yellow, rounded, obovate or obovate, 2-7 mm. long; anthers about 20, rounded, about 0.5-0.6 mm. long and broad.

This subspecies ranges from Lake County, Oregon, southward through the Sierra Nevada to Tulare County, California, at elevations of 2100 to 3250 meters. The related subsp. *typica* Keck (*P. Drummondii* Lehm. Stirp. Pugill. 2: 9. 1830), distinguished by having larger leaves which are dark green and almost glabrous, has a similar range, extending north to British Columbia and Alberta; it has not been found in Nevada, so far as I am aware, although it occurs in California in the region about Lake Tahoe.

NEVADA: WASHOE: East side of Mt. Rose, 10,000 ft., Train 4422 (USNA), 4426 (USNA).

15. *POTENTILLA MULTISECTA* (S.Wats.) Rydb. Bull.Torr.Club 23: 397.
1896.

Potentilla diversifolia var. multisecta S.Wats. in King,
Geol.Expl. 40th Par. 5: 86. 1871.

Perennial from a stout upright woody rootstock, the flowering stems 10-15 cm. long, usually prostrate, appressed-villous. Leaves palmate or subpinnate, 4-10 cm. long, the blades 2-4 cm. long, ovate or suborbicular in outline, 2-4 cm. wide; leaflets 3-5, green both sides, approximate, often conduplicate, cleft to the midrib or nearly so into 3-9 linear or narrowly elliptic segments, strigose above and more densely so beneath. Inflorescence 6-8 cm. long in fruit, loosely spreading, few- to 15- flowered, the pedicels slender, up to 3 cm. long, often nodding or recurved. Hypanthium and sepals rather densely pale-strigose, the sepals 3-5 mm. long, acute, triangular-ovate, broader and longer than the bractlets. Petals yellow, 5-7 mm. long, narrowly obovate, rounded. Stamens 20; anthers about 0.7 mm. long. Pistils 12-20; styles filiform, glabrous, about 2.5 mm. long, attached just below the tip of the pistils; achenes about 2 mm. long.

Flowers in eastern Nevada from May to July; fruit is mature by late July.

The range, according to Rydberg (N.Am.Fl. 22: 327. 1908) is from Montana and British Columbia to Wyoming and Nevada, in high mountains. In Nevada the plant is found in alpine meadows and on rocky hillsides, at elevations of 2500 to 3400 meters.

NEVADA: ELKO: East Humboldt (Ruby) Mts., 9000 ft., S. Watson 330 (King Exp.) July 1868 (US, type). WHITE PINE: Lehman (Layman) Caves, P.A. Lehenbauer, May 14, 1926 (Univ. of Nev. no. 1182); slopes above Timber Creek, Shell Creek Range, McVaugh 5997, 6008 (USNA). LANDER: Bunker Hill, Toiyabe Forest, alt. 2250-3400 m., A.E. Hitchcock 870 (in part) (US).

Note: This species was placed by Rydberg (N.Am.Fl. 22: 327. 1908) in his group Aureae, with P. diversifolia. I judge, however, that it is much more closely related to P. plattensis, P. Breweri and P. Drummondii ssp. Bruceae than to P. diversifolia. It is, indeed, rather difficult to separate P. multisecta from Nevada material of P. Drummondii ssp. Bruceae. The leaves of the latter are less deeply divided and more generally pinnate, and the pubescence is softer and not so stiff as in P. multisecta, but the general resemblance between the two is striking.

16. *POTENTILLA BREVIIFOLIA* Nutt. in Torr. & Gray, Fl.N.Am. 1: 442.
1840.

Dwarf perennial 15 cm. high or less, from stout upright woody rootstocks. Flowering stems mostly 1 or 2, glabrous or essentially so,

but the whole plant more or less densely covered with minute stalked glands, these particularly abundant in the inflorescence. Leaves pinnate, with 3-5 (7) leaflets, the terminal leaflet sometimes deeply incised but not truly pinnate. Leaflets rounded, nearly sessile, 0.5-1 cm. long, 2- to 3- cleft and crenate as well. Stipules broadly ovate, foliaceous, up to about 1 cm. long and 0.6 cm. wide. Flowers 1-15; petals yellow, obovate, emarginate, 4-5 mm. long; sepals ovate-lanceolate, about 3-4 mm. long; bractlets ovate-lanceolate, surpassed by the sepals. Stamens about 25; anthers about 0.3-0.5 mm. long, often broader than long. Pistils 25-30; achenes light green, about 1 mm. long; style filiform, glandular near base, attached slightly below the tip of the achene, about 1.5 mm. long.

This species is a native of the high mountains from Oregon to Wyoming, growing in rocky alpine habitats at elevations of 2700 meters and above.

NEVADA: ELKO: Jarbidge, in moist rocky soil, 10800 ft., Nelson & Macbride 1878, July 8, 1912 (US).

17. *POTENTILLA NINEA* L. Sp.Pl. 499. 1753.

Perennial from short thick much-branched rootstocks, growing in dense rounded mats or tufts up to 30 cm. across; flowering stems more or less tomentose, 20 cm. high or less (usually less than 10 cm.). Leaves mostly basal, tomentose, densely white-tomentose beneath and silky-strigose and woolly above. Leaflets oblong or obovate, coarsely crenate to deeply incised, the principal ones 3- to 7-toothed. Flowers solitary or in small cymes. Hypanthium and sepals more or less white-tomentose; sepals lanceolate or triangular, (3) 3-6 mm. long, longer and wider than the bractlets. Petals yellow, obovate, 3-5 (3) mm. long. Stamens about 20. Pistils many; styles filiform; 1 to 1.2 mm. long, sometimes very slightly glandular.

This is an arctic-alpine species of the northern Hemisphere, extending south in the Rockies to Colorado, and westward to Nevada, on high mountains. Numerous segregate species have been described in this group of *Potentilla*, but until additional material is available it is impossible to determine which, if any, occurs in Nevada.

NEVADA: WHITE PINE: Wheeler Park, 5300 m., McVaugh 6032, 6041 (USNA); Dry rocky soil, Duck Creek Can. 4 mi. s.e. of Paine's Ranch, 2400-5450 m., A.E. Hitchcock 1427, Aug. 17, 1913 (US).

18. *POTENTILLA PSEUDOSERICA* Rydb. Mem. Dept. Bot. Columbia Univ. 2: 98. 1898.

Perennial from a stout woody rootstock, the flowering stems erect or ascending, several, up to about 15 cm. long, silky-pilose with grayish hairs. Leaves mostly basal, pinnate or palmate, with 5 (sometimes 3) leaflets. Blades 1-2 cm. long, 1-5 cm. wide,

suborbicular, usually definitely pinnate but with the lowest pair of leaflets scarcely separated from the rest. Leaflets green and strigose above, silky and white-tomentose beneath, up to 2 cm. long, mostly obovate, pinnately toothed or incised more than halfway to the midrib, the divisions of the principal leaflets oblong, 7-11 in number. Cymes divaricately branched, 2- to 10-flowered. Hypanthium and calyx-lobes densely silky-hairy, the latter ovate, acute, 3-5 mm. long, exceeding the linear or elliptic bractlets. Petals yellow, 6-7 mm. long, obcordate. Stamens about 20; anthers about 0.6 mm. long. Styles 0.9-1.2 mm. long, thickened and glandular near base.

Flowers in Nevada in July and August. Its range, according to Rydberg (N.Am.Fl. 23: 348. 1908) is from Wyoming and Colorado to Nevada; it occurs also in the White Mountains of California. In Nevada it is strictly an alpine plant, occurring among rocks at elevations of 3000 meters and above.

NEVADA: WHITE PINE: Wheeler Peak, at 3300 m., McVaugh 6031, 6037 (USNA).

The type of this species is Shockley 592, supposed by Rydberg to have come from Nevada. According to Jepson, however, Shockley's plant came from the White Mountains of Mono County, California (Fl. Calif. 2: 184. 1936).

19. POTENTILLA PENNSYLVANICA L. Mant. 76. 1767.

Potentilla pennsylvanica var. strigosa Pursh, Fl.Am.Sept. 356. 1814.

Potentilla strigosa Pall. ex Tratt. Ros.Monog. 4: 31. 1824.

Potentilla glabrella Rydb. Mem.Dept.Bot.Columbia Univ. 2: 94. 1898.

Potentilla pennsylvanica var. ovium Jepson, Fl.Calif. 2: 184. 1936.

Perennials with upright or decumbent stems, few to 50 (80) cm. high, more or less glandular-dotted throughout. Whole plant pilose, the stems and lower surfaces of the leaves sometimes tomentose as well. Leaves basal and cauline, pinnate, the basal with 5-15 (usually 7-9) deeply pinnatifid leaflets which decrease regularly in size toward the base of the leaf. Petioles puberulent and hirsute with spreading hairs. Leaflets 1-5 cm. long, silky-strigose and yellowish-green above; lower surface strigose and more or less tomentose, usually gray-green. Lobes of leaflets linear or oblong, the margins inrolled. Cymes few- to 20-flowered, rather dense, few-to 10 cm. long in fruit. Hypanthium and sepals villous and strongly glandular, the latter ovate or triangular, 3-6 mm. long. Bractlets narrower than but about equalling the sepals in length (at least in fruit). Petals yellow, 3-4 mm. long, blunt, obovate. Stamens (11) 16-20. Styles about 1.3 mm. long, thickened and glandular at base; pistils many.

Flowers in Nevada from late June to August.

This species, when considered in the broad sense, ranges from Hudson Bay to the Yukon, south in the Rocky Mountains and adjacent plains to New Mexico and South Dakota, westward sparingly to Nevada and southeastern California.

NEVADA: ELKO: East Humboldt Mts., 9000 ft., S. Watson 326, Aug. 1868 (US). WHITE PINE: Shell Creek Range, n. of Timber Creek, McVaugh 5998 (USMA); Wheeler Peak, 3300 m., McVaugh 6038 (USMA); Ruby Hill, M.E. Jones, July 8, 1891 (US). This locality is apparently near Aurum, not the Ruby Hill in Eureka County. LANDER: Bunker Hill, Toiyabe Forest, 2250-3400 m., A.E. Hitchcock 870 (in part) (US). ESMERALDA: Chiatovitch Cr., White Mts., 9000 ft., V. Duran 3331, June 24, 1932 (Calif, US).

20. POTENTILLA SIBBALDI Hal.f. in Scr.Mus.Helv. 1: 51. 1818.

Sibbaldia procumbens L. Sp.Pl. 284. 1753. Not Potentilla procumbens Sibth., 1794.

Low tufted perennials, the stems 10 cm. high or less from matted creeping woody rootstocks. Leaves chiefly basal, ternate, sparingly appressed-pilose, on slender petioles up to about 5 cm. long. Leaflets 1-2 cm. long, obovate, cuneate at base, the apex usually truncate and 3- to 5-toothed. Cymes 1- to 10-flowered, rather dense. Hypanthium and sepals sparsely strigose, the latter oblong or ovate, 2-3 mm. long, somewhat exceeding the bractlets. Petals 5, elliptic, minute, yellow, about 1.5 mm. long, much shorter than the sepals. Stamens 5, opposite the sepals and inserted at their bases. Pistils 5-20. Achenes glabrous, about 0.4-0.6 mm. long. Styles filiform, longer than the achenes, inserted laterally above the middle of the pistil.

Flowers in Nevada from June to August.

Arctic and alpine regions of the northern Hemisphere, south in western North America to Colorado, Nevada and southern California. It occurs in alpine meadows and on rocks, at elevations of 2500 meters and above.

NEVADA: WASHOE: Mt. Rose, Train 4439 (USMA): Mt. Rose, 9000 ft., P. B. Kennedy 1150 (US). ELKO: East Humboldt Mts., 10,000 ft., S. Watson 344 (King Exp., Aug. 1868) (US). WHITE PINE: Alpine slopes n. of Timber Cr., Shell Creek Range, McVaugh 6016 (USMA); Wheeler Peak, above 3000 m., McVaugh 6043 (USMA).

21. POTENTILLA ANSERINA L. Sp.Pl. 495. 1753.

Argentina Anserina Rydb. Mem.Dept.Bot.Columbia Univ. 2: 159. 1898.

Potentilla Anserina var. concolor Ser. in DC.Prodr. 2: 582.
1825.

Argentina Anserina concolor Rydb. Mem.Dept.Bot.Columbia Univ.
2: 160. 1898.

Argentina argentea Rydb. Bull.Torr.Club 33: 143. 1906.

Perennial; leaves and peduncles in a basal tuft from a fascicle of thick roots which also produce long slender stolons that root at the nodes. Leaves interruptedly pinnate, with 9-31 principal leaflets and some intermediate smaller ones. Leaves strongly whitened, densely silky and tomentose beneath, the upper surface usually glabrate and green. Leaflets obovate, more or less rounded at apex, coarsely serrate, 1-3 cm. long. Flowers solitary in the axils of small leaves (or scales) on the stolons, on long peduncles 2-10 cm. long. Hypanthium and calyx-lobes white-silky, the latter ovate or oblong, 4-6 mm. long; bractlets elliptic or lanceolate, equalling or exceeding the sepals, often toothed. Petals yellow, obovate, rounded at apex, 6-10 mm. long. Stamens 20-25, in 3 series. Pistils many; achenes corky, brown, glabrous, more or less grooved dorsally, about 2 mm. long; style filiform, glabrous, about 1.5 mm. long, attached laterally just above the middle of the achene.

Flowers in Nevada from June to August.

This species, long known to English-speaking peoples as Goose Grass (the specific name, Anserina, refers also to geese), is widely distributed in the northern hemisphere. Various segregate species have been described, none of which occurs in Nevada, with the exception of the form with leaves more or less silvery-silky on both sides (Argentina argentea Rydb.). This seems no more than a minor variant from the typical form, but may prove worthy of recognition as a variety.

NEVADA: ELKO: Elko, in sloughs along Humboldt R., Train 542 (USNA); Ruby L., H.L.Mason 4670 (Calif). WHITE PINE: N. base of Ward Mt., Moore & Franklin 447 (USNA); 1/4 mi. w. of Ely, J. Heinrichs 460 (USNA); Steptal (Steptoef) Cr., Clark Amens (Univ. of Nev. no. 1685). EUREKA: Vicinity of Winzel Ranch, 50 mi. n. of Eureka, Goodner & Henning 972 (USNA); Devils Gate, w. of Eureka, P.Train, June 10, (1936?) (US); Fish Creek Sprs., Sora Ranch, 25 mi. s. of Eureka, Train, June 20 (1936?) (US); Palisade, S.G. Stokes, June 17, 1903 (US). LANDER: 3-18 mi. n. of Austin, highway 8a, Goedner & Henning 872 (USNA); Big Cr., Toiyabe Range, Train, June 3 (1936?) (US). NYE: 14 mi. s. of Dieringer, Goodner & Henning 720 (USNA); LINCOLN: Freel Lytle meadow, 5000 ft., R.D.Hermansen 147H (USNA); Deer Lodge, Desma Hall, June 23, 1935 (Univ. of Nev.)

Dasiphora fruticosa Rydb. Mem. Dept. Bot. Columbia Univ. 2: 188.
1898.

Shrub up to 1.5 m. high with brown bark which soon flakes or shreds off; young branchlets reddish-brown, silky-pilose. Leaves pinnate, 1-2.5 (4.5) cm. long, with 3-7 (usually 5) approximate more or less leathery leaflets. Leaflets elliptic to linear, entire, 0.5-1.5 (2.5) cm. long, silky-strigose on both sides, paler beneath, the margins often revolute. Stipules yellowish, scarious, conspicuous, 0.5-1.5 cm. long. Flowers solitary or in small cymes at the ends of the branches. Hypanthium and sepals pilose and somewhat granular, the sepals ovate, acuminate, 4-6 mm. long, often yellow or scarious when dry, usually exceeded by the narrow green bractlets. Petals bright yellow, nearly orbicular, 6-11 mm. long. Stamens about 25. Pistils numerous; achenes about 1.5 mm. long, densely covered with long straight whitish hairs; styles about as long as the achenes, inserted laterally at or below the middle of the achenes, slender.

Flowers in northern Nevada from July to September.

The shrubby cinquefoil is widely distributed in the northern hemisphere, especially in calcareous regions, where it may become a serious pasture weed. In western North America its range extends southward to New Mexico, northern Nevada and the mountains of California; in Nevada it is found in alpine and subalpine meadows and along streams, at elevations of about 1800 meters and above.

NEVADA: ELKO: Cave Cr., 15 mi. s. of Gardner Ranch, Train 954 (USNA); Lamoille Can., Nichols & Lund 586 (USNA) Ruby Valley, S. Watson 341 (King Exp.) July 1868 (US); East Humboldt Mts., 10000 ft., S. Watson 342 (King Exp.) Aug. 1868 (US); Clover Mts. near Death, 9300 ft., Heller 9175 (US); Ruby Mts. near Blaine P.O., Heller 11100 (US). HUMBOLDT: Martin Cr., n. of Hinkey Summit, Santa Rosa Range, Train 362 (USNA). WHITE PINE: Alpine slopes n. of Timber Cr., elev. 5000 m., Shell Creek Range, McVaugh 6012 (USNA); also abundant on Wheeler Peak above 5300 m.

23. POTENTILLA GLANDULOSA Lindl. Bot. Reg. 19: t. 1583. 1833.

Stems erect, often reddish, up to 1.2 m. high, the leaves often mostly basal. Plants often noticeably pubescent and glandular. Blades pinnate, with 5-9 leaflets; leaflets roundish-ovate or obovate, cuneate or rounded at base, 1-4 (7) cm. long, scarcely petiolate. Cymes branched often elongated, sometimes leafy-bracted; flowers few to 25 (50). Petals yellow or cream-color. Sepals ovate-oblong or lanceolate, acuminate, up to about 12 mm. long.

KEY TO THE SUBSPECIES

1. Petals much longer than the sepals (sepals 10 mm. long or less); plants of middle and high altitudes

- 2. Petals canary-yellow; inflorescence leafy-bracted with rhombic bracts, its branches divergent23a. ssp. glabrata
- 2. Petals creamy-white; inflorescence not leafy-bracted, the branches erect3
 - 3. Leaflets more or less densely beset with stalked glands; stem-pubescence glutinous-villous.....23b. ssp. pseudorupestris
 - 3. Leaflets pilose but not glandular; stems pilose, more or less glabrate23c. ssp. nevadensis
- 1. Petals slightly if at all longer than the sepals. Plants of low or moderate elevations4
 - 4. Petals creamy white, broadly obovate, ascending, equalling or slightly exceeding the sepals; branches divaricate, prominently glandular, leafy-bracted above.....23d. ssp. typica
 - 4. Petals deep yellow, narrow, reflexed or spreading at anthesis, shorter than the sepals; stems more or less densely pilose and glandular; branches divaricate, not leafy-bracted23e. ssp. reflexa

23a. POTENTILLA GLANDULOSA ssp. GLABRATA (Rydb.) Keck, Carneg. Inst. Wash. Publ. 520: 39. 1940.

Drymocallis glabrata Rydb. Mem. Dept. Bot. Columbia Univ. 2: 201. 1898.

Drymocallis foliosa Rydb. N. Am. Fl. 22: 371. 1908.

The range, according to Keck, is from northern Montana to western Wyoming, central Utah and (north-) central Nevada, westward to Washington and Oregon. This subspecies is the chief representative of P. glandulosa in northeastern Nevada, where it flowers from June to August. Here are to be referred the plants from Elko, Humboldt and White Pine Counties which have yellow flowers and glabrate stems and leaves.

NEVADA: ELKO: Coon Creek R.S., Jarbidge Mts., Train 743 (USNA); 15 mi. s. of Secret, Nichols & Lund 63 (USNA); Jarbidge, Nelson & Macbride 1949 (US; det. Keck) and 1923 (US; det. Keck); vicinity of Gold Creek, A. E. Hitchcock 1095 (US; det. Keck) and 1164 (US; det. Keck). WHITE PINE: Alpine slopes n. of Timber Creek, Shell Creek Range, McVaugh 6001 (USNA). HUMBOLDT: Havallah Mts. (Sonoma Range), S. Watson 345 (US; det. Keck).

23b. *POTENTILLA GLANDULOSA* ssp. *PSEUDORUPESTRIS* (Rydb.) Keck, Carneg. Inst.Wash.Publ. 520: 41. 1940.

Potentilla pseudorupestris Rydb. Bull.Torr.Club 24: 250. 1897.

This subspecies ranges from Montana to British Columbia, south to Wyoming, northern Utah, northern Nevada and northern California. According to Keck (op.cit., map, p. 40) it occurs in Nevada in Elko County only (but see specimen cited below). It may be robust and evidently glandular or, in Nevada, less glandular and with the leaves quite smooth; such plants may be distinguished at once from ssp. *nevadensis*, in which the leaves are definitely pubescent but not glandular.

NEVADA: HUMBOLDT: Summit Lake Region, Griffiths & Morris 311 (US; det. by Keck as ssp. *pseudorupestris*, toward ssp. *nevadensis*).

23c. *POTENTILLA GLANDULOSA* ssp. *NEVADENSIS* (S.Wats.) Keck, Carneg. Inst.Wash.Publ. 520: 42. 1940.

Potentilla glandulosa var. *nevadensis* S.Wats. in Brew. & Wats. Bot.Calif. 1: 178. 1876.

Drymocallis monticola Rydb. N.Am.Fl. 22: 370. 1908.

Drymocallis pumila Rydb. N.Am.Fl. 22: 372. 1908.

This subspecies ranges from the Cascade and Blue Mountains of Washington, southward to the mountains of northern California, thence along the Sierra Nevada and to the San Bernardino and San Jacinto Mountains; it occurs east of the Sierra Nevada in western and northwestern Nevada; the altitudinal range of the subspecies is from 1500 to 3500 m.; it occurs in meadows and on moist rocky slopes.

NEVADA: HUMBOLDT: Buckskin Pk. Region, Santa Rosa Range, Train 512 (USNA). PERSHING: Keck (op.cit., map, p. 40) indicates a locality for ssp. *nevadensis* near what appears to be the Humboldt Range; the writer has seen no specimens from this part of Nevada. WASHOE: Galena Cr., P.A. Lehenbauer, June 18, 1935 (USNA); Galena Cr., Public Camp Ground, Archer 5879 (USNA) and 5635 (USNA); Hunter Creek Can., Heller 10480 (US); Peavine Mt., Heller 9760 (US); Washoe L., M.E.Jones, June 7, 1897 (US); Incline, L.Tahoe, P.B.Kennedy 1440 (US). CRMSBY: Kings Can., C.F.Baker 951 (US; det. Rydberg as *Drymocallis monticola*). DOUGLAS: Glenbrook, near L. Tahoe, Tidestrom 10292 (US).

23d. *POTENTILLA GLANDULOSA* ssp. *TYPICA* Keck, Carneg. Inst.Wash. Publ. 520: 44. 1940.

Potentilla glandulosa Lindl.Bot.Reg. 19: t. 1583. 1833.

Drymocallis glandulosa Rydb. Mem.Dept.Bot.Columbia Univ. 2: 198: 1898.

Potentilla valida Greene, Pittonia 3: 20. 1896.

Drymocallis valida Piper, Contr. U.S.Nat.Herb. 11: 342. 1906.

Occurs from British Columbia to Baja California, chiefly near the coast but also in the mountains from British Columbia to northeastern California and western Nevada, ascending to about 2400 m.

NEVADA: WASHOE: Broncho Cr., 6000 ft., P.B.Kennedy 1394 (US; det. by Keck); 6 mi. n. of Incline, McVaugh 6151 (USNA).

23e. POTENTILLA GLANDULOSA ssp. REFLEXA (Greene)Keck, Carneg. Inst. Wash.Publ. 520: 44. 1940.

Potentilla glandulosa var. reflexa Greene; Fl.Franciscana 1: 65. 1891.

Drymocallis reflexa Rydb. Mem. Dept. Bot. Columbia Univ. 2: 203. 1898

Oregon to Baja California, chiefly west of the Sierra Nevada, but crossing the latter through Donner Pass and fairly frequent about Lake Tahoe.

NEVADA: L. Tahoe, Kay Beach 259, July 5, 1937 (USNA).

24. POTENTILLA ARGUTA Pursh, ssp. CONVALLARIA (Rydb.) Keck, Carneg. Inst.Wash.Publ. 520: 39. 1940.

Potentilla Convallaria Rydb. Bull.Torr.Club 24: 249. 1897.

Drymocallis Convallaria Rydb. Mem.Dept.Bot.Columbia Univ. 2: 193. 1898.

Differs from P. glandulosa chiefly in the short dense inflorescence, in the stout and densely viscid-villous stems and in the white petals, which are 6-8 mm. long. The pubescence is shaggy and brownish, the inflorescence is leafy-bracted and the plants are usually larger and stouter than those of P. glandulosa.

The range of ssp. Convallaria is from the Yukon to Colorado and Arizona, westward to Washington, Oregon and northeastern Nevada; the related ssp. typica occurs east of the Continental Divide. The flowering period of ssp. Convallaria, in Nevada, is from June to July.

NEVADA: ELKO: Smith Cr., Ruby Mts., Train, July 2, 1936 (US, det. Keck; USNA) Pine Mt., vicinity of Gold Creek, A.E.Hitchcock 1114 (US; det. Keck). HUMBOLDT: Santa Rosa Forest, E.O.Wooton, July 25, 1927 (USNA; the flowers are white, according to the collector).

DOUBTFUL AND EXCLUDED SPECIES

DRYMOCALLIS INCISA (Lindl.) Rydb. N.Am.Fl. 22: 374. 1908 (Potentilla glandulosa var. incisa Lindl.Bot.Reg. 25: t. 1973. 1857). The identity of Lindley's variety, as pointed out by Keck (Lloydia 1: 33. 1939), is shrouded in confusion and the name cannot be properly applied at the present time.

POTENTILLA PARADOXA Nutt. in Torr. & Gray, Fl.N.Am. 1: 437. 1840. Included by Tidestrom (Contr.U.S. Nat. Herb. 25: 271. 1923) but probably not a member of our flora. It occurs sparingly, if at all, west of the Rockies.

POTENTILLA CONCINNAEFORMIS Rydb. Mem.Dept.Bot.Columbia Univ. 2: 54. pl.15. 1898. Attributed to Nevada by Tidestrom, op.cit. 273. I have not seen authentic material of this species, but Rydberg's plate suggests P. Bearii Clokey.

POTENTILLA MODESTA Rydb. N.Am.Fl.22: 331. 1908. "Eastern Nevada," according to Tidestrom, op.cit. 273. It is possible that Tidestrom's report was based upon the Hitchcock specimen I have cited above under P. nivea.

POTENTILLA FLABELLIFOLIA Hook. in Torr. & Gray, Fl.N.Am. 1: 442. 1840. "Western Nevada," according to Tidestrom, op.cit. 273. This species ranges from British Columbia to central California, but although it occurs on the California side of Lake Tahoe no specimens have been seen from Nevada.

7. Ivesia Torr. & Gray

The species of this genus are perennial herbs with pinnate leaves, and the uppermost leaflets confluent; the petals are yellow, white or purple; the carpels vary in number from 1 to 15; the hypanthium is shallow; the stamens are 5 or 20 in number, or rarely 10 or 15, always with filiform filaments. The genus differs from Potentilla only in the usually fewer carpels and stamens, in the usually clawed petals and in the confluence of the terminal leaflets. According to the latest monographer of the group it comprises 22 species; more or less restricted to the Great Basin and surrounding mountains. (Keck, David D., Revision of Hornelia and Ivesia. Lloydia 1: 75-142. 1938).

KEY TO THE SPECIES

- 1. Stamens 20.....2
- 2. Petals yellow, linear, 2/3 as long as the calyx-lobes; leaflets 4 to 8 pairs, not crowded.....1. I. Jaegeri

2. Petals white (if rarely yellow, then broadly spatulate, slightly exceeding the calyx-lobes); leaflets very numerous, crowded.....3
3. Hypanthium campanulate; sepals 3.5 to 5.5 mm. long.....
8. I. sericoleuca
3. Hypanthium saucer-shaped; sepals 2.5 to 3.5 mm. long...
.....9. I. Kingii
1. Stamens 5.....4
4. Stems arising from a non-creeping woody base.....5
5. Leaflets 12 to 40 pairs.....6
6. Pistils 8 to 18, the receptacle short-hairy; petals obovate to orbicular; styles glandular-thickened, short.....2. I. lycopodioides
6. Pistils 1 to 8; receptacle prominently white-hirsute; petals linear or spatulate; styles not glandular.....7
7. Hypanthium campanulate, not thickened nor pentagonal; styles filiform, elongated....
.....I. Gordonii (see excluded species)
7. Hypanthium rotate, thickened, at length pentagonal; styles scarcely exerted beyond the hairs of the receptacle.....
.....3. I. sabulosa
5. Leaflets 5 to 10 pairs.....8
8. Hypanthium disciform, thickened; filaments 1 mm. long; anthers less than 1 mm. long; achenes carunculate; cyne open.....9
9. Leaflets 3 to 15 mm. long; cyne many-flowered....
.....4. I. Baileyi
9. Leaflets 1.5 to 3 mm. long; cyne few-flowered....
.....5. I. Shockleyi
8. Hypanthium hemispheric, not thickened; filaments 2.2 to mm. long; anthers more than 1 mm. long; achenes not carunculate; cyne dense.....
.....6. I. Webberi
4. Stems arising from creeping linear rhizomes; leaflets 5 to 8 pairs; an alpine dwarf.....7. I. cryptocaulis

1. *IVESIA JAEGERI* Munz & Johnst. Bull. Torr. Club 56: 165. 1929.

Potentilla Jaegeri (Munz & Johnst.) Wheeler, Rhodora 40: 136.
1958.

Stems decumbent, subscapose, 5-12 cm. long; plants puberulent and finely glandular; leaves numerous, 3-8 cm. long; leaflets 4-8 pairs, sparingly hirsute-ciliate, not crowded, 3-6 mm. long, divided to the base into 2-5 oblanceolate to obovate segments. Cyme open, few-flowered; hypanthium and sepals strigose and glandular; sepals 2-3 mm. long; petals yellow, linear, about 1.5 mm. long. Stamens 20; pistils 5-9.

Flowers in southern Nevada in July.

A restricted endemic, confined to the Charleston Mountains and to Clark Mt. in San Bernardino County, California. It occurs in crevices in limestone cliffs, at elevations of 2500 to 3100 meters.

Full citations of specimens may be found in Lloydia, volume 1, p. 116 (1938)

2. *IVESIA LYCOPODIOIDES* A. Gray, Proc. Amer. Acad. 6: 530. 1865.

An alpine dwarf with rotately spreading wiry stems mostly less than 10 cm. long, arising from few-leaved rosettes topping the fleshy fusiform taproot. Leaves verniform, short, 2-15 cm. long, more or less glutinous and glandular, glabrate; leaflets about 25 pairs, 1-6 mm. long, divided to base into 2-5 segments; cyme capitate; bractlets much shorter than the sepals; petals golden-yellow, obovate or orbicular, about equalling the sepals; stamens 5; pistils 8-18.

This species occurs on high peaks of the Sierra Nevada, in California and on Mt. Rose, Nevada, at elevations of 3000 to 4000 meters. It grows, according to Keck (Lloydia 1: 118, 1938) "in moist gravels and hanging meadows." It is represented in Nevada by ssp. typica Keck.

3. *IVESIA SABULOSA* (M.E. Jones) Keck, Lloydia 1: 124. 1938.

Potentilla sabulosa M.E. Jones, Proc. Calif. Acad. ser. 2, 5: 680.
1895.

Comarella sabulosa Rydb. Mem. Dept. Bot. Columbia Univ. 2: 157. 1898.

Horkelia mutabilis Brandg. Bot. Gaz. 27: 446. 1899 (the type from Table Mt., Nye County, Nevada, Furpus 6381).

Stems strictly erect, leafy, 20-50 cm. high, from a stout woody rootstock. Plants glabrous and glaucescent to villous and glandular; basal leaves 5-20 (30) cm. long, with 15-40 crowded pairs of leaflets, these 3-7 mm. long, divided to the base or nearly so into obovate divisions; cyme much branched; sepals broadly lanceolate, 3.7-5.2 mm.

long, larger than the bractlets; petals light yellow, linear-elliptic, much shorter than the sepals. Stamens 5, pistils 1-5.

Flowers in southern Nevada from July to September.

Dry mountain slopes, in open pine woods, in sandy or calcareous soils, at elevations of 1800 to 2500 meters, southwestern Utah and southeastern Nevada.

NEVADA: EUREKA: Hoosac Can., Eureka, P. Train, June 16, 1936 (USNA). LINCOLN: John Devlin homestead, w. slope of Wilson Mt., 35 mi. n.e. of Pioche, P. Train 2552 (USNA). NTE: 3.5 mi. e. of Carrant; Carrant Creek Mts., (both according to Keck). CLARK: Charleston Mts. (according to Keck).

4. IVESIA BAILEYI S.Wats. in King, Geol.Expl. 40th Par. 5: 90. 1871.

Stems ascending, leafy, 10-25 cm. high; plants finely glandular-pubescent; basal leaves 4-12 cm. long; leaflets 5-10 pairs, rather distant, 3-10 (15) mm. long, apically lobed or deeply parted; cymes repeatedly forked, the flowers borne singly on filiform recurving pedicels; sepals deltoid-lanceolate, 2.5-3.2 mm. long; bractlets short; petals white or cream-colored, narrow, not exceeding the sepals; stamens 5; pistils 3-7.

KEY TO THE SUBSPECIES

- 1. Leaflets lobed or cleft apically, not setose-tipped, moderately glandular; petals linear, much shorter than the sepals.....
.....ssp. typica
- 1. Leaflets parted to divided, some of the lobes setose-tipped, densely glandular; petals elliptic, nearly equalling the sepals.....
.....ssp. setosa

4a. IVESIA BAILEYI ssp. TYPICA Keck, Lloydia 1: 126. 1938.

Ivesia Baileyi S. Wats., l.c.

Potentilla Baileyi Greene, Pittonia 1: 105. 1887.

The plants are said to be grayish-green, with the inner surface of the hypanthium and the anthers more or less purplish.

Flowers in northern Nevada in July.

This subspecies occurs in the mountains, at elevations of 1900-2600 meters, in crevices and on rocks, northern Nevada to southern Idaho and southeastern Oregon.

NEVADA: ELKO: Meadow Creek Summit, 1-5 mi. n. of Summit on Elko-Rowland road, Train 891 (USNA); Idavada ("Till" (?) Co., according to Keck), Palmer 33018 (not seen). HUMBOLDT: East fork of the Quinn R., east of McDermitt Ind. Res., Train 449 (USNA). PERSHING: Wright's Can., West Humboldt Mts., W.W. Bailey in 1867 (This specimen, the type of the species, is at the Gray Herbarium, according to Keck).

4b. *IVESIA BAILEYI* ssp. *SETOSA* (S. Wats.) Keck, *Lloydia* 1: 128. 1938.

Ivesia Baileyi var. *setosa* S. Wats. in King, *Geol. Expl.* 40th Par. 5: 91. 1871; the type, Watson 347, came from Fremont's Pass in the East Humboldt (Ruby) Mts.

The plants are yellowish-green, with the anthers and the inner surface of the hypanthium yellowish.

Flowers in central Nevada from June to August; this subspecies is endemic in central and eastern Nevada and adjacent Utah, where it grows in crevices and on dry rocks, at elevations of 1700 to 3100 meters.

NEVADA: ELKO: East Humboldt (Ruby) Mts.; Canyon at the head of south fork of the Humboldt.¹ WHITE PINE: 7 mi. e. of Little Antelope Summit, McVaugh 6105 (USNA); also Egan Can.; Glencoe; Aurum; Beco's. LANDER: Ridge between Austin & Birch Cr., Toiyabe Range; Austin; Birch Creek Can., 17 mi. from Austin, W.H. Henning 46 (USNA); 2.5 mi. up Birch Cr. from Birch Creek Ranch, Goodner & Henning 114 (USNA). NYE: Belmont.

5. *IVESIA SHOCKLEYI* S. Wats. *Proc. Amer. Acad.* 23: 263. 1888.

Potentilla Shockleyi Jeps. *Man. Fl. Pl. Calif.* 492. 1925.

Stems subscapose, scarcely exceeding the basal leaves, 3-9 cm. long, from a densely tufted woody caudex; plants densely glandular-puberulent, pallid, more or less hispid, especially on the margins of the leaflets; leaves 2-7 cm. long, with 7-10 pairs of leaflets which are crowded, minute, 1.5-3 mm. long, divided to the base into 2-5 segments; cyme open, few-flowered, the flowers borne singly on filiform flexuous pedicels; sepals broadly lanceolate, 1.5-3.5 mm. long; bractlets very short; petals pale yellow, oblanceolate to oval, shorter than the sepals; stamens 5; pistils usually 3 (2-5.)

An alpine cushion plant, growing on gravelly slopes and in crevices of rocks, at elevations of 2900 to 3500 meters, from Inyo County to Placer County, California, and in adjacent Nevada (Mt. Rose, Washoe Co.)

¹Where no specimens are cited after a locality in this genus, the locality has been taken from Keck's Monograph.

6. *IVESIA WEBBERI* A. Gray, Proc.Amer.Acad. 10: 71. 1874.

Potentilla Webberi Greene, Pittonia 1: 105. 1887.

Stems wiry, decumbent or ascending, purplish, 8-15 cm. long, from a long slender woody rootstock (resembling a tap-root). Basal leaves 4-10 cm. long, the petioles longer than the blades; leaflets crowded, 5-10 pairs, 3-8 mm. long, parted into 2-5 linear lobes, not bristle-tipped; cyme capitate; sepals lanceolate, 3.5-4.8 mm. long; petals bright- or lemon-yellow, linear-oblong, or elliptic, 2-3 mm. long; stamens 5; pistils 3-8.

Flowers in the vicinity of Reno from late March to May.

An endemic in the valleys of Sierra and Plumas Counties, California, and southern Washoe County, Nevada, growing in rocky soil among sagebrush, at elevations of 1500-1800 meters.

NEVADA: WASHOE: Hunter Creek road, 8 mi. s.w. of Reno, Archer 6121 (USNA); 5 mi. w. of Reno, 1 mi. w. of Hunter Creek road, T.L. Breene no. 1 (USNA); 8 mi. n. of Reno, P.A. Lehenbauer, Mar. 25, 1934 (USNA); same loc. and date, L.R. Miller (Univ. of Nev.); Peavine Mt.; Alun Cr.

7. *IVESIA CRYPTOCAULIS* (Clokey) Keck, Lloydia 1: 130. Dec. 1938.

Potentilla cryptocaulis Clokey, Bull. So. Calif. Acad. 37: 4. Apr. 30, 1938.

Plants matted, the stems filiform, decumbent, up to about 5 cm. long, arising from slender elongated scaly rhizomes. Plants glandular and somewhat villose; leaves mostly 1-2.5 cm. long, with 5-10 pairs of leaflets, these crowded, 1.5-2.5 mm. long, divided to base into 3-5 bristle-fringed segments; cyme compact, few-flowered; sepals deltoid-lanceolate, 1.5-2 mm. long, exceeding the narrower bractlets; petals yellow, narrowly spatulate, longer than the sepals. Stamens 5; pistils 6-10.

Known only from Charleston Peak, Clark County, Nevada, where it occurs at and above timberline in gravelly slopes and limestone rock-slides, at about 3500 meters elevation.

8. *IVESIA SERICOLEUCA* (Rydb.) Rydb. N. Am. Fl. 22: 284. 1908.

Horkelia sericoleuca Rydb. Men. Dept. Bot. Columbia Univ. 2: 144. 1898.

Stems decumbent or ascending, 15-40 cm. long, from a stout upright woody rootstock; plants more or less densely white-silky to tomentose, not glandular; basal leaves 10-15 (30) cm. long; leaflets crowded, 20-35 pairs, 4-10 (15) mm. long, divided to base into 2-4 acute or rounded entire lobes; cyme flat-topped, dense, many-flowered;

hypanthium glabrous within, silky without; sepals narrowly lanceolate, 3.5-5.5 mm. long; bractlets about half as long as the sepals, not thickened; petals yellow or white, spatulate, clawed, about equalling the sepals. Stamens 20; pistils 4-7.

Flowers in western Nevada from June to August or September.

This species is found in sagebrush or subalkaline flats, on the east slope of the Sierra Nevada, from Plumas County to Placer County, California, and in adjacent Nevada, at elevations of 1450 to 2100 meters.

NEVADA: STOREY: 1.6 mi. n.w. of Virginia City, 7300 ft., K.E. Bradshaw 218 (USNA). WASHOE: Reno; Dinsmore Camp, Hunter Creek Can.; Dog Valley.

9. *IVESIA KINGII* S.Wats. in King, Geol.Expl. 40th Par. 5: 91. 1871.

Potentilla Kingii Greene, Pittonia 1: 105. 1887.

Potentilla eremica Coville, Proc.Biol.Soc.Wash. 7: 76. 1892.

The type came from "Near Watkin's ranch, Ash Meadows, Nye County, Nevada" (Coville & Funston 366).

Potentilla Kingii var. incerta H.E.Jones, Zoe 4: 277. 1893.

The type came from "the middle of Steptoe Valley" (White Pine County, Nevada), where collected by Jones, July 13, 1891.

Ivesia halophila Heller, Kuhlbergia 7: 126. 1912. The type came from "the lower end of Lamoille Valley" (Elko County, Nevada, Heller 9261).

Stems decumbent or ascending, divaricately branching toward summit, 15-35 cm. long, from a stout upright woody rootstock; plants glabrous to canescent, glaucous, not glandular; basal leaves 5-12 (20) cm. long; leaflets approximate or imbricated, 12-30 pairs, 3-6 mm. long, entire and ovate or ternately divided; cyme much-forked, the flowers scattered or approximate; sepals broadly lanceolate, 2.5-3.5 mm. long; bractlets ovate-lanceolate, thickened, half as long as the sepals or less; petals white, obovate or spatulate, rounded, truncate or emarginate, long-clawed, somewhat exceeding the sepals; stamens 20; pistils 2-9.

Flowers in central Nevada from June to August.

A plant of alkaline meadows and flats in the Great Basin, ranging from western Utah across Nevada to Mono County, California, at elevations up to about 2000 meters.

NEVADA: ELKO: Humboldt Wells, McVaugh 6413 (USNA); Ruby Valley (the type, Watson 348, at the Gray Herbarium, according to Keck); Cave Creek P.O.; Currie. WHITE PINE: 16 mi. n. of Simonsen, E.M. Hall 12164

(Calif). NYE: 5 mi. n. of Duckwater, Goodner & Henning 796 (USNA); Butterfield Springs, McVaugh 6099 (USNA); Twin Springs; Fish Creek; "Fish Lake Valley" (here was collected Shockley 533, according to Keck; could this be Esmeralda County?). MINERAL: Soda Springs, Shockley 237 (Gray Herb., according to Keck). WASHOE: Reno, opposite Glendale, K.Brandegee in 1883 (Calif). EUREKA: 5-15 mi. w. of Eureka near US 50, Goodner & Henning 821 (USNA). LAJOLLA: Reese R., 10 mi. w. of Austin, C.L.Hitchcock & J.C.Martin 5587 (Calif).

EXCLUDED SPECIES

IVESIA GORDONII (Hook.) Torr. & Gray in Newberry, Pacif.Rail.Rep. 6(3): 72. 1857. Horkelia Gordonii Hook, Journ.Bot. & Kew Gard. Misc. 5: 341. pl. 12. 1853. Potentilla Gordonii Greene, Pittonia 1: 106. 1887. This species occurs in adjacent parts of California, Oregon, Idaho and Utah, but is apparently absent from Nevada.

IVESIA PYGMAEA A. Gray, Proc.Amer.Acad. 6: 531. 1865. Potentilla nubigena Greene, Erythea 3: 36. 1895. Reported from western Nevada by Tidestrom (Contr.U.S.Nat.Herb. 25: 268. 1925). The plant is confined to the Sierra Nevada of California and it is probable that the reports of its occurrence in Nevada have been based upon I. lycopodioides.

IVESIA SANTOLINOIDES A. Gray, Proc.Amer.Acad. 6: 531. 1865. Potentilla santolinoides Greene, Pittonia 1: 106. 1887. "Southwestern Nevada," according to Anderson (Rept.Min.Nev. 1869-70: 120. 1871). The species apparently reaches its northern limit in California, just southwest of Lake Tahoe.

8. Horkelia Chan. & Schlecht.

The species of Horkelia are perennial herbs with pinnate leaves and the uppermost leaflets confluent; the plants usually have a strong characteristic odor. The petals are white or pink; the flowers are usually crowded in dense cymes. The hypanthium is usually deeply cup-shaped, varying to hemispheric. The stamens are 10, inserted near the summit of the hypanthium, with the filaments usually dilated and petaloid. The carpels are usually numerous. The genus, according to Keck (Lloydia 1: 79 et seq. 1938), comprises 17 species, of which all are typically Californian in range; a single species extends eastward to Utah. Horkelia appears to be set off from Potentilla much more distinctly than does Ivesia, and may well deserve generic rank.

KEY TO THE SPECIES

- 1. Leaflets 5 to 10 pairs, many-toothed or divided; whole plant and especially the inflorescence, reddish and strongly glandular1. I. fusca

- 1. Leaflets 2 to 5 pairs, short-toothed at apex only, or entire...
.....3. H. congesta

1. HORKELIA FUSCA Lindl. Bot.Reg. 23: t. 1997. 1837.

Stems erect or ascending from a stout woody rootstock, 10-50 cm. high; plants usually glandular-pubescent throughout, strongly odorous; leaves mostly in a basal rosette, these 8-15 (30) cm. long; leaflets 5-10 pairs, not imbricated, the uppermost confluent; leaflets variable, many-toothed or lobed, more or less cuneate at base, often obovate, 1-2 cm. long. Cymes mostly congested, many-flowered, usually reddish in branches and in the hypanthium and calyx, strongly glandular. Sepals lanceolate, 2.5-4 mm. long, usually much longer than the linear or filiform bractlets. Stamens 10, at least 5 of the filaments dilated at base, lanceolate to deltoid, 0.5-1.5 mm. long. Pistils 15-25.

KEY TO THE SUBSPECIES

- 1. Petals 4-6.5 mm. long, usually pink, veined with rose; bracts subtending the cymes prominent and often exceeding them.....
.....la. ssp. capitata (see under excluded species).
- 1. Petals 2.5-4 mm. long, usually white, lightly roseate-veined; bracts subtending the cymes inconspicuous.....2
 - 2. Leaves densely pubescent, grayish, slightly glandular.....
.....la. ssp. pseudocapitata.
 - 2. Leaves sparingly pubescent, dark green, more glandular.....
.....lb. ssp. parviflora

la. HORKELIA FUSCA ssp. PSEUDOCAPITATA (Rydb. ex Howell) Keck, Lloydia 1: 99. 1938.

Horkelia pseudocapitata Rydb. ex Howell, Fl. N.W. Amer. 1: 180. Apr. 1, 1898.

This subspecies has the leaflets bluntly or sharply toothed or lobed, but never parted into linear or filiform divisions; they are usually plainly gray-pubescent, at least when young.

The flowering period, in western Nevada, is from June to July.

Pine woods and meadows, at elevations of 1150 to 2450 meters, on the east side of the Sierra Nevada in California, western Nevada and sparingly northward to Oregon.

NEVADA: WASHOE: Reno; Washoe L.; Franktown; Little Valley; Marlette L. ORMSBY?: Between Spooner's Summit and Incline, L.R. Miller 136 (USMA).

1b. HORKELIA FUSCA ssp. PARVIFLORA (Nutt. ex Hook. & Arn.) Keck,
Lloydia 1: 99. 1938.

Horkelia parviflora Nutt. ex Hook. & Arn. Bot. Beech. Voy. suppl.
338. 1840.

Similar to the preceding, but not evidently grayish-pubescent.

Flowers in northern Nevada in June and July.

Forested areas in the mountains, at elevations of 1150 to 3000 meters, from Yellowstone Park to Washington, south to northern Nevada and the Cascades and the Sierra Nevada of California.

NEVADA: ELKO: 8 mi. s.e. of Mountain City, Nichols & Lund 377 (USNA); Gold Creek, according to Keck. HUMBOLDT: West fork Martin Cr., Santa Rosa Range, P. Train 525 (USNA). EUREKA: Palisade, according to Keck.

2. HORKELIA CONGESTA Dougl. ex Hook. Bot. Mag. 56: t. 2880. 1829.

Potentilla congesta Baill. Hist. Pl. 1: 369. 1867-9.

Stems erect or ascending from a short erect rootstock, 10-30 (40) cm. high, together with the petioles pilose or hirsute below; leaf-blades silky-villous, especially beneath; basal leaves few, 5-8 (15) cm. long; leaflets 2-7 pairs, not crowded, 8-20 mm. long, linear-oblong to oval, 2- or 3-toothed or lobed at apex (rarely entire); cyme capitate, sparingly glandular; sepals deltoid or lanceolate, 3-4.5 mm. long; petals white, sometimes tinged with pink, the blade narrower than long, frequently linear, obtuse or rounded, equalling or shorter than the sepals; stamens 10; pistils 6-22.

In using the name Horkelia congesta for this species I follow Jepson (Fl. Calif. 2: 204. 1936) rather than Keck, who considers that H. congesta, with two subspecies, is confined to western Oregon; he separates all the California material under the later name Horkelia tridentata, although remarking that the two groups are rather doubtfully distinct (Lloydia 1: 109. 1938). Keck had no records of either species for Nevada, but the collection cited below indicates that at least one of the races of Horkelia congesta (used in the broad sense) occurs there. Following is the essential synonymy:

Horkelia tridentata Torr. Pacif. Rail. Rep. 4: 84. 1857. This race, designated by Keck as ssp. typica (Lloydia 1: 110. 1938), occurs from Jackson County, Oregon, through the Sierra Nevada to Tulare County, California.

Horkelia Tilingi Regel, Act. Hort. Petrop. 1: 153. 1871.

Potentilla Tilingi Greene, Pittonia 1: 105. 1887.

Potentilla congesta var. tilingii Jepson, Man. Fl. Pl. Calif. 496. 1925. This, and the two preceding, are directly synonymous with H. tridentata Torr. Typical H. tridentata, so far as known, does not occur in Nevada.

Horkelia flavescens Rydb. Mem. Dent. Bot. Columbia Univ. 2: 138. 1898.

Horkelia tridentata ssp. flavescens Keck, Lloydia 1: 111. 1938. This race, which Keck suggests is of minor importance, is distinguished from typical H. tridentata by having the hypanthium pilose within instead of glabrous. It occurs in the northern Coast Ranges of California, in the eastern Sierra Nevada (to the eastward from ssp. typica), and in adjacent Nevada.

Horkelia congesta (in the restricted sense) is distinguished from H. tridentata as follows, according to Keck (Lloydia 1: 80. 1938):

congesta

tridentata

Petals cream-color.

Petals white.

Petal-blades as broad as or broader than long, much exceeding the sepals, rounded or emarginate.

Petal-blades narrower than long, equalling or shorter than the sepals; obtuse or rounded.

Ripe achenes rugulose along the whitish veins

Ripe achenes rugose, unicolored.

The following specimen of H. congesta (H. tridentata ssp. flavescens of Keck's treatment) has been studied:

NEVADA: WASHOE: 80 mi. n. of Reno, Ernest Brooks, May 9, 1927 (Univ. of Nevada).

9. Furpusia Brandg.

Low tufted perennial herbs arising from an upright thick woody caudex. Leaves odd-pinnate, mostly basal; whole plant more or less invested with soft viscid hairs. Basal leaves numerous (up to about 20), the bases of old leaves persistent at the summit of the caudex. Blades of the basal leaves 2-5 cm. long, on petioles (2) 3-6 cm. long. Leaflets (3) 5-7, about as long as broad, (0.3) 0.6-1.5 cm. long, petiolulate, with 2-9 short rounded lobes, or palmately cleft with oblong or elliptic, more or less rounded divisions. Stem-leaves about 3 or fewer, similar to the basal but smaller, with fewer and narrower leaflets. Stipules green, oblong, entire or toothed, 1-1.5 mm. wide, 2.5-4.5 mm. long, partially fused with the bases of the petioles; stipules of the basal leaves fused more than half their length, the

free part more or less triangular and often becoming yellow. Flowering stems 7-15 cm. long, usually somewhat exceeding the basal leaves; flowers small, yellow, in terminal cymes of 1-10 flowers each. Pedicels 8-25 mm. long. Hypanthium deeply campanulate, 2-3.5 mm. long, obscurely 10-ribbed, glabrous within. Sepals 5, valvate, entire, ovate, acute or acuminate, 1-2.5 mm. wide, 2.5-3.5 mm. long, somewhat reflexed in flower, erect in fruit. Petals 5, yellow, oblong or lanceolate, about 1 mm. wide, 2.5-3 mm. long (4 mm. according to Rydberg), with a sessile rounded base and an acute tip. Stamens 5, opposite the sepals, persistent in fruit; filaments very slightly enlarged (dilated) toward the base, inserted a little lower in the tube than the petals, about 1 mm. long. Anthers about 0.7 mm. long when dry. Pistils 6-7, inserted at the summit of a pubescent receptacle which elongates with maturity, becoming linear, 2-3 mm. long, so that the mature achenes are extruded from the hypanthium. Styles about 2 mm. long, filiform, glabrous, jointed at the base, nearly terminal. Mature achenes glabrous, yellowish, about 1.5 mm. long.

1. *PURPUSIA SAXOSA* Brandg. Bot. Gaz. 27: 447. 1899.

Furpusia arizonica Eastw. Madroño 2: 12. 1930.

This, the only known species, differs from *Potentilla* and the allied groups by the absence of bractlets of the calyx and by the linear, elongate receptacle. In Nevada the plant is known to produce flowers and fruit from early August to early September. It grows in crevices of rock walls, at elevations of 1200-3000 meters, from the Death Valley region in California across southern Nevada to the Grand Canyon in Arizona.

NEVADA: LINCOLN: 4 mi. n. of Caliente on road to Panaca, P. Train 2476, Sept. 7, 1938 (USMA); Pahroc Range, 4-5000 ft., C.A. Furpus 6305 (US). CLARK: Dead Man Springs, Desert Game Range, J.C. Allen 33, Aug. 6, 1938, at 7500 ft. (USMA); the TYPE (not seen by the writer) was collected by C. A. Furpus (No. 6134) in the Sheep Mountains, probably in Clark County. NYE: Troy Peak, Grant Range, at 3000 m., McVaugh 6068 (USMA).

Tribe 6. COLEOGYNEAE. This tribe comprises a single genus and species. It is sometimes included in the Cercocarpeae.

10. *Coleogyne* Torr.

Dense shrub up to 2 m. high, with gray bark and tangled branches, the tips often spinescent. Branches and leaves opposite. Leaves entire, linear or clavate, thick and coriaceous, strigose, 5-10 (15) mm. long, 1-1.5 mm. wide, blunt or apiculate. Stipules like the leaves in texture and indument, persistent, up to about 2 mm. long. Branchlets of the current season green, strigose like the leaves; flowers solitary, terminating the young branchlets. Calyx 4-parted, the divisions

persistent and somewhat coriaceous, ovate or oval, strigose and green or purplish without, yellow and glabrous within, 5-8 mm. long. Two inner divisions somewhat broader than the outer, emarginate, with mucronate tips; two outer divisions acuminate. Calyx-tube very short; corolla none. Stamens 20-40, inserted near the base of an elongated sheathing tube which incloses the ovary. Sheath (torus) 4-6 mm. long, dilated at base, toothed at apex, glabrous without, densely white-villous within. Pistil 1; style 1, exserted and twisted, densely villous below, attached laterally to the glabrous achene, which is about 3 mm. long at maturity.

1. *COLEOPTER RAMOSISSIMA* Torr. Pl. Frém. 8, pl. 4. 1853.

This is the only known species. It differs from almost all other members of the Rosaceae in having opposite leaves and branches. In Nevada the flowering season is from late April to mid-June. The type was collected in California or southern Nevada by Frémont ("sources of the Mohave and Virgin Rivers").

Sandy or gravelly slopes and canyons in desert mountain ranges, southern California to northern Arizona, southern Utah, and southwestern Colorado, at elevations of 300-1800 meters.

NEVADA: CLARK: "Sheep Mts. Desert Game Range, Clark & Lincoln Cos.", Mrs. J.C. Allen 55 (USNA); Peek-a-boo Canyon, Desert Game Range, J.C. Allen 87 (USNA); Corn Creek, Desert Game Range, S.G. Jewett 182 (USNA); Searchlight, A. Eastwood 18279 (USNA), 18289 (US); Trout Creek fan, Charleston Mts., Clokey & Anderson 7147 (USNA); Old Kyle Canyon fan, I.W. Clokey 7876 (USNA); Nelson, Opal Mts., P. Train 1544 (USNA); Kyle Can., Tidestrom 9589 (US); Mica Spr., M.E. Jones 5061, Apr. 14, 1894 (Calif, US); Good Spring, M.E. Jones, May 1, 1905 (US).

Tribe 7. *DRYADEAE*. A tribe of about 5 genera, the largest of which is *Geum* with about 40 species in the temperate zones. The tribe includes shrubs and perennial herbs, with alternate stipulate leaves; bractlets appear on the calyx in most genera. The pistils vary in number; the fruit is an achene with a terminal persistent style and the seeds basal. *Dryadeae* differ technically from *Potentilloae* in the basal seeds and the persistent styles.

11. *Geum* L.

Perennial herbs with yellow, cream-colored, white or red flowers; leaves usually lyrate-pinnate, mostly basal, the cauline smaller. Hypanthium campanulate or flattened, usually with bracteoles at the sinuses between the calyx-lobes. Sepals and petals 5, the former valvate, persistent. Stamens numerous (more than 20) in several series. Pistils numerous, on a clavate or hemispheric receptacle; fruit an achene, tipped with the persistent, elongated beak-like base of the style; styles filiform, terminal.

KEY TO THE SPECIES

- 1. Calyx-lobes reflexed in flower and fruit; petals yellow; basal leaves lyrate and interruptedly pinnate, the terminal leaflet large and rounded; styles jointed and geniculate above the middle, uncinata at apex after the hairy terminal portion falls away. ..
.....1. G. macrophyllum var. perincisum

- 1. Calyx-lobes erect or spreading in flower and fruit; petals white, cream-colored or yellow; basal leaves pinnate with numerous toothed or dissected leaflets which are all about the same size, the terminal one like the others, not large and rounded; styles more or less evidently jointed near the tips or not at all so, the terminal portion very tardily deciduous, usually glabrous ..
.....2
 - 2. Petals white or tinged with pink; bractlets of the calyx 6-18 mm. long, linear-subulate or oblong, usually exceeding the calyx-lobes, usually strongly purple-tinged; styles much elongating in fruit, plumose, becoming 2.5 to 4 cm. long (excluding the very short naked terminal portion).....
.....2. G. triflorum

 - 2. Petals yellow; bractlets of the calyx 2 to 4 mm. long, usually ovate, usually about two-thirds as long as the sepals, green or somewhat purple-tinged; styles not at all or scarcely elongating in fruit, not plumose, at maturity 3 to 5 mm. long.....3. G. Rossii

1. GEUM MACROPHYLLUM Willd., var. PERINCISUM (Rydb.) Raup, *Rhodora* 33: 176. 1931.

Geum perincisum Rydb. *N.Am.Fl.* 22: 405. 1913.

Geum oregonense Rydb. *Bull. Torrey Club* 25: 56. 1898, as to plant only; not Geum urbanum subsp. Geum oregonense Scheutz, *Nov. Act. Soc. Sci. Upsal.* III. 7(6): 26. 1870.

A coarse erect perennial up to about 1 meter tall, from a short thick rootstock. Whole plant more or less bristly with long stiff yellowish hairs. Basal leaves about 10 or fewer, up to about 45 cm. long, including the petiole, which is somewhat dilated and sheathing at base. Principal leaflets usually 5 or 7, with intervening smaller leaflets scattered at intervals along the rachis; terminal leaflet ovate or rounded-cordate, 5-10 cm. long and about as wide, often 3-lobed and incised and serrate as well, the lobes and serrations usually rounded or blunt-pointed; principal lateral leaflets in pairs, much smaller than the terminal leaflet and the pairs successively

smaller toward the base. Stem-leaves usually 3-5, 3-5 lobed, with broad leafy stipules which are partially adnate to the petioles. Flowers few to 15, in corymbose cymes; petals obovate, 4-7 mm. long. Calyces and peduncles of the flowers and fruits with small stalked glands interspersed among the abundant short hairs. Receptacle loosely covered by very short hairs but its surface not obscured by them. Lower internode of the style (the persistent beak-like base) 4-5 mm. long, loosely supplied with minute stalked glands.

Flowers in northern and western Nevada beginning from mid-June to mid-July; material with mature fruit has been collected from mid-July to mid-September.

Meadows and creek-bottoms, in moist soil, in the interior of northwestern North America, from the Yukon southward, in and west of the Rocky Mountains about to the Mexican border. It is abundant in the highlands from Montana to Washington and is found rather less abundantly southward to California and northern and western Nevada. It occurs at isolated localities around the Great Lakes. In Nevada its altitudinal range appears to be from about 2000-3000 meters.

NEVADA: ELKO: Robinson Cr., e. side of Ruby Mts., P. Train, Aug 1, 1936 (US); Indian Cr., e. side of Ruby Mts., Train, Aug. 1, 1936 (USNA); vicinity Coon Cr. R.S., Jarbidge Mts., Train 695 (USNA); Ruby Valley, 6000 ft., S. Watson 317, Aug. 1863 (US); Wm. Smiley's Ranch near Deeth, A.A. Heller 9058 (US); Pine Mt., near Gold Creek, A.E. Hitchcock 1122 (US). WHITE PINE: Ely, Duck Cr., 4 mi. s.e. of Paine's Ranch, A.E. Hitchcock 1378 (US); Berry Creek Can., Shell Creek Range, Tidestrom 11115 (US); Bird Cr., 15 mi. e. of McGill, Moore & Franklin 667 (USFA); north base Wheeler Peak, near Lehman Caves Camp Ground, McVaugh 6046 (USNA). LANDER: Smith's Creek Can., 44 mi. w. of Austin, Goodner & Henning 647 (USNA); Big Cr. and Kingston Can., A.E. Hitchcock 786 (US). WASHOE: Marlette L., C.F. Baker 1287 (US, 2 sheets); Hunter Cr., P.B. Kennedy 1863 (US); along Galena Cr. 7 mi. w. of Reno Hot Sprs., W.A. Archer 5655 (USNA). ORMSBY: Kings Can., C.F. Baker 1284 (US). MINERAL: Springs at headwaters of Cory Cr., Wassuk Range, 9000 ft., Archer 7064 (USNA). COUNTY UNKNOWN: "Nevada"; Lt. Wheeler in 1873 (US).

NOTE: For discussion of the name used for this variety, see *Rhodora* 33: 172-176. 1931 ("The Genus *Geum* in the Athabasca-Great Slave Lake Region," by Hugh M. Raup). *G. macrophyllum* var. *perincisum* is distinguished from typical *G. macrophyllum* by having deeper lobing in the terminal leaflet of the basal leaves and by the glandularity of the peduncles; the glands are lacking in typical *G. macrophyllum*. *Geum strictum* Ait., of which I have seen no specimens from Nevada, has the receptacle of the fruiting head covered with hairs so as to obscure the pits, and the lower internodes of the styles are glabrous, without the glands which distinguish *G. macrophyllum*.

2. *GEUM TRIFLORUM* Pursh, Fl. Am. Sept. 736. 1814.

Geum ciliatum Pursh, Fl. Am. Sept. 352. 1814.

Sieversia triflora R. Br. ex Richards., Bot. App. Frankl. Journ. ed. 2:
21. 1823.

Sieversia ciliata G. Don. Gen. Hist. 2: 528. 1832.

Erythrocoma ciliata Greene, Leaflet 1: 177. 1906.

Geum triflorum var. ciliatum (Pursh) Fassett, Rhodora 30: 207.
1928.

An erect perennial 20-50 cm. high, from a stout thick rootstock, the stem finely pilose. Leaves mostly basal, few-20, interruptedly pinnate, few-10 (20) cm. long, bristly or white-pilose, especially when young. Leaflets mostly 9-19, somewhat crowded, cuneate in outline, the principal ones 1-3 cm. long. Blades of basal leaves oblanceolate, the leaflets largest on the distal third and the others successively smaller toward the base of the leaf; all leaflets more or less 3- to 5-cleft into linear to cuneate, incised-toothed segments. Stem-leaf usually 1 below the inflorescence, deeply pinnately dissected, 2-5 cm. long, the adnate-sheathing stipules foliaceous, up to about 2.5 cm. long. Cymes 1- to 3-flowered, the flowers long-pedunculate, often nodding; petals 9-15 mm. long, white, yellowish or pinkish; calyx and bracteoles usually strongly purple-tinged, finely pilose, the sepals ovate, acuminate, 8-11 mm. long. Articulation (knee) in the style usually evident, the terminal portion 3-4 mm. long.

Flowers in northern Nevada from early June to mid-July.

Open mountain slopes, prairies and alpine meadows, at elevations of 1200 to 2500 meters, from western Canada southward, chiefly west of the Rocky Mountains, to New Mexico, Utah, northern Nevada and the mountains of California.

NEVADA: ELKO: 32 mi. e. of Owyhee, T.L. Breene 410 (USNA).
WHITE PINE: Fish Cr., 9 mi. s.e. of McGill, Moore & Franklin 646 (USNA); Ely, Duck Creek Can., 4 mi. s.e. of Paine's Ranch, A.E. Hitchcock 1435 (US). HUMBOLDT: Buckskin Peak region, Santa Rosa Range, P. Train 506 (USNA); Hinky Summit, Santa Rosa Range, P. Train 278 (USNA). WASHOE: Hunter Creek Can., P.B. Kennedy 1630 (US).

NOTE: The prevailing form of this species in Nevada is typical G. ciliatum, the type of which came from Idaho. East of the Rockies the species is represented by a variant with broader leaflets, which are usually less deeply incised, and with styles which are obscurely or not at all jointed. This is typical Geum triflorum Pursh, which is taken by most conservative modern students to be conspecific with G. ciliatum. The two were combined by Scheutz in 1870 under the name G. triflorum (Prodr. Mon. Geobotan 55). I am indebted to Professor M. L. Fernald for calling this to my attention.

The form of Geum triflorum which occurs in the Sierra Nevada of California, in western Nevada and northward into Washington has been considered distinct by some authors. This is a form with the leaf-segments broader than those of typical G. Gilliatum as currently understood and with the bractlets shorter than the sepals (according to Rydberg). It has gone under the name of Erythrocoma canescens Greene (Leafl. 1: 178. 1898) or Sieversia canescens (Greene) Rydb. (N.Am.Fl. 22: 409. 1913). The Washoe County specimen cited above, Kennedy 1630, is of this type. It is certainly not more than varietally distinct from the rest of the Nevada material.

3. GEUM ROSSII (R.Br.) Ser. in DC.Prodr. 2: 553. 1825.

Sieversia Rossii R. Br. Chlor. Melv. 18. 1823.

Geum turbinatum Rydb. Bull.Torr. Club 24: 91. Feb.28, 1897.

Geum sericeum Greene, Pittonia 3: 172. May 19, 1897.

Sieversia sericea Greene, Pittonia 4: 50. 1899.

Sieversia turbinata Greene, Pittonia 4: 50. 1899.

An erect perennial up to about 30 cm. high, from a stout erect rootstock covered with the persistent chestnut-brown leaf-bases of previous seasons, the stem short-pubescent and often granular. Leaves mostly basal, few-12, pinnate or so deeply pinnatifid as to appear so, 3-10 (20) cm. long, sparsely pubescent or almost glabrous to densely hispid or silky, the young leaves more densely pubescent than the mature ones. Blades oblanceolate, the principal leaflets 10-20 (35), cuneate in outline, crowded, 2- or 3- (5-) lobed, the lobes often toothed. Longest leaflets up to about 2 cm. long. Stem-leaves 1 or 2 below the inflorescence, deeply pinnatifid, or the upper ones entire or nearly so; stipules foliaceous, broad and often rounded, adnate to the petiole. Flowers solitary or in 2- or 3-flowered cymes, long-pedunculate (in dwarfed alpine forms the plants may be smaller, and the flower usually solitary, on a short peduncle). Petals orbicular or obovate, 6-10 mm. long, yellow. Calyx and bracteoles green or somewhat purplish, finely strigose or glabrate (usually conspicuously pubescent at base), the sepals broadly ovate, acuminate, up to about 6 mm. long.

Flowers in northern Nevada from early July through late August.

Dry rocky alpine slopes and ridges, crevices and cliffs, mountains of western North America. Arctic America, south in the mountains to Wyoming, New Mexico, Utah, northern Nevada, Oregon and the mountains of Arizona; in the United States it occurs chiefly at altitudes of 2500 meters and above.

NEVADA: ELKO: Furlong Lake, Ruby Mts., 8500 ft., P. Train, July 10, 1936 (USNA); Furlong Lake region, 9000 ft., Train, July 10, 1936 (US); Ruby Mts. near Blaine P.O., 9000 ft., A.A. Heller 11102 (US); Ruby Mts.,

north side of Lamoille Can., 9750 ft., Heller 9359 (US); Clover Mountain range near Deeth, 8750 ft., Heller 9139 (US); East Humboldt Mts., 10000 ft., M.E.Jones, Aug. 13, 1897 (US); E. Humboldt Mts., 9000 ft., S. Watson 320, Aug. 1868 (US). WHITE PINE: Ely, Duck Creek Can. 4 mi. s.e. of Paine's Ranch, A.E.Hitchcock 1416 (US).

NOTE: Typical Geum Rossii, from Arctic America and Asia, seems to differ from the plant of western United States principally by its slightly larger flowers. The petals of the Arctic plant, according to Rydberg (N.Am.Fl. 22: 413. 1913) have an average length of about 1 cm., while the maximum length of the petals of its more southern relative is about 1 cm. The achenes of the two plants appear to be identical, however, the two are exceedingly alike in vegetative characters, and the corolla-characters appear to be of no more than varietal importance. Indeed an occasional specimen from the Arctic, especially from interior Alaska, is found to agree in every detail with the bulk of the material from the southern Rocky Mountains. It seems best, therefore, to refer the Nevada plant to G. Rossii rather than to G. turbinatum or to G. sericeum. The former is the earlier name, but the latter was applied to a form with strongly silky leaves which is apparently endemic in the Ruby Mountains. The type was collected there by Greene. The form seems, however, to be neither widespread nor consistent, and apparently does not deserve recognition.

12. Fallugia Endl.

Shrub 0.3-2 (3) meters high, with light gray or reddish shredding bark; branchlets of the current season white or nearly so, pubescent. Leaves deciduous, deeply pinnately lobed; with revolute margins, pubescent above, nearly glabrous beneath, the lower surface more or less obscured by a yellowish or reddish waxy exudate. Leaves 5-15 mm. long, the 3-7 linear lobes spreading, blunt-tipped, often forked, up to about 10 mm. long. Stipules triangular, green or white, about 1 mm. long or less, more or less ciliate-margined. Flowers solitary at the tips of elongated peduncle-like branches or in determinate several-flowered inflorescences, the lateral peduncles usually shorter than the terminal and sometimes not maturing. Hypanthium hemispheric or somewhat flattened, persistent, pubescent and waxy-glandular without, villous within. Calyx-lobes 5, pubescent and waxy-glandular without, glabrous within, oval, 4-7 mm. long, keeled near tip and the midrib extended into a mucro 1-2 mm. long; lobes often with an additional lateral mucro on each side of the midrib or on one side only; bracteoles of the calyx 5, alternating with the calyx-lobes, usually (at least in Nevada material) much shorter than the lobes, 2-5 mm. long, often cleft almost to the base and apparently 2 at each sinus of the calyx. Petals 5, white, 11-15 mm. long, rounded. Stamens numerous (about 100), in 3 series. Pistils numerous (20-60) on a conic short-stalked receptacle; achenes about 3 mm. long at maturity, hairy, the persistent styles plumose, elongated, 2.5-4 cm. long in fruit, often purplish.

1. FALLUGIA PARADOXA (D. Don) Torr. in Emory, Notes Mil. Rec.,
140, pl. 3, 1848.

Sieversia paradoxa D. Don, Trans. Linn. Soc. 14: 576, t. 22:
figs. 7-10, 1825.

This is the only known species. It is commonly called "Apache
Prune." The type was collected in Mexico by Sesse and Mocino.
In Nevada the flowering season is from late April to June; fruits are
matured throughout the summer, depending upon the season; fruits and
occasionally flowers are collected as late as October.

Sandy, gravelly or rocky slopes or canyons, desert mountain ranges,
from the eastern Mojave Desert in California to Colorado and western
Texas, south into northern Mexico. Occurs mostly at elevations of
1400-2100 meters

NEVADA: NE: Troy Canyon, Grant Range, McVaugh 6096 (USNA).
LINCOLN: Pioche, Maud Minthorn 72 (acc. to Jepson, Fl. Calif. 2:
206, 1930); Crystal Springs, R.D. Hermansen 73E (USNA); Hackberry Spr.,
Mormon Mt., P. Train 1922 (USNA); Mormon Mts., Kennedy & Goodding 93
(US). CLARK: Corn Creek, Desert Game Range, S.G. Jewett 158 (USNA);
Hidden Canyon, Sheep Mts., LaRivers & Hancock 638 (USNA); Gold Spring
Creek, Charleston Mts., P. Train 1977 (USNA); Kyle Canyon, Charleston
Mts., I.W. Clokey 7975 (USNA); west slope of Charleston Mts., road
from Pahre to the sawmill, Coville & Funston 300 (US); Bunkerville,
I.N. Goodding 748 (US); Charleston Mts., C.A. Purpus 3080 (US)

13. Cowania D. Don

Erect shrubs or small trees; leaves dentate, entire or deeply
pinnately lobed, coriaceous, usually sticky and dotted with glands
which exude a fragrant resin. Flowers solitary; petals 5, pink,
yellow or white, stamens numerous; achenes 1-12, with long, persistent,
plumose styles; bracteoles of the calyx wanting. A genus of about 5
species, in southwestern United States and northern Mexico.

1. COWANIA MEXICANA D. Don, Trans. Linn. Soc. 14: 575, 1825.

Cowania stansburiana Torr. in Stanst. Expl. Great Salt Lake 366.
1852.

Cowania alba Goodding, Bot. Gaz. 37: 55, 1904 (the type from south
of Bunkerville, Nevada, Goodding 744).

Cowania mexicana var. stansburiana Jepson, Man. Fl. Pl. Calif. 408.
1925.

Much-branched shrub 0.5-3 meters high, with gray or reddish bark,
that of the young branches chestnut-brown, and somewhat beset with small
stalked glands. Leaves 6-12 cm. long, obovate in outline, pinnately 3-

to 5-lobed, the lobes blunt, linear or broader, often toothed or lobed. Blades coriaceous, with revolute margins, glabrous above with numerous impressed glands, the lower surface glabrous or densely white-tomentose. Leaves jointed at base; stipules short-triangular, brown or scarious, gland- or ciliate-margined, fused with the base of the petiole and persistent after the fall of the blade. Flowers solitary, at the ends of short lateral branches, nearly sessile, the pedicels about 5 mm. long or less. Hypanthium 5-7 mm. long in flower, campanulate, gradually (or abruptly) narrowed into the pedicel; pedicel and the outer surface of the hypanthium usually with small stalked glands; inner surface of hypanthium glabrous. Calyx-lobes 5, broadly elliptic, rounded or acute at tip, about 4-6 mm. long, pubescent and usually glandular without, usually nearly glabrous within except near the margins. Petals 5, yellow or creamy white, or nearly white with a yellow base, rounded, 6-10 mm. long. Stamens numerous (more than 60), in two series. Pistils 1-12 (usually 5-10), inserted in the bottom of the hypanthium-tube; achenes glabrate at maturity, 6-8 mm. long, ribbed; styles 4-6 cm. long in fruit.

Flowers in southern Nevada from early May to August; fruit matures from June to August.

Sandy and gravelly slopes and canyons, desert mountain ranges, from the Mojave Desert in California to Utah and Arizona, south into Mexico. Occurs mostly at elevations of 1450-2250 meters.

NEVADA: ESMERALDA: Near Black Mammoth Mine, Silver Peak Range, Archer 7270 (USNA); mesa w. of Goldfield, Heller 10972 (US). ELKO: Antelope Butte, F.A.Clark 315 (King Exp.), Sept. 1868 (US); 1 mi. w. of Pequop Summit, McVaugh 6417 (USNA). WHITE PINE: East base of Diamond Mts. in Newark Valley, V.Bailey 113, June 15, 1898 (US); 9 mi. w. of Ely, Moore & Franklin 317 (USNA); Ely, A.E.Hitchcock 1227 (US). LINCOLN: 10 mi. e. of Groom Dry L., road to Crystal Spr., Train 2387 (USNA); Deer Lodge, Pinyon Mt., Desma Hall, June 11, 1935 (USNA); Mormon Mts., Kennedy & Goodding 97 (US). NYE: Cactus Range, 6500 ft., P.Monnet 967, Oct. 1913 (US); Troy Can., Grant Range, McVaugh 6095 (USNA). CLARK: Dead Man Can., Desert Game Range, J.C.Allen 5 (USNA); Kyle Can., Charleston Mts., Clokey 7546 (Pl.Exsicc.Gray.719) (USNA); Trout Creek fan, Charleston Mts., Clokey & Anderson 7145 (USNA); 5 mi. w. of Goodsprings, LaRivers & Hancock 307 (USNA); Good Springs, M.E.Jones, May 1, 1905 (US); Mica Spr., M.E.Jones 5064u, Apr. 14, 1894 (US).

NOTE: In recent works dealing with the flora of western United States, this species has usually been included under the name of C. stansburiana, although some authors have included both C. stansburiana and C. mexicana. These species are distinguished, according to Rydberg (N.Am.Fl. 22: 415. 1913) and Standley (Contr. U.S.Nat.Herb. 23: 326. 1922) by the lobes of the leaves, which are entire in C. mexicana and cleft or dentate in C. stansburiana. Other differences are said to lie in the calyx-tube or hypanthium-tube, which is abruptly contracted at base in C. mexicana and gradually

narrowed at base in C. stansburiana. Jepson has already noted that there is considerable variation and many intermediate forms in the hypanthium-shape (Fl. Calif. 2: 307. 1936), and it seems apparent from examination of Nevada material that the same thing is true in regard to leaf form. In my opinion C. mexicana and C. stansburiana must be regarded as one and the same; the differences between them are inconsequential and scarcely correlated with other features.

14. Purshia DC.

Figarea Pursh, Fl. An. Sept. 333. 1814, not Figarea Aubl., 1775.

Kunzia Spreng! Anl. Ed. 2, 2: 869. 1818.

Shrubs 0.5 - 3 meters high, with reddish or gray bark, with trunk up to 3 inches; branchlets of the current season chestnut-brown, usually pubescent and somewhat beset with small stalked glands. Leaves thick and somewhat coriaceous, usually appearing fascicled because of the short internodes, 3-lobed or 3-toothed (sometimes with 4 or 5 lobes or teeth), the margins more or less revolute. Blades 5-15 mm. long, cuneate, narrowed to a petiole-like base, jointed at base exactly as in Cowania mexicana; stipules as described for C. mexicana. Flowers solitary, at the ends of short lateral branches, nearly sessile; pedicel usually not sharply set off from the hypanthium, the latter attenuate to the base; combined length of pedicel and hypanthium-tube usually 6 (sometimes 8) mm.; pubescence and glands of hypanthium and calyx-lobes as in Cowania mexicana. Calyx-lobes 5, oblong or elliptic, rounded at tip, 2-4 mm. long. Petals 5, yellow, cream-colored or white, rounded at tip, gradually narrowed to a claw-like base, 4-6 mm. long. Stamens 20-25. Pistils (achenes) 1 or 2, fusiform at maturity, canescent, 12-20 mm. long, including the short persistent style.

The genus is usually understood to comprise 2 species, both natives of western United States. The most extreme forms seem quite distinct, but in central and southern Nevada, where the genus is abundantly represented, there are many perplexing individuals which seem intermediate between the two so-called species. It is thought best, accordingly, to take the course proposed by Jones (Proc. Calif. Acad. Sci. 2, 5: 630. 1936), and recognize but a single species with 2 varieties.

1. PURSHIA TRIDENTATA (Pursh) DC. Trans. Linn. Soc. 12: 156. 1817.

Figarea tridentata Pursh, Fl. An. Sept. 333. 1814.

KEY TO THE VARIETIES:

- 1. Leaves pubescent on both sides, white-tomentose beneath; blades with three coarse teeth at apex, the teeth oblong or broader; impressed glands on the leaf-margins none.....
.....la. P. tridentata (typical)

1. Leaves glabrous or nearly so at least above (at least at maturity); blades with three narrow lobes; margins and sometimes the upper surface of the leaves with numerous impressed glands,.....
.....lb. P. tridentata var. glandulosa

1a. PURSHIA TRIDENTATA (typical)

Flowers yellow; leaves ("apparently deciduous," according to Jepson) usually whitened by the pubescence on both surfaces; leaves usually with a definite broad flat blade distinct from the short petiole. According to Rydberg (N.Am.Fl. 22: 417. 1913) the petals are 7-9 mm. long, but I have seen none longer than 6 mm. in Nevada material.

Flowers in Nevada from mid-April to early June; fruit matures as late as July and is sometimes collected later than this.

Dry slopes and valleys in sandy, gravelly or rocky soil, arid mountain ranges, Montana to British Columbia, south to California, central Nevada, Utah and New Mexico, at elevations of 1000-3000 meters (in Nevada mostly 1400-2000 meters).

NEVADA: WASHOE: Reno, I. Tidestrom 3532, June 14, 1910 (US); 4 mi. w. of Reno, W.A.Archer 5119 (USNA); 2-4 mi. w. of Reno Hot Springs, Archer 5359 (USNA); 10 mi. n.w. of Reno, True & Klugh 41 (USNA); Pyramid Lake, F.B.Headley, July 18, 1911 (USNA); Lake Range between Winnemucca and Pyramid Lakes, Headley (USNA). ORMSBY: Highway east of Carson City, Goodner & Henning 97 (USNA); Clear Creek Road, P.A.Lehenbauer, Apr. 15, 1934 (USNA); Clear Creek Grade, near Carson City, L.R.Miller 29 (USNA); Carson City, M.E.Jones in 1882 (US) and May 31, 1897 (US); Kings Can., C.F.Baker 947 (US, Calif). STOREY: Six Mile Canyon 1mi. e. of Virginia City, Moore & Franklin 29 (USNA); Virginia City, H.G.Bloomer, May 1863 (US). HUMBOLDT: Pine Forest Mts., Griffiths & Morris 255 (US). CHURCHILL: 1-6 mi. w. of Carroll Summit, Goodner & Henning 664 (USNA). LANDER: Birch Creek Canyon, 16 mi. s.e. of Austin, Goodner & Henning 606 (USNA). EUREKA: 2-11 mi. e. of Eureka on highway U.S. 50, Goodner & Henning 805 (USNA); ELKO: Lone Mt., 25 mi. n. of Elko, A.E. Hitchcock 996 (US); Alleghany Cr., Nelson & Macbride 2168 (US); 22 mi. w. of Jarbridge, P. Train 893 (USNA); 10 mi. s. of Ruby Valley, Hitchcock & Martin 5692 (USNA). WHITE PINE: Bird Creek, 15 mi. e. of McGill, Moore & Franklin 670 (USNA); White River Camp, e. slope White Pine Mts., Train 1221 (USNA); Overland Pass, s. end of Ruby Range, H. L. Mason 4834 (Calif.). LINCOLN: Deer Lodge, P. Train 2519 (USNA). NYE: Broad Creek, w. of Darrough Hot Springs, Goodner & Henning 1168 (USNA); Cloverdale Gulch, V. Bailey 109, May 30, 1898 (US). ESMERALDA: White Mts., near Sunland, Heller 10513 (US). MINERAL: Miller Mt., W.A.Shockley 230, June 1882 (US).

1b. *PURSHIA TRIDENTATA* var. *GLANDULOSA* (Curran) M.E. Jones, Proc. Calif. Acad. ser. 2, 5: 680. 1895.

Purshia glandulosa Curran, Bull. Calif. Acad. 1: 153. 1865.

Petals white (according to Jepson, Fl. Calif. 2: 223. 1936) or yellow (according to Curran's original description and to field data on Train specimens cited below). Leaves ("apparently evergreen," according to Jepson) green, glabrous or essentially so above, glabrous and green beneath or slightly tomentose; lobes usually linear, so deeply cut that the central part of the blade is not or scarcely wider than the lobes.

Flowers in southern Nevada in late April; fruit has been collected from June to early September. The range of the variety extends from southern Utah and Nevada through the Mojave Desert and to the mountains on the west side of the Colorado Desert. It occurs chiefly in stony and sandy canyons and washes, in desert mountain ranges, at elevations of 1400 to 2700 meters.

NEVADA: CLARK: Road to Pine Spr. Timber Mt., Train 1620 (USMA); right fork of Trout Can., Train 2003 (USMA); w. slope of Charleston Mts., between Pahump ranch and the sawmill, Coville & Funston 299 (US). LINCOLN: Meadow Valley wash, mile 16, M.E. Jones, Apr. 28, 1904 (US, Calif); Karshaw, Meadow Valley Wash. Coooding 964 (US, Calif); 9.5 mi. w. of Caliente, McVaugh 5984 (USMA); 9 mi. n. of Panaca, McVaugh 5987 (USMA). ESPIRALDA: Tale Can., s.w. of Lida, Tidestrom 9822 (US); Trail Can., White Mts., V. Duran 542 (US; a form approaching the typical one). LIBERAL: 6-7 mi. up Cory Cr., Wassuk Range, Archer 6929 (USMA); Cory Can., Tidestrom 10091 (US); s. base of Mt. Grant, Holler 10910 (US, Calif).

NOTE: Although I have seen relatively few specimens typical of this variety, all the specimens cited under *P. tridentata* (typical) partake to some extent of its characteristics, with the exception of some of the material from the Reno region. Practically all the specimens from central Nevada have glandular foliage, which is green and scarcely whitened above; they have also a tendency toward narrower lobes than those usually seen in typical *P. tridentata*. It is because of this considerable body of specimens, none of which is exactly typical either of *P. tridentata* or "*P. glandulosa*", that I feel justified in relegating the latter to varietal status.

Tribe 8. CERCOCARPEAE This tribe, according to Rydberg, consists of the single genus *Cercocarpus*, with 21 species (W. An Fl. 22: 418. 1913). The genus is confined to western North America.

15. *Cercocarpus* HBK.

Evergreen shrubs or low trees with simple coriaceous leaves. Branches unarmed, the lateral often spurlike, with fascicled leaves. Flowers solitary or in fascicles at the ends of the spurs, arising from winter-buds. Hypanthium slender, cylindric, drying and persistent in fruit, abruptly expanded at the summit into a shallowly cup-shaped or campanulate, 5-lobed, deciduous calyx. Corolla none. Stamens 15-25, inserted on the inside of the calyx-cup and deciduous with it. Pistil 1, in flower hardly exceeding the calyx. Fruit a hairy achene tipped by the much-elongated plumose style and surrounded by the persistent calyx-tube, which is usually split partially down one side by the expanding fruit.

KEY TO THE SPECIES

- 1. Leaves coarsely toothed at apex, the blades ovate to obovate; flowers distinctly pedicellate, often 2 or 3 together.....3. *C. montanus*
- 1. Leaves entire, linear to elliptic or lanceolate, with revolute margins; flowers sessile or essentially so, usually solitary...2
 - 2. Plumose "tail" of the mature achenes 3 (rarely 4) cm. long or less; leaf-blades strongly inrolled, appearing linear....1. *C. intricatus*
 - 2. Plumose "tail" of the mature achenes 5 cm. long or more; leaf-blades elliptic or lanceolate, not inrolled except the margins.....2. *C. ledifolius*

1. *CERCOCARPUS INTRICATUS* S. Wats. Proc.Amer.Acad. 10: 346. 1875.

Cercocarpus arizonicus, M.E. Jones, Zoe 2: 14. 1891.

Cercocarpus ledifolius var. *intricatus* M.E. Jones, l.c.
(based on *C. intricatus* S. Wats.)

An intricately branched and often spinescent shrub 0.6-2 m. high, with gray or reddish bark. Young branchlets reddish, thickly beset with soft whitish hairs. Leaves pubescent or glabrate, or glabrous and shining from the first, sessile or essentially so, 0.3-1.5 cm. long, the margins so much inrolled as to make the blades appear linear and almost cylindrical. Stipules partially adnate, the free part triangular, blunt or acute, 2 mm. long or less. Flowers sessile, solitary or in pairs, the hypanthium-tube 1-1.5 mm. in diameter, 3-7 mm. long. Calyx-cup 3-5 mm. across, including the sepals.

Flowers and fruits in southern Nevada during June and July.

Dry exposed slopes and crevices in cliffs, chiefly at elevations of 1500 to 2100 meters (occasionally up to 2650 meters), desert mountain ranges, southern Nevada to southwestern, central, and northern Utah, northern Arizona and southern California.

NEVADA: CLARK: Lee Can., Charleston Mts., I.W.Clokey 7547 (USNA); Lee Can., Charleston Mts., P. Train 2117 (USNA); Lee Can., Charleston Mts., A.A.Heller 11047 (US); Hidden Forest, head of Deadman Can., Sheep Mts., Train 1782 (USNA); Hidden Forest, Desert Game Range, J.C.Allen 4 (USNA); Lamb Sprs., Desert Game Range, J. C. Allen 130 (USNA); Charleston Mts., 7-8000 ft., C.A.Purpus 6088 (in part) (US); Charleston Mts., 6000 ft., E.A. Goldman 2440 (US). LINCOLN: Half Moon Mine Can., 9 mi. from Pioche, P. Train 2549 (USNA). WHITE PINE: Cathedral Can., s. of Mt. Hamilton, n. end of White Pine Range, P. Train 1242 (USNA); McGill, 2100 meters, I. Tidestrom 11089 (US). WYE: Troy Canyon, Grant Range, McVough 6048 (USNA). EMERALDA: Silver Peak Range, near Red Mt., W.A.Archer 7267 (USNA); Silver Peak Mts., E.A. Goldman 2593 (US).

2. *CERCOCARPUS LEDIFOLIUS* Nutt. ex Torr. & Gray, Fl.N.Am. 1: 427. 1840.

Cercocarpus hypoleucus Rydb. N.Am.Fl. 22: 424. 1913.

Cercocarpus ledifolius var. hypoleucus L.E.Peck, Man. Higher Fl. Oreg. 407. 1941; Madroño 6:134. 1941.

Tall shrub or small tree, mostly 3-6 m. high, with gray or reddish bark (occasionally attains a height of 12 m., and a trunk diameter of 0.5-0.7 m.). Branchlets reddish, pubescent but soon glabrate. Leaves pubescent or glabrate, or glabrous and shining from the first, the lower surface glabrous, pubescent or tomentose; blades 1-3.5 cm. long, 1.3 cm. wide or less, short-petiolate, the petioles stout, up to about 3 mm. long. Stipules partially adnate, the free part triangular or lanceolate, often attenuate, 2-5 mm. long. Flowers sessile or essentially so, solitary or in pairs, the hypanthium-tube (1.5) 2 mm. in diameter, 7-9 mm. long. Calyx-cup 3-5 (7) mm. across.

Flowers in Nevada from mid-May to early July apparently with little relation to climatic differences in the different parts of the State. Fruit matures as late as mid-August.

Canyons and dry rocky slopes, mountain ranges in arid or semi-arid regions, at elevations of 1200 to 3000 meters. Montana to Washington, south to Colorado, Utah, southern Nevada and southern California.

NOTE: The determination of specific limits is very difficult in the group of forms comprising C. ledifolius and its relatives. Rydberg (N.Am.Fl. 22: 418-424. 1913) recognized four species (in the group with entire resinous leaves). The late Marcus E. Jones took a point of view which was diametrically opposed to that of Rydberg; after considerable field study of the forms involved, he concluded that but a single species existed, although with several well-marked varieties. Jones published several papers on this subject (see Zoe 2: 14. 1931; Zoe 2: 244-245. 1931; Zoe 3: 293-300. 1935). Schneider (Ill.Handb.Laubholz).

1: 532, 1905), after examination of the material in the Missouri Botanical Garden, came to a conclusion nearly like that reached by Jones. More recent authors have recognized two species, C. ledifolius and C. intricatus (Munz, P.A., Man. South. Calif. Bot. 236-237, 1935; Jepson W.L., Fl. Calif. 3: 216-217, 1936.

The present writer has been unable to recognize more than one undeniable species in the complex, although there are certainly strongly marked variants which are well correlated with geographical distribution, and further study may show the advisability of segregating one or more species from the complex. The chief variants appear to be as follows:

1. The widespread broad-leaved phase, which is here taken to be typical C. ledifolius. The leaf-blades are pubescent or glabrous, with somewhat revolute margins. Its range is essentially that given above for C. ledifolius.

2. A variety with somewhat narrower leaves, the margins rather strongly inrolled. The blades are rather strongly pubescent, especially beneath. The range is from Washington to Montana, south to Wyoming and northern and western Nevada. This is the plant described by Rydberg as C. hypoleucus; it agrees well with typical C. ledifolius in characters of flower and fruit, and apparently is best regarded as a variety or a mere form of that species.

3. A variety which seems to be more or less intermediate between C. ledifolius and C. intricatus. According to the observations made by Jones, typical C. ledifolius is more or less restricted to the higher elevations throughout its range, while below 7000 feet it shows a complete series of intergrading forms with a small-leaved form (C. intricatus of some authors, not of S. Watson). The leaves vary from those exactly simulating those of true C. intricatus to those which are but slightly smaller than those of typical C. ledifolius. The styles and hypanthia agree with those of C. ledifolius; the styles are rarely less than 5 cm. long. If any specific segregation is to be made in this group of species, the sharpest line seems to be here, between typical C. intricatus (C. arizonicus) and the plant which appears to be but a small-leaved form of C. ledifolius; the distinction lies not in the leaves but in the characters of style and hypanthium. The range of this small-leaved form is almost wholly restricted to the eastern part of the Great Basin, from northeastern Utah to southern Nevada.

NEVADA (Typical C. ledifolius): WASHOE; Charles Sheldon Game Refuge, G.H. Greenway 150 (USNA; a form approaching var. hypoleucus); 4.1 mi. s. of Red Rock, C.A. Graham 427 (USNA; a form approaching var. hypoleucus); north side of Peavine Mt., T.L. Breene 626 (USNA); Galena Cr., Mt. Rose, P.A. Lehenbauer, May 22, 1935 (USNA); Verdi, C.F. Sonne, May 1894 & June 1895 (US); Verdi, S.G. Stokes, June 19, 1903 (US); between Reno Hot Sprs. & Galena Cr., S.D. McKelvey 1357 (US); Hunters Can., near Reno, A.E. Hitchcock 512 (US); Fish Lake,

above Mineral Sta., A.A.Heller 1888, 1891 (US); CRISTO: Clear
Creek Can., C.F.Baker 1888 (US); a pubescent form approaching var.
hypoleucus; Highway e. of Carson City, Goodner & Henning 100 (USMA).
STOREY: 2.5 mi. n. of Virginia City, E.A.Allen 188 (USMA); summit of
Mt. Davidson, E.G.Bloomer in 1887-4 (US). DOUGLAS: Glenbrook, L.S.
Ross 3553 (US). IRON: Slopes of Sweetwater Range near Sweetwater,
E. Engstrom 1916 (US). HUMBOLDT: Martin Creek Basin, Santa Rosa
Range, P.Train 356 (USMA); Pine Forest Mts., Griffiths & Morris 237
(US). CHURCHILL: 1 mi. w. of Carroll Summit, Goodner & Henning 131 1/2
(USMA). MINERAL: South Cat Can., base of Big Indian Mt., Wassuk Range,
T.A.Anther 7099 (USMA). ESMERALDA: Silver Peak Mts., E.A.Goldman 2671
(US); Palmetto Range, C.A.Purpus 5881 (US). LANDER: Near Kingston
Ranger Sta., E.V.A. Mumher 469 (USMA); Kingston Can., 1-3 mi. below
Ranger Sta., Goodner & Henning 194 (USMA). EUREKA: 3 1/2 mi. w. of Elko
at Thomas Falls, E.L.Breene 444 (USMA); vicinity of The Willows about
34 mi. w. of Eureka, Goodner & Henning 557 (USMA). NYE: San Juan Creek
Can., Goodner & Henning 392 (USMA). ELY: Lamoille Can., Ruby Mts.,
A.A.Heller 3551 (US); 1 mi. w. of Popo Summit, McVaugh 6418 (USMA);
a pubescent form approaching var. hypoleucus. WHITE PINE: East fork
of White River, White Pine Range, P.Train 1215 (USMA); Ely, A.E.
Hitchcock 1230 (US). CLARK: Hidden Forest, Desert Game Range, J.C.
Allen 5 (USMA); Hidden Forest, head of Deadman Can., Sheep Mts.,
P.Train 1263 (USMA); ridge s. of Deer Cr., Charleston Mts., I.W.Clokey
554 (Pl. Exsicc. Gray. 731) (USMA); Kyle Can., Charleston Mts., Clokey
554 (US); Charleston Mts., E.A.Goldman 2442 (US); region of Charleston
Peak, G.B. Sudworth, Nov. 10, 1910 (US); Bunkerville, L.N.Goodding 732
(US). COUNTY UNKNOWN: "Nevada," Lt. Wheeler in 1872 (US, 2 sheets).

The following specimens have been seen (from Nevada) of the small-
leaved form distinguished from C. intricatus by its much larger hy-
panthium and style:

WHITE PINE: Mt. Moriah, head of Nigger Cr., 6000-7000 ft.,
P.Train 1185 (USMA). LINCOLN: Mt. Irish, 8-9000 ft., C.A.Purpus
6558 (US). CLARK: Hidden Can., Sheep Mt., 8000 ft., McPeters &
Hancock 621 (USMA); Charleston Mts., C.A.Purpus 3068 (in part) (US).

3. CEROCARPUS MONIANUS Raf. Atl. Jour. 146. 1832.

Cerocarpus parvifolia Nutt. ex Hook. & Arn. Bot. Beech. Voy. suppl.
337. 1840

Spreading or erect shrub 1-3 m. high with gray or reddish bark.
Young branchlets reddish, pubescent. Leaves appressed-pubescent
above with silky hairs, white- or grayish-tomentose beneath. Blades
green above, obovate to sub-orbicular, coarsely serrate above the
middle or sometimes a little below the middle, rounded at tip, cuneate
or somewhat rounded at base, 1-2.5 (4) cm. long, 1-2 cm. wide. Petioles
1-3 mm. long. Stipules partially adrate, the free part soon deciduous,
narrowly triangular, about 5 mm. long. Flowers 2-4 (usually 2 or 3) on
each spur, on pedicels 2-3 mm. long; hypanthium-tube in fruit 8-12 mm.
long, villous without, usually clavate rather than cylindrical, widest
at the mouth, where 1.5-5.5 mm. in diameter. Tails of the achenes mostly
5-7 cm. long. Calyx-cup about 7 mm. across.

The species normally flowers from late May to late June.

Dry rocky slopes and canyons, mountain ranges and foothills at elevations up to at least 2700 meters, South Dakota and northwestern Kansas westward to Montana, Utah and eastern Nevada.

NEVADA: LINCOLN: West slope Wilson Mt., above Devlin Homestead, 8600 ft., P. Train 2556 (USNA); Pioche, 6500 ft., Maud Minthorn 121, May 1909 (in fruit) (Calif).

Tribe 9. RUBEAЕ. This tribe, if broadly interpreted, includes but the single genus Rubus, with more than 400 species, distributed in all parts of the world.

16. Rubus (Tourn.) L.

Perennial shrubs or woody vines (a few herbaceous), usually armed with prickles or bristles. Stems usually biennial, those of the current season (turions or primocanes) vigorous, most of their leaves 5-foliolate; stems the second season (floricanes) sending out floral branches with mostly 3-foliolate leaves. Leaves pinnately or digitately compound, or simple. Flowers mostly white or rose-colored, usually in corymbs or racemes. Calyx 5-lobed, the lobes persistent; bractlets none. Petals 5. Stamens many, inserted on the rim of a disk. Pistils mostly numerous, closely packed on a convex, hemispheric or elongate receptacle, usually becoming drupelets and more or less coalescent when ripe. "Fruit" an aggregate made up of the coalescent drupelets, which falls from the dry receptacle as a thimble or cap (in the Raspberries) or adheres to the receptacle and falls with it (in the Blackberries and Dewberries).

(References: Focke, W.O., Species Ruborum. Monographiae generis Rubi Prodronus. Bibl.Bot., Heft 721, 722, 83: 1-498. 1910-1914. Rydberg, P.A., N.Am.Fl. 22: 428-480. 1913. Bailey, L.E., Species Batorum Boreali-Americana (The Genus Rubus in North America). Gentes Herbarium 5: (unfinished; fasc. 1, pp. 1-64, publ. March 15, 1941; fasc. 2, pp. 65-126, May 21, 1941; fasc. 3, pp.127-198, Oct. 29, 1941; fasc. 4, pp.199-223, Dec. 30, 1941).

KEY TO THE SPECIES

1. Leaves simple, palmately lobed.....4. R. parviflorus

1. Leaves compound, with 3-5 leaflets.....2

2. Stems (at least the younger parts) and inflorescences with numerous bristles and stalked glands; fruit red, thimble-shaped, separating from the receptacle.....
.....3. R. idaeus

2. Stems and inflorescences neither bristly nor glandular, but usually with conspicuous stout curved prickles with broad bases.....3

3. Stems glabrous (except at the tips of the branches of the inflorescence), usually glaucous; petals white; fruit black or red, thimble-shaped, separating from the receptacle.....2. R. leucodermis

3. Stems more or less pubescent in the young growth, not glaucous; petals pink; fruit black, not separating freely from the receptacle.....1. R. procerus.

1. RUBUS PRO CERUS P.J.Mill. in Boulay Ronc.Vosg. 7. 1864.

Stems stout, angled, up to 2 m. high, or merely ascending, or the tips trailing and rooting and the plants more or less creeping; canes rather thickly beset with stout straight or somewhat curved prickles up to 1 cm. long. Leaves mostly 3-foliolate, the leaflets broadly ovate, up to about 10 cm. long and 6 cm. wide, doubly serrate, acute or acuminate at tip, slightly cordate at base, green above and sparsely strigose, pale and densely grayish- or white-tomentose beneath. Inflorescence an elongated terminal panicle; pedicels and calyx densely tomentose; sepals ovate, acuminate, 7-15 mm. long, soon reflexed. Petals 10-12 mm. long, obovate.

Flowering material has been collected in Nevada in late June.

This is an introduced species now naturalized in many parts of the United States. It is extensively cultivated as the "Himalaya Berry" and often becomes established. It is one of a group of European species, all of the subgenus Eubatus, which have pink flowers and tomentose foliage and are exceedingly difficult of determination. The name Rubus thyrsanthus Focke has been applied to the Himalaya Berry (see Bailey, I.E., Stand.Cycl.Hort. new ed. 3: 3029. 1925), but Professor Bailey indicates in his other publications that this name is inapplicable (see Gent.Herb. 1: 136. 1923). Rubus ulmifolius Schott (Isis 1818: 821. 1818) is the oldest name applied to any of the species in this immediate group, and further study may show it to be identical with R. procerus. For the present, however, we may follow Professor Bailey and other students of the blackberries in using R. procerus in this sense.

NEVADA: WASHOE: Truckee River banks at south asylum bridge, Reno, J. Henrichs 280 (USNA). STOREY: 1 mi. n. of Virginia City, R.A.Allen 202 (USNA).

2. RUBUS LEUCODERMIS Dougl. ex Torr. & Gray, Fl.N.Am. 1: 454, 1840.

Rubus occidentalis subsp. Rubus leucodermis Focke, Abh.Nat.Ver.Bremen 4:147. 1874.

Stems erect, but usually arching at the ends, 1-2 m. tall; primocanes green to yellowish; floricanes often purplish; all canes armed with rather stout, recurved prickles. Leaves green and sparsely pilose above,

densely grayish- or white-tomentose beneath. Leaflets ovate, the terminal ones up to 9 cm. long; acuminate, deeply doubly serrate, sometimes lobed; lateral leaflets sometimes obtuse, elliptic or obovate. Corymbs loosely few-flowered (usually 1- to 3-flowered). Calyx tomentose; sepals lanceolate or oblong, long-attenuate, 6-12 mm. long, exceeding the petals.

Flowers in southern Nevada in July and August.

This, the so-called Western Black Raspberry, ranges from British Columbia to Montana, south to Utah, southern Nevada and southern California. It is found in relatively moist canyons and on hillsides, in the mountains.

NEVADA: CLARK: Little Falls, Charleston Mts., I.W.Clokey 5501 (US), 7973 (USNA); Little Falls above Upper Kyle Canyon Camp Ground, 8200 ft., P.Train 2241 (USNA).

NOTE: This plant seems to differ from the eastern Rubus occidentalis chiefly in the more strongly armed canes and perhaps in the shape and serration of the leaflets. Focke (Sp.Rub. 201) considered R. occidentalis to be no more than varietally distinct, and the writer is inclined to concur. Botanists in general, however, in the region where the Western Raspberry is native, have almost without exception accepted it as a distinct species, and it should be studied further before any definite decision is made.

The distribution of R. leucodermis in Nevada appears to be a peculiar one because of the fact that it is known in the State from Clark County only, while outside the State it ranges considerably north and east of Nevada and should be expected to occur in the northern counties rather than in the southernmost alone.

3. RUBUS IDAEUS L., var. ACULEATISSIMUS Regel & Tiling, Nouv. Men. Soc.Imp.Nat.Mosc.11 (Fl.Ajan.) :87. 1859.

Rubus idaeus ssp. Rubus melanolasius Focke, Abh. Nat.Ver.Bremen 13: 47 1896.

Rubus melanolasius Focke, l.c.; Rydb.N.An.Fl. 22: 448. 1913.

Stems erect, 1-1.5 m. tall; canes (at least on the younger parts), leaf-rachises and inflorescences bristly and glandular, sometimes glaucous; canes usually becoming bronzy and the bark flaky in age; prickles slightly dilated at base, but acicular, not stout nor flattened nor curved. Leaves green and sparsely hairy above, grayish- or whitish-tomentose beneath. Leaflets ovate, acute, doubly serrate, the terminal ones often deeply lobed, 3-10 cm. long. Corymbs loosely 1- to 3-flowered, axillary or terminal, the flowers slender-pedicelled. Calyx glandular and pubescent, the lobes usually attenuate or caudate, up to 2.3 cm. long (usually 8-15 mm. long).

Flowers in northern Nevada in July.

This, the Western Red Raspberry, occurs in the mountains of western North America, east to Michigan, and also in eastern Asia.

NEVADA: ELKO: East Humboldt Mts., 10000 ft., S. Watson 309 (US); Coon Creek Basin, Jarbidge Mts., P. Train 738 (USNA); headwaters of Jarbidge R., 6-9 mi. above Jarbidge, 7-8000 ft., Train 815 (USNA). WHITE PINE: Berry Creek, Shell Creek Range, Tidestrom 11092 (US); Alpine slopes n. of Timber Cr., Shell Creek Range, McVaugh 6002 (USNA). NYE: Troy Canyon, Grant Range, McVaugh 6061 (USNA)

4. RUBUS PARVIFLORUS Nutt. Gen.Pl. 1:308. 1818.

Rubus nutkanus Moc. ex Ser. in DC. Prodr. 2: 566. 1825.

Upright unarmed shrubs 0.5-2 m. high, with brown shreddy bark; young growth, inflorescence and petiole pubescent and glandular. Leaf-blades round in outline, cordate, palmately 5-lobed, green, paler beneath, 10-30 cm. broad; petioles about as long as the blades. Flowers 3-10 in loose terminal corymbs; petals white, 15-30 mm. long; sepals ovate, caudate, up to about 25 mm. long. Fruit red, low-convex, juicy, insipid, about 2 cm. broad.

Flowers in northern and western Nevada from mid-June to mid-July.

Moist woodlands and creek bottoms, along canyon streams and in open woods, Alaska to Michigan, south in the mountains to New Mexico, northern and western Nevada and southern California.

NEVADA: ELKO: Trail to Furlong L., Ruby Mts., P. Train, July 12, 1936 (USNA); Deer Cr., n. of Coon Cr. - Bear Cr. divide, Jarbidge Mts., Train 741 (USNA). WASHOE: Reno, H. E. Jones, June 11, 1897 (US); mountains w. of Franktown, A.A.Heller 10524 (US); along Galena Cr. above public Camp Ground about 7 mi. w. of Reno Hot Spr., W.A.Archer 5610, 5701, 5825 (all USNA). ORMSBY: Kings Can., C.F.Baker 1097 (US). DOUGLAS: Woodford's Can., near state line, P.A.Lehenbauer 35 (USNA).

EXCLUDED SPECIES

RIBUS VITIFOLIUS Cham. & Schlecht., reported by Anderson in his Catalogue of Nevada Flora (Rept. of the Mineralogist of the State of Nevada for the years 1869 and 1870. p. 120. Carson City, 1871). Neither this species nor the related R. ursinus Cham. & Schlecht. is known east of the Sierra Nevada (see Gentes Herbarum 5: 48-56. 1941).

Tribe 10. ROSEAE. This tribe includes but a single genus, Rosa, widely distributed in the North Temperate Zone. The estimates on the number of species of roses vary widely, ranging from less than 100 to several thousand.

17. Rosa (Tourn.) L.

Shrubs, usually prickly, with alternate pinnate leaves and more or less adnate stipules and serrate leaflets. Flowers perfect, solitary or corymbose. Hypanthium urceolate or globose, contracted at the mouth, enclosing the achenes, becoming fleshy in fruit. Sepals 5, without bractlets, often deciduous at maturity. Petals normally 5, spreading, usually obovate. Stamens numerous (mostly 50-150), inserted on the margin of the hypanthium. Pistils several or many, inserted at the bottom of the hypanthium or also on its walls. Ovaries hairy, becoming bony achenes; styles ventral, reaching the mouth of the hypanthium or exserted. -- A large and confusing genus, to the amateur and professional taxonomist alike. The principal modern students of the American roses are the late P. A. Rydberg (see North American Flora 22: 483-533. 1918) and Eileen W. Erlanson (see Bot. Gaz. 96: 197-259. 1934, where is also given an extensive bibliography). These two students took quite different points of view in the matter of speciation, Mrs. Erlanson recognizing 16 species in the Section Cinnamomeae (this including all the North American species except 3 which belong in other sections), and Rydberg more than 100.

KEY TO THE SPECIES

- 1. Inflorescence 1- to 3-flowered on short laterals (3 to 10. cm. long); foliage glandular and resin-scented.....
.....R. mutkana (see list of excluded species).
- 1. Inflorescence up to 15-flowered or even more; flowering laterals usually more than 10 cm. long; foliage not conspicuously resinous.....2
 - 2. Leaflets finely serrate or crenate (average number of teeth on each side 15), at least the terminal ones somewhat cordate at base.....3
 - 3. Petals 15 mm. long; flowers on laterals only; stems slender, sparingly armed....2. R. pisocarpa
 - 3. Petals 20 mm. long; flowers on laterals and terminally on turions ("primocanes"); stems coarse, often bristly and prickly.....
.....R. californica (included here for comparison only; not known from Nevada)
 - 2. Leaflets rather coarsely serrate with sharp teeth (average number of teeth on each side about 12), not cordate at base.....1. R. Woodsii

1. ROSA WOODSII Lindl. Ros. Monog. 21, 1820.

Rosa neomexicana Cockerell, Ent. News 12: 41. 1901

Rosa puberulenta Rydb. Fl. Rocky Mts. 443. 1917.

Rosa granulifera Rydb. N. Am. Fl. 22: 517. 1918.

Rosa Fendleri Crépin, Bull. Soc. Bot. Belg. 15: 91. 1876.

Rosa chrysocarpa Rydb. Bull. Torr. Club 44: 74. 1917.

Rosa salictorum Rydb. Bull. Torr. Club 44: 77. 1917 (type from Gold Creek, Nevada).

Rosa Macounii Greene, Pittonia 4: 10. 1899.

Rosa pyrifera Rydb. Fl. Rocky Mts. 445. 1917.

A sparingly armed shrub 1-3 m. tall, with terete reddish-brown glabrous stems and stout prickles (branches rarely merely bristly). Leaflets 5-7 (11), 1-2 (4) cm. long, elliptic or obovate, cuneate at base, glabrous both sides, glaucous beneath. Leaves and inflorescence glabrous or pubescent or sometimes glandular. Stamens about 65. Hypanthium globose or essentially so, the mature "hip" red, 1 cm. in diameter or less. Petals pink, 1-2.5 cm. long.

Flowers in Nevada from early June to July; fruit matures in 3-4 weeks.

This is a widespread rose inhabiting much of the region in the United States between the 100th meridian and the Pacific Coast. It is almost the only species present in the Great Basin and is possibly the only rose native to Nevada (See Erlanson, E. W., Papers Mich. Acad. Sci. 11: 123. 1930. The author made a trip through the western states in 1926, in order to study roses in the field, and made extensive collections in Nevada. She says "All the roses seen in Nevada were apparently diploids belonging to the group of R. Woodsii").

NEVADA: Throughout the state, in open woods, on gravelly hillsides, along river bottoms, fencerows, roadsides, even in the more arid portions, at elevations up to 2500 meters.

2. ROSA PISOCARPA A. Gray, Proc. Amer. Acad. 8: 362. 1872.

Rosa rotundata Rydb. Bull. Torr. Club 44: 76. 1917 (type from the mountains west of Franktown, Nevada, Heller 10520)

Rosa californica var. ultramontana S. Wats. in Brew. & Wats. Bot. Calif. 1: 187. 1876.

Rosa ultramontana (S. Wats.) Heller, Muhlenbergia 1: 107. 1904.

Similar in aspect to the preceding species, and differing chiefly in the key-characters used above, in having the sepals constricted toward base, and in the fruit, which takes over two months to ripen. According to Erlanson, Rosa pisocarpa occurs west of the Sierra Nevada but she implies that it is a member of the Nevada flora when she puts R. rotundata, described originally from Washoe County, in synonymy under R. pisocarpa (Bot. Gaz. 96: 251. 1934). I have seen no specimens from Nevada.

EXCLUDED SPECIES

ROSA NUTKANA Presl; Epim. Bot. 203. 1849. The following species, both placed in synonymy under R. Nutkana by Erlanson (Bot. Gaz. 96: 251. 1934) are attributed to Nevada by Tidestrom, at least by implication (Contr. U.S. Nat. Herb. 25: 281. 1925):

1. Rosa Macdougali Holz. Bot. Gaz. 21: 36. 1896.
2. Rosa Spaldingii Crepin, Bull. Soc. Bot. Belg. 15: 42, nom. provis., 1876; Rydb. N. Am. Fl. 22: 512. 1918.

"ROSA BLANDA; Ait. var.", included by Anderson (Cat. Nev. Fl. 120. 1871), is doubtless Rosa Woodsii.

ROSA GYMNOCARPA Nutt. in Torr. & Gray, Fl. N. Am. 1: 461. 1840. This was attributed to Nevada by Tidestrom (Contr. U.S. Nat. Herb. 25: 282. 1925), but apparently wrongly so.

SUBFAMILY PRUNOIDEAE

A group of about 5 genera, characterized by the superior ovary, the usually solitary carpel which forms a drupe at maturity, the usually deciduous calyx and the simple stipulate leaves. The largest genus is Prunus, which if broadly interpreted has about 200 species.

18. Prunus L.

Shrubs or trees with simple, entire or serrate leaves; flowers white or pink, in corymbs or racemes, or in fascicle-like clusters, or solitary, appearing before or with the leaves; calyx-tube hemispheric or cup-shaped, the unilocular ovary inserted in the bottom of the tube; calyx-lobes 5, deciduous (in ours) after flowering; style 1, undivided; ovules 2, a single one (rarely both) maturing. Fruit a drupe, with pulpy or dry flesh and bony endocarp.

KEY TO THE SPECIES

1. Ovary and drupe glabrous; flowers in corymbs or racemes; style deciduous; leaves (1) 1.5 to 5 cm. wide.....2

- 2. Flowers in axillary corymbs or umbels; corymbs 3- to 12-flowered, on leafless branches; leaves crenate with blunt teeth (the teeth sometimes with slender glandular tips on vigorous shoots of the current season)..... 1. P. emarginata
- 2. Flowers in long racemes; racemes 20- to 60-flowered, on leafy branches of the current season; leaves finely serrate with sharp, spreading slender teeth.....2. P. virginiana
- 1. Ovary and drupe densely pubescent; flowers solitary or in fascicles; style persistent until fruit is mature or nearly so; leaves 1 cm. wide or less (usually 3 to 6 mm. wide)3
- 3. Flowers sessile or nearly so, the pedicels in fruit 3 mm. long or less; style 3 mm. long or less; leaves of the flowering branches 1 to 2 (3.5) mm. wide, oblanceolate, usually blunt at tip, entire or few-toothed.....3. P. fasciculata
- 3. Flowers evidently pedicellate, the pedicels 4 to 10 mm. long; style 6 to 8 mm. long; leaves of the flowering branches (2) 3 to 6 mm. wide, elliptic or oblanceolate, usually acute at tip and evidently dentate or crenate..... 4. P. Andersonii

1. PRUNUS EMARGINATA (Dougl. ex Hook.) D. Dietr. Syn.Pl.3: 42. 1842¹.

Cerasus emarginata Dougl. ex Hook. Fl.Bor.Am. 1: 169. 1834.

Cerasus mollis Dougl. ex Hook., l.c.

Cerasus padifolia Greene, Proc.Biol.Soc.Wash. 18: 59. 1905
(The type from near Carson City, Nevada, M.E. Jones, June 2, 1897).

Prunus emarginata var. mollis Brewer in Brew. & Wats. Bot. Calif. 1: 167. 1876.

A shrub or small tree which in Nevada is usually 3 m. high or less, but which sometimes attains a height of 12 m. Leaves elliptic, oblong or obovate, rounded at tip; or acute, especially on vigorous shoots, cuncate at base, on petioles 3- 6 (10) mm. long. Margins crenate. Leaves and

¹The authorship of this combination is often given as Walp.Rep.2: 9. 1843, or as D.Dietr. Syn.Pl. 3: 42. 1843. I can find no evidence in either work as to the exact date of publication; both are ordinarily cited as having been published in 1843. In "Flora" for April 14, 1843, however, the publication of volume 3 of Dietrich's work is noted, and the date is given as 1842.

inflorescence varying from entirely glabrous to downy-pubescent. Blades mostly 1-2 cm. broad, 2-5 cm. long. Flowers appearing when the leaves are about half grown; petals white; fruit ovoid to globose, 6-12 mm. in diameter, bright red or dark red, with bitter flesh.

Rich moist soil in ravines and along streams, or on dry hillsides, in mountainous regions, at elevations up to 2700 meters. British Columbia and northwestern Montana, south through western Idaho and western Nevada, to southern California and thence east to central Arizona; also in southwestern New Mexico.

NEVADA: WASHOE: Galena Creek, 16 mi. w. of Reno Hot Springs, W.A. Archer 5805 (USNA); on Franktown Road, about 24-25 mi. s. of Reno, W.A. Archer 5294 (USNA); Slide Mountain near Franktown, I. Tidestrom 10505 (US); Hunter Creek Canyon, A.A. Heller 10374 (US); Hunter's Canyon, A.E. Hitchcock 565, 7/18/1913 (US); Washoe Mountains, Sereno Watson 300 (King's Exp.) May 1868 (US). ORMSBY: near Carson City, Dr. C. L. Anderson in 1864 (US); Carson City, M.E. Jones, June 2, 1897 (US); King's Can., C.F. Baker 917, 997 (both US); summit of King's Canyon Road, 9000 ft., T. L. Breene 573 (USNA). DOUGLAS: near Spooner's Summit, Clear Creek road to Lake Tahoe, L. R. Miller 76 (USNA); Glenbrook, along Lake Tahoe, Tidestrom 10307 (US). CLARK: Charleston Park, Charleston Mountains, 2300 m., I. W. Clokey 7553 (USNA).

Note: Full citations of synonymy, full descriptions, illustrations of leaves and pits, and a distribution map may be found in Wight's "Native North American Species of Prunus" (U.S.D.A. Bull. 179, 1915). Jepson (Fl. Calif. 2: 225, 1936) has pointed out that var. mollis (Prunus emarginata villosa Sudw.) apparently does not differ from typical Prunus emarginata except in the difference in quantity of pubescence; both extremes occur in Nevada, and are connected by numerous intergrading forms.

2. PRUNUS VIRGINIANA L. Sp.Pl. 473. 1753.

Cerasus demissa Nutt. in Torr. & Gray, Fl.N.An. 1: 411. June 1840.

Prunus demissa D. Dietr. Syn. Pl. 3: 43. 1842.

Prunus virginiana var. demissa Torr. Bot. Wilkes Exp. 17: 284. 1874.

Cerasus demissa var. melanocarpa A. Nels. Bot. Gaz. 34: 25. 1902.

Prunus melanocarpa Rydb. Bull. Torr. Club 33: 143. 1906

Prunus virginiana var. melanocarpa Sarg. Journ. Arn. Arb. 2: 117. 1920.

Large shrub or small tree up to about 10 m. high; in Nevada often a straggling shrub 3 m. high or less. Leaves broadly (sometimes narrowly) elliptic or obovate, usually abruptly narrowed and acute (often acuminate) at tip and rounded or subcordate (sometimes acute) at base, on petioles

1-2.5 cm. long. Margins finely and sharply serrate with spreading teeth. Leaves and inflorescence glabrous, or some plants with a few hairs or tufts of hairs along the midribs of the leaves on the lower surface. Blades 1.5-5 cm. wide (those of the raceme-bearing branches sometimes smaller), 4-7 (10) cm. long. Flowers white, appearing when the leaves are about half-grown; fruit globose or somewhat elongated, 6-8 mm. long, dark red, with astringent flesh.

Flowers in Nevada mostly during June; fruit ripe late July to September.

Mountain slopes and canyons, creek bottoms and roadsides, at elevations up to about 2250 meters. Perhaps comprises two subspecies, of which the western one is distributed from British Columbia and the North West Territory, east to North Dakota and south to Oklahoma; in the Rocky Mountain region south to southern New Mexico and Arizona; south through Washington, Oregon and California to San Diego County.

NEVADA: WASHOE: 2-4 mi. w. of Reno Hot Springs, W.A.Archer 5376 (USNA); Hunter's Creek Road, 6-8 mi. s.w. of Reno, Archer 6081 (USNA); near Nixon, E.V.A. Murphey 279 (USNA); Pyramid Lake, F.B.Headley 24, July 18, 1911 (USNA); Old Geiger Grade, 16 mi. s.e. of Reno, J. Henrichs 371 (USNA); between Reno and Verdi, P.A.Lehenbauer, May 28, 1935 (USNA); Hunter's Canyon, near Reno, A.E.Hitchcock 1200 (US); Dog Valley Grade (Nev); Bowers (Nev). STOREY: one mi. n.w. of Virginia City, R.A.Allen 208 (USNA); Virginia City, H.G.Bloomer, in 1863 - 64 (US, 2 sheets). ORMSBY: Near bottom of Clear Creek Grade on US route 50, L.R.Miller 77 (USNA); Carson City, M.E.Jones, June 2, 1897 (US); King's Canyon, C.F.Baker 1059 (US). HUMBOLDT: Pine Forest Mountains, Griffiths & Morris 205, July 1901 (US); Bartlett Creek, Griffiths & Morris 336 (US); West Humboldt Mountains, 6000 ft., Sereno Watson 302 (King Exp.), June 1868 (US); West Humboldt Mountains, 8000 ft., Watson 301 (King Exp.), June 1868 (US); Humboldt Canyon, West Humboldt Mountains, A.A.Heller 10614 (US); Rebel Creek, w. side Santa Rosa Range, P. Train 385 (USNA). CHURCHILL: 22 mi. n. of East Gate, 9 mi. from Alpine, R.A.Allen 401 (USNA). MINERAL: 5 mi. up Cory Creek, Wassuk Range, 6600-7200 ft., W.A.Archer 6901 (USNA). ELKO: Lamaille Creek, Ruby Mountains, W.W.Eggleston 7730 (USNA); same locality, Eggleston 7727 (US, 2 sheets); 20 mi. s. of Secret, base of Ruby Range, Nichols & Lund 74 (USNA); East Humboldt or Ruby Mountains, near Cave Creek P.O., A.A.Heller 9516 (US); Jarbidge, A. Nelson & Macoride 1941 (US); Secret Valley, E.V.A.Murphey 229 (USNA); 21 mi. n. of Wells, McVaugh 6408 (USNA). LANDER: Austin to Carter's Ranch, A.E.Hitchcock 723 (US); Trout Creek Canyon about 11 mi. s. of Battle Mountain, Goodner & Henning 901 (USNA); near Big Creek Camp Grounds, Goodner & Henning 352 (USNA). NYE: 1-3 mi. up canyon of North Fork of Twin River, Goodner & Henning 255 (USNA). EUREKA: Thomas Creek Canyon at Thomas Falls, T.L.Breene 443 (USNA). WHITE PINE: Ely, A.E.Hitchcock 1200 (US). LINCOLN: Deer Lodge, Pinyon Mountain, el. 7200 ft., Desma Hall, June 3, 1936 (USNA). COUNTY UNKNOWN: "Nevada", coll. by the Wheeler Expedition, in 1872 (US, 2 sheets); Shule Creek Canyon R.S., Nevada N.F., R. Diefenbach, April 15, 1910 (US).

Note: The choke-cherry of western North American is certainly not more than subspecifically distinct from its eastern relative, differing in its sometimes darker fruit and in its leaves, which tend to be thicker in texture and to have broader and more triangular teeth than those of typical Prunus virginiana from eastern North America. This point of view has been taken by Sargent (Silva N.Am. 4: 42. 1892; Man.Trees N.Am. 573. 1921) and more lately by Jepson (Fl. Calif. 2: 226. 1936) and Rehder (Man.Cult. Trees & Shrubs ed. 2. 479. 1940). It is proper, therefore, to refer all Nevada material to P. virginiana rather than to P. melanocarpa or to P. demissa, both of which were included by Tidestrom (Contr.U.S.Nat.Herb. 25: 285. 1925). I am not at all sure that a definite western subspecies can be recognized with certainty, although certain specimens appear quite distinct from eastern material. In Nevada all the plants I have examined have the leaves perfectly or essentially glabrous and appear to correspond exactly with material from the Rocky Mountain region. The name Cerasus demissa was based upon specimens from western Oregon; if, as has usually been supposed, these belonged to a race with strongly pubescent leaves, the name is not applicable to Nevada material but to a more or less local race occurring chiefly west of the Cascades. This point must be decided by detailed study of the whole species before a subspecific epithet can be applied accurately to our plant.

3. PRUNUS FASCICULATA (Torr.) A.Gray, Proc.Amer.Acad. 10: 70. 1875.

Emplectocladus fasciculatus Torr. Pl.Frém. 10. pl. 5. 1853.

A much-branched thorny shrub up to about 3 m. high, with trunk up to 5 cm.; leaves linear to oblanceolate, 1-2 (rarely 5 on vigorous shoots) mm. wide, 5-20 (rarely 35 on vigorous shoots) mm. long, rounded or short-acute at tip, attenuate at base. Blades entire or with 1-3 small teeth on each side. Young branchlets pubescent; leaves pubescent at least at base, or sometimes entirely glabrous, often fascicled at the ends of very short lateral branches which also bear the flowers. Flowers solitary or in fascicles of 2-6; plants more or less dioecious, some bearing staminate flowers only. Corolla white, the petals 2-3 mm. long. Fruit ovoid, 8-12 mm. long, densely covered with yellowish-brown bristly hairs.

Flowers in Nevada from early April to mid-May; fruit ripe late June to July.

Rocky or sandy slopes and washes, deserts and semi-deserts, at elevations of 900 to 2100 meters. Deserts and desert mountain ranges of southern California, east to Utah and Arizona.

NEVADA: ESMERALDA: Palmetto Range, 6000-7000 ft., C.A.Purpus 5857, May-Oct. 1898 (US). LINCOLN: Mormon Mountains, Kennedy & Goodding 140 (US); Caliente, L.N.Goodding 609 (US); Caliente, I. Tidestrom 9485 (US). CLARK: Kyle Canyon, I.W.Clokey 7552 (Pl.Exsicc. Gray. 722) (USNA); Kyle Canyon, I. Tidestrom 9618 (US); Mountain Spring, Charleston Mountains, Vernon Bailey 1881, April 30, 1891 (US); Spring

Mountains, near Goodwings, Hillebrand 6038a (US); Crescent Mining Camp, 5000 ft., P. Train 1484 (USMA); south of Deadman Canyon, 7000 ft., P. Train 1982 (USMA); w. side of Spirit Mountain, 20 mi. s. of Searchlight, P. Train 1337 (USMA); Esch, I. Tidestrom 6979 (USMA); near Wilson's Ranch, base of Charleston Mts., McVail 5089 (USMA).

4. PRUNUS ANDERSONII A. Gray, Proc. Amer. Acad. 7: 357. 1866.

Embletholadus Andersonii Nels. & Kern, Maklenbergia 3: 139. 1908.

A much-branched thorny shrub up to 2 (rarely 3) m. high, leaves all dull, fleshy, lustrous, elliptic or oblanceolate (sometimes obovate), 5-6 (rarely 12 on vigorous shoots) cm. wide, mostly 10-50 cm. long, acute or sometimes blunt at tip, attenuate at base or sometimes narrowed to a definite petiole up to about 5 mm. long. Blades normally minutely toothed with up to about 10 teeth on each side, but the teeth sometimes much reduced or apparently wanting. Plants usually wholly glabrous, but in one form the leaves, young branchlets, pedicels and calyces are short bristly-pubescent as in P. fasciculata. Branchlets purplish, glaucous with a conspicuous bloom. Leaves often fascicled at the ends of the short spur-like flowering laterals. Flowers often solitary but sometimes 2-5 from a single spur. Corolla pink or rose-colored, the petals 6-8 mm. long. Fruit somewhat flattened (lenticular), up to about 15 mm. long, often oblique, covered with yellowish-brown bristly hairs; flesh thin, at maturity often splitting at one side, tasting like a green peach.

Flowers in Nevada from late April to mid-June; fruit ripe from late June to September.

Rocky and sandy slopes and draws, arid mountain ranges, at elevations of 1000 to 2050 meters, central and western Nevada and extending into California along the east side of the Sierra Nevada from Modoc County to Inyo County. The type of this species came from "foot-hills, Carson, Nevada," C. I. Anderson.

NEVADA: WASHOE: 1 mi. e. of Pea Vine ranch, house, Tracy & Kluge 51, May 18, 1903 (USMA); Pyramid Lake, W.A. Ancher 5091, 5090 (both USMA); Reno Hot Springs, 7 mi. s. of Reno, Ancher 5523, 5524 (both USMA); Reno, I. Tidestrom 10008 (US); Pyramid Lake, Tidestrom 10670 (US); Hunter's Canyon, Reno, A.E. Hitchcock 515 (US); Verdi, C. F. Sonne, May 1895 (US, 2 sheets); Verdi, Sonne, May 16, 1897 (US); Verdi, S. G. Stokes, June 12, 1903 (US). CRISBY: Carson City, along Clear Creek Grade, I. R. Miller 28 (USMA); west of Carson City, I. Tidestrom 10240 (US); Empire City, H. E. Jones 3356, July 19, 1862 (US); King's Canyon, C. F. Baker 207, June 13, 1902 (flowering specimen only) (US); Carson City, C. I. Anderson (Calif). HUMBOLDT: Thomas Creek, 7 mi. s.e. of Winnemucca, P. Train 106 (USMA); Jackson Mts., C. J. Harris 2754 (USMA). PERSHING: Trinity Mountains, 5000 ft., Sereno Watson 299 (King Exp.), May 1868 (USMA); Unionville, P. Train (US); Rabbit Hole Mountains, Vernon Bailey 121, July 5, 1896 (US); 15 mi. n.w. of

Lone Mountain, Vernon Bailey 103, May 14, 1898 (US). MINERAL: 6-7 miles up Cory Creek, Wassuk Range, 7400 ft., W.A.Archer 6936 (USNA); Hawthorne, M.E.Jones, Apr. 15, 1907 (US); Candelaria, W.H.Shockley in 1890 (US). ESMERALDA: Miller Mountain, 7000 ft., W.H.Shockley 216 (USNA); Indian Spring, 15 km. w. of Lida, I. Tidestrom 9862 (US). LANDER: 8 mi. from Austin, Goodner & Henning 841 (USNA); Austin, A.E.Hitchcock 685 (US); Kingston Canyon, Toyabe Mountains, I. Tidestrom 10941 (US). TUREKA: 3 mi. above Horse Ranch, Goodner & Henning 514 (USNA).

Note: All the specimens cited above, comprising the greatest part of all the herbarium material seen by the writer, are uniformly glabrous. The following specimens apparently constitute a somewhat localized race of Prunus Andersonii; in this race the plants are noticeably pubescent as indicated above under the description of the species, but seem to differ in no other respects from the more widely distributed glabrous form. More field study is desirable, in order to determine the exact distribution and status of this race.

CALIFORNIA: INYO: Willow Creek Canyon, Panamint Mountains, Coville & Funston 840 (Death Valley Exp.) (USNA).

NEVADA: WASHOE: 4 mi. s. of Verdi, R.A.Allen 57 (USNA); Reno, A.A.Heller 10974 (US); 22 mi. s. of Reno, Moore & Franklin 69 (USNA). STOREY: Virginia City, H.G.Bloomer in 1863-64 (US, 3 sheets); 6 Mile Canyon, 1 mi. s.e. of Virginia City, Moore & Franklin 23 (USNA); same locality, R.A.Allen 152 (USNA). ORMSBY: King's Canyon, C.F.Baker 907, July 1, 1902 (US); along Clear Creek highway near Lake Tahoe, L.R.Miller 59 (USNA). LYON: 1 mi. w. of Silver City in American Flat Canyon, R.A.Allen 101 (USNA).

SUBFAMILY POMOIDEAE.

A very close-knit group of 10 or 15 genera, characterized by its apple-like fruits (pomes), in which fleshy part of the fruit is formed chiefly by accessory parts of the flower rather than from the ovary itself. The largest genera are Cotoneaster, with about 50 Old World species, Crataegus with perhaps 200 species in the North Temperate Zone and Sorbus with 50 or 75 species in the same area.

19. Sorbus L.

Trees or shrubs with deciduous odd-pinnate leaves; branches unarmed, flowers white, in compound cymes, often very numerous; stamens 15 - 20; ovary of 2-5 carpels which are about half superior and partly free above; fruits berry-like, chiefly red; seeds 1 or 2 in each locule. The North American species all belong to the Section Aucuparia (Medik.) Koch (see Jones, George Neville, "A Synopsis of the North American Species of Sorbus"; Journ.Arn.Arb. 20: 1-43. 1939). According to Jones, the genus comprises about 80 species, distributed throughout the northern hemisphere.

KEY TO THE SPECIES

1. Leaflets 7 - 9 (11); stipules more or less persistent; pedicels and peduncles glabrous; inflorescence few-flowered.....1. S. californica
2. Leaflets 11 - 13; stipules early deciduous; pedicels and peduncles sparingly pilose; inflorescence 80- to 200-flowered.....2. S. scopulina

1. *SORBUS CALIFORNICA* Greene, Pittonia 4: 131. 1900.

Many-stemmed shrub 1-2 meters tall; winter-buds glutinous; stipules more or less persistent; young twigs, pedicels, peduncles, leaves and calyxes glabrous; leaflets 7-9 (or 11), oblong-oval, obtuse or subacute at tip, sharply and coarsely serrate to below the middle, 1-2 cm. wide, 3-4 cm. long, somewhat glossy above, paler beneath. Inflorescence 4-10 cm. broad, few-flowered. Petals orbicular, 5-4 mm. long; styles 4, 1.5-2 mm. long; ovary pubescent on top; fruit scarlet or coral-red, ellipsoid or somewhat pyriform, not glaucescent, 7-10 mm. in diameter, 50 or fewer in number.

Fruit matures in western Nevada about mid-September or before.

Along streams or on moist steep slopes, northern California and western Nevada, at elevations of 1500-3000 meters.

NEVADA: CHASEY: Mariette Lake, R.A. Allen 561 (USMA). WASHOE: Snow Valley, Baker 1281 (US); Slide Mt., A.H. Heller 10929 (US).

2. *SORBUS SCOPIJLINA* Greene, Pittonia 4: 130. 1900.

Shrub 1-4 meters tall; winter-buds glutinous; stipules membranous, glabrous, early deciduous; young twigs, pedicels, peduncles, calyxes sparingly pilose; leaves glabrous, at least when mature; leaflets 11-13, lanceolate or oblong-lanceolate, sharply acute or short-acuminate at tip, finely and sharply serrate from the apex almost to the base, 1-2 cm. wide, 5-6 cm. long, green and glossy above, paler beneath. Inflorescence 9-15 cm. broad, 80- to 200-flowered. Petals oval, 5-6 mm. long; styles 3-4, 2-2.5 mm. long; ovary pubescent on top; fruit orange or scarlet, globose, not glaucescent, 8-10 mm. in diameter.

Fruit matures in northeastern Nevada about mid-August.

Along streams, in canyons, on wooded hillsides and dry mountain slopes, British Columbia and Alberta to South Dakota, south to northern California, northeastern Nevada, and in the Rocky Mountains to New Mexico, up to about 3000 meters.

Not reported from Nevada by Jones (l.c.), but the following specimens, not seen by him, are at hand:

ELKO: Head of Copper Creek Basin, Jarbidge Mts., 8200-8800 ft., P. Train 651 (USNA); Jarbidge River Canyon, 2 mi. above Jarbidge, Train 821 (USNA); Jarbidge River Canyon, 1/4 mi. above Jarbidge, 6200 ft., Train 831 (USNA).

20. *Crataegus* L.

Trees or shrubs with simple deciduous leaves, the blades usually serrate, often lobed; branches often armed with stout axillary spines (this character constituting the principal difference between *Crataegus* and the genera *Cotoneaster* and *Mespilus*). Flowers in cymose corymbs terminating short leafy lateral branches; calyx-tube usually obconic, the lobes 5, often glandular-serrate, usually reflexed in age; petals white in most species, soon falling; stamens 5-25, variable in number even in the same species. Ovary of 1-5 carpels inserted in the calyx-tube and united with it; styles 1-5, persistent; ovules 2 in each carpel, a single one maturing (this constitutes the chief difference between *Crataegus* and *Pyracantha*). Fruit subglobose, usually red or black, the flesh usually dry and mealy; nutlets 1-5, hard and bony.

KEY TO THE SPECIES

- 1. Leaves elliptic to ovate-lanceolate, usually broadest at the middle and tapering about equally to both ends (rarely broadest somewhat above the middle); blades finely serrate, not lobed (sometimes doubly serrate, with some of the teeth larger than adjoining ones).....1. *C. rivularis*
- 1. Leaves obovate to broadly ovate, usually broadest above the middle (sometimes at the middle), the blades usually tapering to the base and abruptly contracted at apex; margins serrate and usually plainly lobed toward the apex.....*C. Douglasii* (see list of excluded species)

1. *CRATAEGUS RIVULARIS* Nutt. in Torr. & Gray, Fl. N. Am. 1: 464. 1840.

Tree or large shrub up to about 7 m. high; branchlets bright red-brown, lustrous, unarmed or with short straight spines 1.5-2.5 cm. long. Leaves pilose above, acute or acuminate at apex, cuneate at base, 1.5-3.5 cm. wide, 4-7 cm. long (usually about 5 cm. (2 inches) long by 1.8 cm. (3/4 inch) wide, according to Sargent). Petioles somewhat winged at apex, 0.8-2 cm. long. Corymbs usually glabrous; calyx-lobes usually narrow, subulate, glandular-toothed. Fruit becoming black at maturity, about 1 cm. in diameter.

Flowers in Nevada in May (Train 3634 is in full flower); fruit ripe in September.

Stream banks and bottoms of canyons, mountainous areas, from southeastern Idaho and northern Nevada to northern and eastern Utah, southwestern Wyoming and northern New Mexico.

NEVADA: ELMO: near Death, E.T.A. Mummer 442, Aug. 8, 1937 (USIA); East Humboldt Mountains, 5500 feet, Sereno Watson 352, Sept. 1888 (King Exp.) (US); Lee P.O., south fork of the Humboldt, 5950 feet, A.A. Heller 2411, Aug. 13, 1903 (US); Boulder Creek, Starr Valley, 5 mi. s. of Death, at 5400 feet, P. Train 3334, May 11, 1940 (USIA). Reported from the "Clover Mountains" (present East Humboldt Mountains) by Sereno Watson (Bot. King Exp. 92, 1871).

EXCLUDED SPECIES:

CRATAEGUS DOUGLASSII Lindl. Bot. Reg. 21: pl. 1210, 1835. This was said by Tidestrom (Contr. U.S. Nat. Herb. 25: 284, 1925) to occur in Nevada, but I have seen no specimens from the state. It occurs in Modoc County, California, and southward, west of the Sierra Nevada; it is also found in the region from Oregon eastward across central Idaho into Montana and probably also in northern Utah. It differs from *C. rivularis* chiefly in the shape and manner of separation of the leaves, by its more numerous, and shorter and stouter spines and by its somewhat broader calyx-lobes which are often entire.

The type-locality of *C. rivularis* is given as "Oregon, along rivulets in the Rocky Mountains, Nuttall! Interior of Oregon, Douglas!" The description combines characters of *C. rivularis* with those of *C. Douglasii*, as might be expected if Douglas' plant came from interior Oregon, where the latter species grows. A specimen of Nuttall's collecting, however, which is now in the Torrey Herbarium at the New York Botanical Garden, is *C. rivularis* as currently interpreted and doubtless came from the Rocky Mountains, as stated on the original label, rather than from Oregon.

21. *Paraphyllax* Nutt.

A much-branched shrub 0.6-2 m. high, with drooping branches, deciduous narrow often fascicled leaves and pubescent branchlets. Blades elliptic to oblong or oblanceolate, entire or obscurely toothed, or serrate on vigorous shoots, 0.5-0.8 cm. wide (up to 1.8 cm. on vigorous shoots), 1.5-4 (6) cm. long, usually 3-5 times as long as wide, sessile or on very short petioles up to about 3 mm. long. Blades acute and often apiculate at tip, acute or cuneate at base, at first somewhat pubescent at least near base, the upper surface glabrate. Flowers solitary or in umbel-like corymbs of 2-5 flowers each, appearing when the leaves are about half grown. Ovary of 2 or 3 carpels, completely inferior and united with the calyx-tube, each carpel with 2 ovules incompletely separated by a false partition. Fruit a pome 3-10 mm. in diameter, yellow at maturity with a reddish or brownish cheek, with 4-6 seeds. Flesh soft and somewhat juicy but so bitter as to be inedible. Calyx-lobes narrowly triangular, 3-4 mm. long, obscurely glandular-margined,

hairy within, persistent in fruit. Stamens 20, styles 2 or 3. Petals 5, spreading, pale pink or rose, or white, clawed, 8-10 mm. long. Seeds about 5 mm. long.

1. PERAPHYLLUM RAMOSISSIMUM Nutt. in Torr. & Gray, Fl. N. Am. 1: 474. 1840.

This is the only known species. The genus is closely related to Amelanchier, differing chiefly in the few-flowered inflorescence and in the narrow leaves. The styles and carpels are 2 or 3 in Peraphyllum and usually 5 in Amelanchier. The plant is locally known as Crab Apple or Squaw Apple.

The flowering season in Nevada is from late April to early June; the fruit ripens in August. The bushes are often very abundant in their preferred habitat, which is on open stony or sandy hillsides, associated with junipers and Amelanchier. A bush of this species, when covered with the conspicuous yellowish fruits, is a handsome sight; the fruits themselves, in spite of their appearance, are exceedingly bitter and astringent. The range of Peraphyllum extends from southwestern Colorado, where it is abundant on the high mesas, across the desert regions of southern Utah and Nevada to the high interior plateau of northeastern California and thence to northeastern Oregon.

NEVADA: WASHOE: Smoke Creek, V. Bailey 125, July 9, 1898 (US). NYE: Manhattan, Goodner & Henning 289 (USNA); Quinn Canyon Mts., 6600 ft., E. R. Hall 40 (Calif). LINCOLN: mountains w. of Caliente, Tidestrom 9538 (US); Caliente, M. E. Jones, April 29, 1904 (Calif, US); 9 mi. n. of Panaca, McVaugh 5986 (USNA); Pioche, M. Minthorn 22 (Calif). CLARK: Charleston Mountains, C. A. Furpus 6121 (Calif, US); Cold Spring, Charleston Mts., Clokey 7555 (USNA); 1 1/4 mi. n. of E-Spear Ranch, road to Cold Spring Creek & Willow Spr., Train 1745 (USNA).

22. Amelanchier Medik.

Shrubs or trees with simple, usually serrate, deciduous leaves; blades elliptic, ovate to obovate or suborbicular. Flowers white, in racemes terminating short leafy branches of the current season, the racemes often short, subcorymbose, or even reduced to a single flower. Pedicels bracteate at base and bearing a second bract usually at or above the middle, the bracts scarious, usually silky, often reddish, with black subulate tips, linear, 4-6 (12) mm. long, usually less than 1 mm. wide, deciduous about the time the flowers open. Stipules similar to the flower-bracts, falling about the same time. Ovary of 2-5 carpels, inferior and united with the calyx-tube, each carpel in fruit divided by a partition from the back; styles 2-5, united more or less at base. Fruit a berrylike pome with mealy or juicy or leathery flesh, edible, but often insipid. Calyx-lobes 5, usually entire, narrowly triangular or less often linear or somewhat enlarged and foliaceous, often strongly reflexed in fruit; neck of the hypanthium usually produced into a rim above the rounded summit of the ovary. Petals 5, spreading, oblanceolate or obovate, usually clawed. Stamens mostly 10-20. Seeds 4-10.

About thirty-five species of this genus have been described from western United States, but there has been no monographic study of that part of the genus which occurs in this region and it is not possible at present to determine the standing of all the so-called species. It is probable, however, that the actual number of species in western North America does not exceed three, and there may be even fewer than this. Jepson (Fl. Calif. 2: 434, 1933) includes all material from west of the Rockies in a single species, A. alnifolia Nutt., with five varieties in California.

In the preparation of the following treatment of the genus as it occurs in Nevada I have examined material from all parts of the state, both in the field and in the herbarium and have yet to find any character or series of characters by which more than a single species may be distinguished. Botanists have in the past distinguished species chiefly through characters involving pubescence, serration, shape and size of the leaf-blades, number of styles and color of fruit. None of the above proves dependable when applied to a large suite of specimens, and none seems to be correlated with other features to a degree great enough to make it significant in the separation of species. Fruit-color, in particular, has been a stumbling-block in the recent treatments of the western Amelanchiers. Most modern floras dealing with western North America include one or more species of this genus with "orange or yellow fruits"; I can find no evidence, however, to indicate that fruit of either of these colors is ever produced, except as an abnormality, by any species of Amelanchier. It is probable that all reports of orange and yellow fruits are based upon one or more of the following:

1. Poorly dried specimens of unripe fruits. Herbarium material, when poorly prepared, often bears fruits of an orange or yellow tinge; such fruits, when fresh, are invariably green, with or without a reddish cheek.

2. Diseased fruits. Various rust-fungi, particularly of the genus Gymnosporangium, parasitize the species of Amelanchier. In some areas in the arid and semi-arid regions of the Great Basin the Amelanchier fruits may be so heavily infested that it is almost impossible to find one maturing normally; the infected fruits are often colored bright yellow or orange by the rust, so that whole bushes may appear at first glance to bear yellow or orange fruit.

3. Fruits which dry upon the bush or tree before becoming fleshy. In the southern parts of the range of Amelanchier, particularly in the Great Basin from southern Nevada to southwestern Colorado, the fruits regularly become leathery at maturity rather than juicy and become completely dry before falling from the plant. These dry fruits are rusty-brown or orange-brown in color; before drying, however, the mature pomes are greenish-white or almost pure white, with a purplish-red cheek which sometimes covers most of the fruit. At first sight these pale leathery fruits seem very different from the dark purple juicy ones which prevail elsewhere in the genus. There is apparently no fundamental difference, however, as juicy dark purple fruits may be found occasionally on almost all bushes which regularly bear the pale dry or leathery ones. The differences between the two types appear to be indicators of sub-specific differences only.

Whether or not they are to be regarded as distinct species, there are in Nevada several easily recognizable forms or races which have rather definite geographical ranges and which may be distinguished as follows:

- 1. Leaves glabrous above and usually beneath, at least when mature; blades oblong, those of the flowering branches (at maturity) 1.5 to 3 cm. broad, 3 to 4 cm. long; branchlets of the current season at first often silky, usually soon glabrous; mature young branchlets (1 to 2 years old) glabrous, bright reddish-brown; growth usually vigorous, the vegetative shoots often 10 to 20 cm. long and the raceme-bearing branches up to about 10 cm. long; fruit fleshy, juicy and sweet, dark purplish-black; racemes few- to 15-flowered, usually elongated, the lower peduncles not elongated and the lower flowers thus much exceeded by the upper ones
.....Form A

- 1. Leaves pubescent on both surfaces, even at maturity, with soft crisped hairs which are faintly glistening and often yellowish; blades elliptic to oblong or orbicular, those of the flowering branches (at maturity) 1 to 2 (3) cm. broad, 1 to 2.5 (3.5) cm. long; growth usually less vigorous, the vegetative shoots usually less than 10 cm. long or, if more than this, the raceme-bearing branches (including flowers or fruit) only 2 to 3 (5) cm. long; fruit various; branchlets various; racemes usually shorter, few- to 10-flowered, usually subcorymbose or subcapitate as a result of the elongation of the lower peduncles.....2

- 2. Leaves entire or with a few small teeth near apex, the apex usually narrow and pointed, often apiculate; blades elliptic; branchlets usually reddish-brown, glabrate; fruit purplish-black, juicy.....
.....Form B

- 2. Leaves coarsely serrate; the apex usually not acute but obtuse or rounded or even emarginate; blades elliptic to sub-orbicular or even broader than long; branchlets of the current season usually persistently pubescent; mature branchlets often pubescent until several years old, usually gray and somewhat corky but with a brown-under-color; fruit purplish-black and juicy or pale and leathery, often drying to a pale brown while on the plant.....
.....Form C

1. Form A. This is almost certainly identical with Amelanchier florida Lindl., Bot.Reg. t. 1589. 1833. It is also the plant which has been called, incorrectly, A. alnifolia Nutt. The name Amelanchier alnifolia is based on Aronia alnifolia Nutt. (Gen.N.Am.Pl. 1: 306. 1818), the original material of which was collected between Fort Mandan, North Dakota, and the "Northern Andes." Pennell has shown (Bartonia no. 18: 15-16. 1936) that this was probably not very far west of Fort Mandan and so doubtless in what is now western North Dakota, in the high plains country, some distance east of the Rocky Mountains. None of

This plant's original material has been found by recent students of the genus, but it is possible that he had some species of eastern affinities rather than the western plant later described by Lindley. Until the problem has been satisfactorily worked out the more desirable course is to use Lindley's name for the plant here referred to as Form A. The following specimens from Nevada are typical:

NEVADA: ELKO: East Humboldt Mts., S. Watson 353 (King Exp.), 9000 ft., Aug. 1868 (US); Jarbidge Ranger Station, 1940 m., W.W. Eggleston 14105 (US); Jarbidge, Nelson & Macbride 1939 (US); Pine Mountain, near Gold Creek, A.E. Hitchcock 1185 (US); Star Canyon southeast of Deeth, A.A. Heller 10567, 10576 (both US); Thomas Creek Public Camp, forks of Thomas Cr. and Lamoille Canyon, Ruby Mts., P. Train 4600 (USMA); Maggie Cr., 10 mi. s. of Mountain City, P. Train 903 (USMA). EUREKA: 34 mi. w. of Elko in Thomas Cr. Canyon at Thomas Falls, 7500 ft., T.L. Breene 446 (USMA). WASHOE: Fish Lake, above Marmel Station, 5500 ft., Heller 9295, 10004 (both US); Hunter Cr., 6000 ft., P.B. Kennedy 1866 (US); Hunters Canyon near Reno, A.E. Hitchcock 555 (US).

This form or race may usually be distinguished by the relatively large leaves, which are free from pubescence or essentially so, thin in texture, green but not shining above, and glaucous beneath. In northern and western Nevada, however, there occur many plants intermediate between this and the race designated above as Form C. The leaves of these perplexing specimens are, for the most part, smaller and thicker than those of Form A, and are usually pubescent even at maturity; the inflorescence usually resembles that of Form C rather than that of Form A; the growth and pubescence of the young branchlets, at least in material from Washoe County and southward, resemble those of Form A:

NEVADA: ELKO: Camp Halleck, E. Palmer 120, Aug. 1876 (Calif); Lamoille Cr., Ruby Mts., Eggleston 7728, 2100 m. (US); Lamoille Cr., between Lamoille and the mountains, 6150 ft., Heller 9510 (US); Gold Creek, 6300 ft., Nelson & Macbride 2121 (US); Oasis, E.J. Palmer 38025 (US); Jarbidge, Nelson & Macbride 1935 (US). HUMBOLDT: Pine Forest Mts. Griffiths & Morris 227 (US); Summit Lake Region, Griffiths & Morris 337 (US); head of Summit Lake Cr., 6000 ft., Train 3047 (USMA); Spring Cn., w. side Sta. Rosa Range, 5000 ft., Train 407 (USMA). PERSHING: W. Humboldt Mts., 8000 ft., S. Watson 353 (King Exp.), June 1868 (US). WASHOE: Upper Vya Mountain Spring near Vya, Train 2787A (USMA); Galena Cr. 7 mi. w. of Reno Hot Spr., 6200 ft., Archer 5587 (USMA); 5-10 mi. s.w. of Reno, on Hunter Cr. road, T.L. Breene 175 (USMA); Thomas Cr., Sierra Nevada range, 7500 ft., Archer 5033 (USMA); trail to Mt. Rose through Tahoe meadows, 8900 ft., J. R. Harriehs 517 (USMA). ORMSBY: Carson City, foothills, 6000 ft., M.E. Jones, June 2, 1897 (US); Lake Tahoe, E.O. Wootton, Jun. 5, 1927 (USMA). DOUGLAS: Glenbrook, along Lake Tahoe, 1860 m., Tidestrom 10277 (US); Glenbrook, 1840 m., J.E. Baker 1002 (US); Clear Cr. road near Glenbrook, 6200 ft., L.R. Miller 22 (USMA); Zephyr Cove, near Lake Tahoe, 7000 ft., Archer 6163 (USMA). WHITE PINE: Berry Cr., Shell Cr. Range, 8200 ft., Train 1067 (USMA).

3. Form B. This is Anelanchier pallida Greene, Fl. Fran. 1: 53. 1891. The type, so marked by Greene, was collected by Greene himself near Yreka, Siskiyou County, California, May 12, 1876 (E.L. Greene Pl. Calif. no. 779, Herb. Green. 12153). The following specimens from Nevada are typical:

NEVADA; WASHOE: 1 mi. s. of Verdi, R.A.Allen 8 (USNA); 1 mi. n.w. of Verdi, on Fish Hatchery road, Train 4377 (USNA); same locality, McVaugh 6120 (USNA); Washoe Hill so. of Reno, on Carson City highway, L.R.Miller 5 (USNA); Hunters Can., near Reno, A.E.Hitchcock 450 (US); foothills s.w. of Franktown, Henrichs 51 (USNA); Franktown road 24-25 mi. s. of Reno, Archer 5296 (USNA). ORMSBY: King's Can., 1700-2000 m., C.F.Baker 952, 1219 (both US, both Calif).

This form is a common and characteristic one in northeastern California, occurring along the eastern slope of the Sierra Nevada as far south as the region about Reno. The leaves are commonly gray on both surfaces because of the persistent pubescence; the blades are variable in shape and in degree of serration, those on vigorous shoots often simulating those of Form C and becoming suborbicular, with several coarse teeth.

3. Form C. This is the dominant Amelanchier in the Great Basin; it is almost the only one which occurs in the area. The earliest name for it, if it is to be recognized as a species, is Amelanchier utahensis Koehne, Miss.Beil.Progr.Falk-Realgymn.Berlin nr. 95: 25. 1890. Following is the essential synonymy:

Amelanchier pallida var. arguta Greene, Erythea 1: 221. 1893.

The type was collected near Wells, Nevada, by E. L. Greene in July, 1893 (Herb.Green. 12184).

Amelanchier alnifolia var. utahensis (Koehne) M.E.Jones, Proc. Cal.Acad. ser. 2, 5: 679. 1895.

Amelanchier nitens Tidestrom, Proc.Biol.Soc.Wash. 36: 182. 1923.

The type, collected by Ivar Tidestrom (no. 9653) came from Wilson's Ranch at the southern base of the Charleston Mountains, southwest of Las Vegas, Nevada.

The following specimens from Nevada are typical of the extreme form which is common in the Great Basin and which is not readily confused with any other form; the pubescence is evident and persistent; the leaves are small but are conspicuously toothed to the middle or below, and are subcoriaceous at maturity; the branchlets usually grow very slowly and are pubescent until maturity and often for 2 or 3 years; the inflorescences are sub-corymbose and usually bear not more than about 6 flowers:

NEVADA; ELKO: 21 mi. n. of Wells, McVaugh 6409 (USNA); 1 mi. w. of Pequop Summit, Pequop Mts., McVaugh 6415 (USNA); 10 mi. n. of Ruby Valley P.O., 6000 ft., Nichols & Lund 30 (USNA); Owyhee Indian Reservation, E.V.A. Murphey 360 (USNA); Delano Mts., about 35 mi. n. of Montello, 6200 ft., P.Train 3717 (USNA); Lone Mt., near Park's Sta., 25 mi. n. of Elko, 1850-2500 m., A.E.Hitchcock 992 (US); Ridge above Cave Creek P.O., 6800 ft., Heller 9510 (US); Clover mountain range near Deeth, 7300 ft.,

Heller 9178 (US); E. Humboldt Mts., 8000 ft., S. Titson 553, July 1863 (King Exp.) (US); Gold Creek, 8800 ft., Nelson & McBride 2120 (US). HUMBOLDT: Pine Forest Mts., Griffiths & Morris 124 (US); Thomas Cr., 7 mi. s.e. of Winnemucca, 8000 ft., Train 205 (USNA). PERSHING: West slope of Star Peak, 7500 ft., Heller 10650 (US). WASHOE: 3 mi. e.n.e. of Tule Pk., C.A. Graham 140 (Calif); Sheldon Antelope Refuge, 8000 ft., McVaugh 6260 (USNA); 1 mi. e. of Reno, Calif., May 12, 1929 (Univ. of Nev.); Upper Vya mountain Spring, near Vya, Train 2797 (USNA). STOREY: near Virginia City, H.G. Placard in 1865-64 (US); 8.7 mi. n.e. of Steamboat Spr., 4600 ft., E.W. Scribn. 219 (USNA). WHITE PINE: Berry Creek Can., Shell Creek Range, 2320 m., Tidestrom 1297 (US); White Pine Mts., near Hamilton 2580 m., Tidestrom 1216 (US). EUREKA: near The Willows, about 34 mi. w. of Eureka, Goodner & Henning 561 (USNA); 8-11 mi. (s.e.) of Eureka on U.S. rte. 50, Goodner & Henning 564 (USNA); 3 mi. above Horse Ranch, Goodner & Henning 518 (USNA); Pine Summit, 7374 ft., McVaugh 6108 (USNA). LANDER: Trout Creek Can., about 11 mi. s. of Battle Mountain, Goodner & Henning 904 (USNA); near Big Creek Camp Grounds, Goodner & Henning 555 (USNA); Lewis Can., 15 mi. s. of Battle Mountain, Goodner & Henning 1087 (USNA); near Mill Creek Ranch, 27 mi. s. of Battle Mountain, Goodner & Henning 1021 (USNA); near Austin, 6500 ft., E.W.A. Murphy 452 (USNA); 16-19 mi. from Austin, in Birch Creek Can., W.H. Henning 52 (USNA); Kingston Creek, 1.5-2.5 mi. below Ranger Station, Goodner & Henning 175 (USNA). EMERALDA: Chiatovitch Cr., 2300 m., V. Duran 2701 (Calif). MINERAL: Quaking Aspen Can., 1 mi. s.w. of Aurora, 7700 ft., Train 424 (USNA); Mount Grant Grade, west slope of Mt. Grant, Wassuk Range, 9700 ft., Train 427 (USNA); Cottonwood Can., Wassuk Range, 7000-9000 ft., Archer 126 (USNA; this collection is from an unusually vigorous plant; the branches are elongated and glabrate, but in other respects it is perfectly typical). NIE: Troy Canyon, Grant Range, McVaugh 6087, 6098 (USNA; specimens more or less glabrous); 1 mi. e. of Lobbin Summit, Monitor Range, 8600 ft., Train 427 (USNA; this collection is almost entirely glabrous, but is otherwise perfectly representative); Tonopah, 6000 ft., W.H. Shockley 100, May 1907 (Calif). LINCOLN: Deer Lodge, Piyon Mt., 7200 ft., Desma Hall, Aug. 21, 1935 (USNA); Jack Rabbit Mine Can., e. slope Bristol Range, 10 mi. n. of Pioche, 6000 ft., Train 268 (USNA); between Uvada and Panaca, Tidestrom 2480 (US); 9.5 mi. w. of Orlente, McVaugh 5385 (USNA); Mt. Irish, 6000-7000 ft., C.A. Harris 3835 (US, Calif); Comet Peak, Pioche, M.E. Jones, Aug. 30, 1912 (Calif). CLARK: 4 mi. e. of Kyle Canyon Ranger Station, e. slope Charleston Mts., 6000 ft., Train 1682 (USNA); Kyle Canyon, Tidestrom 9600 (US); Kyle Canyon, 2120 m., L.W. Clokey 7141, 7142 (both US; the more vigorous branchlets are glabrate); Kyle Canyon, 2100 m., Clokey 7541 (US, USNA; branchlets as in 7141, 7142); Kyle Canyon, 2200 m., Clokey 7542 (US, USNA; branchlets as in 7141, 7142); right fork of Trout Can., 6000 ft., Train 2065 (USNA; branchlets glabrate); Sheep Mts., 6600 ft., Annie M. Alexander 1762 (Calif).

In desert and semi-desert areas from Clark County, Nevada, throughout the Grand Canyon region, there is an abundance of a glabrous or nearly glabrous form with small lustrous leaves, which seems to be otherwise identical with Form C. This is the plant described as *A. nitens* Tidestrom, which was said by its author to have yellow fruit ("pomis maturis aureis"). In July 1941 I was able to visit Wilson's Ranch, the type locality of this species, and to collect mature fruits. As in many similar localities in the southern Great Basin, most of the fruits had dried at maturity, leaving the seeds to rattle within. On a few bushes, however, I was able to find an

occasional berry which was still soft and slightly fleshy; all these were pale, nearly white, with a purplish-red cheek; they were in fact identical with the fruits of A. utahensis from other parts of its range.

The following specimens appear to be typical of the sub-glabrous form described as A. nitens:

NEVADA: CLARK: Wilson's Ranch, Charleston Mts., 1180 m., I.W. Clokey 8236, 8237 (both USNA); same locality, McVaugh 5966 (USNA); Harris Spring Road, Charleston Mts., 2000 m., Clokey 7543 (US).

The following specimens have the foliage of Form C., except that some of the leaves may be pointed and entire; the branchlets are usually glabrate, and vigorous shoots are frequently found; these are thus apparently intermediate between Form B and Form C:

NEVADA: WASHOE: log railroad n. of Verdi, 5300 ft., Heller 10875 (US); Truckee R., Pyramid L., S.C. Mason in 1909 (USNA); Pyramid Lake, F.B. Headley 26 (US, USNA); n. side of Peavine Mt., T.L. Breene 625 (USNA); between Reno Hot Spr. and Galena Cr., S.D. McKelvey 1355 (US). STOREY: 1 mi. s.e. of Virginia City, in Six Mile Can., 6100 ft., R.A. Allen 171 (USNA). OERMSBY: 4 mi. s.w. of Carson City on Kings Canyon Road, Breene & Sampson 22 (USNA); Kings Can., 1700-2000 m., C.F. Baker 946 (US).

Discussion: The whole geographical ranges of the three forms discussed above are approximately as follows, so far as can be determined from the specimens at the United States National Herbarium.

Form A: Western Canada (and Alaska ?), southward, principally in the Rocky Mountains. It is common in the Rockies of central and western Colorado and occurs in northwestern New Mexico, with what is apparently an isolated station in western Texas. It ranges from Montana and Idaho southward (but only at higher elevations) to the principal mountain ranges of northern and central Utah and central Arizona. It occurs sparingly in northern Nevada and in somewhat modified form in western Nevada, along the eastern slope of the high Sierras, and doubtless is to be found in northern California.

Form B: This form seems not to cross the Sierra Nevada in California, but is found north and east of that range from western Nevada to Modoc and Del Norte Counties, California, and perhaps further south in the Coast Ranges.

Form C: This is the only representative of the genus throughout the central Great Basin. It ranges from northern Nevada and southern Idaho east to the Rocky Mountains in western Colorado and New Mexico, and south to south-central Arizona and the mountains of southern California. What is apparently the same form is known from northern Baja California.

EXCLUDED GENERA

AGRIMONIA L. Agrimonia gryposepala Wallr. and A. striata Michx. were included by Tidestrom in his Flora of Utah and Nevada (Contr. U.S. Nat. Herb. 25: 277. 1925). He suggested at that time that these species were probably not members of the flora which he was treating.

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