

THE POTENTILLAS OF SOUTHERN CALIFORNIA

— By —

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The *Potentillas* of Southern California have never been the subject of a special paper. The student interested in the species found in Southern California has had to rely on accounts of them given in the *Botany of California* by Brewer and Watson, which is quite out of date, or on those in the several generic monographs which vary widely in scope and specific concept. In the present paper an attempt has been made to supply an account of the local species of *Potentilla*, this study being based on field work and careful consideration of a large amount of herbarium material. Although we have treated only those species which grow in the eight southern-most counties of California, repeated consideration and study have been given to the related extralimital species and it is hoped that a practical and logical classification has been obtained.

The genus *Potentilla* is here taken in its broadest sense, including not only such genera as *Drymocallis*, *Stellariopsis*, and *Argentina*, which are maintained by Rydberg, but even *Horkelia*, *Ivesia*, and *Sibbaldia*, generic segregates kept up by Gray, Watson and Wolf. Our study of the group convinces us that there is no intermediate stand; either *Potentilla* should be completely broken up into small genera, or it should be accepted in the inclusive sense once argued for by Greene, *Pittonia* 1:95-106, 1887. The inclusive genus, well defined as it is by technical details and characterized even to the amateur by its readily recognized habit, we feel is preferable to a galaxy of small and intergrading technical genera, hence we are content to follow such authority as Bentham and Hooker, *Gen. Pl.* 1:620 (1865), Hall, *Univ. Cal. Pub. Bot.* 1:86. (1902), and Jepson, *Fl. West. Mid. Cal.*, 208. (1911), thus defining *Potentilla* in its broadest sense.

During the preparation of this paper, we have had opportunity of studying Southern California *Potentillas* in most of the important local as well as national herbaria. The California collections examined are those at Pomona College (Po), University of California (UC), and Stanford University (St), and the private herbaria of Mr. Frank Peirson of Pasadena (FP) and Dr. A. Davidson of Los Angeles (D). The material at the Gray Herbarium (G), New York Botanical Garden (NY), Philadelphia Academy (Ph), National Museum (US), Field Museum (FM), and Missouri Botanical Garden (Mo) has also been examined. The manuscript was first roughed out in California on the basis of the California material mentioned above, and was subsequently finished at the Gray Herbarium where we had more authentic material at hand and where complete library facilities were obtainable. Later the conclusions arrived at were checked in the other herbaria mentioned. We are very glad to acknowledge our gratitude to the curators of the various herbaria visited for their courtesy and permission to examine specimens under their care. Particular acknowledgment we feel due to Mr. Frank Peirson for valued opinions and suggestions.

In previous papers, which we have written, we have felt a lack in exactness in describing habitats of various species in the groups in which we have worked. The old system of life-zones, valuable as it has been, leaves much to be desired in the amount of information it gives when designating habitat. In casting about for something more suitable for our purposes, we have decided to make use of the classification of plant communities worked out by Clements on pages 114 to 236 of his *Plant Indicators* (Carnegie Institution Pub. 290. 1920).

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The genus *Potentilla* has species growing in almost everyone of the major divisions employed by Clements for Southern California and may serve as a good example of the practicability of using this classification, which can be summarized for our region as follows:

(1) **Desert Scrub Climax (Larrea-Prosopis Formation)**, represented in our California deserts by the **Western Desert Scrub (Larrea-Franseria Association)** with such dominants as: *Larrea divaricata*, *Franseria dumosa*, *Parosela spinosa*, *Fouquieria splendens* and *Olneya tesota*.

(2) **Grassland Climax (Stipa-Bouteloua Formation)**, weakly represented in Southern California by poorly defined relics of **Bunch-Grass Prairie (Agropyron-Stipa Association)**, which is characterized by *Stipa pulchra* and *S. lepida*.

(3) **Sagebrush Climax (Atriplex-Artemisia Formation)**, with two associations in Southern California.

(A) **Basin Sagebrush (Atriplex-Artemisia Association)**, with such dominants as: *Artemisia tridentata*, *Chrysothamnus nauseosus*, *Grayia spinosa*, *Tetradymia spinosa*, and *Gutierrezia Sarothrae*.

(B) **Coastal Sagebrush (Salvia-Artemisia Association)**, with such dominants as *Artemisia californica*, *Salvia mellifera*, *S. apiana*, *S. leucophylla*, and *Eriogonum fasciculatum*.

(4) **Chaparral Climax (Quercus-Ceanothus Formation)**, represented in our region by the **Coastal Chaparral (Adenostoma-Ceanothus Association)** and with such dominants as: *Adenostoma fasciculatum*, *A. sparsifolium*, *Ceanothus cuneatus*, *C. divaricatus*, *C. verrucosus*, *Arctostaphylos glauca*, *Rhamnus crocea*, *R. californica*, *Rhus ovata*, *Photinia arbutifolia*, and *Prunus ilicifolia*.

(5) **Woodland Climax (Pinus-Juniperus Formation)**, in Southern California divided into:

(A) **Pinon-cedar Woodland (Pinus-Juniperus Association)**, the association of *Juniperus utahensis* and *Pinus monophylla* occurring in our mountains in the eastern part of the California deserts.

(B) **Pine-oak Woodland (Pinus-Quercus Association)**, characterized by *Pinus sabiniana*, *Quercus wislizenii*, *Juniperus californica*, *Pinus monophylla*, and *Yucca brevifolia*.

(6) **Montane Forest Climax (Pinus-Pseudotsuga Formation)** with one association in Southern California, the **Sierran Montane Forest (Pinus Association)**, having such dominants as: *Pinus ponderosa*, *P. Lambertiana*, *P. Coulteri*, *Abies concolor*, *Pseudotsuga macrocarpa*, and *Libocedrus decurrens*.

(7) **Subalpine Forest Climax (Picea-Abies Formation)** represented by the **Sierran Subalpine Forest (Pinus-Tsuga Association)** and with *Pinus Murrayana* and *P. flexilis* dominant.

(8) **Alpine Meadow Climax (Carex-Poa Formation)**, the Californian representation of which, the **Sierran Alpine Meadow (Carex-Agrostis Association)** is barely suggested on our highest Southern California peaks by such species as: *Ranunculus Eschscholtzii*, *Festuca supina*, *Juncus Parryi*, and *Oxyria digyna*.

In general, it can be said that the first of the divisions treated above is about the same as the Lower Sonoran Zone; the second, third, fourth, and fifth together are comparable to the Upper Sonoran, the sixth to the Transition, the seventh to the Hudsonian-Canadian, and the eighth to the Arctic-Alpine.

KEY TO SOUTHERN CALIFORNIA SPECIES OF POTENTILLA

Annuals or biennials; weedy plants of wet soils; inflorescence usually leafy and many flowered.

Petals about as long as the sepals; calyx more or less enlarged in fruit.....9. *P. norvegica* var. *hirsuta*.
 Petals about half as long as sepals; calyx scarcely enlarged in fruit.

Stems erect or strictly ascending; herbage dull green, somewhat glandular; leaflets of cauline leaves cuneate-obovate...
8. *P. biennis*.
 Stems spreading and diffusely branched from base; herbage light green, not glandular; leaflets of cauline leaves cuneate-oblong.....10. *P. millegrana*.

Perennials; inflorescence usually inconspicuously leafy.

Basal leaves palmate or practically so.

Lower leaves 3-foliolate; stamens generally 5..17. *P. Sibbaldi*.

Lower leaves 5- to 7-foliolate; stamens generally 20.

Stems prostrate; leaves subpalmate, with a suggestion of of a pinnate condition; pubescence silky, tawny.....
12. *P. Wheeleri*.

Stems ascending, at least toward the apex; leaves truly palmate; pubescence rarely silky, not tawny.....
11. *P. gracilis*.

Basal leaves evidently pinnate.

Flowers solitary on naked, axillary peduncles; spreading by stolons.

Achenes corky, conspicuously dorsally grooved; pubescence more or less lustrous.....15. *P. Anserina*.

Achenes firm, rounded dorsally, not grooved; pubescence usually dull.....16. *P. pacifica*.

Flowers cymose; stems not stoloniferous.

Leaflets very numerous (20 or more pairs), densely imbricated, conspicuously silvery-silky.

Inflorescence congested; pistils about 6; stems loosely decumbent.....5. *P. argyrocoma*.

Inflorescence diffusely paniculate; pistil one; stems suberect.7. *P. santolinoides*.

Leaflets less than 15 pairs, usually not densely imbricated, and not silvery-silky, though occasionally white-tomentose.

Outer filaments conspicuously dilated.

Leaflets flabellate-dissected; stems widely spreading; petals about 2 mm. long.....1. *P. Wilderae*.

Leaflets more or less toothed; stems erect to ascending; petals mostly over 4 mm. long.

Leaflets of basal leaves few, 1-3 pairs; terminal leaflet petiolulate, not lobed; petals broadly obovate or orbicular...4. *P. truncata*.

Leaflets of basal leaves 5-many pairs; terminal leaflet lobed; petals oblong-spatulate.

Herbage dark green, oily, strongly glandular; leaflets over 1 cm. long; valley plants2. *P. cuneata*.
 Herbage light green to canescent, not oily, sparsely if at all glandular; leaflets mostly less than 1 cm. long; montane plants3. *P. Bolanderi*.

Outer filaments not conspicuously dilated.

Style not inserted near the base of the achene. Leaflets bi- or tri-lobed, in about 7 crowded pairs; stamens separated from the receptacle by an open space.....6. *P. callida*.

Leaflets not bi- or tri-lobed, not crowded.

Petals elliptic-oblong, 2-3 mm. long; herbage glandular; of desert mountains....13. *P. saxosa*.

Petals broadly obovate, 5-6 mm. long; herbage not glandular; of coastal swamps14. *P. multijuga*.

Style inserted near the base of the achene.

Styles fusiform, about twice as long as mature achenes; petals not erect in anthesis; leaflets usually merely dentate.

Stems and leaves commonly viscid-glandular and strongly pubescent; leaves dark green above, evidently lighter below; stems generally reddish. 18. *P. glandulosa*.

Stems and leaves glabrate or inconspicuously glandular, not viscid; leaves light green, scarcely bicolored; stems light green.....19. *P. Hanseni*.

Styles almost filiform, about 3 times the length of the mature achenes; petals erect in anthesis; leaflets generally cuneate-floerbelliform.....20. *P. cuneifolia*.

TREATMENT OF SPECIES

1. *Potentilla Wilderae* (Parish) n. comb.

Horkelia Wilderae Parish, Bot. Gaz. 38:460. 1904. Rydberg, No. Am. Fl. 22:272. 1908. Parish, Pl. World 20:220. 1917. Davidson & Moxley, Fl. So. Calif., 174. 1923.

Pale green perennial from perpendicular root, with several caespitose widely spreading slender stems, 1-3 dm. high, finely glandular-pubescent throughout, diffusely branched above; stipules of lower leaves 1-1.5 cm. long, with free tips ca. 3 mm. long, lanceolate, sometimes toothed; upper stipules lance-ovate, 3-8 mm. long; basal leaves pinnate, 5-10 cm. long; petioles 1-4 cm. long; leaflets 13-21, 5-10 mm. long, cuneate, deeply incised into few oblong lobes; cauline leaves much reduced, the uppermost unifoliate, dissected; flowers numerous on slender recurving pedicels 5-14 mm. long; hypanthium cupulate ca. 2 mm. in diameter, glandular-puberulent and somewhat ciliolate; bractlets oblong, 0.7-1 mm. long, becoming reflexed; sepals triangular-lanceolate, erect, ca. 2 mm. long; "petals obovate, white, about equaling the sepals;" achenes several, only 1 or 2 maturing and these ca. 1.8 mm. long, subapically bearing a scarcely thickened smooth style; filaments 10, deltoid, borne on hypanthium somewhat above base of receptacle; receptacle villous.

Distribution very local; known only from the vicinity of the type locality, i. e., the highest point (7,500-7,600 ft. alt.) on the trail from Barton Flats to the South Fork of the Santa Ana River, San Bernardino Mts. Growing as scattered colonies in small clearings about shrubs and under pines in the Montane Forest Climax. Specimens studied: San Bernardino Co.: Trail to South Fork of Santa Ana River, "elev. 8,000 ft.," June 27, 1904, *Mrs. Wilder 237* (type, St; isotype, U. C.), Aug. 28, 1905, "7,200-8,000 ft.," *Mrs. Wilder 238* (G, Po); above Seven Oaks, 7,500 ft., July 6, *D. L. Crawford* (Po); Barton Flats Trail, 7,600 ft., *F. W. Peirson 3114* (FP, Po), Barton Flats, *Peirson 4277* (FP, Po).

An interesting species far removed geographically from its nearest relative, *P. Parryi* Greene (*Pittonia* 1:102. 1887), of Amador County, Calif., and distinct from the latter in having much smaller flowers and in lacking a horizontal rootstock.

- ✓ 2. *Potentilla cuneata* (Lindl.) Baill. ex Hook. & Jackson, Ind. Kew. 3:612. 1894.

Horkelia cuneata Lindl., Bot. Reg. 23: sub. pl. 1997. 1837. Rydb., Monog., 132, pl. 66. 1898. No. Am. Fl., 22:275. 1908. *Horkelia californica* var. *cuneata* Gray, Proc. Am. Acad. 6:529. 1865. *Potentilla Lindleyi* Greene. *Pittonia* 1:101. 1887. *Potentilla puberula* Greene, *Pittonia* 1:102. 1887. Davidson, List Pls. L. A. Co., 5. 1892. Davidson, Cat. Pls. L. A. Co., 8, 1896. *Horkelia puberula* (Greene) Rydb., Bull. Torrey Club 25:55. 1898. Monog., 131, pl. 65. 1898. No. Am. Fl. 22:275. 1908. Abrams, Fl. L. A., 201. 1904 and 181. 1917. Davidson & Moxley, Fl. So. Calif., 175. 1923. *Horkelia platycalyx* Rydb., Monog., 131, pl. 64. 1898. No. Am. Fl. 22:274. 1908. Abrams, Bull. So. Cal. Acad. 1:88. 1902. Fl. L. A., 201. 1904. Davidson & Moxley, Fl. So. Calif., 174. 1923. *Potentilla multijuga* of Greene, Fl. Fran. 1:66. 1891 and Jepson, Fl. W. Mid. Calif., 209. 1911. *Horkelia capitata* of Torrey, Pac. R. R. Rep. 4:84. 1857. *Horkelia californica* of Wats., Bot. Calif. 1:181, 1876 as to plants of So. Calif. *Potentilla californica* of Davidson, List Pls. L. A. Co., 5, 1892. Cat. Pls. L. A. Co., 8, 1896. McClatchie. Fl. Pasadena, 638. 1895. *Horkelia sericea* of Abrams, Fl. L. A., 201, 1904 and 181. 1917. Rydb., Monog., 128. 1898 for So. Calif. Abrams, Bull. So. Cal. Acad. 1:88. 1902. *Horkelia Kelloggii* of Davidson & Moxley, Fl. So. Calif., 174. 1923. Rydb. No. Am. Fl. 22:273. 1908 for So. Calif.

Perennial with more or less horizontal rootstock, covered with persistent leaf-bases; stems mostly several, ascending, leafy. 2-7 dm. high, strongly glandular-pubescent throughout; lower stipules 1-3 cm. long, pubescent to glandular-pubescent, free portion 5-15 mm. long, lanceolate to lance-linear, usually entire; upper stipules lanceolate to ovate, somewhat smaller, entire or toothed; leaves pinnate, dark green, oily, strongly glandular-pubescent, lower leaves 5-30 cm. long; petioles 2-12 cm.; leaflets 11-25, 5-35 mm. long, cuneate to obovate to orbicular, dentate to almost cleft; terminal leaflet not distinct, but somewhat merged with the nearest ones and appearing lobed; cauline leaves reduced and subsessile; cymes at first congested, but in age loosely and ascendingly branched, rather rigid; pedicels becoming 5-15 mm. long, erect; hypanthium saucer-shaped, 4-7 mm. broad, glandular-pubescent; bractlets 3-4 mm. long, oblong-lanceolate or narrowly ovate; acute, erect; sepals triangular-lanceolate, 4-6 mm. long; petals oblanceolate, rounded at apex, white, a little surpassing sepals; filaments 10, triangular or lance-oblong, borne on hypanthium somewhat above base of villous receptacle; achenes numerous, bearing below apex a subfiliform style 2-3 mm. long.

Entering our region from the north and occurring west of the mountains from Santa Barbara County to San Diego County. Most collected near Santa Barbara and between Los Angeles and San Bernardino. A member of the Coastal Sagebrush Association, growing in gravelly soil below 3,500 ft. alt. in middle stages of the succession. Specimens studied: Santa Barbara Co.: Santa Barbara, *Brandegee in 1888* (FM), *I. E. Diehl 241* (Po), *Brewer 380* (UC), *Rothrock 19* (FM, G, US), *21* (FM); Santa Barbara County, *M. S. Baker in 1895* (UC), *Elmer 3793* (G, St, NY, US), *Wheelock in 1893* (NY); Ellwood, *Eastwood 5, in 1903* (G, NY, UC, US); Dutard's Ranch, *Eastwood in 1896* (G); Blochman's Ranch near Santa Maria, *Eastwood 476* (G, US); Santa Inez Mts., *Dunn in 1891* (UC, US). Ventura County: Ojai Valley, *Hubby in 1896* (UC); Casitas Pass, *Hall 3209* (UC); Ojai, *Peckham in 1866* (US). Los Angeles County: Los Angeles, *Nevin* (UC), *Gambel* (G), *Wallace in 1854* (US); *Hasse in 1888* (FM); Ballona Harbor, *Abrams 1237* (St); Glendale, *Hasse in 1888* (St); Lincoln Park, L. A., *Grant 2202* (St); Garvanza, *Grant in 1902* (UC), *Davidson in 1890* (D); Sierra Santa Monica, *Hasse 3794* (NY); Altadena, *Peirson 362* (FP); Pasadena, *Hall 3750* (FM, Mo, NY, UC), *Grant 599* (St, US), *Abrams 1423* (St); San Gabriel, *Antisell 80* (G), *Bigelow* (G); Glendora, *Grant & Wheeler 599-6258* (FM, G, UC); Pomona Valley, *Barber 146* (UC); North Pomona, *Braunton 205* (UC, US); Claremont, *Robinson 8* (Po), *Baker 4760* (FM, G, NY, Po, St, UC), *Peirson 4278* (FP). San Bernardino Co.: San Antonio Canyon Wash, *Johnston 1892* (NY, Po, St, US); Upland, *Johnston 56* (NY); Deer Canyon Wash, *Etiwanda, Johnston 1887* (NY, Po, St, US); Bloomington, *Hall 169* (UC), *Hall 4963* (FM, G, Mo, Po, NY, St, UC, US); San Bernardino Valley, *Parish 6893* (Po, UC), *Parish 4742* (NY, St), *Parish 279* (FM, G, US), *Parish 3651* (FM, G, UC, US); Colton, *Parish 2036?* (FM, G, NY, Po), *Parish 2208* (NY, US); San Bernardino Mts., *Vasey 164* (US). San Diego Co.: Carlsbad, *Parish 4474* (FM, G, NY, St, US).

The taxonomy and synonymy of this species have been so involved as to be most confusing. We are convinced after careful work on much material that the Southern California plants which have gone commonly under the names of *Horkelia puberula* and *H. platycalyx* have no constant distinguishing features. Certainly corolla-size and depth and width of hypanthium do not distinguish them. Furthermore, our southern plants cannot well be separated from the northern ones, and we must take up for the whole concept, the oldest specific name, *cuneata*. In reducing all the plants of this general type to *cuneata*, we admit frankly that it is difficult to separate them by technical characters from the montaine plants which have been classified as *Cleveland, bernardina*, and *Rydbergii*. And yet it is our feeling that there are two general groups: the more oily, glandular, darker green plants of the low altitudes (*cuneata*), and the lighter green, not oily, and scarcely glandular plants of the montaine region, which, particularly in San Diego County, run into forms resembling the valley plants. For these montaine plants the oldest specific name is *Bolanderi* and we refer our southern plants to varieties under that species.

3. *Potentilla Bolanderi* (Gray) Greene. *Pittonia* 1:103. 1887.

Horkelia Bolanderi Gray. *Proc. Am. Acad.* 7:338. 1868.

Light green to hoary-pubescent perennial from heavy perpendicular root with branching crown and 1-several erect or ascending stems 0.5-5. dm. high; stipules of lower leaves 10-25 mm. long, free tips 5-12 mm. long, linear, mostly entire; upper stipules 8-12 mm. long, lance-ovate, generally dentate; leaves pinnate, mostly clustered at base of plant; lower leaves 3-15 cm. long; petioles 1-6 cm.; leaflets 11-19, 3-10 (15) mm. long, cuneate to cuneate-obovate to suborbicular, toothed or

cleft at apex; cauline leaves reduced, uppermost sometimes unifoliate, dissected; inflorescence loosely but rigidly branched, bearing more or less congested few-flowered cymules; pedicels erect, 2-5 mm. long; hypanthium cupulate, 2.5-4 mm. broad; sepals lanceolate, 3-4 mm. long, erect; bractlets lanceolate, 1-2 mm. long; petals white, oblanceolate, rounded at apex, slightly exceeding sepals; filaments 10, triangular, borne on hypanthium above somewhat villous receptacle, filiform, almost 2 mm. long; achenes numerous.

Our southern montane plants are very near *Potentilla Bolanderi* of Central California and apparently deserve only varietal rank. They are distinguished from the typical form by less shaggy pubescence, perhaps more cupulate hypanthium, and widely separated range. They fall readily into two varieties:

Herbage canescent, not at all glandular... *P. Bolanderi* var. *Parryi*.

Herbage merely pubescent, sparsely glandular. *P. Bolanderi* var. *Clevelandi*.

3a. *Potentilla Bolanderi* var. *Parryi* (Wats.) n. comb.

Horkelia Bolanderi var. *Parryi* Wats. Bot. Calif. 1:182. 1876. Davidson, Cat. Pls. L. A. Co., 8. 1896. *Horkelia Parryi* (Wats.) Rydb. Monog. 1:129. pl. 62.1898. Davidson, Erythea 2:64.1894. *Horkelia bernardina* Rydb. No. Am. Fl. 22:273.1908. Parish, Pl. World 20:217. 1917. Davidson Moxley Fl. So. Calif., 174. 1923. *Horkelia Rydbergii* Elmer, Bot. Gaz. 39:50.1905. Rydb. No. Am. Fl. 22:273.1908. Davidson & Moxley, Fl. So. Calif., 173.1923.

Not *Horkelia Parryi* Greene, Bull. Calif. Acad. 2:416.1887 nor *Potentilla Parryi* Greene, Pittonia 1:102. 1887.

Herbage canescent, conspicuously strigose, glandless.

Growing in moist soil about meadows, under pines, and along banks of streams at elevations from 4000 to 9500 ft., in the mountains from Ventura to San Bernardino Counties. Type locality, San Bernardino Mts. A plant of the Montane Forest Climax. We have seen the following material. Ventura County: "Santa Barbara," Rothrock 21. July 1875 (Yale) probably Mt. Pinos (See Rothrock 210 under *P. santolinoides*); Cuddy Valley, Mt. Pinos, Hall 6353 (Po); Frazier Mt., Hall 6610 (UC); Coville & Funston 1198 (US); Lockwood Valley, Dudley & Lamb 4674 (Po, St); Griffins, Elmer 3971 (NY, St). Los Angeles Co.: Pine Flats, San Gabriel Mts., Peirson 2448 (FP, Po); Kessler in 1921 (D); Mescal Creek, San Gabriel Mts., Munz 7694 (Po), Peirson 4026 (FP); Big Rock, Davidson in 1893 (D). San Bernardino Co.: Holcomb Valley, Pierce in 1922 (Po); Head of Devil's Canyon, Parish 2368 (NY); in 1900 (St); Little Green Valley, G. R. Hall 6 (St, UC); Doble, Bear Valley, Parish 10888 (G, NY, St); Bear Valley, Hall 7560 (NY, UC), Jones 6299 (Po); Abrams 2837 (FM, G, NY, St), Peirson 1966 (FP); Strawberry Peak, Abrams 2000 (NY, Po, St); Mohave River, Palmer in 1876 (G); Round Valley above Barton Flats, Wilder 416 (Po); South Fork of Santa Ana, Munz 6256 (Po); Peirson 3286 (FP), J. & H. W. Grinnell 221 (US); Upper Santa Ana Canyon, Hall 7540 (NY, St, UC), 7541 (NY, Po, UC); Big Meadows of Santa Ana, Munz 6132 (NY, Po); Grayback, Lemmon in 1879 (FM, G); Between Vivian and High Creeks, Munz 7598 (NY, Po), Peirson 3976 (FP); High Creek, Crawford 892 (Po); Seeley Flat, Parish 2368 (FM, UC); San Bernardino Mts., Parish 3706 (G, UC), Hall 1300 (NY, UC). Blasdale in 1891 (UC), Parry in 1875 (G), Nevin in 1880 (G), S. B. & W. F. Parish 607 (St, US); So. Calif., Parry & Lemmon 103 (FM).

Plants west of Cajon Pass are rather more canescent than those of the San Bernardino Mts. and were described by Elmer as *Horkelia Rydbergii*, but we find insufficient grounds for maintaining this even as a variety distinct from *Parryi*.

3b. *Potentilla Bolanderi* var *Clevelandi* (Greene) n. comb.

Potentilla Clevelandi Greene, Pittonia 1:102. 1887. Hall, Univ. Calif. Pub. Bot. 1:187.1902. *Horkelia Clevelandi* (Greene) Rydb., Bull. Torrey Club 25:54.1898. Rydb., No. Am. Fl. 22:273.1908. Davidson & Moxley, Fl. So. Calif. 174.1923. *Horkelia californica* of Brandegee, Zoe 4:204.1893.

Herbage light green, more or less pubescent, sparsely glandular.

Ranging from the San Jacinto Mts. southward to the San Pedro Martirs in northern Lower California. Fairly frequent in situations similar to those of var. *Parryi*. Commonly forming dense matted colonies in the Montane Forest Climax at elevations from 4200 to 7200 ft. Type locality, Laguna Mts., San Diego Co. The material listed below has been studied. Riverside Co.: San Jacinto Mts., S. B. & W. F. Parish 1107 (FM), Orcutt in 1890 (US), Orcutt 2104 (UC), Anthony in 1895 (UC); Strawberry Valley, San Jacinto Mts., Hall 2291. (NY, St, UC), 648 (UC), Hasse 5650 (NY), F. Grinnell Jr. in 1908 (Po, St); Idyllwild, Spencer 1202, June 15. 1921 (NY, Po), 1202, June 19. 1919 (G, Po), 2199 (Po); Keen Camp, Munz 5766 (Po); Tahquitz Valley, Munz 6011 (Po); Hall 738 (US), San Diego Co.; Mrs. Gregory in 1891 (UC); Palomar, Brandegee in 1893 (UC), Hall 1966 (UC), Pearson 4780 (FP), Stokes in 1895 (St), Chandler 5392 (NY, UC); Noble Mine, Chandler 5490 (NY, UC), Parish 4529 (NY, St); Cuyamaca, T. S. Brandegee in 1894 (UC); Abrams 3922 (FM, G, NY, Po, St, UC, US); Laguna Mts., T. S. Brandegee in 1904 (UC); Eastwood 9219 (G), Spencer 951 (G), Cleveland in 1886 (UC), Mearns 3523 (US), Lower California: Hansens, Orcutt in 1883 (US), Orcutt 905 (UC); Cantillas Mts., Orcutt in 1883 (G); San Pedro Martir, T. S. Brandegee in 1893 (UC, US).

4. *Potentilla truncata* (Rydb.) n. comb.

Horkelia truncata Rydb. No. Am. Fl. 22:274. 1908. Davidson & Moxley, Fl. So. Calif., 174.1923.

Yellowish-green perennial from a short root; glandular-pubescent throughout; stems several, erect, leafy, 3-7 dm. high, branching only near the top; lower stipules 1-2 cm. long, over half free, more or less cleft; cauline mostly ovate, cleft or toothed, uppermost smaller, sometimes entire, ovate to lanceolate; leaves pinnate; lower ones few, 6-15 cm. long; petioles 3-5 cm.; leaflets 5-9, oblong to obovate-cuneate, lateral ones 1-3 cm. long, sometimes rather finely dentate except for the coarser teeth at the end; terminal leaflet larger, petiolulate, not lobed; cauline leaves somewhat reduced, the uppermost 1- to 3-foliate, leaflets narrower; cyme few flowered, with a few strictly ascending branches bearing somewhat congested floral clusters; pedicels becoming 5-30 mm. long, ascending or erect, glandular-pubescent; hypanthium saucer-shaped, ca. 5 mm. broad; sepals triangular, 4-5 mm. long, glandular-pubescent; bractlets ovate, acute, ca. 4 mm. long; petals white, orbicular, clawed, ca. 5 mm. in diameter; filaments 10, outer very broadly triangular, inner ones triangular-ovate, borne on hypanthium somewhat above base of glabrate receptacle; achenes numerous, bearing just below apex a slender style 2-3 mm. long.

A little known but distinct species, apparently from the Coastal Chaparral of eastern San Diego County and northern Lower California. We know of the following collections: San Diego Co.: Mesa Grande, Spencer 1160, June 1, 1919 (G, NY, Po); near Ramona, Chandler 5321 (NY). Lower California: Guadalupe Mine, Orcutt in 1883 (FM, NY); Guadalupe Mts., Orcutt 840 (G).

5. *Potentilla argyrocoma* (Rydb.) n. comb.

Horkelia argyrocoma Rydb., Monog., 144, pl. 84.1898. *Ivesia argyrocoma* Rydb. No. Am. Fl. 22:284.1908. Parish, Pl. World 20:218. 1917. Davidson & Moxley, Fl. So. Calif., 175.1923. *Ivesia unguiculata* of Wats., Bot. Calif., 2:444.1880.

Perennial, silvery-silky throughout; caudex short, with yellowish or brownish, hairy, persistent leaf-bases; stems several, generally with reddish tinge, 1-3 dm. high, spreading, leafy, branching freely; basal stipules ca. 1 cm. long, the free portion 2-3 mm. long, subulate; cauline stipules 4-10 mm. long, lanceolate to lance-ovate, often toothed; leaves with very numerous, closely imbricate leaflets, so as to be almost vermiform; lower leaves numerous, 3:10 cm. long; petioles 1-3 cm. long, with wide-spreading silvery hair; leaflets 1-3 mm. long, divided almost to base into 2 ovate lobes; upper leaves gradually reduced and shorter petioled; cymes congested, usually subcapitate; pedicels 1-2 mm. long; hypanthium deeply cupulate, 3-4 mm. broad; sepals oblong or oblong-lanceolate, ca. 3 mm. long; bractlets oblong 2-2.5 mm. long; petals white, clawed, obovate, retuse, 3-4 mm. long; filaments 20, lanceolate or wedge-shaped, borne on the hypanthium somewhat above the hairy receptacle; achenes several, bearing below the apex a subfiliform style ca. 2 mm. long.

Known only from dry meadows and lower slopes of Bear Valley, at 6500 to 6900 ft. alt., where locally frequent in the Montane Forest Climax. Material seen, from San Bernardino Co.: Bear Valley, *S. B. & W. F. Parish 151* (FM, US), *S. B. Parish 3764* (G, UC), in 1896 (St.), 151 (G), in 1894 (UC), 3173 (US), 19279 (G, UC), 2362 (FM, NY, UC), 4948 (NY, US). *Pierce in 1922* (Po), *Harwood 4361* (Po), *Munz 5650* (Po), *Jones 6298* (Po, US), *Abrams 2903* (NY, St.), *Parry & Lemmon 104* (G, Mo), *Leiberg 3306* (US); no locality given, *Parry & Lemmon in 1876* (FM, G, NY).

6. *Potentilla callida* Hall. Univ. Calif. Pub. Bot. 1:86.1902.

Ivesia callida (Hall) Rydb. No. Am. Fl. 22:286.1908. Davidson & Moxley, Fl. So. Calif., 175.1923.

Perennial, villous throughout, glandular above; root ca. 2 mm. thick, somewhat woody; stems several, slender, simple, erect or ascending, 3-5 cm. high; stipules ca. 1 cm. long, the free portion lanceolate, 2-3 mm. long, entire or toothed; leaves villous, pinnate, mostly basal; lower leaves 2-3 cm. long; petioles 0.5-1 cm. long; leaflets in ca. 7 pairs, crowded, 3-4 mm. long, divided to base into 2 or 3 oval segments; upper leaves reduced, with 1-5 leaflets; "flowers sometimes solitary on ends of stems, but usually 3 to 6 in a simple raceme"; pedicels slender, 4-10 mm. long; hypanthium saucer-shaped, 3-5 mm. wide, glandular-villous; sepals lance-ovate, ca. 2.5 mm. long; bractlets narrow, 1:5 mm. long; "petals white, oblong, obtuse or acutish, narrowed at base but not clawed, a little longer than the calyx" (ca. 3 mm. long); stamens ca. 20; filaments filiform; receptacle hairy; "pistils several, styles laterally attached slightly longer than the glabrous achenes."

Known only from Tahquitz Peak, San Jacinto Mts., where it grows in rock-crevices at about 8000 ft. alt., Montane Forest Climax. Riverside County: Tahquitz Peak, *Hall 2611* (NY, UC), *Kessler in 1921* (D).

7. *Potentilla santolinoides* (Gray) Greene. Pittonia 1:106.1887.

Ivesia santolinoides Gray. Proc. Am. Acad. 6:531.1865. Wats., Bot. Calif. 1:184.1876. Parish, Zoe 4:163. 1894. Pl. World 20:218. 1917. *Stellariopsis santolinoides* (Gray) Rydb., Monog. 155, pl. 95. 1898. No. Am. Fl. 22:292.1908. Davidson & Moxley, Fl. So. Calif., 175. 1923.

Perennial, with deep root and short erect caudex covered with hairy dead leaf-bases; stems several, suberect, slender, 1-4 dm. high, freely branched, almost leafless, with spreading silky hair at very base, otherwise quite glabrous except at the axils; basal stipules 10-15 mm. long, silky, with free linear tips 4-5 mm. long; those of lower cauline leaves ca. 5 mm. long, somewhat ovate, often divided; uppermost reduced; leaves terete, worm-like, white silky, of exceedingly numerous, very closely imbricate leaflets; lower leaves 2-10 cm. long; petioles 0.5-2. cm. long, with spreading silky hair; leaflets divided almost to base into several oval lobes; cauline leaves much reduced and quite sessile; inflorescence diffusely paniculate, open; pedicels very slender, 5-30 mm. long; hypanthium deeply saucer-shaped, 2-3 mm. in diam., glabrous; sepals spreading, deltoid-ovate to ovate-oblong, acute, 1-1.5 mm. long; bractlets ovate, small, very much shorter than the sepals; petals white, orbicular, ca. 2 mm. long; stamens 15, insertion on disk somewhat separated from pistil; filaments filiform; anthers purplish-brown, very broadly obovate, basifixed, dehiscent by two short lateral slits; pistil one; achene ca. 2 mm. long, mottled, compressed, bearing a filiform style just below apex.

Infrequent, but sometimes locally abundant, on dry gravelly slopes and ridges at altitudes of from 6000 to 9000 ft. Occurring in the Montane Forest Climax in all the mountains from Kern County to Riverside County. Kern Co.: Tehachapi Peak, *Dudley 313* (St, UC, US); top of Shepherds Peak, Bisses Station Tehachapi, *Dudley 410* (St). Ventura Co.: Mt. Pinos, *Munz 7018* (Po), *Rothrock 210*, July 1875 (G, US, Yale), *Dudley & Lamb 4591* (Po, St), *Peirson 3233* (FP, Po), *Abrams & McGregor 252* (St), *Hall 6511* (St, UC); Alamos Mt., *Hall 6705* (UC); Griffins, *Elmer 3314* (G, NY, St, US). Los Angeles Co.: summit of Mt. Waterman, immature specimen, *Peirson in 1921* (FP). San Bernardino Co.: Fish Camp, *Johnston 2880* (Po); Bear Valley, *Parish 3763* (UC, US); Grout Creek, *Parish in 1894, No. 3115* (St, UC, US); Holcomb Valley, *Parish 1819* (G, St, UC, US); Upper Holcomb Creek, *Wilder 758* (Po.) Riverside Co.: Ridge east of Tahquitz Valley, *Jaeger 1043* (Po); Tahquitz Valley, *Spencer 1702* (G).

8. *Potentilla biennis* Greene. Fl. Fran. 1:65.1891.

Potentilla biennis Greene. Rydb. Monog. 44, pl. 9, 1898. No. Am. Fl. 22: 305. 1908. Wolf, Monog. Pot., 400.1908. Parish, Pl. World 20:218.1917. *Tridophyllum bienne* Greene, Leaflets 1:189. 1905. *Potentilla lateriflora* Rydb., Bull. Club 23:261. 1896. *Potentilla millegrana* of Davidson, Muhlenbergia 4:67.1908 and Davidson & Moxley, Fl. So. Calif., 176. 1923. *Potentilla rivalis millegrana* of Coville, Con. U. S. Nat. Herb. 4:96.1893.

Annual or biennial; stems 1 to several, 2-5 dm. high, suberect, finely glandular-pubescent, rather slender, strict, not much branched, leafy to the very summit; stipules not over 1 cm. long, narrowly ovate, entire or toothed, glandular-pubescent; leaves trifoliolate, dull green, glandular-pubescent; lower petioles 2-6 cm. long, glandular-pubescent, upper ones gradually reduced; leaflets cuneate-obovate, at least two-thirds as long as wide, ca. 1-3 cm. long, coarsely dentate; flowers solitary in the axils of the upper leaves, grouped, however, to form leafy racemes; pedicels slender, 5-20 mm. long, ascending; hypanthium saucer-shaped, 3-4 mm. broad; sepals deltoid to ovate-oblong, becoming 3-4 mm. long; bractlets oblong to elliptical, ca. two-thirds length of sepals; petals yellow, inconspicuous, obovate or spatulate, shorter than sepals; stamens 10 on a disk slightly separated from base of receptacle; filaments filiform; pistils numerous; style terminal, fusi-form, thickened; achenes pallid.

On exposed banks along streams and lake shores from Inyo Co. to the San Bernardino Mts., at altitudes ranging from 4000 to 7000 ft. Growing in the Piñon-cedar Association of the Woodland Climax and at the lower altitudes in the Montane Forest Climax. Inyo Co.: Panamint Canyon, *Hall & Chandler 7008* (UC); Wood Canyon, Grapevine Mts., *Coville & Funston 1763* (NY). Kern Co.: Vicinity of Ft. Tejon, *Abrams & McGregor 278* (St); Tehachapi Mts., *Dudley 504* (NY, UC, US); Tehachapi, *Davidson in 1895* (D, UC, reported as *millegrana*); Water Canyon, Tehachapi Mts., *Abrams & McGregor 483* (St, US). Ventura Co.: Mt. Pinos, *Munz 7006* (NY, Po), *Elmer 3805* (G, Mo, UC), *Peirson 3236* (FP, Po). San Bernardino Co.: Upper Santa Ana Canyon, *Hall 7519* (UC), *Peirson 4182* (FP), Bear Valley, *Parish 1816* (FM), *Jones in 1900* (Po), *Davidson 2204* (D), *Abrams 2878* (G, Mo, NK), *S. B. & W. F. Parish 1497* (FM, G, St, US).

9. *Potentilla norvegica* var. *hirsuta* (Michx.) Lehm., Pugill. 9:75.1851.

Potentilla norvegica var. *hirsuta* in Wolf, Monog. *Potentilla*, 404. 1908. *Potentilla monspeliensis* L., Sp. Pl., 499. 1753. Rydb., Monog., 45, pl. 10. 1898. No. Am. Fl. 22:307. 1908.

Annual or biennial; with one to several stout, leafy, erect or suberect, often reddish, sparsely hirsute stems, 2-6 dm. high, branching above; stipules 1-3 cm. long, ovate, hirsute, usually toothed; leaves palmately 3-foliolate, dark green above, lighter below, hirsute, not glandular; lower ones on hirsute petioles 3-10 cm. long; uppermost subsessile; leaflets 1-7 cm. long, obovate, less than two-thirds as wide as long, with ovate teeth; uppermost leaves with oblanceolate leaflets; flowers in a terminal leafy cyme, this frequently quite congested; pedicels 4-20 mm. long, stiff, pubescent; hypanthium saucer-shaped, becoming 6-8 mm. broad, hirsute; sepals erect, deltoid to ovate-oblong, acute; bractlets oblong or elliptical; petals yellow, broadly obovate or cuneate, about equaling sepals; stamens ca. 20, borne on edge of a disk somewhat above base of receptacle; filaments filiform; pistils numerous; style terminal, fusiform, thickened; achenes tan-colored.

Known in our range only from Cuyamaca Lake, San Diego Co., where it is occasional on moist banks at 4600 ft. alt., in the Montane Forest Climax. San Diego Co.: Cuyamaca Lake, *Munz & Harwood 7189* (NY, Po), *Peirson 4829* (FP, Po).

10. *Potentilla millegrana* Engelm.; Lehm. Delect. Sem. Hort. Hamb. 1849: 11. 1849.

Potentilla millegrana in Rydb., No. Am. Fl. 22:305.1908. Wolf. Monog. *Potentilla*, 399. 1908. *Potentilla rivalis* var. *millegrana* Wats., Proc. Am. Acad. 8:553. 1873. Bot. Calif., 1:178. 1876. *Potentilla leuocarpa* Rydb., in Britt & Brown, Ill. Fl. 2:212.1897. Rydb., Monog., 43 pl. 8.1898. Parish, *Muhlenbergia* 9:59. 1913.

Annual or biennial, diffusely branched from base; stems slender, spreading, pubescent, 1-3 dm. long; stipules ovate to lanceolate, pubescent, mostly entire, 3-10 mm. long; leaves trifoliolate, light green, pubescent, not glandular; lower petioles 1-4 cm. long, pubescent; upper reduced; leaflets 5-35 mm. long, cuneate-oblong, with few coarse teeth; flowers axillary, associated to form a leafy, racemiform or dense cymose terminal inflorescence; pedicels 5-30 mm. long, slender, pubescent; hypanthium saucer-shaped, 3-5 mm. broad; sepals deltoid-ovate to ovate-oblong, abruptly acuminate, pubescent, erect, 2-3 mm. long; bractlets oblong, nearly equaling petals, spreading; petals inconspicuous.

ous, shorter than sepals, oblong-ovate, yellowish; stamens ca. 10, on a disk slightly above the base of the receptacle; filaments filiform; pistils numerous; styles apical, fusiform, thickened; achenes tan-colored.

Moist grounds at low altitudes in the Desert Scrub Climax in the southern and eastern parts of our range. To this species we refer the following specimens: Bottom lands of Colorado River, *Parish 3498* (St.) San Bernardino Co.: Needles, *Jones 3342* (FM, NY, Po, UC, US). Imperial Co.: Cameron Lake, *T. S. Brandegee in 1901* (UC); Mountain Springs, *Mearns 3128* (St). Lower California: Seven Wells on Salton River, *Schoenfeldt 2332* (St); Unlucky Lagoon, *Schoenfeldt 2917* (St). A collection by Miss Eastwood (677) on the trail to Manzana Creek, Zaca Lake Forest Reserve in the northwestern part of our region has been referred here; it is a puzzling one and well out of the normal range.

✓ 11. *Potentilla gracilis* Dougl.; Hook. Bot. Mag., pl. 2984. 1830.

Potentilla gracilis of Wats., Bot. Calif., 1:179. 1876. Hall, Univ. Calif. Pub. Bot. 1:87.1902. *Potentilla Parishii* Rydb., No. Am. Fl. 22:313.1908. Davidson & Moxley, Fl. So. Calif., 176.1923. *Potentilla Hallii* Rydb., Bull. Torrey Club 28:176. 1901. Rydb., No. Am. Fl. 22:314. 1908. Parish, Pl. World 20:218.1917. Davidson & Moxley, Fl. So. Calif., 176.1923. *Potentilla lasia* Rydb., No. Am. Fl. 22:314.1908. Parish Pl. World 20:218.1917. Davidson & Moxley, Fl. So. Calif., 176.1923. *Potentilla Elmeri* Rydb., No. Am. Fl., 22:315.1908. Davidson & Moxley, Fl. So. Calif., 176.1923. *Potentilla comosa* Rydb., No. Am. Fl. 22:316.1908. Parish, Pl. World 20:218.1917. Davidson & Moxley, Fl. So. Calif., 176. 1923. *Potentilla Hassei* Rydb., No. Am. Fl. 22:329. 1908. Davidson & Moxley, Fl. So. Calif., 176. 1923. *Potentilla gracilis* var. *fastigiata* of Wats., Bot. Calif., 1:179.1876. Hall, Univ. Calif. Pub. Bot. 1:88.1902. *Potentilla gracilis* var. *rigida* of Wats., l. c. and of Hall, l. c. *Potentilla Nuttallii* of Davidson, Erythraea 2:64. 1894. Cat. Pls. L. A. Co., 8. 1896. Muhlenbergia 4:67.1908.

Perennial, with short root; stems somewhat rigid; decumbent to ascending to erect, finely pubescent to villous, not glandular, 1-5 dm. high, branching only above; stipules of basal leaves 1-2 cm. long, glabrous to villous, with free lanceolate, entire tips ca. 5 mm. long; cauline stipules 1-2 cm. long, lanceolate to ovate, glabrous to villous, entire or toothed; leaves palmate, mostly 5-foliolate, the uppermost 3-foliolate or simple; basal leaves several, 4-15 cm. long; petioles 1-12 cm. long, usually villous-hirsute; leaflets 1-5 cm. long, often much greener above than below, finely pubescent to hirsute or silky, oblanceolate to obovate, finely dentate to flabelliform-dissected; cauline leaves few, reduced, uppermost sessile and very small; flowers in more or less loose, corymbose, terminal cymes; hypanthium saucer-shaped, hairy, becoming 4-6 mm. broad; pedicels stiffish, 3-15 mm. long; sepals oblong-lanceolate to ovate-deltoid, acuminate; bractlets oblong, shorter than sepals; petals conspicuous, 5-7 mm. long, yellow, obovate to obovate-orbicular; stamens usually 20, borne on a disk close to base of receptacle; filaments filiform; pistils numerous; style filiform, terminal.

In and about meadows at from 4,500 to 8,000 ft. alt., usually common in all our mountains in the Montane Forest Climax. Kern Co.: Tehachapi Mts., *Dudley 436* (NY, St, UC, US), *Hasse & Davidson 1706* (D). Ventura Co.: Mt. Pinos, *Elmer 4009*, type collection of *P. Elmeri* (G, Mo, NY, St. UC), *Dudley & Lamb 4482* (Po, St); Head of Piru Creek, *Rothrock 243* (FM); Goodenough Meadow, Mt. Pinos,

Dudley & Lamb 4719 (St); East slope of Mt. Pinos, *Hall* 6419 (UC); San Emigdio Potrereros, Mt. Pinos, *Hall* 6379 (UC); Frazier Mt., *Hall* 6613 (UC). Los Angeles Co.: San Antonio Mts., *Hall* 232 (UC); Big Rock, *Davidson* in 1893 (D, St); Swartout, *Munz* 4665 (Po), *Peirson* 3165 (FP), *Hall* in 1899 (NY). San Bernardino Co.: Bear Valley *Jones* in 1900 (Po), *Parish* 3252, type coll. of *P. lasia* (D, NY), *Parish* 1817 (FM, US), *Abrams* 2828 (G, Mo, NY, Po, St, US). *Pierce* in 1922 (Po), *Eduards* in 1917 (Po), *Parish* 3152, type coll. of *P. comosa* (NY); Little Bear Valley, *Chandler* in 1897 (UC); Seven Oaks, *Davidson* 2237 (D); Hunsaker Flats, *Munz & Johnston* 2860 (Po, St); San Bernardino Mts., *W. C. Blasdale* (UC), *Parish* 1685 (FM, St, US); Upper Santa Ana Canyon, *Hall* 7539 (NY, UC); South Fork, Santa Ana River, *Peirson* 1974 (FP), *J. & H. W. Grinnell* 252 (US); Mare Flats, *D. L. Crawford*, July 6 (Po). Riverside Co.: Tahquitz Valley, *Hall* 806 (UC, US), *Munz* 5986 (Po), *Hall* 2356 (UC), *F. Grinnell, Jr.* (St); Strawberry Valley, *Hall* 2296 (Mo, St, NY, UC, US); San Jacinto Mts., *Hasse* in 1892, type coll. *P. Hassei* (D, NY); Idyllwild, *Spencer* 2271 (Po), 1370 (G, NY), 1860 (Po), 2198 (G), 1371 (G), *Smith* 3401 (D); Thomas Valley, *Hall* 2184 (UC). San Diego Co.: Palomar, *Hall* 1946 (UC), *Peirson* 2182 (FP); Doane Valley, *Peirson* 4805 (FP); Cuyamaca Lake, *Munz & Harwood* 7203 (NY, Po), *Spencer* 878a (NY), 1184 (G), *Dunn* in 1899 (UC), *Abrams* 3871 (G, Mo, NY, St, UC, US) Cuyamaca Mts., *Palmer* 83 (FM, Mo); Laguna Mts., *T. S. Brandegee* in 1904 (UC), *Orcutt* in 1889 (Mo), *Schoenfeldt* 3576 (US); Smith Mt., *McClatchie* in 1896 (NY); Descanso, *Parish* 4523, type of *P. Parishii* (NY, St); Mts. E. of San Diego, *Parry* in 1850 (NY); "San Diego," *Palmer* (US).

Throughout its range, *Potentilla gracilis* is a variable species and, while our plants deviate somewhat from the typical form, which came from the "banks of the Columbia River," we can find no constant differentiating characters. Rather extended study of the species from the whole western United States has caused us to refer all our Southern California material to *gracilis* proper, although plants from within our region, exhibiting slight variations have been variously named. *P. Parishii* Rydb. has been applied to slender plants of San Diego Co., with leaves pubescent rather than tomentose beneath, green above, and having the pubescence of the stems and petioles appressed. *P. Hallii* Rydb. applies to similar plants of the San Bernardino Mts., but with the pubescence of the stems and petioles spreading, and with many lanceolate teeth to the leaflets. If the teeth to the leaflets are ovate and few, such plants have been called *P. lasia* Rydb. *P. Elmeri* Rydb. applies to Ventura Co. plants with the leaflets rather deeply cleft, green above and white-silky beneath and with pubescence of the stems and petioles appressed. *P. comosa* Rydb. applies to plants of San Bernardino Co., similarly deeply cleft, but with the stems and petioles having a spreading pubescence. Low plants of the San Jacinto Mts., with densely strigose stems and leaves are *P. Hassei* Rydb. The varieties of *P. gracilis*, namely *fastigiata* and *rigida* of Wats. are very ill defined. *Fastigiata* is characterized by its short compact cyme, dense pubescence, and low habit. *Rigida* is tall, stout, and villous, without tomentum. According to Watson the latter is the most common form in California.

12. *Potentilla Wheeleri* Wats. Proc. Am. Acad. 11:148. 1876.

Low perennial, stems several to many, from short caudex, 5-20 cm. long, spreading or prostrate, freely branching, sparsely pubescent to silky-villous; lower stipules ca. 1 cm. long, villous, free portion ca. 5 mm. long, lanceolate, long acuminate; cauline stipules 4-8 mm.

long, pubescent to villous, lanceolate to ovate, generally not toothed; leaves subpalmate; basal leaves many, 1-8 cm. long; petioles 0.5-6 cm., silky-villous to glandular-villous; leaflets 5, silky-villous on both surfaces to glandular-pubescent, cuneate to obovate, with few large terminal broad teeth; stem leaves reduced, becoming trifoliate or even simple and sessile; flowers in bracteate cymes becoming loosely branched in age; pedicels spreading or recurved, slender, pubescent, 4-16 mm. long; hypanthium saucer-shaped, becoming 4-5 mm. long, strigose; sepals deltoid to ovate-oblong; bractlets oblong; petals yellow, obcordate, 4-5 mm. long, slightly exceeding sepals; stamens 20, borne close to base of receptacle; filaments filiform; pistils numerous; styles filiform.

Represented in our region by two varieties, which can be separated as follows:

- Leaves conspicuously silky, scarcely if at all glandular; stems rather rigid.....*P. Wheeleri* var. *typica*.
Leaves not conspicuously silky, rather green and glandular; stems very slender.....*P. Wheeleri* var. *rimicola*.

12a. *Potentilla Wheeleri* var. *typica* var. nov.

Potentilla Wheeleri Wats., Proc. Am. Acad. 11:148. 1876. Bot. Calif., 2:444. 1880. Rydb., Monog., 54, pl. 16. 1898. No. Am. Fl. 22:327. 1908. Parish, Pl. World 20:218. 1917. Davidson & Moxley, Fl. So. Calif., 176. 1923. *Potentilla Wheeleri* var. *viscidula* Rydb., Bull. Torrey Club 23:429. 1896; Rydb., Monog., 55. 1898; Wolf, Monog. Pot., 518. 1908 as to Calif. plants. *Potentilla viscidula* Rydb., No. Am. Fl. 22:327. 1908 as to Calif. plants. *Potentilla luteosericea* Rydb., Monog., 101. 1908. Rydb., No. Am. Fl. 22:339. 1908. Wolf, Monog. Pot., 208. 1908.

Stems rather rigid; leaves conspicuously silky, slightly or not at all glandular.

In Southern California known only from the San Bernardino Mts., and outside our range from the southern Sierra Nevada and the San Pedro Martirs. At elevations of from 6,500 to 11,500 ft., occurring in meadows and moist places of the Montane and Subalpine Forest Climaxes, and in damp gravel about the summit of San Gorgonio Peak. At this higher altitude it assumes a reduced form which is quite indistinguishable from impoverished plants of dry situations at lower levels. Material studied: So. Calif., *Parry & Lemmon 100* (FM). San Bernardino County: Bear Valley, *Leiberg 3409* (US), *Harwood 4343* (Po). Abrams *2108* (St), Parish *3146* (Mo, St, UC, US), *3773* (G, UC), *2363* (FM, NY, UC), *4944* (NY, St), *Abrams 2746* (Po, St, G, NY, UC, US), *Pierce in 1922* (Po), *Hall 7559* (NY, UC), *Jones in 1900* (P, Mo, US), *Munz 5640* (Po), *Peirson 4606* (FP, St), *Parish 1498* (G, Mo, NY, St, US); Bluff Lake, *Peirson 1978* (FP); Santa Ana River, *Peirson in 1922* (Po); So. Fork, Santa Ana River, *Peirson 3113* (FP); Dry Lake, *Hall 7628* (UC), *Crawford. July 3* (Po), *Peirson 4279* (FP); Mt. San Gorgonio. *Munz 6214* (NY, Po), *Crawford 900* (Po), *Blasdale in 1891* (UC), *Grinnell 24* (UC), *Lemmon* (UC), *Hall 7640* (NY), *7641* (UC), *Peirson 1979* (FP), *Peirson 4180* (FP), *Burlew 3568* (NY), *Abrams & McGregor 752* (NY, St, US), *Wright in 1879* (G), *J. & H. W. Grinnell 274* (US). Lower California: San Pedro Martir. *T. S. Brandegee in 1893*, type of *luteosericea* (NY, UC). Reported from San Antonio Mts. by Davidson & Moxley, Fl. So. Calif., 176. 1923, but we have seen no material.

12b. *Potentilla Wheeleri* var. *rimicola* n. var.

Potentilla Wheeleri of Brandegee, Zoe 4:205. 1893, probably this.

Branches and pedicels very slender; herbage usually green, glandular, with oily pubescence.

Known from the San Jacinto and San Pedro Martir Mts. It apparently inhabits rock-crevices and, with us, occurs in the lower part of the Subalpine Forest Climax at altitudes of 8,000 to 9,000 ft. Type: Dark Canyon, San Jacinto Mts., at 7,900 ft. alt., *Munz & Johnston 8764* (Pomona College Herbarium 43360). Other material from Riverside Co.: Tahquitz Peak, *F. M. Reed 2529* (UC); Mt. San Jacinto, *Kessler, Sept. 1, 1921* (D). Lower California: San Pedro Martir Mts., *T. S. Brandegee in 1892* (UC), *in 1893* (US).

13. *Potentilla saxosa* Lemmon; in Greene, Pittonia 1:171. 1888.

Horkelia saxosa Rydb., Monog., 155. 1898. *Potentilla rosulata* Rydb., Bull. Torrey Club 26:542. 1899. No. Am. Fl. 22:336. 1908. Davidson & Moxley, Fl. So. Calif., 177. 1923. *Potentilla acuminata* Hall, Univ. Calif. Pub. Bot. 1:86. 1902. Rydb., No. Am. Fl. 22:336. 1908. Davidson & Moxley, Fl. So. Calif., 177. 1923.

Low caespitose perennial, usually with thick woody root and caudex; stems few to several, leafy, slender, glandular-pubescent, 3-25 cm. high; lower stipules 5-15 mm. long, densely glandular-pubescent, the free tips lanceolate, 2-4 mm. long; cauline 3-10 mm. long, glandular-pubescent, lanceolate to ovate, subentire; leaves thick to thin in texture, pinnate; basal ones several, 5-15 cm. long; petioles 1-9 cm., finely to heavily glandular-pubescent, or almost oily viscid, 3-15 mm. long, cuneate-obovate to orbicular, strongly toothed to flabellate-dissected; cauline leaves reduced, commonly 3-5 foliolate, uppermost unifoliate and not greatly reduced; cymes leafy, few or many flowered; pedicels filiform, spreading, becoming 8-15 mm. long; hypanthium plate-shaped, 2-4 mm. broad; sepals ovate or ovate-triangular, acute, spreading, 2-3 mm. long; bractlets oblong, erect, 1.2-2 mm. long; petals oblong, white to ochroleucous, not surpassing sepals; stamens 20 to 40, borne about base of receptacle; filaments filiform; pistils 10 or more; receptacle glabrous or villous at base, achene bearing filiform-subulate style just below apex.

In dry rock-crevices in the lower portions of the Pinyon-cedar Association, along the western borders of the desert at scattered stations from Inyo Co. to Lower California. Inyo Co.: So. of Bishop, *Heller 8297* (G); Lone Pine. *Jones in 1897* (Po); Deep Spring Valley, *White Mts., Purpus 5813* (UC, US). San Bernardino Co.: Cactus Flat, San Bernardino Mts., *Peirson 4605* (FP, Po); Twenty-nine Palms, *Alverson in 1898*, type of *P. rosulata* (UC); Keyes Ranch, Little San Bernardino Mts., *Munz 4531* (Po), *Munz & Johnston 5248* (G, Po); Desert Queen Mine, *Jaeger 254* (Po), 446 (US); Garden of Gods, Little San Bernardino Mts., *Jaeger 429* (US). Riverside Co.: Chino Creek, *Hall 2605*, type of *P. acuminata* (UC). San Diego Co.: Walkers Ranch, near Jacumba, *Abrams 3686* (G, St, NY). Lower California: Cantillas Mts., *Orcutt in 1883* (FM, G, UC); Sierras de Campo National, *Orcutt in 1883* (G); All Saints Bay, *Orcutt in 1882* (G).

To *P. saxosa* we refer a rather variable aggregate, differing widely as to number of leaflets, depth of division in each leaflet, texture of leaves, and shape of bracts. The plants that have been referred to the three species *saxosa*, *acuminata* and *rosulata* show such an inextricable maze of variations without geographic correlation, as to make it quite evident that we are dealing with a highly variable single species. If we follow Rydberg's key (No. Am. Fl. 22:299. 1908) we would place in *saxosa* all the Lower California specimens cited above, and the Lone Pine collection by Jones; while to *rosulata*

would go the other plants, except Hall's type of *acuminata*, which is apparently a shade plant. But in all these, the variations in the several characters are not correlated and there are no clearly defined segregates.

14. *Potentilla multijuga* Lehm., Ind. Sem. Hort. Bot. Hamb. 1849:6. 1849.

Potentilla multijuga Lehm. Rev. Pot. 29. pl., 7. 1856. Rydb. Monog., Pot., 110, pl., 48. 1898. Bull. Torrey Club 23:434. 1896. No. Am. Fl. 22: 346. 1908. Wolf, Monog. Pot., 490. 1908. Abrams, Fl. L. A., 179. 1917 and 198. 1904. Davidson & Moxley Fl. So. Calif., 177. 1923. *Potentilla plattensis* of Davidson, Cat. Pls. L. A. Co., 8, 1896.

Perennial, with a taproot and almost no caudex; stems few, erect, 3-7 dm. high, slightly silky-strigose, somewhat leafy; lower stipules 2-2.5 cm. long, glabrous, with free lance-ovate tips 5-7 mm. long; cauline stipules, ovate, entire or toothed, 5-20 mm. long; leaves pinnate; basal leaves numerous, 1-3 dm. long; petioles 6-12 cm. long, glabrate; leaflets 11-27, sparsely strigose to glabrate, 1-4 cm. long, cuneate-obovate, with few coarse teeth above the middle; cauline leaves much reduced, few foliolate to simple; flowers in loose strict cymes; pedicels ascending, 10-30 mm. long; hypanthium 4-6 mm. broad, very sparsely pubescent; sepals oblong-ovate, acute, glabrate; bractlets ovate or elliptical, spreading; petals conspicuous, yellow, broadly obcordate, ca. 7 mm. long; stamens about 20, borne on disk close to base of receptacle, pistils numerous; styles subterminal, filiform.

Definitely known from a single station in our region, in a marsh west of Los Angeles, in the Coastal Sagebrush Association. Los Angeles Co.: Flats near Ballona, *Hasse 4950*, in 1890 (D, NY, US); moist meadow near Los Angeles, *Hasse in 1893* (NY); brackish meadow, near Los Angeles, *Hasse in 1891* (G, Mo).

- ✓ 15. *Potentilla Anserina* L., Sp. Pl., 495. 1753.

Potentilla Anserina L. Fernald, Rhodora 11:8. 1909. *Argentina Anserina* (L). Rydb., Monog. Pot., 159. 1898. Rydb. No. Am. Fl. 22: 353. 1908. Davidson & Moxley Fl. So. Calif., 177 1923, in part. *Argentina Anserina concolor* (Ser.) Rydb. Monog., 160. 1898. *Potentilla Anserina* var. *concolor* Ser. in DC. Prodr. 2:582. 1825. Parish, Pl. World 20:218. 1917.

Low perennial with cluster of fascicled roots and a short caudex bearing rosette of leaves and one or more pubescent stolons one to several dm. long; stipules of basal leaves 1-2 cm. long, with ovate to lanceolate, free hyaline tips 4-8 mm. long; stipules on stolons silky, ovate, lacerate into few sharp teeth; leaves pinnate, silvery-silky, especially below, upper surface often much the greener and almost glabrous; basal leaves spreading, 5-20 cm. long; petioles 1-5 cm. long, spreading silky-villous; leaflets 9-31, with smaller subsidiary ones interposed, 0.5-4 cm. long, oblong to oblong-lanceolate, deeply and sharply serrate; leaves on stolons much reduced; peduncles axillary, solitary, single flowered, about equaling leaves; hypanthium saucer-shaped; sepals ovate or ovate-oblong, acute; bractlets oblong, about equaling sepals; petals very conspicuous, obcordate, 8-12 mm. long, yellow; stamens ca. 20, closely arranged about base of receptacle; filaments subulate, somewhat dilated; pistils very numerous; styles filiform, lateral; achenes very plump, corky, deeply dorsally grooved.

Known in our region only from the San Bernardino Mts., where it grows in moist alkaline soil, about Bear and Baldwin Lakes, at elevations of about 6,500 ft., in the Montane Forest Climax. San Bernardino Co.: Bear Lake, *Munz 5712* (Po); Baldwin Lake, *Johnston in 1924* (Po), *Peirson 4593* (FP); San Bernardino Mts., *Hall 1034*

(UC); Bear Valley, *Harwood* 4337 (Po), *Jones in 1900* (Po), *Parish 1499* (Mo, St, US), *Parish 3154* (Mo, US). The last four collections named are silky-strigose above as well as below and belong to the variety *sericea* Hayne (Fernald, *Rhodora* 11:8. 1909).

16. *Potentilla pacifica* Howell. Fl. N. W. Am. 1:179. 1898.

Potentilla pacifica Howell, Fernald, *Rhodora* 11:8. 1909. *Argentina Anserina* of Davidson, Cat. Pls. L. A. Co., 8. 1896. Davidson & Moxley, Fl. So. Calif., 177. 1923, in part. Of Abrams, Fl. L. A., 199. 1904 and 180. 1917. Yates, 9th Rep. State Mineralogist of Calif., 15. Greene, *Pittonia* 1:80 & 87. 1887. Brandegee *Zoe* 1:136. 1890.

Similar to *Anserina*, but with stolons, petioles, rachises and peduncles glabrous or glabrate; leaves suberect, 0.3-5. dm. long, with 7-31 oblong, oblanceolate, or obovate leaflets, green above, white-tomentose to glabrate beneath, the pubescence when present being opaque and dull and not lustrous nor sericeous; achenes less plump, not corky nor grooved.

Apparently confined to coastal marshes where it may be locally frequent, but has been seldom collected. In the Coastal Sagebrush Association, San Luis Obispo Co.: San Luis Obispo, *Jones in 1883* (Po); Pismo Beach, *Peirson 1983* (FP); Arroyo Grande, *Alice King in 1895* (UC); Morro, *Barber* (UC). Ventura Co.: Oxnard, *Davy 7807* (UC). Los Angeles Co.: Near Santa Monica, *Barber 131* (UC); Los Angeles Co., *Grant 6313* (St); Los Angeles, *High School collectors in 1904* (Po); Ballona Creek, Mesmer, *Abrams 1463* (St); Ballona, *Johnston 1336* (Po, St) *Braunton 455* (St, UC, US); Playa del Rey, *Abrams 2519* (NY, Ph, St); Cienega near Los Angeles, *Blake 853* (Ph); Cienega, L. A. Co., *Braunton 110* (US).

17. *Potentilla Sibbaldi* Hall. fl. in Ser. Mus. Helv. 1:51. 1818.

Sibbaldia procumbens L., Sp. Pl., 284. 1753. Munz, Bull. So. Calif. Acad. 23:129. 1924. Not *Potentilla procumbens* Sibth. 1794.

Perennial, frequently matted, caespitose or with elongate, scaly rootstocks; flowering stems not over 1 dm. high, strigose, few leaved; lower stipules glabrate, ca. 1 cm. long, the free portion ovate, ca. 3-5 mm. long; cauline stipules 4-8 mm. long, ovate to lance-ovate, glabrate; leaves trifoliate, appressed-pilose; lower ones 1-7 cm. long; petioles 0.5-5 cm. long, strigosely pubescent; leaflets 1-2 cm. long, cuneate, 3-5 toothed at apex; stem leaves similar but on shorter petioles; flowers borne in small congested, flat-topped cymes somewhat projected above the foliage; pedicels 1-4 mm. long, stiffish; hypanthium deeply saucer-shaped, strigose, 2-3 mm. broad; sepals erect, oblong or obovate, obtusish, becoming 3-4 mm. long; bractlets linear-oblong, ca. 3 mm. long; petals yellowish, spatulate or obovate, shorter than sepals; stamens 5, insertion on disk separated from receptacle; filaments filiform; anthers obcordate, dehiscent by well developed lateral slits; pistils 5-20; styles lateral, filiform.

Known in our range from a single collection in the Subalpine Forest Climax of the San Bernardino Mts., at 9,000 ft. alt. San Bernardino Co.: Foxesee Creek, *Peirson 3492* (FP, Po).

18. *Potentilla glandulosa* Lindl., Bot. Reg. 19: pl. 1583. 1833.

Perennial; stems one to several, suberect, fairly coarse, 2-8 dm. high, leafy, forking above, densely glandular- or viscid-villous, generally reddish; lower stipules adnate for 0.5-3 cm., free tip lanceolate 2-4 mm. long, glandular-pubescent; upper stipules free, ovate, 3-10

mm. long, often toothed; leaves pinnate, sparsely long-pubescent, glandular, strongly bi-colored, being dark green above; lower ones 5-9 foliolate, 1-3 dm. long; petioles 1-15 cm. long, viscid-villous to glandular-pubescent; leaflets 5-40 mm. long, obovate to rhombic, serrate, often doubly so, teeth mucronate; terminal leaflets larger almost orbicular; upper leaves 3-5 foliolate, somewhat reduced, short petioled or sessile; flowers in an open cyme; pedicels 2-6 mm. long; hypanthium cup or saucer-shaped, becoming 4-8 mm. broad; sepals erect or spreading, oblong-ovate to ovate, acute; bractlets oblong, obtuse, usually conspicuous; petals conspicuous, yellow or cream colored and conspicuously veined; stamens ca. 25, borne close about base of receptacle; filaments filiform; pistils numerous; style suprabasal, fusiform, verrucose.

Key to varieties of *P. glandulosa*.

Coarse, generally exceeding 3 dm. high; inflorescence conspicuously leafy; of low altitudes.....*P. glandulosa* var. *genuina*.
Slender, generally less than 3 dm. high; inflorescence frequently not leafy; of pine belt.....*P. glandulosa* var. *reflexa*.

18a. *Potentilla glandulosa* var. *genuina* Wolf, Monog. Pot., 136. 1908.

Potentilla glandulosa Lindl., Bot. Reg., 19: pl. 1583. 1833. Davidson, Erythea 2:30. 1894. Brewer & Wats., Bot. Calif., 1:178. 1876. Davidson, Cat. Pls. L. A. Co., 8. 1896. List Pls. L. A. Co., 5. 1892. McClatchie, Fl. Pasadena, 638. 1895. *Drymocallis glandulosa* (Lindl.) Rydb., Monog., 198. pl. 107. 1898. No. Am. Fl. 22:372. 1908. Abrams, Fl. L. A., 204. 1904 and 180. 1917. Davidson & Moxley, Fl. So. Calif., 178. 1923. Millsbaugh & Nuttall, Field Mus. Pub. Bot. 5:129. 1923. *Potentilla arguta* var. *glandulosa* (Lindl.) Cockerell, W. Am. Sci. 5:11. 1888. *Potentilla Wrangelliana* Fisch. & Avé-Lall. Ind. Sem. Hort. Petrop. 7:54. 1840. *Drymocallis Wrangelliana* (Fisch. & Avé-Lall.) Rydb., Monog., 201. pl. 108. 1898. No. Am. Fl. 22:374. 1908. Parish, Pl. World 20:218. 1917. Davidson & Moxley, Fl. So. Calif., 178, 1923. *Potentilla glandulosa* var. *Wrangelliana* (Fisch. & Avé-Lall.) Wolf. Monog. Pot., 137. 1908.

A fairly coarse plant, generally over 3 dm. high, with reddish stems; inflorescence conspicuously leafy.

Frequent in cool shaded places in the Coastal Sagebrush and Chaparral Associations, on low hills and in lower canyons of the mountains. Usually associated with *Quercus agrifolia* and *Q. chrysolepis*. Confined to the coastal drainage, where it is most common and characteristic below 4,000 ft. alt. Santa Barbara Co.: Loma Alta, Parish 11036 (St); Lompoc, Suksdorf 177 (G); Carpenteria, Brewer 260 (G, US); Santa Barbara, Elmer 3921 (Mo, NY, St, US), Grant 5481 (St). Ventura Co.: Sulphur Mt. Spring, Sulphur Mts., Abrams & McGregor 54 (NY, St, US); Ojai, Peckham in 1866 (UC, US), Hubby 9 (UC). Los Angeles Co.: No locality, Hasse 3752 (NY), Hasse in 1892 (NY), in 1891 (Mo), Grant 2475 (NY); Topanga Canyon, Santa Monica Mts., Munz & Harwood 3982 (Po); Griffith Park, Los Angeles, Macbride & Payson 399 (G), Braunton 543 (US); Los Angeles, Davidson in 1891 (St); Altadena, McClatchie in 1893 (NY); Arroyo Seco, Greata 313 (UU); Oak Knoll, Grant 325 (Mo, Ph), Braunton 83 (US); Pasadena, Grant 6179 (St); Sturtevant's Camp, Grant 4468 (St); Hennigers Flats, Peirson 4276 (FP); Laurel Canyon, Peirson 696 (FP); Sierra Madre, Nevin 930 (G); Turnbull Canyon, Johnston 1894 (NY, Po, St); Puente Hills, Munz 2182 (Po); Live Oak Canyon, Shaw in 1900 (Po); Lone Hill near San Dimas, Parish 19266 (G, UC), Munz, Street & Williams 2493 (Po); Claremont, Crawford in 1915 (Po, US), Robinson in 1916 (Po). Orange Co.: Laguna Beach, Johnston 1893 (NY, Po). San Bernardino Co.: San Bernar-

dino, *Parish* 4471 (G, NY, St, Mo), *Parish* 4777 (NY, St, US); Canyon Diablo, *Parish* in 1898 (NY), 11902 (UC), 4471 (FM, US, NY); San Bernardino Mts., at 3,000 ft., *Parish* 6376 (UC); Foothills, San Bernardino Mts., *Parish* 291 (St, US); Foothills San Bernardino Co., *Parish* in 1888 (FM); Waterman Canyon, *Parish* 11391 (Po, UC). Riverside Co.: Temecula, S. B. & W. F. *Parish* 803 (G); Temecula Canyon, *Johnston* 1873 (NY, Po); Hemet Valley, *Munz & Johnston* 5534 (Po); San Juan Road near Elsinore, *Bacr* in 1921 (Po), San Diego Co.: San Luis Rey River, *Orcutt* in 1882 (FM); Pala Canyon, *Parish* 4517 (NY); Fallbrook, *Cleveland* in 1881 (UC), *Hall* 508 (UC); Descanso, T. S. *Brandege* in 1906 (UC), *Spencer* 2286 (G), *Spencer* 2287 (G); Mesa Grande, *Spencer* 1332 (G, Po); Julian, T. S. *Brandege* in 1894 (UC), *Orcutt* in 1889 (Mo); Spencer Valley, *Abrams* 3793 (G, Mo, St, NY); Cuyamaca Mts., *Hall* in 1899 (UC); Campbells Ranch, Laguna, *Mearns* 3534 (St. US); Green Valley, near San Diego, *Collins & Kempton* 142 (US); San Diego, *Spencer* 128 (G, UC, US); Alpine, *Mearns* 3947 (US); Canyon de los Negros, S. B. & W. F. *Parish* 783 (US); San Miguel Mt., *Chandler* 5216 (NY, St); Campo, *McGregor* 2077 (St). Lower California: No. Low. Calif., *Orcutt* in 1885 (UC); San Pedro Martir, T. S. *Brandege* in 1893 (UC).

Such plants as *Abrams* 3793, the *Hall* specimen from the Cuyamacas, the *Brandege* collections at Julian and in the San Pedro Martir are from intermediate altitudes and are very difficult to place definitely. They are quite intermediate between var. *genuina* and var. *reflexa*.

Glandulosa and *Wrangelliana* are recognized as two distinct species by Rydberg and as a species and variety by Wolf on the basis of narrow sepals and bright yellow flowers for *glandulosa*, and broader sepals and whitish flowers for *Wrangelliana*. The former, as figured in Lindley's plate does have narrow sepals and yellow flowers and is based on material collected by Douglas in California. Material at the Gray Herbarium collected by Douglas does not sustain these distinctions.

18b. *Potentilla glandulosa* var. *reflexa* Greene, Fl. Fran., 65. 1891.

Potentilla glandulosa var. *reflexa* Greene, Wolf, Monog., 138. 1908. *Potentilla reflexa* Greene, Pittonia 3:19. 1896. *Drymocallis reflexa* (Greene) Rydb., Monog., 203, pl. 110. 1898. No. Am. Fl. 22:376. 1908. *Parish*, Pl. World 20:218. 1917. *Drymocallis viscida* *Parish*, Bot. Gaz. 38:460. 1904. Rydb. No. Am. Fl. 22:375. 1908. Davidson & Moxley, Fl. So. Calif., 178. 1923. *Parish*, Pl. World 20:218. 1917. *Johnston*, Pl. World, 22:105. 1919. *Potentilla glandulosa* var. *nevadensis* of *Hall*, Univ. Calif. Pub. Bot. 1:87. 1902. *Potentilla glandulosa monticola* of *Abrams*, Fl. L. A., 200. 1904 and 178. 1917. *Drymocallis monticola* of *Davidson & Moxley*, Fl. So. Calif., 178. 1923 and *Parish*, Pl. World 20:218. 1917.

A rather slender plant, generally not exceeding 3 dm. in height, with reddish stems, highly glandular; inflorescence scarcely leafy.

Frequent in half moist places in all our mountains from 5,000 to 8,500 ft. alt., in the Montane Forest Climax. Ventura Co.: North Creek, Mt. Pinos, *Hall* 6464 (UC); Saw Mill Mt., Mt. Pinos, *Hall* 6524 (UC); Trail to Zaca Peak, *Eastwood* 591 (US); Side of Alamo Peak, Mt. Pinos region, *Dudley & Lamb* 4650 (Po, St); Liebre Mts., *Abrams & McGregor* 371 (NY, St, US); Topatopa Mts., *Abrams & McGregor* 95 (NY, St, US). Los Angeles Co.: Mt. Wilson, *Abrams* 2585 (Mo, Ph, NY, St); Acton, *Hasse* 6046 (NY); Prairie Fork, San

Gabriel River, *Johnston* 2072 (UC), 2068 (Po, St, UC); Browns Flats, San Gabriel Mts., *Johnston* 1753 (NY, Po, St, UC). San Bernardino Co.: Swartout Valley, San Gabriel Mts., *Munz* 4599 (NY, Po), *Peirson* in 1922 (FP, Po); Icehouse Canyon, *Parish* 11946 (UC), *Johnston* in 1918 (Po), Coldwater Fork, Lytle Creek, *Johnston* 2062 (Po, St); Head of San Antonio Canyon, *Johnston* 1410 (UC). San Bernardino Mts., *Blasdale* in 1891 (UC), *Parish* 3163 (Mo, US); Little Green Valley, San Bernardino Mts., *G. R. Hall* 7 (UC); Strawberry Peak, *Parish* 2364 (NY, UC); Snow Canyon, Mill Creek, *Parish* 5060 (NY, St, UC, US); Mill Creek Canyon, *Crawford*, *July* 2 (Po); Camp Vivian, *Grant* 6347 (St); Deep Creek, *Parish* 5806 (NY); So. Fork, Santa Ana River, *Munz* 6258 (Po), *Hall* 7516 (NY, Po, UC), *J. & H. W. Grinnell* 230 (US). Riverside Co.: San Jacinto Mts., *Hall* 719 (US); Strawberry Valley, *Hall* 2204 (Mo, NY, St, UC, US), *Hasse* 5689 (NY), *Hall* 2039 (UC); Idyllwild, *Spencer* 2173 (Po), 2198 (Po), 1861 (Po), 1862 (Po); North side of San Jacinto Mts., *Hall* 2546 (UC). San Diego Co.: Palomar Mt., *Chandler* 5350 (NY), *Parish* 4406 (FM, Mo, NY, St, US); Cuyamaca, *Hitchcock* in 1915 (US); 3 mi. so. of Cuyamaca Lake, *McGregor* in 1918 (St); Laguna Mts., *T. S. Brandegees* in 1904 (UC).

19. *Potentilla Hansenii* Greene, *Pittonia* 3:20. 1896.

Drymocallis Hansenii (Greene) Rydb., *Monog.*, 200. 1898. No. Am. Fl. 22:373. 1908. *Parish*, *Pl. World* 20:218. 1917. Davidson & Moxley, *Fl. So. Calif.*, 178. 1923. *Potentilla lactea* Greene, *Pittonia* 3:20. 1896. *Hall*, *Univ. Calif. Pub. Bot.* 1:88. 1902. *Potentilla glandulosa lactea* Greene, *Fl. Fran.*, 65. 1891. *Potentilla glandulosa nevadensis* Wats., *Bot. Calif.* 1:178. 1876. *Drymocallis lactea* (Greene) Rydb., No. Am. Fl. 22:369. 1908. *Johnston*, *Pl. World* 22:105. 1919. Davidson & Moxley, *Fl. So. Calif.*, 178. 1923. *Potentilla rupestris* var. *americana* Wolf, *Monog.*, 129. 1908.

Perennial; stems suberect, one to several, slender, light green, glabrate or finely pubescent, inconspicuously if at all glandular, branching above; stipules of lower leaves not generally exceeding 1 cm., pilose-pubescent, free tips ca. 3 mm. long, ovate to ovate-acuminate; upper stipules reduced, ovate to lanceolate, frequently toothed; leaves pinnate, sparsely pubescent and little glandular, light green, not strongly bicolored; lower leaves 5-9 foliolate, 4-15 cm. long; petioles 1-7 cm. long, glabrate or puberulent; leaflets obovate to almost orbicular, 5-15 mm. long, often deeply and sharply serrate, terminal frequently larger, obovate to suborbicular; upper leaves reduced, uppermost trifoliate; leaflets narrower and acuminate, almost lacking in the loose cymose inflorescence; hypanthium saucer-shaped, silky, strigose, becoming 6 mm. broad; sepals erect, lanceolate or oblong-lanceolate; bractlets small, lanceolate or linear; petals white, ochroleucous, or cream-colored, obovate, about equalling sepals; stamens ca. 25, borne near base of receptacle; filaments filiform; pistils numerous; styles suprabasal, fusiform, verrucose.

Frequent in So. Calif. from Mt. Piños to San Jacinto Mts.; growing about meadows and in fairly moist spots at from 5,000 to 9,000 ft. alt. in the Montane Forest Climax. Ventura Co.: Near Cuddys, Mt. Pinos, *Dudley & Lamb* 4484 (Po, St); Griffins, *Elmer* 3978 (Mo, NY, St, UC, US). Los Angeles Co.: Prairie Fork, San Gabriel River, *Johnston* 2066 (Po, St, UC), *Peirson* 2678 (FP); Big Pines, Swartout Valley, *Hall* 1572 (St), *Peirson* 5249 (FP, Po). San Bernardino Co.: Meadows above Bear Valley, *Hall* 7562 (NY, UC); Green Valley, *Shaw & Illingsworth* 206 (NY); Dry Lake, *Hall* 7613 (NY, UC); Little Bear Valley, *Parish* 10946 (St); Hunsaker Flats *Munz & Johnston* 2859 (Po, St); Bluff Lake, *Peirson* 5250 (FP), Riverside Co.: Tahquitz Meadow, *Spencer* 1372 (NY), *Hall* 2355 (Mo,

NY, St, UC, US), *Munz 5987* (Po), *Jaeger in 1921* (Po); Long Valley, *Jaeger in 1921* (Po); San Jacinto Mts., *A. W. Anthony in 1895* (UC); Tamarack Valley, *Hall 2400* (UC).

20. *Potentilla cuneifolia* (Rydb.) Wolf. Monog., 139. 1908.

Drymocallis cuneifolia Rydb., Monog., 204. pl. 111. 1898. No. Am. Fl. 22:376. 1908. Parish, Pl. World 20:218. 1917. Davidson & Moxley, Fl. So. Calif., 178. 1923.

Perennial; stems one to few, erect, slender, branching above, 1-4 dm. high, glabrate to sparsely glandular-villous, especially below; lower stipules 0.5-1.5 cm. long, free tips 3-5 mm. long, ovate; upper stipules smaller, ovate, mostly toothed; leaves pinnate, not bicolorated, glabrate to almost silky and glandular; lower leaves 5- to 11-foliolate, 3-20 cm. long; petioles 1-10 cm. glabrate to villous glandular; leaflets 5-20 mm. long, cuneate-flabelliform, with coarse teeth mostly at the apex; upper leaves 3-foliolate, reduced, sessile, almost lacking in the loose corymbose cyme; hypanthium cupulate, becoming 4-5 mm. broad; sepals ovate or deltoid ovate, erect; bractlets minute, oblong, erect; petals yellow, erect, obovate, only a little exceeding sepals, 4-5 mm. long; stamens ca. 20, borne close about base of receptacle; filaments filiform; pistils numerous; styles filiform, several times length of achene.

A little known species, apparently confined to the desert slopes of the mountains south of the Mohave Desert and known from the very lower part of the Montane Forest Climax. Los Angeles Co.: Mt. Islip, *Peirson 2801* or *493a* (Po, FP); South Fork, Rock Creek, *Peirson 493* (FP, Po). San Bernardino Co.: Green Lead Mine, San Bernardino Mts., *Parish 1818*, type collection (FM, G, NY).

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BULLETIN of the SOUTHERN CALIFORNIA
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Bulletin of the
Southern California Academy of Sciences

Began issue with Vol. I, No. 1, January, 1902. Issued ten numbers in 1902, nine numbers in 1903, 1904, 1905; three numbers in 1906. Issued two numbers annually from 1907 to 1919, both inclusive (except 1908—one issue only). Issued four numbers (January, May, July and October) in 1920.

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