A FLORA OF TASSAJARA

Volume One: The Complete Text

By David Rogers

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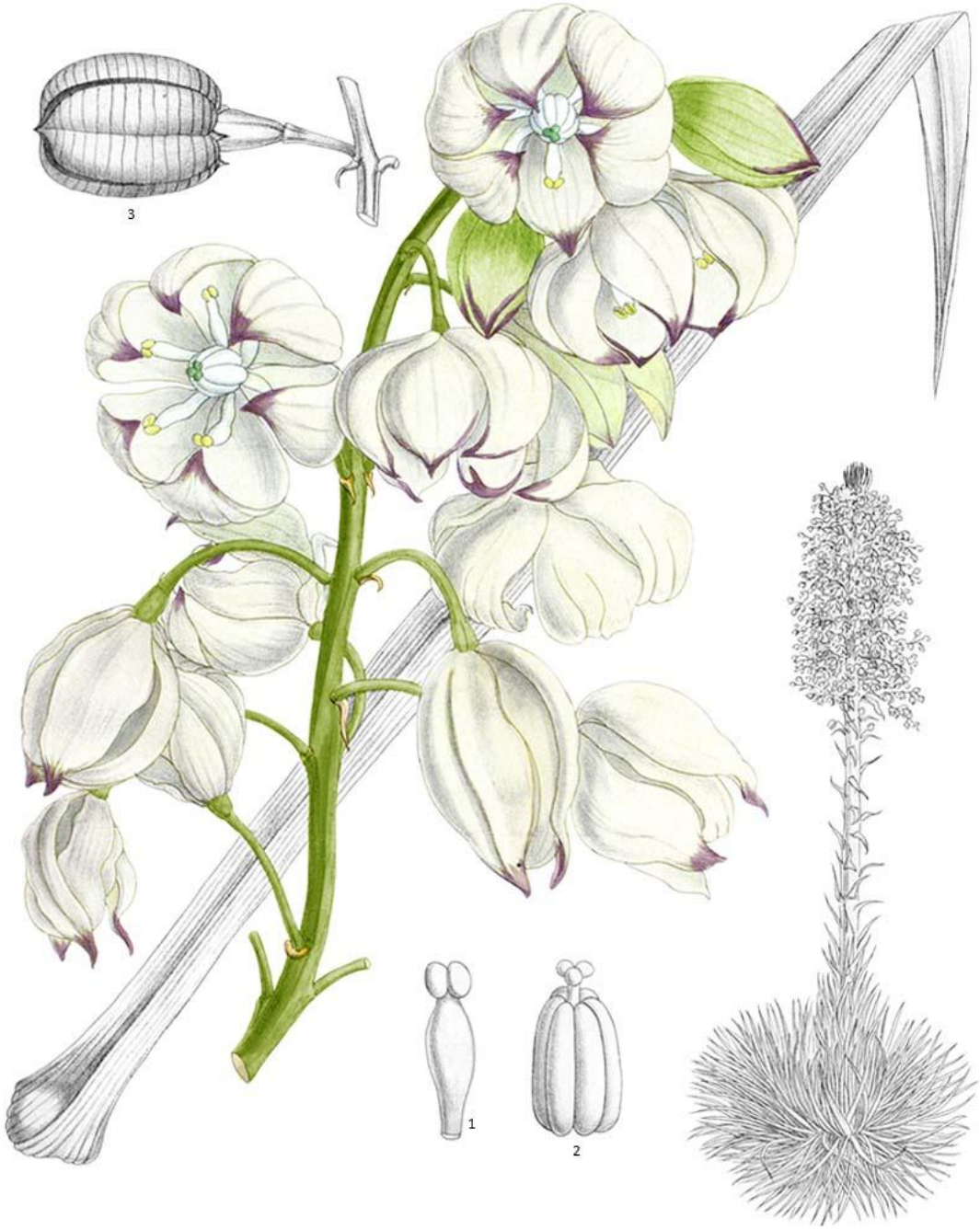
THE VASCULAR PLANTS OF THE TASSAJARA REGION OF THE VENTANA WILDERNESS, MONTEREY RANGER DISTRICT OF LOS PADRES NATIONAL FOREST, SANTA LUCIA MOUNTAINS, MONTEREY COUNTY, CALIFORNIA.

A completely revised second edition that includes 96 additional taxa.

Volume One: The Complete Text



By David Rogers

On the cover:
Foothill Penstemon (*Penstemon heterophyllus).*
J. R. Guillot, delineator, J. H. Goffart, sculptor.
Revue Horticole volume 1901, year 1901.

On the title page:
Chaparral Yucca (*Hesperoyucca whipplei*).
Harriet Thiselton Dyer, delineator.
Curtis' Botanical Magazine volume 125, 1899.

CONTENTS

Beyond the division level, plant families are arranged alphabetically, as are the genera of the families and the species of the genera.

SYMBOLS

+: species or lesser taxa (subspecies and varieties) that were not included in the first edition of this text.
●R: range of distribution.
●H: habit of growth.
e: species or lesser taxa that are endemic to the Santa Lucia Mountains.
∨: species or lesser taxa that reach their most southern distribution in the Santa Lucia Mountains.
∧: species or lesser taxa that reach their most northern distribution in the Santa Lucia Mountains.
<>: species or lesser taxa that have populations in the Santa Lucia Mountains that are greatly disjunct from the nearest populations.
❀: flowering period.
!: species that manifested themselves on a grand scale during the first spring after the Basin Complex Fire of 2008.

In the discussions of individual species texts, scientific names that are in bold **Times New Roman** indicate native species, while those that are standard Calibri indicate introduced species.

VASCULAR PLANTS

Vascular plants differ from the other (and usually much smaller) manifestations of terrestrial plants, such as the mosses (*Bryophytes*), hornworts (*Anthocerotophytes*) and liverworts (*Marchantiophytes*), in having xylem, cells that transport water and some nutrients, and phloem, living tissue that transports soluble nutrients to other parts of the plant, in particular, sucrose (sugar). They are thus able to attain much greater sizes than non vascular terrestrial plants.

A DICHOTOMOUS DIAGNOSTIC KEY TO THE DIVISIONS AND FAMILIES OF VASCULAR PLANTS IN THE TASSAJARA REGION. p. 1

1a. Plants that reproduce by one celled spores (ferns, horsetails, moss ferns):
- **2a**. Moss like plants with trailing, ascending or erect stems. The nearest equivalents to leaves are small scale like formations that are spirally arranged on the stems. Spores are produced in the axils of specialized scales that are terminal on the stems (sporophylls) . . . . . ***Lycopodiophyta***.
- **2b**. Plants with erect, ascending or arching stems or leaves. Leaves well developed or not. Spores are produced on the lower leaf surfaces or in terminal cone like structures (ferns and horsetails). . . . . ***Pteridophyta***.

1b. Plants that reproduce by seeds, and thus male and female reproductive formations are manifested:
- **3a**. Coniferous trees, i.e., trees which lack true flowers. Ovules are naked and produced on the inner surface of (usually) spirally arranged pistillate (female) scales. Fertilization occurs on contact with air borne pollen from staminate (male) catkins. The pistillate scales enlarge and become woody with age, forming a cone or similar structure. Pollen is transported by air. . . . . ***Pinophyta***.
- **3b**. Flowering plants, i. e., broadleaf trees, shrubs, and herbaceous plants (including grasses and glasslike plants) with true flowers. Ovules are in enclosed in ripening pistils (ovaries). Fertilization occurs with contact of pollen with specialized receptive (usually terminal) organs (stigmas) which send pollen grains to the ovary. Pollen is transported by air, insects or birds. . . . . ***Anthophyta***. (the Angiosperms).
  - **4a**. Germinating embryos with two opposing cotyledons (generally leaf like and often food supplying structures). The leaves are rarely grass like, and they typically have a pinnately or palmately branched vein structure, with capillary veins netted between the larger veins. Trunks or branches of tree or shrub species developing concentric rings with each year's growth, and thus widening the girth. Outer flower parts (calyces & corollas), if present, are mostly lobed or divided in four's, five's, or more. Broadleaf trees, shrubs, and perennial and annual herbaceous plants (the Dicotyledons):
    - **5a**. Aromatic trees or large shrubs with six yellow petal like sepals that are spirally arranged in 3's. Stamens spirally arranged in 3's; pollen aperture one. *Umbellularia californica* (California Bay Laurel) . . . . . ***Magnoliidae***.
    - **5b**. Trees, shrubs, and perennial and annual herbs with the flower parts generally arranged in 4's or 5's. Pollen apertures 3 or more. . . . . ***Eudicotyledons***.
  - **4b**. Germinating embryos with one cotyledon. Leaves most typically elongated and more or less glasslike, and with a parallel vein structure. Outer flower parts (perianth segments) are singular, dual, or arranged in one or more series of three's. Trunks or branches of tree or shrub like plants are not truly woody and do not develop true bark, the "wood" is either fibrous and/or pithy and does not develop growth rings (such as in palm, banana, and Joshua trees), or is hard and tubular in shape, and solid only at the nodes (as in the bamboos of the Grass Family). Grasses, sedges, rushes, cat tails, lilies, orchids, irises, etc. . . . . ***Monocotyledons***.

LYCOPODIOPHYTA (Lycophytes):

Lycopodiophyta is represented in the Tassajara region by one family that has only one genus. . . . . ***Selaginellaceae***.

PTERIDOPHYTA. Ferns.

1a. Reed like plants with hollow stems. The nearest equivalents to leaves are scale or sheath like formations that are produced at the nodes, or slender reed like structures that are produced in whorls at the nodes. The spores are produced in cone like structures that are terminal on the fertile stems. Horsetails. . . . . ***Equisetopsida***.

1b. Plants without hollow stems. Leaves well developed. The spores are produced from sori (sporangia clusters) on the lower surface of the leaf blades. Ferns. . . . . ***Polypodiopsida***.

EQUISETOPSIDA (EUSPORANGIATE FERNS):

Equisetopsida is represented in the Tassajara region by one family that has one genus. . . . . ***Equisetaceae*** (*Equisetum*).

POLYPODIOPSIDA (LEPTOSPORANGIATE FERNS):

1a. Sporangia hidden under the reflexed margins of the leaf segments. . . . . ***Pteridaceae*** (*Adiantum, Myriopteris, Pellaea*).

1b. Sporangia fully exposed or covered by indusium (a membranous tissue):
- **2a**. Sporangia covered by indusium (the indusium shriveling in maturity):
  - **3a**. Sori elongated and slightly curved. . . . . ***Blechnaceae***.
  - **3b**. Sori round or horse shoe shaped:

4a. Hardy ferns with evergreen fronds ranging from about 3 to 10+ dm. long. . . . . ***Dryopteridaceae***.
4b. Small and delicate ferns with dry season deciduous fronds usually less than 3 dm. long (ours). . . ***Cystopteridaceae***.
2b. Sporangia not covered by indusium:
5a. Sporangia not clustered into distinct sori, but scattered near the margins or along major veins:
6a. Fronds mostly 4 to 20 dm. (16-80") long. Stipes (petioles) stout, light colored, and not glossy. . ***Dennstaedtiaceae***.
6b. Fronds mostly 1 to 4 dm. (4-16") long. Stipes slender, dark, and glossy. . . . . ***Pteridaceae*** (*Pentagramma*).
5b. Sporangia clustered into distinct sori:
7a. Sori round and produced in two parallel rows. . . . . ***Polypodiaceae***.
7b. Sori irregularly shaped and produced at the apex of major veins. . . . . ***Pteridaceae*** (*Aspidotis*).

PINOPHYTA (GYMNOSPERMS, CONIFEROUS TREES):

1a. Leaves opposite, branched, and comprised of numerous flat scale like segments. . . . . ***Cupressaceae***.
1b. Leaves alternate, often in bundles, not branched, and narrowly linear to narrowly oblong. . . . . ***Pinaceae***.

ANTHOPHYTA (ANGIOSPERMAE, FLOWERING PLANTS):

MAGNOLIIDAE (MAGNOLIIDS):

Magnoliidae is represented in the Tassajara region by one family and one species. . . . . ***Lauraceae***.

EUDICOTYLEDONS (EUDICOTYLEDONEAE, EUDICOTS):

1a. Flowers produced in flower heads that resemble a single flower. The flowers are sessile on a common receptacle that bears few to usually many (and often minute) flowers. The receptacle is usually surrounded by one or more whorls of involucre bracts (phyllaries). The ovaries are inferior and are frequently crested with scale or bristle like segments (pappus). The corollas are either tubular at the base and strap like above (a ligulate or ray corolla), or tubular below and lobed at the apex (a tubular or discoid corolla). The flower heads may be comprised entirely of ligulate flowers (a ligulate head), entirely of tubular flowers (a discoid head), or of both ray and tubular flowers (a radiate head); in such flower heads the ligulate flowers are situated at or near the parameters of the receptacle and resembling petals. Anthers are united into a tube surrounding the style. Represented in the Tassajara region by 47 genera and 73 species. . . ***Asteraceae***.
1b. Flowers not produced in true flower heads. If produced in head like clusters, the flowers are not borne on a common receptacle, and if the flowers have corollas, they also have calyces:
2a. Corollas absent. Calyces (if present) are often green, but they are corolla like in color and texture in some species (some species also have involucres that are corolla like in color and/or texture) . . . . . GROUP ONE.
2b. Corollas present, but they may be very minute or shed early in some species:
3a. Corollas divided to the base into distinct petals, or some petals free and others partly united. . . . . GROUP TWO.

3b. Plants in which the corollas are united at the base. In some the corollas are united only at the very base, while in others the corollas are united into a tube, ring, bowl or disk like formation for much to nearly all of their length. . . . GROUP THREE.

GROUP ONE. COROLLAS ABSENT.

The calyces and/or involucres may be corolla like in color and/or texture in some species.

1a. Small parasitic plants that occur on the branches and stems of pine trees. As the plants lack chlorophyll, they are not green, and the leafless stems are comprised of jointed scale like segments. . . . . ***Viscaceae*** (*Arceuthobium*).
1b. Plants that are not in any way like the above. If the plants are parasitic, they are small shrubs that have green leaves, and they do not occur on pine trees:
2a. Leaves strictly basal. . . . . ***Polygonaceae*** (*Systenotheca* & some species of *Eriogonum* & *Chorizanthe*).
2b. Leaves not strictly basal:
3a. Leaves opposite or mostly opposite (some may be whorled in 3's or more in some species):
4a. Shrubs that are not vine like or parasitic on other plants. The flowers are produced in dangling catkins. . . . . .
4b. Herbaceous plants, parasitic shrubs, and vines or vine like plants:
5a. Parasitic shrubs that occur on the branches and stems of trees or shrubs. The fruits are white berries. . . . . ***Viscaceae*** (*Phoradendron*).
5b. Plants that are not parasitic. The fruits are not berries:
6a. Vines or vine like plants:
7a. Perennial vines with woody lower stems. The leaves are divided into 3 to 7 petiolate leaflets. . . . . .

Ranunculaceae (*Clematis*).

7b. Prostrate annual herbs. The leaves are obcordate (heart shaped) to fan shaped or roundish and usually notched at the apex. . . . . ***Polygonaceae*** (*Pterostegia*).

6b. Erect or mound forming annual and perennial herbs:

8a. Mound forming annual herbs. These are strongly aromatic gray-green plants that are xerophytic, and thus most of the growth occurs during the dry season. . . . . ***Euphorbiaceae*** (*Croton*).

8b. Erect annual and perennial herbs:

8a. Leaves with deeply serrate margins. The stems are 4 angled and are armed with needle like bristles that inject a painfully stinging fluid upon contact with the skin. Nettles. . . . . ***Urticaceae***.

8b. Leaves with entire to crisped or finely toothed margins. The stems are round and are not armed with stinging bristles:

9a. Flowers produced in the axils of leaves. The flowers have staminate and pistillate sections; the stalked pistillate section is positioned above the staminate section. . . . . ***Euphorbiaceae*** (*Euphorbia*).

9b. Flowers produced in terminal or lateral clusters or in terminal panicles or spikes. The flowers are normal (they have both stamens and pistils) . . . . . ***Polygonaceae*** (*Chorizanthe* & *Eriogonum*).

3b. Leaves alternate or mostly alternate (in some species the basal leaves are produced in rosettes):

10a. Annual and perennial herbs:

11a. Leaf blades 1 to 4 times ternately divided into leaflets. Stamens 8 to many, pistils 2 to 20. Plants which are restricted to wet or seasonally wet habitats. . . . . ***Ranunculaceae*** (*Thalictrum*).

11b. Leaf blades simple or pinnately divided into lobes or leaflets. Stamens 1 to 9, pistils 1. Plants which are, for the most part, not restricted to wet or seasonally wet habitats (the exceptions are in *Datiscaceae* and *Polygonaceae* (*Persicaria*):

12a. Blades of larger leaves pinnately divided into lobes or leaflets:

13a. Perennial herbs with erect or ascending stems ranging from about 7 to 10 dm. (28-72") tall. Flowers produced in the axils of the leaves. Ovaries inferior. . . . . ***Datiscaceae***.

13b. Annual herbs with prostrate or ascending stems ranging from about .5 to 2 dm. (2-8") long. Flowers produced in crowed terminal racemes. Ovaries superior. . . . . ***Brassicaceae*** (*Lipidium*).

12b. Leaves simple; the margins range from entire to sharply toothed, shallowly lobed or crisped:

14a. Flowers produced in the axils of leaves. The flowers have staminate and pistillate sections; the stalked pistillate section is positioned above the staminate section. . . . . ***Euphorbiaceae*** (*Euphorbia*).

14b. Flowers produced in terminal or lateral clusters, in terminal panicles, or in terminal or lateral spikes. The flowers are normal (they include both stamens and pistils):

15a. Flowers subtended by an involucre. The calyces and sometimes the involucres are petal like in color and texture. . . . . ***Polygonaceae*** (*Chorizanthe membranacea* & *Eriogonum elongatum*).

15b. Flowers not subtended by an involucre:

16a. Stems with sheath like structures at the leaf nodes. . . . . ***Polygonaceae*** (*Rumex* & *Persicaria*).

16b. Stems without sheath like structures at the nodes. . . . . ***Chenopodiaceae***.

10b. Trees and shrubs:

17a. Leaves sessile, less than 2 cm. long, narrowly linear to linear oblong or linear oblanceolate, and with entire margins that are revolute. The calyces are petal like in color and texture. Shrubs or subshrubs that are less than 2 m. (6.5') tall. . . . . ***Polygonaceae*** (*Eriogonum fasciculatum*)

17b. Leaves petiolate (at least shortly so), usually much more than 2 cm. long, not narrowly linear, or if so, then the margins are not revolute. The calyces, if present, are not petal like in color or texture, except in *Lauraceae*. Trees and large shrubs that are usually more than 2 m. tall:

18a. Plants strictly riparian (they only occur along or near perennial or mostly perennial streams, at springs and seeps, etc.):

19a. Leaves large, generally deltate in outline, and palmately divided into three to (usually) five pointed lobes. The bark of at least the upper branches is smooth and off white, but becoming grayish with age, and flaking off in thin scales. Seeds produced in remotely spaced globular clusters on pendulous racemes. Sycamore trees. . ***Platanaceae***.

19b. Leaves of various sizes and shapes, but not palmately divided into pointed lobes. The bark is smooth to rough, light to dark gray or brown, and not flaking off in thin scales. Seeds produced in cone like structures or in capsules:

20a. Leaves oblong-ovate to rhombic and with doubly serrate margins. The fruit is a woody cone like structure that contains winged nutlets. Alder trees. . . . . ***Betulaceae***.

20b. Leaves deltate to narrowly linear; the margins are entire, serrate or crenate, or sometimes irregularly lobed. The fruit is a capsule that produces seeds which are equipped with tufts of fine hairs which enable them to be carried by the wind. Willows and Cottonwoods. . . . . ***Salicaceae***.

18b. Plants that are not restricted to riparian habitats (but they can occur in riparian habitats):

21a. Leaves strongly aromatic, with a distinct spicy scent and taste. The sepals are 6 to 8 mm. long, yellow or

yellowish, and resemble petals. The fruit is a fleshy drupe with a thin green skin, oily flesh, and a stone like seed. . . . . ***Lauraceae*** (*Magnoliidae*, page).

21b. Leaves not or not strongly aromatic. Sepals, if present, are less than 6 mm. long, and do not resemble petals. Fruits of various kinds, and if a drupe, then juicy and berry like:

22a. Flowers produced in catkins or the staminate flowers produced in catkins. The fruit is an acorn. Oaks and Tanoaks. . . . . ***Fagaceae***.

22b. Flowers not produced in catkins:

23a. Leaves elliptic to obovate with serrate margins, and up to 8 cm. long. The fruit is an achene with a persistent feather like style that is enclosed in a persistent floral tube. . . . . ***Rosaceae*** (*Cercocarpus*).

23b. Leaves roundish to ovate with spiny toothed margins, and less than 4 cm. long. The fruit is a red berry containing two seeds. . . . . ***Rhamnaceae*** (*Rhamnus ilicifolia*).

GROUP TWO: COROLLAS DIVIDED INTO DISTINCT PETALS, OR SOME PETALS PARTLY UNTIED.

1a. Petals unequal in size, shape or arrangement. Some petals partly united or not:

2a. Flowers produced in simple or compound umbels. Petals 5. . . . . ***Apiaceae***.

2b. Flowers not produced in umbels:

3a. Petals 4 in 2 unequal sets, the outer petals united at the base, the inner petals are united at the tip. Stamens 6. . . . . ***Papaveraceae*** (*Ehrendorferia*).

3b. Petals 3 to 5, none united at the tip. Stamens 5, 6 to 8, or 10 or more:

4a. Stamens 5. Petals 5, the arrangement with two upper, two lateral and one lower, the lower spurred at the base. The fruit is a 3 chambered capsule. . . . . ***Violaceae***.

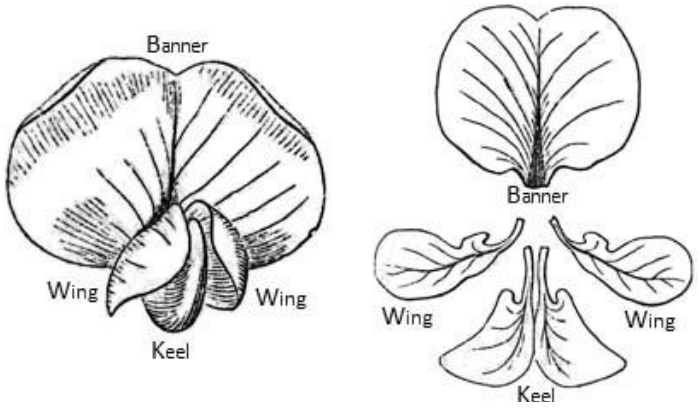
4b. Stamens 6 or more. Petals 3 to 5, and spurred only in *Ranunculaceae*. The fruit is a capsule, legume or follicle:

5a. Flowers with one or five nectar bearing spurs, and with sepals that are petal like in color and texture. Stamens 10 or more, the filaments mostly free. Pistils 3 to 5. . . . . ***Ranunculaceae*** (*Delphinium*).

5b. Flowers without spurs, the sepals not petal like (except in *Polygalaceae*). Stamens 6 to 10, the filaments usually fused. Pistil singular. The fruit is a capsule or legume. Lower petal or petals obscuring or engulfing the stamens and pistil:

6a. Leaves simple. Stamens 6 to 8. Petals 3 or 5 or absent. Petal arrangement with two small upper petals, two large lateral petals (actually modified sepals) and one lower and sack like petal. The fruit is a two chambered capsule. . . . . ***Polygalaceae***.

6b. Leaves divided into 3 or more leaflets. Stamens 10. Petals 5, the arrangement papilionaceous (butterfly like), with 1 upper and usually larger petal (banner), 2 lateral petals (wings), and 2 central petals (the keel), which are often united or partly united, and are often obscured by the wings. The fruit is a 1 to many seeded legume (pod). ***Fabaceae***.



A papilionaceous *Fabaceae* flower

1b. Petals equal or nearly equal in size, shape and arrangement. No petals partly united:

7a. Trees, shrubs and subshrubs:

8a. Plants with thorns or spines. Petals 5:

9a. Stamens 10 to many. Ovaries superior, the fruit an aggregation of drupelets (blackberry) or achenes hidden within an enlarged hypanthium (rose hip) . . . . . ***Rosaceae*** (*Rosa* & *Rubus*).

9b. Stamens 5. Ovaries inferior, the fruit a spiny berry. . . . . ***Grossulariaceae***.

8b. Plants not thorny (plants may have spinescent branchlets or prickly hairs). Petals 4, 5 or 6:

10a. Ovaries inferior or partially inferior (positioned below or partially below and to some extent connected to the calyx, at least near the base):

11a. Flowers with more stamens than petals:

12a. Shrubs with alternate leaves. The fruit is a red and waxy or black and berry like pome (an apple like fruit). . . . ***Rosaceae*** (*Heteromeles* & *Amelanchier*).

12b. Subshrubs with opposite leaves or with at least some of the leaves opposite. The fruit is a dry capsule:

13a. Plants with erect or ascending branches. Flowers elongated and with a red and corolla like tube about 2 to 4 cm. long. Petals red. Seeds crested with tufts of hair. . . . . ***Onagraceae*** (*Epilobium canum*).

13b. Plants with semi prostrate branches. Flowers not elongated and less than 1 cm. long. Petals white. Seeds without tufts of hair. . . . . ***Philadelphaceae*** (*Whipplea*).

11b. Flowers with the same number of stamens as petals:

14a. Leaves opposite or in opposite groups or clusters. Petals and stamens 4. . . . . ***Cornaceae***.

14b. Leaves alternate or in alternate groups or clusters, except in some *Rhamnaceae* species (locally *Ceanothus cuneatus*). Petals and stamens sometimes 4 but usually 5:

15a. Petals and stamens 5, the stamens alternate with the petals. Ovaries completely inferior. The fruit is a berry. . . . . ***Grossulariaceae***.

15b. Petals and stamens 4 or 5, the stamens opposite the petals. Ovaries only partially inferior. The fruit is a dry capsule or berry. . . . . ***Rhamnaceae***.

10b. Ovaries superior (positioned above and not connected to the calyx, but the calyx may surround the ovary):

16a. Stamens 10 or more:

17a. Plants vine like. Leaves divided into 3 to 15 leaflets. True petals absent, but simulated by four sepals that are petal like in color and texture. . . . . ***Ranunculaceae*** (*Clematis*).

17b. Shrubs or subshrubs. Leaves simple. True petals present:

18a. Shrubs:

19a. Sepals 2, petals 4. The fruit is a slender capsule. . . . . ***Papaveraceae*** (*Dendromecon*).

19b. Sepals and petals 5. Fruit is an achene, drupe or follicle. . . . . ***Rosaceae***.

18b. Tufted subshrubs or woody based perennial herbs:

20a. Leaves mostly alternate and narrowly linear. Petals yellow. . . . . ***Cistaceae***.

20b. Leaves opposite and ovate to obovate or oblanceolate. Petals red. . . . . ***Caryophyllaceae*** (*Silene*).

16b. Stamens less than 10:

21a. True petals absent, but simulated by 6 sepals that are petal like in color and texture. Leaves strongly aromatic. The fruit is a green and oily drupe with one large seed. . . . . ***Lauraceae*** (*Magnoliidae*, page).

21b. True petals present. The leaves not strongly or pleasantly aromatic. Fruits various, but not like the above:

22a. Leaves whorled in 4's or more. Calyx absent, petals 4. The fruit is a berry or 2 nutlets. . . . . ***Rubiaceae***.

22b. Leaves alternate or opposite, but not whorled in 4's. Calyx present, petals 2 to 6. The fruit is a berry, winged nutlet, capsule or elongated pod:

23a. Leaves divided into 3 or more leaflets:

24a. Leaves divided into 3 (or rarely 5) leaflets. The fruits are greenish or whitish berries. Contact with surface oils causing a severe allergenic dermatitis in most people. Poison Oak. . . . . ***Anacardiaceae***.

24b. Leaves divided into more than 3 leaflets:

25a. Leaflets with spiny toothed margins. Petals 6. The fruit is a berry. . . . . ***Berberidaceae***.

25b. Leaflets with serrate but not spiny toothed margins. Petals 2 or 4 (5). The fruit is not a berry:

26a. Leaves pinnately divided into leaflets. Petals 2. The fruit is a double samara (2 winged nutlets) . . . . ***Oleaceae***.

26b. Leaves palmately divided into leaflets. Petals 4 (5). The fruit is a large pear shaped capsule with one seed that is about 2 to 5 cm. wide. . . . . ***Sapindaceae*** (*Aesculus*).

23b. Leaves simple or lobed, but not divided into leaflets:

27a. Trees or large shrubs. Leaves opposite, deltate to roundish in outline, about 1 to 4 dm. (4-16") in diameter, and deeply divided into 5 (or sometimes 3) major lobes. The fruit is double samara (2 winged nutlets) . . . . . ***Sapindaceae*** (*Acer*).

27b. Short to long branched subshrubs. The leaves are much smaller and not lobed:

28a. Branches short. Petals 4. The fruit is a long and narrow silique. . . . . ***Brassicaceae*** (*Boechera*).

28b. Branches long. Petals 4 to 6. The fruit is capsule that is obscured within a tubular calyx. . ***Lythraceae***.

7b. Annual and perennial herbs:

29a. Ovaries inferior or partially inferior (positioned below or partially below and to some extent connected to the calyx, at least near the base):

30a. Leaves one or more times pinnately, ternately, or palmately divided into distinct leaflets or narrow segments. Flowers produced in simple or compound umbels:

31a. Umbels simple or compound, but the inflorescence not paniculate. The fruit is dry, often prickly or bristly, and splitting into two carpels in maturity. . . . . ***Apiaceae***.

31b. Umbels produced on the branches of a panicle. The fruit is a berry. . . . . ***Araliaceae***.

30b. Leaves simple to pinnately or palmately toothed or lobed, but not divided into distinct leaflets or narrow segments. Flowers not produced in umbels (or in well defined umbels):

32a. Styles 2 to 5, or the style two cleft nearly to the ovary:
33a. Cauline leaves alternate or leaves strictly basal. . . . . ***Saxifragaceae***.
33b. Cauline leaves opposite:
34a. Flowers produced in small and loose umbels in the axils of the leaves. . . . . ***Apiaceae*** (*Bowlesia*).
34b. Flowers produced in terminal head like clusters. . . . . ***Hydrangeaceae*** (*Whipplea*).
32b. Style singular (the stigma may be lobed):
35. Flowers with 4 sepals, 4 petals, and 4 or 8 stamens. The fruit is a 4 celled capsule. . . . . ***Onagraceae***.
35b. Flowers with 5 sepals, 5 to 10 petals, and 10 or more stamens. The fruit is a 1 celled capsule. . . . ***Loasaceae***.
29b. Ovaries superior (positioned above and not connected to the calyx, but the calyx may surround the ovary):
36a. Flowers with 10 or more stamens:
37a. Pistils 3 to many, each maturing into an achene or a follicle:
38a. Leaves simple and very succulent. The fruit is a follicle. . . . . ***Crassulaceae***.
38b. Leaves variously lobed or divided into leaflets, these not or only slightly succulent. The fruit is a follicle or achene:
39a. Flowers with a hypanthium (a generally cup shaped structure from which the calyx, corolla and stamens arise). Petals and sepals symmetrical, the sepals green and not petal like. The fruit is an achene. . . ***Rosaceae***.
39b. Flowers without a hypanthium. Petals and sepals symmetrical or asymmetrical, the sepals in *Delphinium*, *Aquilegia*, and *Clematis* petal like in color and texture. The fruit is a follicle or achene. . . . ***Ranunculaceae***.
37b. Pistils 1, remaining intact or dividing into few to many carpels in maturity (the styles may be one to several, and entire or divided):
40a. Cauline leaves opposite or whorled, or some cauline leaves opposite or whorled:
41a. Leaves palmately divided into deep lobes or segments. The fruit consists of 5 carpels, each of which retains longitudinal section of the style. . . . . ***Geraniaceae*** (*Geranium*).
41b. Leaves simple. The fruit is a capsule:
42a. Plants of wet habitats. Petals entire and yellow with black dots. Stamens usually much more than 10. . . . ***Hypericaceae***.
42b. Plant of various habitats, but not wet ones. Petals lobed or entire, not yellow, or if yellowish, then lobed and not black dotted. Stamens 10:
43a. Leaves opposite. Petals lobed (except in *Minuartia* & *Moehringia*). Annual and perennial herbs. . . . . ***Caryophyllaceae***.
43b. Leaves whorled, opposite and also often alternate. Petals entire. Small perennial herbs that only occur in some areas of the higher elevations of the Tassajara region. . . . . ***Ericaceae*** (*Chimaphila*).
40b. Cauline leaves alternate (basal leaves may be in rosettes), or the leaves strictly basal:
44a. Fruits comprised of 5 to 15 one ovuled carpels. . . . . ***Malvaceae***.
44b. Fruit a capsule:
45a. Leaves clover like, i.e., divided into 3 generally obcordate leaflets. . . . . ***Oxalidaceae***.
45b. Leaves not clover like, the blades ranging from simple to palmately lobed or deeply cleft, or ternately divided into numerous narrowly linear segments:
46a. Sepals 2. Petals 3 to 7:
47a. Leaves simple and entire. Sepals persistent. Petals 3 to 7 and red to pinkish) . . . . . ***Montiaceae*** (*Calandrinia*).
47b. Leaves divided into narrowly linear segments, or pinnately divided into leaflets or lobes. Sepals falling early, usually before the flowers are mature. Petals 4 and yellow to orange (or orangish) . . . . . ***Papaveraceae***.
46b. Sepals (or calyx lobes) 5. Petals 5:
48a. Sepals (or calyx lobes) equal or nearly equal in size and arrangement. Petals white. . . ***Saxifragaceae***.
48b. Sepals asymmetrical (1 large, 2 intermediate, and 2 minute and bract like). Petals yellow. . ***Cistaceae***.
36b. Flowers with less than 10 stamens:
49a. Cauline leaves opposite or whorled, or at least some of the cauline leaves opposite or whorled:
50a. Pistils 3 to 5, the fruit is a follicle. Annual herbs less than 6 cm. (2½") tall and with leaves less than 3 mm. long). . . . . ***Crassulaceae*** (*Crassula*).
50b. Pistils 1, the fruit of various manifestations. Plants generally more to much more than 6 cm tall, the leaves generally more to much more than 3 cm. long:
51a. Sepals 2. Cauline leaves fused on one or both sides of the stem into disk like or 2 lobed formations) . . . . . ***Montiaceae*** (*Claytonia*).
51b. Sepals 3 to 6 (or absent). Cauline leaves not or only slightly fused at the base:
52a. Leaves divided into deep lobes or segments. The fruit consists of 5 carpels, each of which retains longitudinal section of the style (the style becoming coiled when dry) . . . . . ***Geraniaceae*** (*Erodium*).
52b. Leaves simple, entire or toothed, but not deeply divided into lobes or segments:
53a. All or some of the leaves produced in whorls:

54a. Lower cauline leaves whorled, the basal in rosettes and the upper opposite. Sepals 3, petals 6. The fruit is a narrow capsule. Small annual herbs. . . . . ***Papaveraceae*** (*Meconella*).

54b. All leaves whorled. Sepals absent, petals 5. The fruit is 1 berry or 2 nutlets. Annual and perennial herbs. . . . . ***Rubiaceae***.

53b. All leaves opposite or some leaves opposite and others alternate:

55a. All leaves opposite. Sepals, petals and stamens 5. . . . . ***Caryophyllaceae***.

55b. Lower leaves generally opposite and the upper leaves generally alternate. Sepals and petals 4 to 6, stamens 6. . . . . ***Lythraceae***.

49b. Cauline leaves alternate or the leaves strictly basal:

56a. Pistils 2 to many, the fruit is an achene. . . . . ***Ranunculaceae*** (*Ranunculus hebecarpus*).

56b. Pistil 1:

57a. Sepals 2. . . . . ***Montiaceae***.

57b. Sepals 4 to 15:

58a. Sepals and petals 4. Stamens 6, 4 long and 2 short (or rarely with only 2 or 4 stamens). The fruit is a 1 to many seeded, generally flattened, and often pod like capsule. . . . . ***Brassicaceae***.

58b. Sepals 5 to 16, petals 5 or 6. Stamens 5 or 6:

59a. Sepals 9 to 16, petals 6, stamens 6. Leaves basal and pinnately divided into leaflets. . . . ***Berberidaceae***.

59a. Sepals, petals and stamens 5. Leaves basal or cauline and simple and entire:

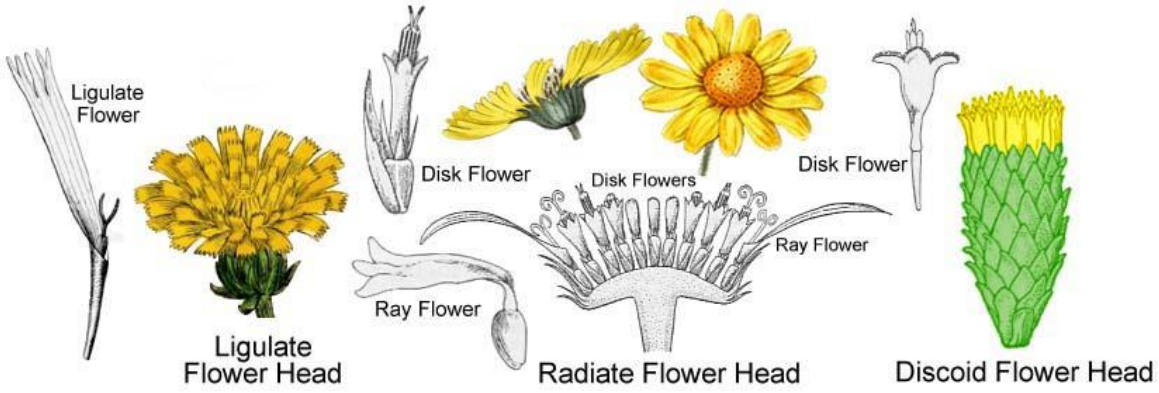
60a. Leaves strictly basal, 4 to 14 cm. long, the blades generally ovate lanceolate. Flowers singular and terminal on scapes. . . . . ***Parnassiaceae***.

60b. Leaves cauline, narrowly linear, and 1 to 2.5 cm. long. Flowers produced in open cymes. . . ***Linaceae***.

GROUP THREE: COROLLAS UNITED, AT LEAST AT THE BASE.

In some species the corollas are united only at the very base, while in others they are united into a ring, tube, bowl or disk like formation for much to nearly all of their length.

1a. Flowers produced in flower heads that resemble a singular flower. The flowers are sessile on a common receptacle that bears few to usually many (and often minute) flowers. The receptacle is usually surrounded by one or more whorls of involucre bracts (phyllaries). The ovaries are inferior and are frequently crested with scale or bristle like segments (pappus). The corollas are either tubular at the base and strap like above (a ligulate or ray corolla), or tubular below and lobed at the apex (a tubular or discoid corolla). The flower heads may be comprised entirely of ligulate flowers (a ligulate head), entirely of tubular flowers (a discoid head), or of both ray and tubular flowers (a radiate head); in such flower heads the ligulate flowers are situated at or near the parameters of the receptacle and resembling petals. The anthers are united into a tube surrounding the style. Represented in the Tassajara region by 47 genera and 73 species. . . ***Asteraceae***.



Asteraceae flower heads and flowers

1b. Flowers not produced in flower heads that resemble a singular flower. If produced in head like clusters, the flowers are not borne on a common receptacle, and each are subtended by calyces:

2a. Parasitic plants that lack chlorophyll, and thus they are not green. True leaves absent, but bracts may be present:

3a. Primarily underground plants that are parasitic on the roots of other plants; the flowers range from black to yellowish, pink and purplish blue. The bilabiate corollas range from about 1 to 4.5 cm. long. . . . . ***Orobanchaceae*** (*Aphyllon*).

3b. Slender stemmed vines that are parasitic on the branches and stems of other plants; the plants range from pale yellow to slightly orangish. The corollas are urn shaped and less than 6 mm. long. . . . . ***Convolvulaceae*** (*Cuscuta*).

2b. Plants that are not parasitic (or only partially parasitic) that have chlorophyll, and thus they are green or partially green:

4a. Leaves strictly basal and rarely present while the flowers are blooming. . . . . ***Campanulaceae*** (*Nemacladus*).

4b. Leaves strictly basal or not, and present while the flowers are blooming:

5a. Leaves very succulent, the larger ones produced in basal rosettes. Corollas fused only at the very base, and thus the

lobes may at first appear to be petals. . . . . ***Crassulaceae*** (*Dudleya*).
5b. Leaves not or only slightly succulent, and produced in basal rosettes or not. Corollas united in various ways:
6a. Leaves produced only in basal rosettes:
7a. Flowers produced in loose racemes on capillary pedicles 8 to 20 mm. long. . . . ***Campanulaceae*** (*Nemacladus*).
7b. Flowers produced in umbels or terminal head like clusters:
8a. Flowers produced in umbels. Corollas petal like in texture and variously colored. . . . . ***Primulaceae***.
8b. Flowers produced in terminal clusters. Corollas translucent and paper like. . . . . ***Plantaginaceae*** (*Plantago*).
6b. Leaves or some leaves cauline (produced on the stems). The basal leaves of some species are produced in rosettes:
9a. Leaves produced only in whorls of 4 to 8 at the nodes of the stems. . . . . ***Rubiaceae*** (*Galium*).
9b. Leaves not produced in whorls, or only some of the leaves are produced in whorls:
10a. Leaves alternate or most leaves alternate:
11a. Corollas asymmetrical:
12a. True corollas absent, but the colorful involucres and/or calyces may be at first mistaken for corollas. . . . ***Polygonaceae*** (*Chorizanthe*).
12b. True corollas present (i. e., they are positioned above the calyces):
13a. Ovaries inferior (positioned below the calyx lobes). Plants of wet habitats. . ***Campanulaceae***. (*Lobelia*).
13b. Ovaries superior (positioned above the corolla). Plants not of wet habitats (except for *Castilleja minor*):
14a. Flowers not subtended by colorful petal like bracts. Bases of corolla tubes with narrow spurs or swollen pouch like formations. . . . . ***Plantaginaceae*** (*Antirrhinum*, *Nuttallanthus*).
14b. Flowers in most species subtended by colorful petal like bracts. Bases of corolla tubes not spurred or pouched. . . . . ***Orobanchaceae*** (*Castilleja*, *Cordylanthus*, *Pedicularis* and *Triphysaria*).
11a. Corollas symmetrical or nearly so:
15a. Trees, shrubs and subshrubs:
16a. Trees with strawberry like fruits (*Arbutus*), or shrubs with apple like fruits (*Arctostaphylos*). Bark, or portions of bark (and often stems) that are smooth reddish brown (reddish brown or not and shredding in *Arctostaphylos tomentosa*). Flowers urn shaped. Stamens 10. . . . ***Ericaceae*** (*Arbutus*, *Arctostaphylos*).
16b. Shrubs or subshrubs with fruits that range from many seeded capsules, achenes or round berries that are black in maturity. Bark not smooth reddish brown (if the stems are reddish brown the flowers are not urn shaped). Flowers variously shaped; urn shaped only in *Eriodictyon tomentosum*. Stamens 5 to 9:
17a. True corollas absent, but the calyces, which are petal like in color and texture, can at first be mistaken for corollas. The fruits are achenes. . . . . ***Polygonaceae*** (woody *Eriogonum* species).
17b. True corollas present. The fruits are many seeded capsules or round black berries:
18a. Corollas rotate and disk or star shaped. Anthers at first joined and forming a ring that closely surrounds the styles. The fruits are round berries that are black in maturity. . . . . ***Solanaceae***.
18b. Corollas urn shaped, bell shaped, funnel shaped, or salverform. Anthers free and not forming rings around the styles. The fruits are many seeded capsules:
19a. Flowers produced in terminal clusters. Corollas salverform. . . . . ***Polemoniaceae*** (*Eriastrum*).
19b. Flowers produced in panicles that are comprised of coiling cymes. Corollas urn shaped, bell shaped or funnel shaped. . . . . ***Boraginaceae*** (*Eriodictyon*, some species of *Phacelia*).
15b. Annual and perennial herbs:
20a. Vines or vine like plants:
21a. Leaves palmately 5 to 7 lobed. Corollas rotate. Staminate flowers produced in axillary racemes, pistillate flowers produced singularly in the axils. The fruits are large round berry like structures that are covered with spines. . . . . ***Cucurbitaceae***.
21b. Leaves triangular in general outline. Corollas broadly funnel shaped. Flowers bisexual and produced singularly in the axils of the leaves. The fruits are capsules. . . . . ***Convolvulaceae***.
20b. Plants that are not vines or vine like:
22a. True corollas absent, but the involucres and/or calyces, which are petal like in color and/or texture, can be at first mistaken for corollas. The fruits are achenes. . . . ***Polygonaceae*** (*Chorizanthe*, *Eriogonum*).
22b. True corollas present. The fruits are capsules or round berries that are black in maturity:
23a. Corollas rotate and disk or star shaped. Anthers at first joined and forming a ring that closely surrounds the styles. The fruits are round berries that are black in maturity. . . . . ***Solanaceae***.
23b. Corollas rotate, bowl shaped, bell shaped, funnel shaped or salverform. Anthers free and not forming rings around the styles. The fruits are capsules or nutlets:
24a. Ovaries inferior. The fruits are capsules. . . . . ***Campanulaceae*** (*Githopsis*, *Heterocodon*).
24b. Ovaries superior. The fruits are capsules or nutlets:
25a. Flowers produced in outwardly coiling racemes. . . . . ***Boraginaceae***.
25b. Flowers not produced in coiling racemes:
26a. Fruits comprised of 1 to 4 nutlets. . . . . ***Boraginaceae***.

26b. Fruit a capsule:
27a. Calyx lobes in most species cleft less than half way to the calyx base. Corollas salverform to funnel shaped. Styles 3 lobed. . . . . ***Polemoniaceae***.
27b. Calyx lobes cleft nearly to the calyx base. Corollas rotate to bell shaped. Styles 2 lobed. . . ***Boraginaceae***.

10b. Leaves opposite or some leaves opposite (or in opposite clusters in some species):
28a. Corollas symmetrical or nearly so:
29a. Trees, shrubs and subshrubs:
30a. Corollas actually consisting of four red petals about 8 to 16 mm. long, which are borne on long red corolla like floral tubes that are about 2 to 4 cm. long. The fruits are slender capsules that contain numerous comose seeds. . . . . ***Onagraceae*** (*Epilobium canum*).
30b. Flowers not like the above. The fruits are berries:
31a. Small trees or large shrubs. Leaves pinnately divided into 5 to 7 leaflets. Flowers produced in large and generally flat topped terminal cymes. . . . . ***Adoxaceae***.
31b. Lanky shrubs or subshrubs. Leaves entire or sometimes shallowly lobed. . . . . ***Caprifoliaceae***. (*Symphoricarpos*).
29b. Annual and perennial herbs:
32a. True corollas absent, but the calyces, which are petal like in color and/or texture, can be at first mistaken for corollas. The fruits are achenes. . . . . ***Polygonaceae*** (*Chorizanthe*, *Eriogonum*).
32b. True corollas present. The fruits are capsules or nutlets:
33a. Corollas actually consisting of four red petals that are borne on long red corolla like floral tubes that are about 2 to 4 cm. long. The fruits are slender capsules that contain numerous comose seeds. . . . . ***Onagraceae*** (*Epilobium canum*).
33b. Flowers not like the above. The fruits range from four nutlets to slender or roundish capsules:
34a. Flowers with 2 pistils that mature into long and narrow capsules that contain many comose (tufted) seeds. . . . . ***Apocynaceae***.
34b. Flowers with 1 pistil that matures into roundish to oblong-ovoid capsules or 4 nutlets:
35a. Flowers sessile and produced in dense terminal and lateral spikes. Corollas very slightly to moderately bilabiate. The ovaries mature into 4 nutlets. . . . . ***Verbenaceae***.
35b. Flowers pedunculate and produced in the axils of the leaves. Corollas rotate to salverform. The ovaries mature into capsules:
36a. Corollas narrowly funnel shaped to salverform. . . . . ***Polemoniaceae*** (*Microsteris*).
36b. Corollas rotate to bowl shaped:
37a. Leaves entire. Corollas usually pinkish orange (salmon), but are sometimes white, pink, blue, purple or scarlet. . . . . ***Myrsinaceae***.
37b. Leaves pinnately or irregularly lobed or parted into leaflets. Corollas purplish blue, blue, white, or blue and white . . . . . ***Boraginaceae*** (*Pholistoma* & *Nemophila*).
28b. Corollas asymmetrical (bilabiate—but only slightly in some species):
38a. Vine like shrubs or subshrubs. The fruits are round berries. . . . . ***Caprifoliaceae*** (*Lonicera*).
38b. Shrubs, subshrubs and annual and perennial herbs, none of which are vine like. The fruits are not berries:
39a. Ovaries inferior and maturing into achenes. Corolla bases spurred or pouched (the spur is very small in *Plectritis congesta*). Annual herbs. . . . . ***Valerianaceae***.
39b. Ovaries superior and maturing into capsules or nutlets. Corolla bases not spurred or pouched in most species. Shrubs, subshrubs and annual and perennial herbs:
40a. Ovaries maturing into 4 nutlets (sometimes some of the nutlets fail to mature):
41a. Corollas strongly to moderately bilabiate (two lipped) . . . . . ***Lamiaceae***.
41b. Corollas weakly to moderately bilabiate:
42a. Flowers produced in terminal and lateral spikes in which the flowers are not whorled. Ovary not or only slightly 4 lobed. . . . . ***Verbenaceae***.
42b. Flowers produced in whorls, head like clusters, or in spikes in which the flowers are whorled. Ovary deeply 4 lobed, especially in fruit. . . . . ***Lamiaceae***.
40b. Ovaries maturing into capsules.
43a. Calyx united into a tube for more (and usually much more) than 70% of the length, the calyx ribs usually pleated. Stigmas 2 lobed, the lobes flat, disk like, and moving together when touched. . . . ***Phrymaceae***.
43b. Calyx divided into sepals, or united into a tube for no more than 60% of the length, the calyx ribs not pleated. Stigmas not lobed:
44a. Stems four angled. Lower corolla lip much smaller than the upper lip. . . . . ***Scrophulariaceae***.
44b. Stems not four angled. Lower corolla lip slightly to much larger than the upper lip (the corollas are narrowly tubular in *Penstemon centranthifolius*) . . . . . ***Plantaginaceae***.

MONOCOTYLEDONS. (Monocotyledoneae, Monocots).

1a. Perianths (corollas) petal like, i.e., they are colorful and/or delicately textured:
2a. Ovaries inferior (they are positioned below or partially below the perianth segments):
3a. Perianth segments asymmetrical. Ovaries one celled. Stamens one or two. . . . . ***Orchidaceae***.
3b. Perianth segments symmetrical. Ovaries three celled. Stamens three. . . . . ***Iridaceae***.
2b. Ovaries superior (they are positioned above the perianth segments and in no way joined to the segments):
4a. Leaves stiff and sword like, up to 1 m. (40") long, tapering to a very sharp and penetrating spine, and produced in dense basal tufts. Flowers borne in profusion in massive panicles on thick stalks up to 4 m. (13') tall. . . . . ***Agavaceae*** (*Hesperoyucca*).
4b. Plants that are in no way similar to the above:
5a. Flowers produced in terminal umbellate clusters, the flowers clearly radiating from a common point:
6a. Lower portion of perianth segments united into a tube, or if the perianth segments are divided to the base (as in *Bloomeria*), then the flowers are yellow and the filaments have a cup shaped appendage at their bases. Plants not smelling or tasting onion like. . . . . ***Themidaceae***.
6b. Perianth segments divided to the base, the flowers are not yellow (ours), and the filaments do not have basal appendages (the bases are wide and fused into a ring). Plants with an onion like scent and taste. . . . . ***Alliaceae***.
5b. Flowers not produced in umbellate clusters, or if the inflorescence is somewhat umbellate, then the flower do not radiate from a common point:
7a. Styles three and distinct to the base. . . . . ***Melanthiaceae***.
7b. Styles singular (but often 3 lobed or parted at the apex):
8a. Well developed leaves borne only at or near the base of the plant, upper "leaves" reduced to scarious bracts. . . ***Agavaceae*** (*Chlorogalum*).
8b. Well developed leaves present on the stems above the base of the plant, but may be reduced in size or modified in shape and/or arrangement. . . . . ***Liliaceae***.
1b. Perianth segments not petal like; they are husk or scale like, and green when young but brown or brownish yellow later on:
9a. Flowers with three or more perianth segments:
10a. Flowers densely compacted on elongated spikes. Perianth segments are slender thread like fibers. The fruit is an achene. Cat Tails. . . . . ***Typhaceae***.
10b. Flowers borne on branching panicles. Perianth segments green when young and husk like when mature, and arranged in two series of three's. The fruit is a many seeded capsule. Rushes. . . . . ***Juncaceae***.
9b. Flowers with one or two perianth segments:
11a. Flowers with one scale like perianth segment (bract) covering or partly covering the flowers and fruits. Stems solid, not jointed, and typically three angled (and thus triangular) in cross section. Plants mostly of wet or moist habitats. Sedges. . . . . ***Cyperaceae***.
11b. Flowers with two husk like perianth segments (glumes) subtending or sometimes enclosing the flowers and fruits. Stems hollow, solid only at the nodes (joints), and usually round in cross section. Most species not of wet or moist habitats. Grasses. . . . . ***Poaceae***.

LYCOPODIOPHYTA (Lycophytes). FERN MOSSES AND QUILWORTS.

Lycopodiophyta is the oldest of the extant vascular terrestrial plant divisions, for the fossil record shows that it developed during the Devonian Period of the Paleozoic Era (about 410 million years ago). Although the *Lycopodiophyta* have traditionally been considered to be closely allied to *Pteridophyta*, the ferns and related plants, recent genetic studies have shown that this division is distantly related to all other forms of extant vascular plants, having radiated from the base of the vascular plant clade at a point much earlier than the other clades. *Lycopodiophyta* consists of about 12,000 species of extant moss or grass like plants; it includes *Lycopodiaceae* (the Club Moss Family), *Isoetaceae* (the Quillwort Family), and the following family:

SELAGINELLACEAE. SPIKE OR FERN MOSS FAMILY.

As presently circumscribed, *Selaginellaceae* consists of a single genus that is comprised of moss like plants, but it is very likely that in the future more genera will be recognized.

SELAGINELLA. FERN OR SPIKE MOSS, RESURRECTION PLANT.

Selaginella consists of approximately 700 known species, most of which occur in tropical and warmer temperate regions. The name is a diminutive of the Latin word *Selago*, which is the classical name for some species of *Lycopodium*.

1a. Stems erect or ascending and rooting only at the base. . . . . ***S. bigelovii***.
1b. Stems prostrate and rooting at the nodes. . . . . ***S. hansenii***.

Selaginella bigelovii Underwood. BUSHY FERN MOSS. These distinctive plants are widespread and locally common at all elevations in the Tassajara region, and they mostly occur on open rocky slopes, and sometimes on very steep and generally barren soiled slopes. Dormant plants are grayish during dry periods, but are green during the rainy season, and even the brief moisture a summer shower will cause the plants to quickly revive (hence the name 'Resurrection Plant' has been applied to many species of this genus). ●R: from Napa and Sonoma counties in the Coast Ranges, and from Mariposa County in the Sierra Nevada, to northern Baja California. Also on most of the islands off the coast of southern California. ●H: moss like plants usually with erect or decumbent-ascending stems that range from about 5 to 20 cm. (2-8") long. The branching stems are covered with small and imbricated awl shaped scales. The sporangia are located on the inner surface of specialized terminal leaves (sporophylls).

+<>***Selaginella hansenii*** Hieron. SHAG CARPET FERN MOSS. These sprawling plants are rather common on north or generally north facing rock outcrops, cliffs, and tree trunks in this region. In the first edition of this text I noted that I suspected that such plants represented *S. hansenii*, but I was unable to find any sporophylls on any of the specimens that I collected. At that time the known presence of this species in the Santa Lucia Mountains was based only on a specimen that was collected in the vicinity of Jamesburg by Richard M. Holman on May 24th, 1933 (UC 505130). The presence of this species in the Tassajara region was verified by Vern Yadon, who identified it from a specimen that he collected along Tassajara Road, about a half of a mile north of Tassajara Hot Springs, in May of 2000 (PGM 4784). I suspect that more field research by botanists will lead to larger known distribution of this species in the Santa Lucia Mountains. The Basin Complex Fire of 2008 was devastating to the plants of this region. Vast numbers of plants that grew on tree trunks were consumed (and in most cases, along with trees that they were growing on), and those growing on rock outcrops did little better. In places where there had been large carpet like patches, such as around the waterfall and along Tassajara Creek between the hot springs and The Narrows, the rocks were made barren. ●R: the Sierra Nevada and its foothills, from Shasta County to Kern County, the Santa Lucia Mountains of Monterey County, the inner North Coast Ranges in Tehama County, the inner South Coast Ranges in Merced County, and on the Sutter Buttes. In his original description of the species, Hieron listed the Oakland Hills as a locality, which was based on a specimen that was collected by "Hillebrand, anno 1863." ●H: mat like plants with a profusion of prostrate stems that root at the nodes. The stems, which are more or less pinnately branched, are covered with appressed scale like leaves about 1 to 4.5 mm. long. The spores are produced the inner surface of specialized terminal leaves (sporophylls).

***PTERIDOPHYTA* (*Monilophyta*). FERNS SENSU LATO.**

Pteridophyta includes 37 families and about 12,000 species. Ferns first appear in the fossil record about 360 million years ago in the early Carboniferous period, but many of the current families and species did not appear until roughly 145 million years ago in the early Cretaceous, and thus after flowering plants came to dominate many environments.

1a. Reed like plants with hollow stems (ours). The nearest equivalents to leaves are scale or sheath like formations that are produced at the nodes, or slender reed like structures that are produced in whorls at the nodes. The spores are produced in cone like structures that are terminal on the fertile stems. Horsetails. . . . . **Eusporangiate Ferns**.
1b. Plants without hollow stems. Leaves well developed. The spores are produced on the lower surface of the leaf blades. . . . . **Leptosporangiate Ferns**.

EUSPORANGIATE FERNS.

Eusporangiate ferns are divided into three classes: *Psilotopsida*, the Wisk Ferns (*Psilotaceae*) and the Adder's Tongue or Grape Ferns (*Ophioglossaceae*), *Maratitiales*, the Maratitoid Ferns (*Maratitiaceae*), and *Equisetopsida*.

EQUISETOPSIDA.

The *Equisetopsida* were formerly regarded as a separate division of spore producing plants (the *Equisetophyta*), but they are now recognized as being genetically close to the more typical ferns. Although this class is presently represented by only one extant family (*Equisetaceae*) and one genus, during the late Paleozoic Era (about 250 to 350 million years ago) it was much more diverse, and it included many species that were abundant, some of which were tree like plants that were as much as 30 meters tall.

EQUISETUM. HORSETAILS AND SCOURING RUSHES.

This is a widely distributed genus that consists of 15 species of perennial herbs. As a whole, the species are represented on all of the major landmasses except for Australia and New Zealand. The genus name is derived from the Latin words *equis* (horse) and *seta* (bristle or stiff hair), and refers to the characteristics of the roots of *E. fluviatile* Linnaeus.

1a. Stems with whorls of long and slender reed like branches at the nodes. Fertile and sterile stems are physically dissimilar, and arise separately from the ground. . . . . ***E. telmateia***.

1b. Stems without reed like branches at the nodes, or with short and stubby branches at the nodes. All stems fertile and physically similar:

2a. Stems slender, less than 4 mm. wide, and often with smaller, secondary stems arising from the base, and often with short, finger like branches that are produced in whorls at the nodes. . . . . ***E. laevigatum***.

2b. Stems stout, 4-12 mm. wide, and never with secondary basal stems, and never with branches at the nodes. . . . . ***E. hyemale***.

Equisetum hyemale Linnaeus subsp. ***affine*** (Engelmann) Calder & R. L. Taylor [*E. h.* var. *a*. Engelmann; var. *californicum* J. Milde; var. *robustum* (A. Braun) A. A. Eaton]. NORTH AMERICAN SCOURING RUSH. These distinctive plants are scattered along streams and sometimes in seasonally wet habitats at lower and intermediate elevations in this region, but are uncommon. ●R: widespread in North America, from Alaska and Newfoundland to Guatemala; the typical subspecies occurs in Eurasia. ●H: rhizomatic perennial herbs with erect, relatively stout, and scruffy textured evergreen stems that range from about 6 to 20 dm. (2-6.5') tall. The sheaths have a distinctive band pattern consisting of a broad white band, with equally broad black bands above and below the white band. The terminal cones are generally ovoid and about 1 to 2.5 cm. long.

Equisetum laevigatum A. Braun [*E. funstoni* A. A. Eaton; *E. kansanum* J. Schaffner]. SMOOTH SCOURING RUSH. This is the most frequently encountered horsetail in the Tassajara region, where it is scattered, often small colonies, in wet (or seasonally wet) and generally shady habitats. ●R: widely distributed in temperate North America, from British Columbia and Quebec to northern Mexico. ●H: rhizomatic perennial herbs with slender and erect stems that range from about 4.5 to 1.8 dm. (1.5-6') tall. The primary stems often have shorter secondary stems rising from the base, and occasionally they also have short and stubby branches at the lower nodes. Although the stems are produced annually, they do no rapidly disintegrate, and thus this species can be identified from dead material nearly year round. The terminal cones are generally ovoid to lance ovoid, and about 1 to 2 cm. long.

Equisetum telmateia Ehrhart subsp. ***braunii*** (J. Milde) Hauke [*E. t.* var. *b*. Milde]. GIANT HORSETAIL. The conspicuous sterile stems of this species are widely scattered along perennial streams and occasionally at springs and seeps in the Tassajara region. In recent years several large colonies have developed along sections of Tassajara Creek upstream from the hot springs. ●R: western temperate North America, from British Columbia and Idaho to southern California. In California it occurs in the Coast, Transverse and Peninsular ranges, from Del Norte and Siskiyou counties to San Diego County, and in the northern Sierra Nevada, from Butte and Plumas counties to Tuolumne County. It also occurs on Santa Cruz and Santa Catalina islands. The typical subspecies occurs in Eurasia. ●H: rhizomatic perennial herbs of wet or moist habitats. The sterile stems, which are green and have whorls of slender branches at the nodes, are mostly about 3 to 12 dm. (1-4') tall. The fertile stems, which range from whitish green to straw colored, are produced only in the spring; they are about 2 to 6 dm. (8-24") tall. The terminal cones are oblong ovoid to lance ovoid, and about 4 to 8 cm. long.

Specimens of *Equisetum* x *ferrissii* Clute, hybrids between *E. hyemale* and *E. laevigatum*, have been collected in the upper Arroyo Seco Canyon (south of the confluence of Tassajara Creek), and thus they may also be present somewhere in this region.

LEPTOSPORNAGIATE FERNS
(*POLYPODIOPSIDA* or *PTERIDOPSIDA*).

This is a primarily tropical class of vascular plants that is comprised of 23 families and about 9,000 species. Most of the species are herbaceous, but some are shrub or tree-like, such as the tree ferns of Australia, New Zealand and Tasmania.

BLECHNACEAE. DEER FERN FAMILY.

Blechnaceae consists of about 9 or 10 genera and approximately 250 species. Most of the species occur in tropical regions. The name is based on that of the member genus *Blechnum*, the Deer Ferns.

WOODWARDIA. CHAIN FERNS.

Woodwardia consists of 14 species that occur in the temperate and tropical regions of North America, in the Mediterranean region and in eastern Asia. The genus was named for the English botanist Thomas J. Woodward (1745-1820).

Woodwardia fimbriata Smith [*W. chamissoi* Brackenridge; *W. radicans* var. *americana* Hooker]. GIANT CHAIN FERN. With fronds that can be as long as 3 meters (9' 8") long, this is not only the largest species of the genus *Woodwardia*, but it is also the largest fern species that is native to temperate North America (*Acrostichum aureum*, a widely distributed fern with fronds up to 4 meters long, also occurs in North America, but it is restricted to tropical regions). Although *W. fimbriata* is often encountered along perennial streams and at seeps in the Tassajara region, most of these plants tend to be comparatively small and are often singular (probably due to an intolerance to torrential water flows), and it is only at major springs that this species reaches its full development (in large rhizomatic colonies). Probably for nearly as long as the spring that supplies Tassajara with its drinking water has been flowing, a colony of these ferns was established at this site. The beauty of this colony was one the most charming features that were to seen along Tassajara Road as one was approaching the hot springs. Unfortunately an attempt to eradicate this colony was eradicated occurred during the 1990s, presumably due to an assumption that the plants were consuming too much water (remnants of this population are still extant in nearby seepy areas). I am sure that surrounding riparian trees take up much more water than the ferns ever did. This colony can be reestablish with genetically identical plants, for those that have been planted in the developed area of Tassajara are transplants from this former colony. ●R: Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from British Columbia to the Sierra de San Pedro Martir in northern Baja California. Also on Santa Rosa, Santa Cruz and Santa Catalina islands, on the Sutter Buttes, and in the higher mountains of Arizona. ●H: rhizomatic ferns producing circles of large evergreen fronds that range from about 9 to 30 dm. (3-9.8') tall. The blades are more or less broadly elliptic in outline and pinnately divided into numerous oblong-

lanceolate pinnae, which, in turn, are pinnately cleft into many linear lanceolate ultimate segments. The elongated and slightly curved sori are produced in two parallel rows.

A colony of *Woodwardia fimbriata* plants at a spring along the Marble Peak Trail between the Horse Pasture Trail junction and Tassajara Camp. Note the canteen in the lower right.

CYSTOPTERIDACEAE. FRAGILE FERN FAMILY.

Cystopteridaceae consists of three genera and about 37 species that as a whole are represented nearly worldwide. The other two genera are *Acystopteris* and *Gymnocarpium*.

CYSTOPTERIS. BLADDER FERNS.

Cystopteris consists of about 20 species, most of which occur in temperate regions. The name is derived from the Greek words *cystis*, bladder, and *pteris*, fern, on account of the shape of the indusia, which resemble bladders.

Cystopteris fragilis (Linnaeus) Bernhardi [*Polypodium fragile* Linnaeus]. FRAGILE FERN. These delicate ferns are widely scattered at all elevations in the Tassajara Canyon and vicinity, but they are restricted to rocky areas in shady and more or less moist (or seasonally moist) woodland habitats. ●R: this is one of the most widely distributed of all vascular plant species, for it occurs in both temperate and tropical regions nearly worldwide. ●H: small ferns from relatively short rhizomes, with delicate and easily broken fronds that range from about 8 to 30 cm. long. The fronds arise at the start of the rainy season and whither at the start of the dry season, except in perennially wet or moist habitats. The blades, which are about 10 to 25 cm. long, are ovate-lanceolate in outline, and pinnately divided into distinct segments that are pinnately toothed or lobed. The ovate to roundish sori are produced along the major veins.

DENNSTAEDTIACEAE. BRACKEN FERN FAMILY.

Dennstaedtiaceae consists of about 11 genera and approximately 170 species; most of the species are endemic to tropical regions. The name for the family is based on that of the member genus *Dennstaedta*.

PTERIDIUM. BRACKEN FERN.

As currently treated in the Jepson e Flora, this genus consists of about five species, but in many other texts it is considered to be comprised of one highly variable species that is of nearly worldwide distribution. If the later opinion is correct, this species is both the most widespread and abundant fern on earth. The name is diminutive of *Pteris*, the Greek word for ferns.

Pteridium aquilinum (Linnaeus) Kuhn var. ***pubescens*** Underwood [*Pteris aquilina* Linnaeus; *P. t.* var. *lanuginosa* (Bory) Hooker]. WESTERN NORTH AMERICAN BRACKEN FERN. This distinctive species is widely scattered and locally common to abundant in the Tassajara region, such as along Willow Creek, in The Pines, on Pine and Chew's Ridges, etc., but it is absent in most areas. Plants that grow in constantly moist situations, such as at springs, are much larger than those growing in habitats that are seasonally dry. ●R: widespread in western North America, from Alaska to Alberta, Montana, South Dakota, Wyoming, Colorado, New Mexico, western Texas, northern Mexico and northern Baja California. According to many authorities, *Pteridium aquilinum* consists of 12 varieties, which, as a whole, are distributed nearly worldwide. ●H: rhizomatic ferns with generally arching fronds that range from about 3 to 15 dm. (1-5') tall. The fronds are produced annually from late spring to early summer. The blades are broad, generally triangular in outline, and intricately foliated. The upper divisions are twice pinnate, while the larger lower divisions are three times pinnate. The sporangia are concentrated in nearly continuous bands on the lower margins of the segments.

DRYOPTERIDACEAE. WOOD FERN FAMILY.

Dryopteridaceae consists of about 40 genera and more than 1600 species worldwide. Like many fern families, most of the species are restricted to tropical regions.

1a. Fronds once pinnate (ours) . . . . . ***Polystichum***.
1b. Frond twice pinnate. . . . . ***Dryopteris***.

DRYOPTERIS. WOOD FERNS.

The genus *Dryopteris* is comprised of about 100 species that, as a whole, are widely distributed, but the genus is particularly well represented in eastern Asia. The name is derived from the Greek words for oak and fern.

Dryopteris arguta (Kaulfuss) Watt [*Aspidium* a. Kaulfuss]. CALIFORNIA WOOD FERN. This species is widespread and locally common at all elevations in the Tassajara region. It mostly occurs on shady woodland slopes, but it is also fairly common under dense stands of tall *Ceanothus* dominated chaparral. ●R: Cascade Ranges, Coast Ranges, the Sierra Nevada, and the Transverse and Peninsular ranges, from British Columbia to the Sierra San Pedro Martir in northern Baja California. Also on Santa Rosa, Santa Cruz, Santa Catalina, San Clemente and the Anacapa islands, on the Sutter Buttes, and in the mountains of central Arizona. ●H: evergreen ferns from relatively stout, woody and generally ascending rhizomes, with crowns of fronds that range from about 3 to 10 dm. (12-39") tall. The blades are ovate-lanceolate to oblong-lanceolate in outline and bipinnately divided into ultimate segments that are pinnately toothed or lobed. The sori are produced in two parallel rows and are covered with horse shoe or kidney shaped indusium.

POLYSTICHUM. SWORD FERNS.

This is a widely distributed genus consisting of approximately 175 species. The name is derived from the Greek words *polus*, many, and *stichos*, row, on account of many rows of sori of some species.

1a. Fronds mostly less than 5 dm. (20") long. Pinnae 2 to 3 cm. long, less than 5 times longer than wide, generally imbricated, and abruptly tapering to a relatively blunt apex. . . . . ***P. imbricans*** subsp. ***imbricans***.
1b. Fronds mostly 5 to 10+ dm. (20-40"+) long. Pinnae usually much more than 3 cm. long, more than 5 times longer than wide, generally on a single plane, and gradually tapering to an often upwardly curled, pointed apex:
  2a. Larger stipe scales lanceolate and about 2 to 3 mm. wide. The stipe scales usually occur only near the base of the stipe, but if present higher up, they are few and are readily deciduous. Indusium entire or toothed. . . . . ***P. imbricans*** subsp. ***curtum***.
  2b. Larger stipe scales ovate and 3 to 6 mm. wide. The stipe scales are persistent and crowed along the length of the stipes and rachis of the blades. Indusium ciliate. . . . . *P. munitum*.

Polystichum imbricans (D. C. Eaton) Wagner [*Aspidium munitum* var. *imbricans* Eaton; *P. munitum* var. *imbricans* (Eaton) Maxon] subsp. ***imbricans***. ROCK SWORD FERN, DWARF SWORD FERN. This species is widely scattered at all elevations in the Tassajara region, and it primarily occurs in shady woodland habitats, and especially in rocky areas and at the bases of large rocks. ●R: widely distributed in the Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from British Columbia to the mountains of San Diego County. It also occurs in the mountains of northeastern Oregon and on Santa Cruz Island. ●H: evergreen ferns with erect or ascending rhizomes that produce tufts of fronds that range from about 3 to 5 dm. (12-20") long. The blades are lanceolate to lance-oblong in outline and are pinnately divided into simple (and more or less imbricated) pinnae, the margins of which are serrate. The sori are produced in two parallel rows, and are partially covered with indusium.

Polystichum imbricans (Eaton) Wagner subsp. ***curtum*** (Ewan) Wagner [*P. munitum* subsp. *curtum* Ewan]. NAKED STEMMED SWORD FERN. This taxon, which more strongly resembles *P. munitum* than it does *P. imbricans*, is widely scattered and locally common in shady or mostly shady habitats at all elevations in the Tassajara region. It primarily occurs in woodland habitats. ●R: Cascade, Coast, Transverse and Peninsular ranges, from Trinity and Tehama counties to the mountains of San Diego County, and in the Sierra Nevada, from Butte and Plumas counties to Mariposa County. ●H: evergreen ferns that are similar to the typical species, except for the much longer fronds (5 to 10 dm. [20-40"] long), the more narrowly lanceolate blades, and the much longer pinnae (3 to 10 cm. long).

Polystichum munitum (Kaulfuss) C. Presl [*Aspidium m.* Kaulf.]. WESTERN SWORD FERN. Although this species is abundant in the coastal canyons of the Santa Lucia Mountains, it appears to be absent in the Tassajara region. James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), listed this species as being present above 600 meters (1,968 ft.) on Pine and Chew's ridges in the "Distribution of Plants" appendix, and in the main text he stated that "Most plants on the study peaks have rachises with reduced scales and probably fit ssp. *curtum* Ewan." *Polystichum imbricans* is not listed in Griffin's text. In May of 1955 Beatrice Howitt collected a specimen in Miller Canyon that she assigned to *P. munitum* (Howitt 362; PGM 5062), but the duplicate specimen at the California Academy of Sciences Herbarium (CAS 509271) has been assigned to *P. imbricans* subsp. *imbricans*. In September of 1958 Howitt collected a specimen in Anastasia Canyon that she also assigned to *P. munitum*, but its duplicate at the California Academy of Sciences has also been reassigned to *P. imbricans* subsp. *imbricans*.

POLYPODIACEAE. POLYPODY FERN FAMILY.

Polypodiaceae consists of about 40 genera and approximately 650 species that, as a whole, are represented nearly worldwide. This family is especially well represented in the tropical regions of North and South America.

POLYPODIUM. POLYPODY FERNS.

According to the Jepson eFlora, the genus *Polypodium* consists of about 40 species, but according to the Flora of North America, it includes about 100 species. In any case, most of the species occur in the temperate and tropical regions of North and South America. The name is derived from the Greek words *polus*, many, and *pous*, foot, perhaps on account of the knoblike formations on the rhizomes.

1a. Leaf veins free. Sori generally round. Blade segments often acute at the apex and often falcate (sickle shaped). . . . . ***P. glycyrrhiza***.
1b, Leaf veins free and fused. Sori round to ovate or oblong. Blade segments rounded or only slightly acute at the apex:
2a. Leaf blades deltate to ovate, often more or less irregular in outline, the lower 1 to 3 opposing blade segments often longer than those above. Sori round to ovate and more or less sunken. . . . . *P. californicum*.
2b. Leaf blades oblong-ovate, more or less regular in outline, the lower 1 to 3 opposing blade segments generally shorter than those above. Sori ovate to oblong and not sunken. . . . . ***P. calirhiza***.

Polypodium californicum Kaulf. CALIFORNIA POLYPODY FERN. In the first edition of this text I noted that "It is possible that some of the plants of this region here assigned to *P. californicum* may represent *P. calirhiza*, which is reported to occur in the Santa Lucia Mountains." Since that time my observations of the local populations of such plants has lead me to suspect that *C. calirhiza* is the only one of these species that occurs in the Tassajara region. As *P. californicum* occurs in this part of California, I have included it in the preceding key, just in case. Prior to the recognition *P. calirhiza* in 1993, such plants keyed out to be *P. californicum*, which is a species that primarily occurs on coastal bluffs.

+∨***Polypodium calirhiza*** S. Whitmore & A. R. Smith [*P. intermedium* Hooker & Arnott 1840, not Colla 1836; *P. vulgare* Linnaeus var. *intermedium* (Hooker & Arnott) Fernald; *P. californicum* Kaulfuss traditionally misapplied]. NORTHERN CALIFORNIA POLYPODY FERN. This species is widespread and locally common at all elevations in the Tassajara region, and it primarily occurs on shady or semi shady rock outcrops, cliffs, and on tree trunks and branches. The frequently dense stands of fronds are a common and conspicuous sight during the rainy season. *Polypodium calirhiza* was derived by hybridization between *P. californicum* and *P. glycyrrhiza*, and hybrids between *P. calirhiza* and *P. glycyrrhiza* are common throughout the range of their geographic overlap; such plants probably occur in this region. The name for *P. calirhiza* is a combination of the names for *P. californicum* and *P. glycyrrhiza*. ●R: Cascade and Coast ranges and the Sierra Nevada, from Lincoln and Lane counties in western Oregon to Kern County in the Sierra Nevada, and to the Santa Lucia Mountains of San Luis Obispo County in the Coast Ranges. It also occurs on the Sutter Buttes. ●H: perennial herbs from creeping rhizomes that produce numerous fronds that range from about 1 to 4 dm. (4-160") long. The fronds rise suddenly after the onset of the rainy season and wither with equal speed at the beginning of the dry season. The blades are generally oblong-ovate in outline and are deeply and pinnately divided into oblong lobes. The ovate to oblong sori are produced in two parallel rows on the lower side of the fronds

∨***Polypodium glycyrrhiza*** D. C. Eaton [*P. aleuticum* A. E. Bobrov; *P. falcatum* Kellogg; *P. occidentale* (Hooker) Maxon; *P. vulgare* Linnaeus subsp. *occidentale* (Hooker) Hultén; *P. vulgare* var. *falcatum* (Kellogg) H. Christ; *P. vulgare* var. *occidentale* Hooker]. LICORICE FERN. In the first edition of this text I stated that this species was scattered in permanently moist habitats along Willow Creek. In the spring of 2009 Diane Renshaw and myself found another population along Tassajara Creek not far below the confluence of Oryoki Creek. ●R: temperate and boreal western America, from the Aleutian Islands and the Alaska Peninsula to British Columbia, Washington, Oregon and California. In California the distribution of this species extends southward in the Coast Ranges to northwestern San Luis Obispo County, and it also occurs in the northern Sierra Nevada, from Butte and Plumas counties to El Dorado County. Disjunct populations occur on the Kamchatka Peninsula in northeastern Asia, in the mountains of northern Idaho, and in the mountains of Arizona. ●H: rhizomatic evergreen perennial herbs which produce fronds that range from about 2 to 7 dm. (8-28") long. The blades are generally lanceolate in outline and pinnately divided into linear to linear-attenuate segments. The sori are round or sometimes oval and produced in two parallel rows on the lower surface of the blades.

PTERIDACEAE. BRAKE FERN FAMILY.

This is a widely distributed family that consists of about 40 genera and approximately 500 species. The family name is based on the member genus *Pteris*; *Pteris* is the Latin word for fern.

1a. Sporangia fully exposed or only partially concealed by recurving leaf segment margins, or by modified (indusia like) recurving margins (false indusium):
2a. Sporangia covered at least partly by recurving margins (*Aspidotis densa*), or by false indusium. . . . . ***Aspidotis***.
2b. Sporangia diffuse and scattered along major veins. . . . . ***Pentagramma***.
1b. Sporangia concealed under the recurving margins of the leaf segments:
3a. Lower surface of blade segments scaly, fibrous or densely pubescent. . . . . ***Myriopteris*** (*Cheilanthes*).
3b. Blades glabrous throughout:
4a. Margins of blade segments, or at least fertile blade segments, slightly to deeply lobed and/or incised. . . . . ***Adiantum***.
4b. Margins of all blade segments entire. . . . . ***Pellaea***.

ADIANTUM. MAIDEN HAIR FERNS.

Adiantum consists of approximately 200 species that are widely distributed in tropical and temperate regions. The name is derived from the Greek words *a*, without, and *diaine*, wetted, alluding to the way the segments of the fronds instantly repel water.

1a. Blades divided into 2 equal and curving parts that are on one side divided into once pinnate divisions. . . . . ***A. aleuticum***.
1b. Blades not divided into 2 parts; they are 2 to 3 times pinnately divided along one axis:
2a. Margins of leaflets shallowly lobed to entire, the sterile leaflets not toothed. . . . . ***A. jordani***.
2b. Margins of leaflets deeply lobed or incised, the sterile leaflets finely toothed. . . . . ***A. capillus-veneris***.

Adiantum aleuticum (Ruprecht) Paris [*A. pedatum* Linnaeus var. *aleuticum* Ruprecht]. FIVE FINGER FERN, WESTERN MAIDEN HAIR FERN. These distinctive ferns are scattered on wet, rocky and usually shady banks along Willow Creek, Oryoki Creek, upper Tassajara Creek, Church Creek, the upper Carmel River in Pine Valley and probably along the Miller Fork of the Carmel River in Miller Canyon. ●R: widespread in western North America, from Alaska to the mountains of New Mexico and California. The distribution of this species in California extends southward to Tulare County in the Sierra Nevada, and to the Santa Lucia Mountains of northwestern San Luis Obispo County in the Coast Ranges. Disjunct populations occur in the San Rafael and Santa Ynez mountains in Santa Barbara County, in the San Gabriel and San Bernardino Mountains of Los Angeles and San Bernardino counties, in the San Jacinto Mountains of Riverside County, and on Santa Cruz Island. This species also occurs on serpentine outcrops in eastern Canada and the northeastern United States. ●H: evergreen ferns with fronds that range from about 2 to 8 dm. (8-32") long. The slender and glossy stipes are dark brown to nearly black. The blades are somewhat palmately branched into divisions that are about 1 to 4+ dm. (4-16") long. The divisions are pinnately divided into crowded segments; the lower margins of the segments are entire and the upper are lobed and toothed. The sporangia are concealed under the reflexed outer margins.

Adiantum capillus-veneris Linnaeus. VENUS HAIR FERN, COMMON MAIDEN HAIR FERN. This species is scattered in a variety of shady habitats at lower to intermediate elevations in the Tassajara region, but it is best developed in permanently wet and deeply shady habitats that are rarely affected by seasonal flooding, such as at springs and seeps. Plants are also sometimes found in the dense shade of arborescent *Ceanothus* dominated chaparral, but such plants tend to be small and rather sickly looking. ●R: this is one of the most widely distributed of all plant species, for it occurs in tropical and warmer temperate regions worldwide. ●H: delicate ferns with fronds that range from about 2 to 7 dm. (8-28") tall. The stipes are very slender, glossy, and nearly black in color. The blades are bipinnately to tripinnately divided into obovate to roundish leaflets with irregularly lobed or incised margins. The sporangia are concealed under the reflexed margins of the fertile leaflets.

Adiantum jordani Mueller [*A. emarginatum* Hooker]. CALIFORNIA MAIDEN HAIR FERN. This species is widely scattered and locally common on shady woodland slopes in the Tassajara region, generally below about 3,500 ft., and it is most frequently found near the bases of trees, boulders and large rocks. ●R: Sierra Nevada and the Cascade, Coast, Transverse, and Peninsular ranges, from Douglas County in southwestern Oregon to the mountains of northern Baja California. ●H: delicate ferns with fronds that range from about 5 to 5 dm. (8-20") tall. The very slender and glossy stipes are dark brown to nearly black. The blades are bipinnately to tripinnately divided into generally fan shaped leaflets, and the sporangia are concealed under the reflexed margins of the fertile leaflets.

ASPIDOTIS. SHIELD FERNS, FALSE INDUSIA FERNS.

Aspidotis consists of four species of North America, one of which occurs only in Mexico. Three species occur in California, and two are endemic to the California Floristic Province. The name is derived from the Greek word *aspis*, shield, on account of the shield like false indusia of the type species, *A. californica*.

1a. Ultimate leaf segments mostly linear and entire. Sporangia continuous on both sides of midvein. False indusia with many shallow and regular teeth. . . . . ***A. densa***.

1b. Ultimate leaf segments generally ovate in outline and pinnately divided into lobes. Sporangia not continuous on both sides of midvein. False indusia more or less entire or with coarse or deep irregular teeth or lobes:

2a. False indusia about as wide as long, free, 1 to 2 (-5) per segment, and more or less entire or with a few coarse or deep irregular teeth. ***A. californica***.

2b. False indusia about as wide or wider than long, generally fused at the base, 3 to 5 (-7) per segment, and with many coarse or deep, irregular teeth or lobes. . . . . ***A. carlotta-halliae***.

Aspidotis californica (Hooker) Nuttall ex Copeland [*Hypolepis c.* Hooker; *Cheilanthes c.* (H.) Mettenius]. CALIFORNIA SHIELD or LACE FERN. These delicate ferns are lightly scattered on rock outcrops and cliffs in the Tassajara region, and mostly at lower to intermediate elevations. In the developed area of Tassajara plants can be found on the cliffs beyond the lower barn, and on a rock outcrop a very short distance beyond the start of the trail to the Hog's Back. Plants have existed at the later site since at least 1901, for according William Dudley's "Tassajara" specimen of June 14th, 1901 (DS 50165), he collected it on "Rocks above Camp" (at that time The Flats were utilized as a camping ground for guests). According to the note in the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901, he collected it on "Rocks near Springs" (Elmer 3266; DS 86135). This species was also collected on "Rocks" in the developed area of Tassajara by Roxana Ferris in April of 1933 (Ferris 8303; DS 216518 & UC 524368). ●R: Coast Ranges, the Sierra Nevada, Transverse and Peninsular ranges, from Trinity and Plumas counties to the Sierra Juarez in northern Baja California. Also on Santa Cruz and Santa Catalina islands. ●H: small ferns with delicate and intricately foliated fronds that range from about 1 to 3 dm. (4-12") tall. The blades are three to four times pinnately divided into generally decurrent and often toothed ultimate segments. The sporangia are produced on the lower surface of the segments, mostly towards the apex.

∨***Aspidotis carlotta-halliae*** (Wagner & Gilbert) Lellinger [*Cheilanthes c. h.* W. & G.]. SERPENTINE SHIELD FERN. This taxon is rare on the serpentine outcrop on Pine Ridge, where it was first discovered by Vern Yadon in May of 1970 (CAS 554892). This is a fertile hybrid between *A. californica* and *A. densa*. ●R: scattered on serpentine outcrops in the Coast Ranges, from Marin County to San Luis Obispo County. ●H: small ferns strongly resembling *A. californica*, except for the characteristics listed in the key; the plants are also generally smaller.

∨***Aspidotis densa*** (Brackenridge) Lellinger [*Onychium d.* Brackenridge; *Pellaea d.* Hooker; *Cheilanthes siliquosa* Maxon]. COMMON SHIELD FERN, INDIAN'S DREAM. This species is scattered in rocky areas on the serpentine outcrop that extends from Pine Ridge to Bear Basin, but it is not known to occur elsewhere in this region. ●R: from British Columbia to California, Utah, Wyoming and Montana. In California the distribution of this species extends southward through the Sierra Nevada to Kern County, and to the Santa Lucia Mountains of San Luis Obispo County in the Coast Ranges. Disjunct populations occur in the Cuyamaca Mountains in San Diego County, and on the Gaspe Peninsula in eastern Quebec. ●H: small ferns from short rhizomes that typically produce dense tufts of fronds that range from about .5 to 3 dm. (2-12") tall. The blades are bipinnately divided into linear to elliptic segments. The sporangia are produced in lines on both sides of the midvein of the segments.

MYRIOPTERIS. MYRIAD FERNS, BEAD FERNS, LACE FERNS, LIP FERNS.

The genus *Myriopteris* consists of about 47 species of the western hemisphere. Most of the species occur in western North America, and the genus is especially well represented in Mexico. The name is derived from Greek words and means myriad fern, on account of the intricately divided leaf blades of most of the species.

1a. Ultimate segments of fronds mostly oblong, and densely tomentose below. . . . . ***M. gracillima***.
1b. Ultimate segments of fronds round or roundish, and subtended by a dense layer of thin scales and longish hairs:
2a. Blades glabrous on the upper surface; ultimate segments larger and more roundish. . . . . ***M. covillei***.
2b. Blades with a scattering of hairs on the upper surface; ultimate segments smaller and less roundish. . . . . ***M. intertexta***.

Myriopteris covillei (Maxon) A. Love & D. Love [*Cheilanthes c.* Maxon]. GREATER BEAD FERN. These small ferns are widely scattered on major rock outcrops and cliffs above about 1,500 ft. in the Tassajara region. ●R: Sierra Nevada and the Coast, Transverse and Peninsular range, from Tuolumne and Tehama counties to the mountains of northern Baja California, and eastward to the mountains to Utah and Arizona. ●H: small ferns with short rhizomes that produce tufts of fronds that range from about 1 to 2 dm. (4-8") long. The blades are rather exotic, for they are three to four times pinnately dissected into small and dark green bead like segments that are connected by thread like stems. The segments of young fronds appear to float on a cloud of white translucent scales and white fibers that are borne on the lower side of the blade. The sporangia are concealed under the reflexed margins of the segments.

∨***Myriopteris gracillima*** (D. C. Eaton) J. Smith [*Cheilanthes g.* Eaton]. GRACEFUL LIP FERN, LACE FERN. The only areas in the Tassajara region were this species is known to occur is in rock outcrops on the northern extensions of the Elephant's Back, where it was discovered by Vern Yadon in July of 1980 (PGM 2560), and on Pine Ridge, where Leroy Abrams collected a specimen of it in May of 1920 (Abrams 7411; DS 111853). The only other areas in the Santa Lucia Mountains where this species is known to occur is on the Ventana Double Cone and on and in the vicinity of Cone Peak. ●R: widely distributed in the mountains of temperate western North America, from British Columbia and Alberta to California and Utah. In California the distribution of this species extends to Kern County in the Sierra Nevada, and to the Santa Lucia Mountains of Monterey County in the Coast Ranges. In the Coast Ranges this species is fairly common in suitable habitats from the mountains of northern Napa County northward, but to the south this species is only known to occur on Mount Tamalpais in Marin County, on Mount Diablo in Contra Costa County, on Mount Hamilton in Santa Clara County, and in the Santa Lucia Mountains of Monterey County. ●H: small ferns of rock outcrops and cliffs, with short rhizomes which produce tufts of fronds that range from about 5 to 25 cm. (2-10") long. The blades are linear to lanceolate in outline and bipinnately divided into oblong segments. The segments are densely tomentose below. The sporangia are concealed under the reflexed margins of the segments.

+***Myriopteris intertexta*** (Maxon) Grusz & Windham [*Cheilanthes i.* (Maxon) Maxon; *C. covillei* var. *i.* Maxon]. LESSER BEAD FERN. In the first edition of this text I noted that this species was reported to occur in the Santa Lucia Mountains, and thus it may be present somewhere in the Tassajara region. In the late spring of 2009 I found this species growing out of shaded rock cracks on Flag Rock, and herbarium specimens have been collected at two other locations in this region. One was collected "Below Tassajara Road, Chew's Ridge" by James Griffin in August of 1974 (Griffin 3274; JEPS 74112), and the other was collected by Vern Yadon on the "Elephant Back NW end-Sect. 35 Tassajara Hot Springs Quad." in July of 1980 (PGM 2559). The Elephant Back is the large two domed mountain that is located about 2.75 linear miles west-northwest of Tassajara Hot Springs. This is an allotetraploid hybrid of *M. covillei* and *M. gracillima*. ●R: Sierra Nevada and the Cascade and Coast ranges, from Douglas County in southwestern Oregon to Kern County in the Sierra Nevada, and to the Santa Lucia Mountains of San Luis Obispo County in the Coast Ranges. Also in the White and Inyo mountains of Inyo County and southwestern Nevada, and disjunct populations occur in the San Bernardino Mountains in San Bernardino County, and in the Cuyamaca Mountains of San Diego County. ●H: small ferns from short rhizomes that produce fronds that range from about 6 to 14 cm. long. The blades, which are ovate-deltoid to oblong in outline, are thrice pinnately divided into very small and bead like ultimate segments. The sporangia are concealed under the reflexed margins of the segments.

PELLAEA. DUSKY FERNS.

Pellaea consists of about 35 species that occur in tropical and temperate regions. Most of the species are endemic to North and South America, but the genus is also represented in Europe, Africa, Australia and New Zealand, and on some of the Pacific islands. The name is based on the Greek word *pellos*, dusky, and probably refers to the bluish gray color of the leaf segments that is often manifested in the type species, *P. atropurpurea*.

1a. Blade segments mostly oblong or ovate, fairly rounded at the apex, spaciously arranged, and blue green during the rainy season and reddish brown during the dry season. . . . . ***P. andromedifolia***.
1b. Blade segments narrowly elliptic, acute at the apex, crowded, and gray green during rainy season and gray during the dry season. . . ***P. mucronata***.

Pellaea andromedifolia (Kaulfuss) Fee [*Pteris andromedaefolia* Kaulfuss]. COFFEE FERN. This species is locally common in rocky and shady or partly shady habitats at all elevations in the Tassajara region, but it is generally uncommon above about 3,000 ft. In his original description of this species, Georg Frederich Kaulfuss (1786-1830) spelled the name for this species as *andromedaefolia*, and this is how it is spelled in all of the texts that I have seen that were published prior to 1993. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Lane County in western Oregon to northern Baja California. Also on the Channel Islands. ●H: rhizomatic ferns with fronds that range from about 1.5 to 7 dm. (6-28") tall. The blades are two to three times pinnately divided into generally remote and oblong to oblong-ovate ultimate segments. The segments are bluish green above and light green below during the rainy season, but turn reddish brown during the dry season. During the dry season the segments resemble coffee beans, and hence the common name. The sporangia are concealed under the reflexed margins of the segments.

Pellaea mucronata (D. Eaton) D. Eaton [*Allosorus m.* D. Eaton; *P. ornithopus* Hooker]. BIRD'S FOOT FERN. This distinctive species is widely scattered and locally common on fully exposed, poor soiled and often rocky habitats at all elevations in the Tassajara region, particularly on southern slopes that are dominated by chaparral. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Jackson and Josephine counties in southwestern Oregon to northern Baja California, and eastward in the desert mountains to southern Nevada. Also on Santa Rosa, Santa Cruz, Santa Catalina, and San Clemente islands. ●H: short rhizomed ferns with coarse fronds that range from about 1.5 to 5 dm. (6-20") tall. The blades are two to three times pinnately divided into crowded and

linear-oblong to elliptical segments that are about 2 to 6 mm. long. The segments are gray green during the rainy season and gray during the dry season. The sporangia are concealed under the reflexed margins of the segments.

PENTAGRAMMA. GOLDEN BACK FERN.

Pentagramma consists of two species that are endemic to western North America. Both species occur in California, and one species, plus one lesser taxon, are endemic to the California Floristic Province. The name is derived from the Greek words *penta*, five, and *gramme*, line, supposedly for the leaf blades.

Pentagramma triangularis (Kaulfuss) Yatskievych, Windham & Wollenweber [*Gymnogramme t.* Kaulf.; *Pityrogramma t.* (Kaulf.) Maxon]. COMMON GOLDEN BACK FERN. This species is widespread and locally common at all elevations in the Tassajara region, and it primarily occurs in generally shady situations in both woodlands and chaparral. The common name refers to the pale yellowish under surfaces of the blades. ●R: temperate western North America, from British Columbia to Idaho, Utah, New Mexico and northern Baja California. ●H: shortly rhizomatic ferns with fronds that range from about 1.5-4 dm. (6-16") tall. The fronds are usually evergreen, but may wither during the summer months of exceptionally dry years. The stems are slender, glossy, and dark brown to reddish brown. The blades are generally triangular in outline, with the upper pinnae pinnately divided, and the lower (and larger) pinnae bipinnately divided. The sporangia are scattered along major veins.

Myriopteris intertexta growing out of a shaded crack on Flag Rock. Photographed by the author in early June of 2009.

PINOPHYTA (*Coniferophyta*, Gymnosperms). CONIFEROUS TREES. p. 19.

This division is comprised of about 10 families, 68 genera and approximately 630 species. It includes *Pinaceae* (pine, fir, douglas fir, spruce, hemlock, etc.), *Cupressaceae* (cypress, cedar and juniper), *Ginkgoaceae* (ginkgo), *Taxodiaceae* (redwood, bald cypress, Japanese cedar, etc.), *Araucaria* (monkey tail tree, Norfolk Island pine, etc.), *Taxaceae* (yew, California nutmeg, etc.), *Ephedraceae* (Mormon tea) and *Cycadaceae* (the cycads and related plants).

1a. Leaves branched and comprised of numerous flat scale like segments (ours). The fruits consist of three woody scales that enclose two seeds (ours). . . . . ***Cupressaceae***.
1b. Leaves not branched, and alternate (in *Abies*) or produced in bundles (in *Pinus*). The fruits are imbricated woody cones. . . ***Pinaceae***.

CUPRESSACEAE. CYPRESS FAMILY.

Cupressaceae consists of 30 genera and more than 130 species worldwide; most of the species occur in North America and Eurasia. This family includes the cypresses (*Cupressus*), the junipers (*Juniperus*), the redwoods (*Sequoia*, *Sequoiadendron* & *Metasequoia*), and Port Orford Cedar (*Chamaecyparis*).

CALOCEDRUS. BEAUTIFUL CEDAR.

Calocedrus consists of three species, two of which occur in eastern Asia, and one in western North America. The name is derived from the Greek words *kalos*, beautiful, and *kedros*, cedar.

Calocedrus decurrens (Torrey) Florin [*Libocedrus d.* Torrey]. INCENSE CEDAR. Prior to the Marble Cone Fire of 1977, this species was a common member of the largely coniferous forest that extended from Pine Ridge to Bear Basin. During the years following the Marble Cone Fire young trees were a common sight on Pine Ridge, and in some places they outnumbered those of *Pinus ponderosa*. The number of trees further declined due to the Kirk Complex Fire of 1999 and the Basin Complex Fire of 2008. I have not been on Pine Ridge since the Basin Complex Fire, but it appears, based on a photograph that I have seen that was taken at the summit of the South Ventana Cone in 2014, that a few trees are still extant. The lone tree that was mentioned in the first edition of this text, which occurred on an oak woodland slope about ½ mile north of Tassajara, was another victim of the Basin Complex Fire. It occurred in a ravine about 200 feet above Tassajara Road, a short distance north of the first hairpin curve as one is leaving the hot springs. It retained a few living branches for about a year after the fire. The wood of this species has the familiar scent of a freshly sharpened pencil, the manufacturing of which is one of the more common uses of this species. ●R: Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Marion and Wasco counties in northwestern Oregon to the mountains of northern Baja California. In the North Coast Ranges it is a fairly regular member of forested areas from Mount St. Helena in Napa County northward, and it occurs in an almost continuous stand through the Sierra Nevada to Kern County. Scattered populations occur in the Transverse and Peninsular ranges of southern California and northern Baja California, and disjunct populations occur in the South Coast Ranges. One of these populations is on, and in the vicinity of, San Benito Mountain in San Benito County, and scattered populations occur in the Santa Lucia Mountains of Monterey County. According to the Consortium of California Herbaria database, specimens from apparently native populations have been collected on Copernicus Peak in Santa Clara County, in the Santa Cruz Mountains in San Mateo County, and at two locations in the Santa Lucia Mountains of San Luis Obispo County. ●H: aromatic evergreen trees with generally conical crowns that range from about 20 to 35 m. (65-115') tall when mature, with exceptionally large trees ranging upward to 50 m. (160') tall. The trunks of older trees are typically quite broad at the base but taper rather rapidly upward. The reddish brown and fibrous bark is similar to the bark of redwoods. The light green leaves are comprised of flat and branching scale like segments. The cones, which are about 2 to 2.5 cm. long, consist of three woody scales that enclose two seeds. The yellowish to reddish brown seeds are about 8 to 12 mm. long, inclusive of the two wings, which are of unequal length.

In the first edition of this text I noted that a planted cypress tree was present in a bend in Tassajara Road formed by the second hairpin turn (above the last crossing of Cabarga Creek) as one is leaving Tassajara Hot Springs (about 1½ miles north of the hot springs), and that it appeared to be the same species and about the same age as those planted in the developed area of the hot springs. This tree, which probably represented *Cupressus arizonica*, was consumed by the Basin Complex Fire of 2008.

PINACEAE. PINE FAMILY.

Pinaceae consists of ten genera and 193 species, most of which endemic to the northern hemisphere. It includes the pines (*Pinus*), the firs (*Abies*), the spruces (*Picea*), the hemlocks (*Tsuga*), and the two species of Douglas Firs (*Pseudotsuga*).

1a. Leaves produced singularly. Cones facing upward on the branches; cone scales falling upon maturation of the cones. . . . . ***Abies***.
1b. Leaves produced in bunches of three's (ours). Cones hanging downward or outward on the branches; cone scales persistent. . . ***Pinus***.

ABIES.

Depending on the source of information, the genus *Abies* consists of somewhere between 39 and 56 species of the northern hemisphere, where, as a whole, they occur in North and Central America, Eurasia and North Africa.. *Abies* is the Latin word for silver fir.

Due to the extreme rarity, the extreme uniqueness and the wealth of information regarding *Abies bracteata*, I have written the following in depth account of this species:

Abies bracteata (D. Don) Poiteau (not *A. b.* D. Don ex Poiteau) [*Pinus bracteata* D. Don; *Pinus venusta* Douglas in Hooker; *Picea bracteata* (D. Don) Loudon; *Abies venusta* (Douglas in Hooker) Koch. SANTA LUCIA FIR, BRISTLECONE FIR, SANTA LUCIA SILVER FIR, BRACTEATED SLIVER FIR, LEAFY BRACTED FIR, FRINGE CONE SILVER FIR, LEAFY CONE SILVER FIR, PALO INCIENSO.

This rare and very unique species is scattered at higher and intermediate elevations in the Tassajara region, and it primarily occurs on talus slopes or rock outcrops on north or partially north facing slopes, and in very densely wooded areas where there is no undergrowth of shrubs. It occurs in the upper regions of Tassajara Creek, upper Church Creek, in Miller Canyon, in Pine Valley, in Bear Basin and in Anastasia Canyon. At least two populations used occur in the Oryoki Creek Canyon, but the one that could be seen from vantage points on Black Butte was destroyed in the Basin Complex Fire of 2008, and the grove that occurred on the ridge to the southwest of the developed area of Tassajara was destroyed by the Kirk Complex Fire of 1999. The upper crown of the tallest tree of this grove could be seen from the developed area of Tassajara. A lone tree once occurred along the Marble Peak Trail in the upper regions of Willow Creek, but I doubt that it survived the fires of 1999, 2008 and the Willow Fire of 2021.

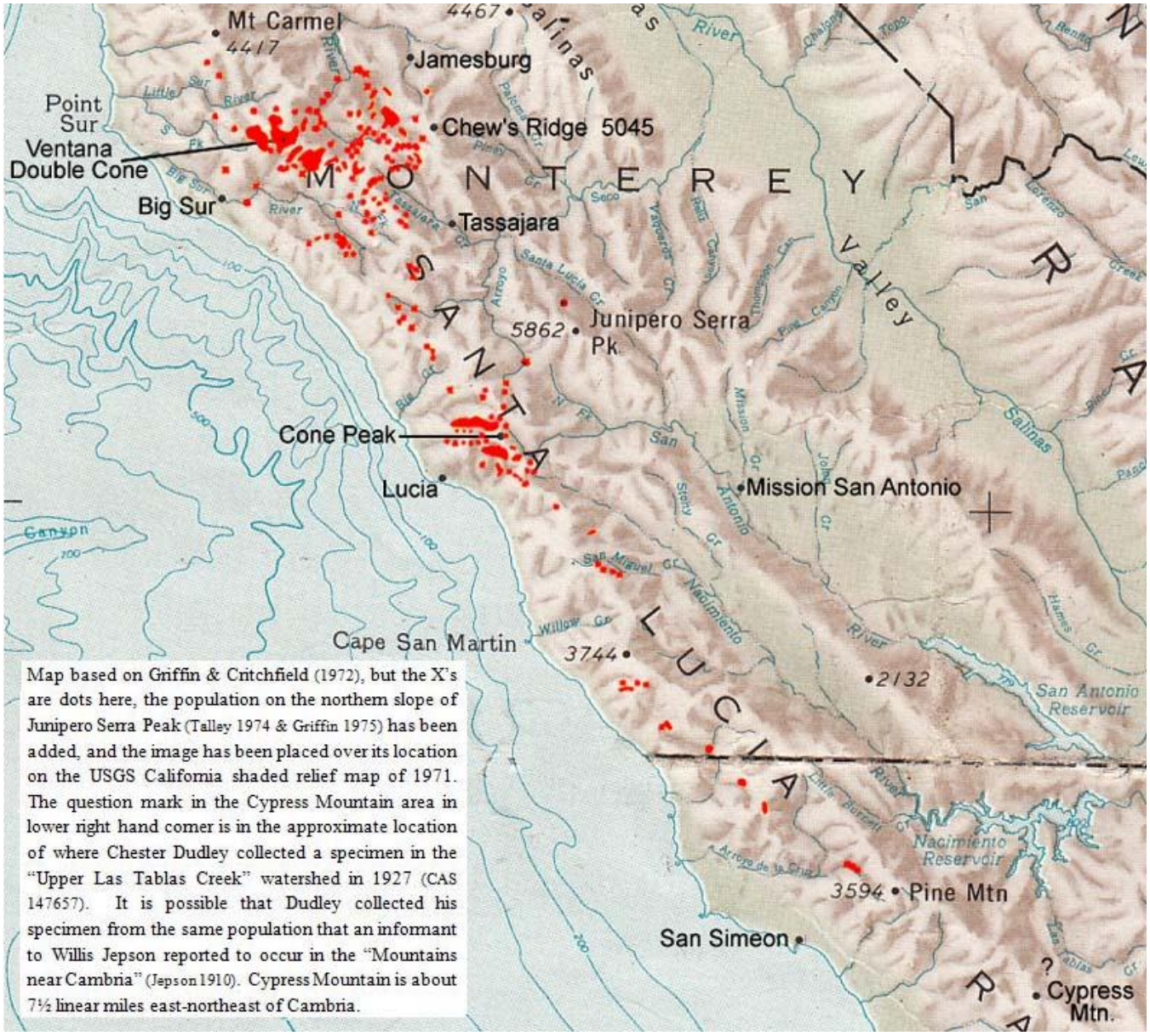
●R: *Abies bracteata* is endemic to the Santa Lucia Mountains of Monterey County and northwestern San Luis Obispo County. It occurs in the upper watersheds of the Carmel, Little Sur, Big Sur, Arroyo Seco, San Antonio and Nacimiento rivers, as well as in the upper watersheds of a number of smaller streams that flow into the Pacific Ocean. The northern terminus of it distribution extends from Skinner's Ridge, in the northern watershed of the Little Sur River, to the vicinity of Chew's Ridge, where the most interior population occurs to the east of Tassajara Road in Anastasia Canyon. It is in the upper watershed of the Little Sur and Carmel rivers (on the north slope of the Ventana Ridge and in Miller Canyon) where the greatest number of these trees occur. South of the Big Sur River and upper Arroyo Seco watersheds the populations become restricted to the Coast Ridge, with the exception one grove that occurs on the north slope of Junipero Serra Peak in the watershed of Santa Lucia Creek. It is in the vicinity of Cone Peak that the second greatest concentration of this species occurs. The most southern documented populations are located in the narrows of Marmolejo Creek, a tributary of the Arroyo de la Cruz; the trees are about 2 miles east of Hearst's Castle (Olson 1968). It is possible that trees range farther southeast, for Chester Dudley collected a specimen in the "Upper Las Tablas Creek" area in 1927 (CAS 147657), and thus probably on the northern slope of Cypress Mountain. It is likely that this is the same population that an informant to Willis Linn Jepson reported to occur in the "Mountains near Cambria" (Jepson 1910). Cypress Mountain is located about 7 ½ linear miles east-northeast of Cambria. Throughout the range of this species the trees are largely restricted to talus slopes and rock outcrops or cliffs (especially on north or partially north facing slopes), moist canyon bottoms, and densely forested areas where there is little or no undergrowth. Most populations occur between 2,000 and 5,000 feet.

Abies bracteata is not only the rarest and most narrowly endemic of all extant fir species, it is also the most morphologically distinct. This species is the only extant member of *Abies* section *bracteata* (Englemann emend. Sargent), and Liu (1971) classified it as the sole member of *Abies* subgenus *Pseudotorreya*. The name *Pseudotorreya* alludes to the similarity of the long and sharply pointed leaves to those of the genus *Torreya* (*Taxaceae*). Other unique morphological features include the bracts subtending the cone scales, which are elongated into awl like formations that are about 2 to 5 cm. long, the large spindle shaped and resinless winter twig buds, the long, stiff and sharply pointed leaves, and the spire like upper crowns.

●H: densely foliated evergreen trees with one straight and relatively narrow main stem that gradually tapers to a narrow leader; the bases of mature trees range from about 3 to 10 dm. (12-40") in diameter. Occasionally trees are encountered that have had their leader broken off during a violent storm; such trees develop one, two or sometimes three erect and closely parallel replacement leaders (I once saw a tree in Miller Canyon that had four new leaders). Mature trees range from about 10 meters (33') tall in dry, rocky and exposed habitats, to 37 meters (120') tall in moist canyon bottoms. Exceptional trees have been reported to be as much as 55 meters (180') tall. The bark, which is about one half to three-quarters of an inch thick, is medium gray or greenish, and that old trees can be irregularly broken with remote shallow fissures. ●The numerous branches are slender and rather evenly spaced; at the base they spread outward at right angles from the trunk, and they occasionally occur in distinct whorls. The lower and middle branches mature trees continue to spread outward with each year's growth (if unobstructed by nearby vegetation or excessive shade); they are at first outwardly ascending, but, probably due to force of gravity, they become outwardly drooping in age. The lower and middle branches consist of generally flat sprays in which the opposite branchlets become increasingly reduced in length toward the apex. The short and outwardly spreading upper branches are closely spaced, and form a conspicuous steeple-shaped structure on which the unique cones are produced. Thus the conical crowns of fully mature trees are upwardly spire like, and when trees are situated in areas where their lower branches are free from the shade of other trees (which causes them to die and eventually fall off), or unobstructed by surrounding shrubs or rocks, the descending lower branches form a broad pyramidal base. In 'perfect' specimens the lower-most branches touch the ground, and no part of the trunk can be seen when viewed from above or from the side. ●The closely spaced leaves are alternate and produced on all sides of the branchlets and stems, although those of the sterile branches form two opposing rows due to twists in their short petioles. The blades are narrowly linear and about 2.8 to 6 cm. long; the upper surfaces are flat, dark green and shiny, while the lower surfaces, excepting for the protruding midrib, are whitish due a coating of bloom. ●The straw colored next year's growth buds, which are terminal on the outer stems, are ovate to spindle shaped, sharply pointed, and about 1 to 2.5 cm. long. ●Pollen is produced in pale yellow cone or catkin like formations, and trees in this stage (starting in early May) are very conspicuous, even at long distances. These axillary structures are cylindrical, about 1 to 4 cm. long, and are produced on the lower sides of the previous year's branchlets of the middle and upper branches. The staminate flowers are subtended by imbricated lanceolate bracts. The erect pistillate 'flowers' are oblong, about 3 cm. long, and are produced only on the short branches of the spire like upper crown. ●The oval to oblong cones are about 5 to 10 cm. long, and although they are produced on the upper side of the branches, the weight of mature cones can cause the outer branchlets to droop. The cones are at first green with a purplish brown tinge, but turn purplish brown when fully mature The cones are quite unique in that the scales have strongly attached bracts that terminate in awns that are about 2 to 4 cm. long; they are often dotted with drops of resin. The cones mature in late summer, and begin to break apart in September or October. ●The seeds are obovate-cuneate, about 8 to 10 mm. long, and have wings that are about 10 mm. long.

NATURAL HISTORY

Fossils and fossilized pollen grains provide evidence that members of *Abies* section *bracteata* were formerly widely distributed in temperate western North America (Axelrod 1976 a &1987; Leopold & Zaborac-Reed, 2014). The earliest known fossils were collected at Florissant Fossil Beds National Monument in central Colorado, and date to the late Eocene (34 million years ago). These fossils represent *Abies rigida* Knowlton. Fossils that date to the Oligocene (34 to 23 million years ago) have been collected at the Antero, Browns Canyon and Creed sites in Colorado, and those of the later sites have



Map based on Griffin & Critchfield (1972), but the X's are dots here, the population on the northern slope of Junipero Serra Peak (Talley 1974 & Griffin 1975) has been added, and the image has been placed over its location on the USGS California shaded relief map of 1971. The question mark in the Cypress Mountain area in lower right hand corner is in the approximate location of where Chester Dudley collected a specimen in the "Upper Las Tablas Creek" watershed in 1927 (CAS 147657). It is possible that Dudley collected his specimen from the same population that an informant to Willis Jepson reported to occur in the "Mountains near Cambria" (Jepson 1910). Cypress Mountain is about 7½ linear miles east-northeast of Cambria.

also been assigned to A. rigida. Early Oligocene fossils have also been collected at the Rujada site in western Oregon, and these have been assigned to *Abies chaneyi* Mason. These fossils date to 31.5 million years ago. Fossils dating to the Miocene (23 to 5.3 million years ago) have been collected at the Clarkia site in northern Idaho, the Mascall and Stinking Water sites in eastern Oregon, the upper Cedarville site in far northeastern California, and at the Middlegate and Purple Mountain sites in western Nevada. The fossils from the Clarkia, Mascall and Stinking Water sites have been assigned to *A. chaneyi*, and those of Upper Cedarville, Middlegate and Purple Mountain sites have been assigned to *Abies scherrii* Axelrod. The cone scales of this taxon, with their long awl like bracts, are nearly identical to the present species. (Axelrod, 1976 a; Leopold & Zaborac-Reed, 2014).

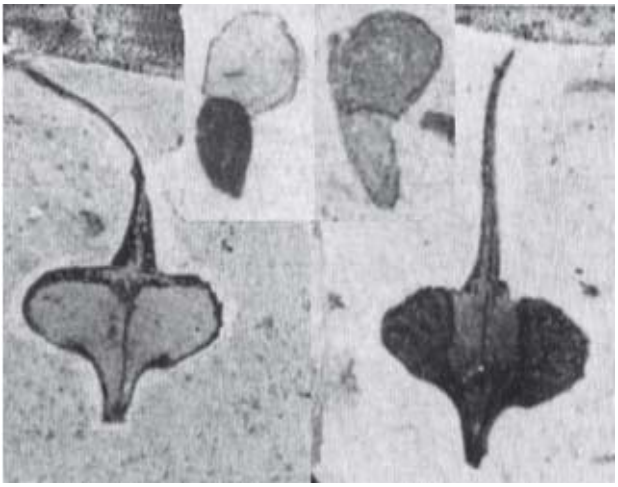
Based on the overall composition of the plant fossils from the Miocene sites in western Nevada where *A. scherrii* was present, this species occupied a transitional habitat between a broadleaved evergreen (sclerophyll) forest and a forest of mixed conifers, similar to what *A. bracteata* now inhabits in the Santa Lucia Mountains. Many of the fossilized plants were related to (if not the direct ancestors of) plants which are current associates of *A. bracteata*. Of the plants associated with the ancient broadleaf forest, specimens of *Quercus hannibalii* made up to 85% of the specimens in some of the formations. This species was very similar to the extant *Quercus chrysolepis* (Canyon Live Oak), the current overall dominant species on the middle and higher ridges on the Santa Lucia Mountains. Other extant broadleaf trees and shrubs which have counterparts in the deposits include *Arbutus* (Madrone), *Notholithocarpus* (*Lithocarpus*, Tan Bark Oak), *Quercus wislizenii* (Interior Live Oak), *Acer* (Maple), *Cercocarpus* (Hard Tack or Mountain Mahogany), *Ceanothus cuneatus*, *Heteromeles* (Toyon), *Frangula* (*Rhamnus*) *californica* (Coffee Berry), *Platanus* (Sycamore), *Salix lasiolepis* (Arroyo Willow) and *Salix melanopsis* (Dusky Willow). Of the specimens associated with the ancient coniferous forest, two have living counterparts that currently exist in the Santa Lucia Mountains, *Pinus ponderosa* (Ponderosa Pine) and *Pseudotsuga menziesii* (Douglas Fir). Other conifers represented in the fossil flora, which still have living counterparts, but not in the Santa Lucia Mountains, include *Sequoiadendron giganteum* (Giant Sequoia), *Pinus monticola*, *Abies concolor* (White Fir), *Abies magnifica* var. *shastensis*, and *Picea breweriana* (Weeping Spruce) (Axelrod, 1976 a).

During the Miocene climatic conditions were warmer and more equable than they have been for the last five million years, and due to the less elevated topography of western North America at that time, there was regular summer rainfall. During the late Miocene tectonic forces caused the uplifting of the Cascade Range, the Sierra

Abies bracteata trees growing on talus slopes in the upper watershed of Tassajara Creek, as photographed by the author from a bolder stack a short distance east of the Black Cone Trail. This stand occurs on the north slope of the upper most westward fork of this stream.

The lower inner crown of a relatively young *Abies bracteata* tree growing in Tilden Regional Park, which is adjacent to Berkeley, California. According to the records of the East Bay Regional Park District's Botanical Garden, which is also located in Tilden Park, the park's trees were grown from seeds that were collected in 1938, and the young trees were planted in 1947. Photographed by the author.

The lower outer crown of the same tree, which is located a short distance above Wildcat Canyon Road as it passes along the eastern boundary of the botanical garden. The trees inside the botanical garden and those along Golf Course Rd. were planted too close together, and thus they lack lower branches.



This image includes a combination of four details from plate six of Daniel Axelrod's The Late Oligocene Creede Flora, Colorado (1987), which depict cone scales and seeds of the fossil species *Abies rigida*. These fossils were deposited 27.2 million years ago. The similarities of these fossil features to those of the extant *Abies bracteata* are obvious.

Nevada, the Rocky Mountains and the Colorado Plateau, and the resulting rain shadow caused the Great Basin region to become arid. *Abies bracteata*, like many other extant western North American coniferous trees, could not tolerate these hotter and drier conditions, and thus became restricted to the coastal mountains and the higher inland mountains of Pacific Slope of temperate western North America (Axelrod, 1976 a; Leopold & Zaborac-Reed, 2014).

As the climate began to cool through the Pliocene (5.3 to 2.6 million years ago), leading to ice ages of the Pleistocene (2.6 million to 11,700 years ago), *Abies bracteata* probably could not tolerate the extreme cold, and became restricted to the California Coast Ranges. According to Axelrod (1976 a), *Abies bracteata* probably occurred in the in the Sierra Nevada during the Pliocene, but climatic conditions there probably became too severe for this species during the following ice ages of the Pleistocene. Axelrod also speculated that conditions also became too severe for this species in the North Coast Ranges, and its elimination in the South Coast Ranges and in the mountains of Southern California (if it ever existed there) may have been due to a xerothermic (dry and hot) period that lasted from about 4,000 to 8,000 years ago.

GENETIC DIVERSITY.

Based on the results of Ledig, Hodgskiss & Johnson's study of the genetic diversity and seed production of *Abies bracteata* (*Conservation Genetics* 7: 383-398, 2006), the long term survival of *Abies bracteata* is uncertain, for its genetic diversity is low. Species with low genetic diversity are in greater danger of decline due to new environmental threats, such as diseases or climate change, for they have a more limited capability of producing evolutionary responses. The low genetic diversity of *Abies bracteata* suggests that it was at one time reduced to a single interbreeding population, probably during what appears to have been an extremely xerothermic (hot dry) period between about 4,000 and 8,000 years ago, after which it expanded to its present range. Ledig, Hodgskiss & Johnson also state that:

> We believe that the real danger to Santa Lucia fir is lack of genetic diversity, either within populations or among populations… A slow attrition in the number of populations is to be expected from century to century, and protection from exploittation alone is unlikely to prevent eventual extinction. At exposed, high elevation sites, effective regeneration may occur only once or twice a century, as inferred from age distributions of trees in natural populations (Talley 1974). The infrequent periods of regeneration may be driven, in part, by climate and fire, but reduction in seed yield due to inbreeding and predation probably play a role. Demographic stochasticity [randomness] might result in population extinction, given the right sequence of high seed chalcid numbers and climatic conditions unsuitable for pollination, seed maturation, and/or seed survival… In addition to the losses resulting from lack of pollination and seed predation are the losses from genetic deaths as the inbred zygotes are removed by selection during stand maturation… These genetic deaths occur as seeds fail to germinate and as a high proportion of the seedlings that do germinate succumb to completion or developmental failures before maturation… Santa Lucia fir's remaining genetic resources should be protected *ex situ* in seed banks and field gene banks in case restoration is needed or to establish new populations in suitable habitat if climate change scenarios unfold as projected.

PESTS.

The seeds of *Abies bracteata* are parasitized by the larvae of the wasp *Megastigmus pinus* Parfitt, Fir Seed Chalcid, and in some years they can inflict a 100% mortality on the seed crop of a tree (Parfitt 1857; Wolf 1967; Talley 1972 & 1974, etc.). These small wasps deposit their eggs directly into embryonic seeds when the young cones are still soft, and the larva consume the inner portions of the seeds while the outer casings continues to grow. After the maturation of the seed casings the insects exit by drilling a small round hole through this structure. Fortunately the effects that these insects have on the reproduction of this species is cyclical, for in many years abundant crops of viable seeds are produced. According to Talley (1972):

> Good seed crops are occasionally produced by the firs ability to respond to climatic fluctuations with a dramatic fluctuation in annual cone production, thus literally swamping the wasps with more seed than they can parasitize in one year, and producing next to no cones the subsequent year.

Megastigmus pinus was first named and described by the English entomologist Edward Parfitt in 1857, and as the first of the host species that he listed was *Picea bracteata*, he must have identified this host by using John C. Loudon's "Arboretum et Fruticetum Britannicum" (1838). In this text Loudon assigned *Abies bracteata* to the genus *Picea*. It is most probable that is was from the *Abies bracteata* seeds that were collected by A. F. Beardsley in the fall of the previous year (1856) that the specimens of adult *Megastigmus pinus* wasps had emerged.

Megastigmus pinus infests the seeds of at least seven *Abies* species (and hence the common name Fir Seed Chalcid), and its distribution extends from British Columbia to Colorado and to the higher mountains of southern California (Keen 1958; Furniss & Carolin 1977). According to this species author (Edward Parfitt), he named it *pinus* because "It appears to be generally attached to the *Pinus* family (i.e., *Pinaceae*, to which the genus *Abies* belongs).

In late July of 1880 George Vasey, the chief botanist of the U. S. Department of Agriculture and the curator of the United States National Herbarium, collected infested cones of *Abies bracteata*, and from Jolon he shipped them to the Department of Agriculture's Division of Entomology (Comstock 1880). The seeds of all of these cones were infested *Megastigmus* larvae, and the cone scales of one was also infested with the larvae of a moth species that was new to science. In September of that year five moths emerged from the cone scales. This species was named *Grapholitha bracteatana* by Charles H. Fernald, but this species was later assigned to the genera *Laspeyresia* and *Cydia* (Cydia *bracteatana* is its currently accepted name. This species, which has the common name of Fir Cone Moth, also infests *Abies concolor* (White Fir), *A. magnifica* (Red Fir),

Pseudotsuga menziesii (Douglas Fir) and *Picea sitchensis* (Sitka Spruce), and its distribution extends from British Columbia to Colorado and California (Keen 1958; Furniss & Carolin 1977).

According to Talley (1972): "As for the score of wood boring beetles that attack" *Abies bracteata* "trunks and branches, their total impact is not alarming, and, like the other insects, appears to represent a stable equilibrium." The only bark beetle that I have found specific references to its predation on *Abies bracteata* is *Scolytus dentatus* Bright, Santa Lucia Fir Bark Beetle, which feeds on the bole (main trunk) and larger branches of this species. This species was first named and described by D. E. Bright in 1964, and the type locality is Cone Peak (Wood 1982). It apparently feeds only on *Abies bracteata* bark.

In the late 1960s it was discovered that the leaves of *Abies bracteata* trees growing in the vicinity of Cone Peak were infected by a needle cast caused by the fungus *Lirula nervisequia* (DC ex Fr.) Darker var. *conspicua* Darker, which had previously been found only on *Abies* species in Europe and Asia. The most conspicuous sign of infection is a black upper surface line that runs nearly the entire length of infected, and thus dead, leaves. In R. F. Scharpf, John Stanley and F. G. Harksworth's report on this disease it was stated that:

> For the most part, the disease appeared to be confined to the lower part of the crown of each tree. No particular year of needles was selectively attacked by the fungus. To the contrary, needles ranging from 4 to 22 years old were infected. Infection was expressed as a random scattering of dead and dying needles along branches. Older, as well as recently killed, needles remained firmly attached to the branch and showed no propensity to "cast." Infection was light, with only 1 out of every 10 or more needles showing any symptoms or signs… Because of the limited range and inaccessibility of the host species, the disease probably was not introduced into the native stands. Instead, the organism probably has become geographically isolated along with the host and has managed to perpetuate itself. The disease, judged by its nature, does not appear to be causing any significant damage to trees or to be seriously threatening the species. We suggest, however, that surveys should be made to determine the extent and magnitude of infection throughout the range of bristlecone fir.

In spite of its pests, *Abies bracteata* appears to be a reproductively vigorous species, for in places where I have come into close contact with adult trees, I also saw younger trees that were at all stages of maturation, including many seedlings. In 1897 Alice Eastwood noted that "The number of small trees coming up in San Miguel Canyon assures us that the species is in no danger of extermination," and in 1905 Plumber & Gowsell noted that "Its reproduction is good all over the entire area" of the proposed Monterey Forest Reserve. Don Olson reported "Many young trees and seedlings were growing in the surrounding shade" of the most southern documented grove of this species (Olson 1968), and Stephen Talley, in his Ph.D. dissertation on the ecology of the Santa Lucia Fir (1974, p. 187), states that "Several authors have expressed concern that cone parasites are rendering *Abies bracteata* and endangered species… The abundance of reproduction in ravine stands observed by Pinchot (1908) and Plummer and Gowsell (1905), and during this study, contradict these fears."

Abies bracteata almost always occurs in the following types of habitats: on steep rocky slopes comprised of talus or scree, in deep rocky and/or shady canyon bottoms, in very dense evergreen woodlands in which there is no undergrowth, and sometimes on cliffs. The one thing that these habitats have in common is that they are both relatively fire proof, an essential condition for the survival of *A. bracteata*, for the thin bark and dense crowns, which often extend nearly to the base of the trees, make this species extremely vulnerable to fires.

BOTANICAL AND HORTICULTURAL HISTORY

Although the Esselen and Salinan Indians, who occupied regions in which *Abies bracteata* occurs, certainly had their own names for this species, these words are now probably lost. William Peebles, who made an expedition to the Santa Lucia Mountains in 1858 to collected *Abies bracteata* seeds, reported that the padres at Mission San Antonio de Padua used the resin of this species for incense (Murray 1859), and Willis Linn Jepson, in his The Silva of California (1910), stated that the:

> Fathers at Mission San Antonio knew the trees and called them "Incienso," since from them they obtained the resin used for incense in religious ceremonies in the San Antonio Chapel. Doubtless from them Coulter and Douglas had their information regarding the existence of this species in the rugged and inaccessible Santa Lucia Mountains well off the old Spanish trail to Los Angeles from Monterey.

The San Antonio padres certainly discovered this species while on evangelical missions to coastal villages via trails that the Salinan people had established between the coastal and interior regions of their territory.

The exact location of where the earliest botanical explorers found *Abies bracteata* is known, for, as it will be seen, it was repeatedly stated that they encountered this species on the seaward facing slope of the mountains in an area where *Pinus lambertiana* (Sugar Pine) was present. As *Pinus lambertiana* is restricted to two populations in the Santa Lucia Mountains, the interior one on the summit of Junipero Serra Peak is ruled out, and thus these men discovered *Abies bracteata* in the vicinity of Cone Peak, which overlooks the Pacific Ocean. The general route that these explorers must have taken followed that of what are now known as the Carrizo and Gamboa trails (the former reaches the summit of the Coast Ridge from the east, and the later from the west), and this general route was certainly a path by which the Salinan peoples traveled between their geographic districts of *Lima*, in which Mission San Antonio is located, and the coastal geographic district of *Kigilit*. In 1897 Alice Eastwood described this route as "The most rugged but most attractive of all these trails. Long ago it was much traveled by the Indians, but now a traveler rarely crosses the mountains by that route" (Eastwood 1897). The trees from which the early *Abies bracteata* specimens were collected certainly belonged to the stands that occur in the South Fork of Devil's Canyon, a tributary of Big Creek.

The first botanical explorers to collect specimens of *Abies bracteata* were David Douglas and Thomas Coulter, who crossed paths in Monterey in 1831 and 1832. Unfortunately the journals that these men kept during their California explorations were lost, and thus information about their findings is limited to other sources. Coulter's journal was lost while being shipped from Mexico to England (Nelson & Probertl, p. 117, 1994, etc.), and Douglas' journal was lost when his canoe was "Dashed to atoms" by a cataract on the Fraser River in British Columbia (Douglas in Hooker 1836 p. 159, 1836).

David Douglas, one of the most famous of the 19th century scientific explorers, was a Scottish student of the renowned English botan-ist Sir William Jackson Hooker. Douglas was then on his second botanical expedition to western North America on behalf of the Horticultural Society of London. Thomas Coulter was an Irish botanist, physician, and a student of the eminent Swiss botanist Augustin de Candolle; Coulter explored in Mexico and California from 1824 to 1834.

David Douglas arrived at Monterey on by sea on December 22, 1830, and spent the next three months negotiating his stay with the territorial government (at that time California was a territory of Mexico). While awaiting his passport Douglas made one excursion beyond the vicinity of the Monterey Peninsula, when, in February of 1831, he accompanied William Hartnell, a Monterey merchant, to

Thomas Coulter (1793-1843), left, and David Douglas (1799-1834). The portrait of Coulter is from E. Charles Nelson and Alan Probert's biography of Coulter, *A Man Who Can Speak of Plants* (1994), and that of Douglas accompanied Sir William Jackson Hooker's biography of Douglas in volume two of the *Companion to the Botanical Magazine*, 1836.

Mission San Juan Bautista. From there Douglas proceeded, with an armed escort, to the missions of Santa Clara and Santa Cruz; he had returned to Monterey by the second day of March.

After receiving his passport on April 20th, Douglas headed south, and by April 25th he had reached the mission at Soledad. Two days later he was at Mission San Antonio, and he reached Mission San Miguel by May 1st, Mission San Luis Obispo by May 3rd, Mission La Purisima by May 5th, Mission Santa Ynez on May 6th, and the Santa Barbara Mission by the middle of the month. After "A short stay" at Santa Barbara, Douglas returned to Monterey via "The same route," but it took him much longer to get back, for he was "Occasionally penetrating the mountain valleys which skirt the coast." Douglas got back to Monterey in late June, where he remained until at least July 15th.

Douglas then "Started for San Francisco," and on this excursion he also visited San Jose, Santa Clara, Sonoma, Fort Ross, and Mount Diablo, where he collected the rare Mount Diablo Fairy Lantern. Douglas had returned to Monterey by August 25th of 1831.

Thomas Coulter arrived at Monterey by sea in late September or early October of that year, and on October 18th he joined a party of men who were traveling south to Mission San Gabriel (near Los Angeles). The party moved at a remarkably fast pace along El Camino Real, for they arrived at Santa Barbara two days later, and by November 3rd Coulter was at San Gabriel, where he wrote a letter to his sister that was dated November 8, 1831. As Coulter returned to Monterey on 23rd day of that month, it is chronologically possible that he collected specimens of *Abies bracteata* and *Pinus coulteri* during this time.

David Douglas concluded a letter to Sir William Jackson Hooker, that was dated November 23rd, 1831 (the day that Coulter returned to Monterey), with the following paragraph:

> Since I began this letter, Dr. Coulter, from the Central States of the Republic of Mexico, has arrived here, with the intention of taking all he can find to De Candolle at Geneva. He is a man eminently calculated to work, full of zeal, very amiable, and I hope may do much good to Science. As a salmon-fisher he is superior even to Walter Campbell, of Islay, Esq., the Izaak Walton of Scotland; besides being a beautiful shot with a rifle, nearly as successful as myself! And I do assure you, from my heart, it is a terrible pleasure to me thus to meet a really good man, and one with whom I can talk of plants.

According to Nelson & Probert's biography of Thomas Coulter, A Man Who Can Speak of Plants (1994), Douglas's letter, as published in volume two of the *Companion to the Botanical Magazine*, was edited, and that the concluding line of the original manuscript actually reads "And I do assure from my heart it is a terrible pleasure to me to find a good man and a man who can speak of plants;" and hence the title of their book.

From November of 1831 to March of 1832 Coulter and Douglas remained in Monterey. While in California Douglas became of friend of William Hartnell, an English merchant who settled in Monterey in 1822, and Douglas (and perhaps Coulter) lodged at Hartnell's home. During this period Douglas and Coulter were enlisted in the *Compania Extranjera* (Company of Foreigners), a group of about 60 foreign residents of Monterey, who organized, under the leadership of Mr. Hartnell, to assist in keeping order during a threatened rebellion against the government.

For the remainder of Douglas' stay in California he was in "Constant dread of a vessel arriving, and sailing without me," and thus he "Could not venture to be absent more than fifteen or twenty days at a time from the coast." Douglas mentioned the location of only one of these later excursions, which was to the Santa Lucia Mountains in March of 1832, and it was on this outing that he encountered the trees that he named *Pinus venusta*.

It was also in March of 1832 that Thomas Coulter set out on an expedition that would take him through southern California and then eastward, across the desert, to the Colorado River, and thus it is probable that he was accompanied by Douglas for the first part of this journey. On March 20th of that year, Coulter took chronometer readings at Monterey, and as it took him 17 days to reach Santa Barbara, it is quite possible that he also collected specimens of *Abies*

bracteata and *Pinus coulteri* in March of 1832.

In a letter to his mentor, Sir William Jackson Hooker, which was dated October 23rd, 1832, Douglas stated:

> I will now mention another new *Pinus* to you (*Pinus venusta*), which I discovered last March, on the high mountains of California (you will begin to think that I manufacture Pines at my pleasure). As my notes are not at hand, I must describe by memory. Leaves solitary, two ranked, green above, glaucus beneath. Cone cylindrical, three to four inches long, erect; scales orbicular, deciduous (like those of *P. balsamea*), with an entire bractea or appendage between the scales, exserted to three or four inches and a half! When on the tree, being in great clusters and at a great height withal, these cones resemble the inflorescence of a *Banksia*, a name which I should have liked to give to the species, but that there is a *Pinus banksii* already. This tree attains a great size and height, and is, as a whole, a most beautiful object. It is never seen at a lower elevation than six thousand feet above the level of the sea [?], in latitude 36 degrees, where it is not uncommon.

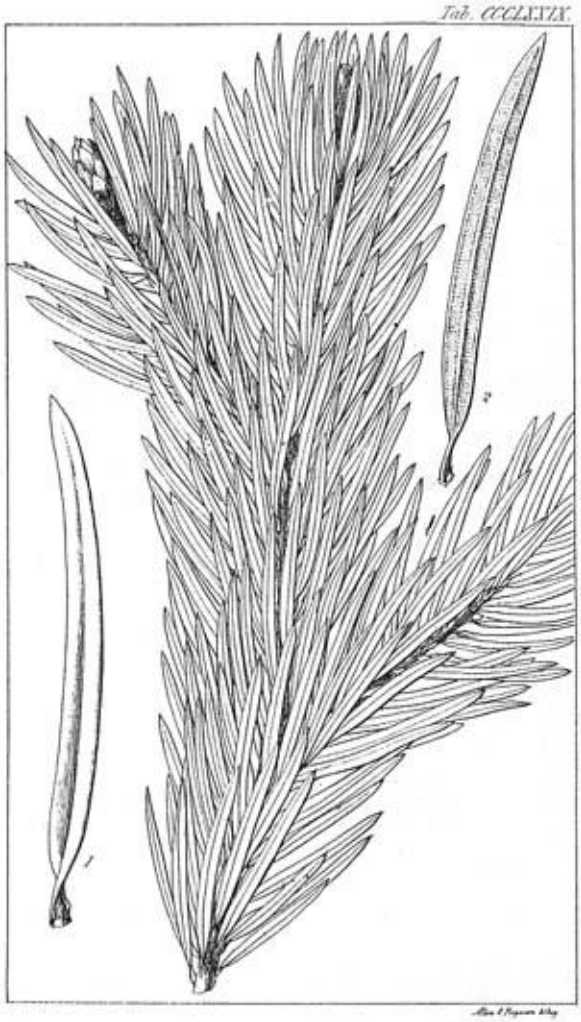
Due to the time of year, Douglas must have imagined what intact cones would look like, and his specimens, or at least the ones he sent to Hooker, lacked reproductive features. In any case, we know the location in the Santa Lucia Mountains were Douglas found *Abies bracteata*, for in the next paragraph he stated that:

> I saw for a second time, and in a new habitat, *Pinus lambertiana*, more southerly on the mountains of Santa Lucia, in Upper California. The cones were in fine condition, though perhaps a little too young and somewhat longer than those I had discovered to the north in 1826. The timber in this new situation is the largest of all, but by no means so fine as that in 43 and 45 degrees of N. latitude, where the temperature is doubtless more congenial to it.

From Mission San Antonio Thomas Coulter continued on his southward journey, and reached Santa Barbara on April 6, 1832, Mission San Gabriel on April 23rd, and by May 8th he was camping on the banks of the Colorado River. Coulter was disappointed with the relatively small number of specimens that he was able to collect, for in a letter to his mentor, Alphonse de Candolle, which Coulter wrote while still at the Colorado River, he stated that his:

> Small collection of plants from this country were made about Monterey chiefly, and that happens to be the best part of the country—at least nine tenths of the plants of California exist in the mountains of San Antonio within 30 leagues of Monterey to the southeast, and in those of Santa Cruz and Santa Clara 30 leagues northwest of it, that is to say within Lat. 35 and 38. As this district has been pretty well examined last year by a Mr. Douglas, I wished to examine new ground and have come south hoping to find a good harvest hereabouts and have been completely disappointed.

On May 17th of 1832 Coulter began his return trip from the Colorado River; he reached Mission San Gabriel by June 15th, and by July 5th he was at Santa Barbara, were he remained for a least two days. On July 19th Coulter reached Monterey, where, to his great surprise, David Douglas was still waiting for a departing vessel. As it took Coulter 12 days to travel between Santa Barbara and Monterey, he had ample time to collect (or again collect) *Abies bracteata* specimens, and this would have been an ideal time to collect cones of this species. Coulter's specimens included at least one intact cone (the cones begin to fall apart in late summer and early fall), while those of Douglas, or at least those that he sent to Sir William Jackson Hooker, only included stems and leaves, as evidenced by the figure one of Douglas's specimens in volume 4 of Hooker's *Icones Plantarum* (tab. 379, 1841).



An illustration of one of David Douglas's *Abies bracteata* specimens that was published in volume 4 of Sir William Hooker's *Icones Plantarum* (1841). Douglas must have forgotten to label this specimen, for Hooker erroneously published this figure under the name *Taxodium* (*Sequoia*) *sempervirens*, the Coast Redwood. An explanation of Hooker's error is included in the concluding Taxonomy section of this text.

Douglas finally departed Monterey on a vessel bound for Hawaii in August of 1832. In a letter to Sir William Jackson Hooker, dated October 23, 1832, Douglas noted that:

> I left in California my friend Dr. Coulter, who will not, I trust, quit that country till he has accomplished everything, for he is zealous and very talented. To de Candolle, who is his old tutor, he sends all his collections; and who can wonder at his giving him preference? Dr. Coulter expects to be in England in the autumn of 1833; I have given him a letter of introduction to you.

It thus appears that it was after the departure of Douglas that Coulter had the misfortune of breaking a leg, which prevented him from making expeditions to the San Francisco Bay region and the San Joaquin Valley. Coulter remained in Monterey until late 1832, when he began an overland journey to San Diego, from where he departed on a ship bound for Mexico. Although the overland portion of this journey provided Coulter with yet another chance to collect *Abies bracteata* specimens, due his physical condition, he probably did not. On this excursion Coulter concentrated his efforts in recording the vocabularies of the Indians at the various missions along the route (Nelson & Probert, 1994).

Based on what is known about their explorations in California, my

hunch is that Coulter and Douglas were together when they encountered *Abies bracteata* in March of 1832, and that Coulter revisited the location in the following July in order to collect cones.

DAVID DON'S DESCRIPTION OF *PINUS BRACTEATA*.

Abies bracteata was first named and described (as *Pinus bracteata*) by David Don in 1836, in his paper "Descriptions of Five New Species of the Genus *Pinus*, Discovered by Dr. Coulter in California" (*Transactions of the Linnean Society of London* 17: 439-444). After his Latin description of the species, Don stated that:

> This curious and interesting species of fir was discovered by Dr. Coulter on the sea side of the mountain range of Santa Lucia, about 1000 feet lower down than [*Pinus*] *coulteri*. The trunk rises to the height of 120 feet, is very slender, not exceeding two feet in circumference, and as straight as an arrow. The upper third of the tree is clothed with branches, giving it the appearance of an elongated pyramid. The branches are spreading, the lower ones are decumbent. The bracts are long and recurved, and but little changed from the ordinary leaves, which give the cones a singular appearance. The seeds are remarkable for a peculiarity in their structure, in having the nucleus exposed at the inner angle of the seed through a considerable opening in the outer testa, as if the junction of the two sides had been prevented by the rapid enlargement of the nucleus. It is only the middle branches that bear cones.

Because Don states that this species was found about 1000 feet lower down than *Pinus coulteri*, we know the location of its collection, for in the same text he states that *Pinus coulteri* was discovered "On the mountains of Santa Lucia, near the Mission of San Antonio, in latitude 36º, within sight of the sea and at an elevation of from 3000 and 4000 ft. It was growing intermingled with *Pinus lambertiana*." Thus he collected it the vicinity of Cone Peak.

THE EARLIEST ILLUSTRATIONS *ABIES BRACTEATA*.

The first illustration of *Abies* (*Pinus*) *bracteata* was a chromolithographic plate that was published in 1837 in volume three of Aylmer Bourke Lambert's *A Description of the Genus Pinus*, a text that is comprised of inconsistent editions that were published between 1803 and 1842 (Little 1949). The accompanying text was written by David Don, and it is essentially the same as that of Don's original description of this species in volume 17 of the *Transactions of the Linnean Society of London*.

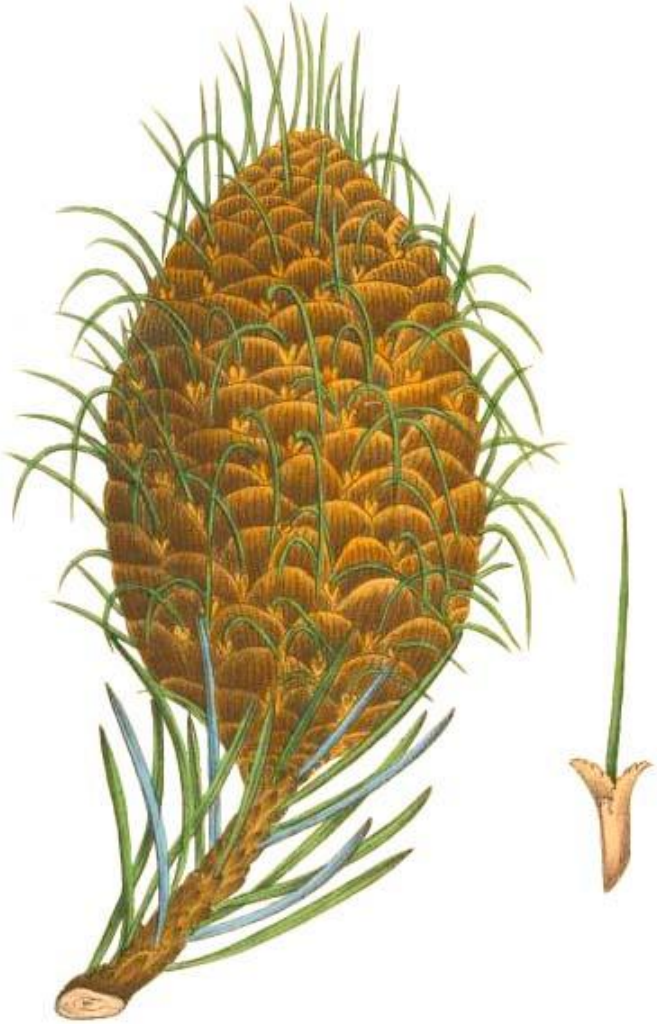
In 1838 a line drawing illustration of *Abies bracteata*, which was based on the illustration in *A Description of the Genus Pinus*, was published in volume four of John Claudius Loudon's *Arboretum et Fruticetum Britannicum* (fig. 2256). In this text Loudon placed the species in the genus *Picea*.

A third illustration of this species was published in part six of Franz Antoine's *Die Coniferen, Nach Lambert, Loudon und Anderen* (1841), and this chromolithographic plate was also based on the illustration that was published in *A Description of the Genus Pinus*.

WILLIAM GAMBEL (1823-1849).

The next scientific explorer who may have collected specimens of *Abies bracteata* was William Gambel. Gambel was primarily an ornithologist who, while on an expedition through the southwestern United States (then northern Mexico) from 1841 to early 1843, also collected plant specimens for his mentor, Thomas Nuttall. Nuttall (1786-1859) is the well known English botanist and zoologist who worked in the United States from 1808 to 1841. Gambel collected botanical and zoological specimens in California from January to September of 1842, and for a time he resided at the Monterey home of William Hartnell, as did David Douglas and probably Thomas Coulter a decade before.

In 1845 Gambel donated two specimens of *Pinus lambertiana* to the Academy of Natural Sciences of Philadelphia (one of a cone and seeds and the of other of a leafy branch), that he collected in "The Mountains of Santa Lucia, Upper California" (*Proceedings of the Academy of Natural Science of Philadelphia* 2: 276 & 279, 1846). Although it is unknown if Gambel also collected specimens of *Abies bracteata*, somehow Thomas Nuttall came into possession of a specimen of an intact cone, which was the study for a totally original illustration of this species that was published in volume three of Nuttall's *The North American Sylva* (1849).

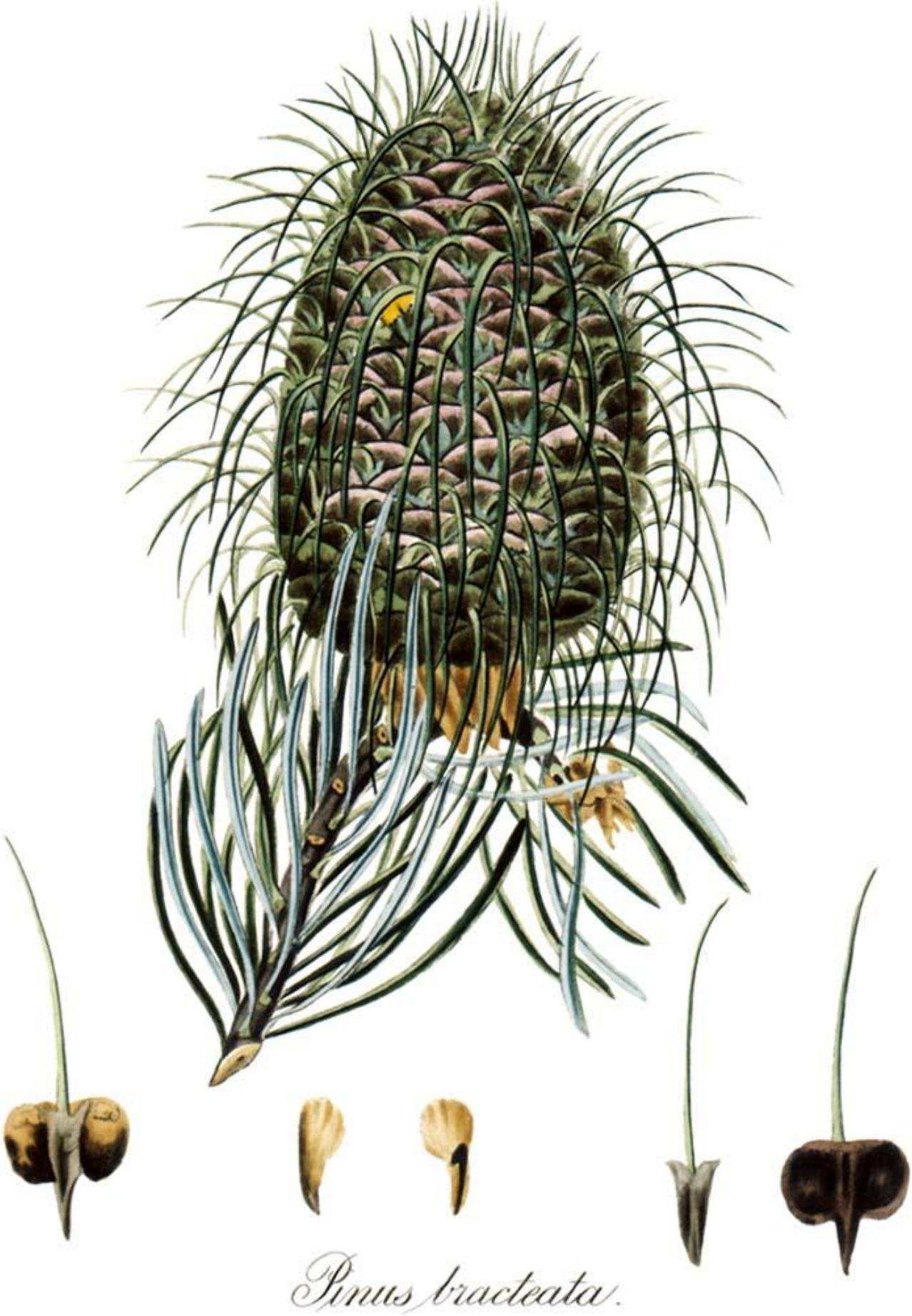


An *Abies bracteata* cone as illustrated in volume three of Thomas Nuttall's *The North American Sylva*, 1849.

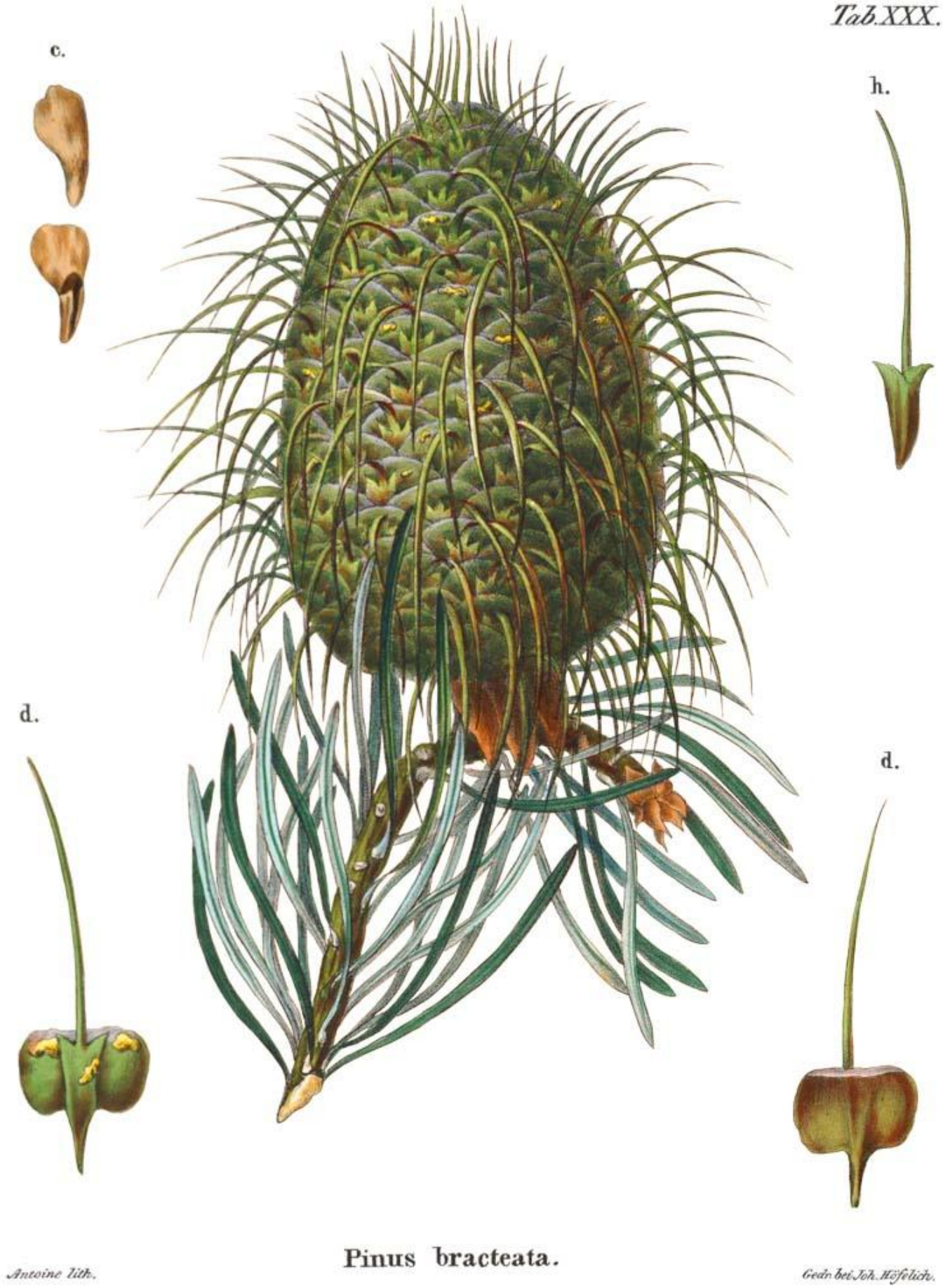
THEODORE HARTWEG (1812-1871).

Due to Douglas and Coulter's descriptions of *Abies bracteata*, this species became "One of the greatest desiderata among unintroduced coniferous trees" to Europe (Lindley 1853), and thus the acquisition of seeds from which this species could be introduced into European gardens was one of the primary objectives of a number of botanical expeditions during the 1840s and 1850s. The first of these was made by Karl Theodor Hartweg, on behalf of the Horticultural Society of London. Although Mr. Hartweg arrived in Monterey in June of 1846, it was not until September of 1847 that he was able to make an excursion to the Santa Lucia Mountains, for this was during the Mexican-American War, and all available horses at Monterey had been sent south to assist in the battle of San Pascual near San Diego. The following excerpt is from part four Mr. Hartweg's Journal of a Mission to California in Search of Plants, which was published on pages 225 and 226 of volume three of *The Journal of the Horticultural Society of London* (1848):

> On September the 20th [1847] I again left Monterey for the southern parts, which, on account of the disturbed state of last



Pinus (*Abies*) *bracteata* as illustrated in volume three Aylmer Lambert's "A Description of the Genus Pinus," 1837.



Pinus (*Abies*) *bracteata* as illustrated in Franz Antoine's "Die Coniferen," 1841.

year, I could not visit before. As a guide I engaged the services of a man who had accompanied me on my last excursion to Santa Cruz, and who, from his profession as a hunter, was well aquatinted with the intricate mountain paths of the district I intended to visit. On the day of our starting we reached the mission of La Soledad, an ill-constructed, half-ruined building, situate in the Salinas Valley, and encamped towards evening on the banks of the Salinas River, within a short distance of the mission.

By sunrise the following morning we were again on horseback, and leaving the main road on the right, we entered a mountain defile [Reliz Canyon] leading to the mission of San Antonio… From San Antonio a range of mountains extends along the coast, attaining a great elevation, which, although apparently barren as seen from the mission, I was assured on the western flank towards the sea is covered by large Pines… Having ascended the first ridge, we passed through thickets of *Arctostaphylos tomentosa* and *Ceanothus thyrsiflorus*, and entered a forest of *Pinus lambertiana*. The cones of this noble Pine are always hanging from the points of the branches, were by this time already open, and the seeds had fallen out. From cones that had been blown down, I picked out a few seeds.

Descending the western flank of the great mountain range, I found at last the long-wished-for *Abies bracteata*, occupying exclusively ravines. This remarkable Fir attains the height of 50 feet, with a stem from 12 to 15 feet in diameter [he must have meant inches], one third of which is clear of branches, and the remainder forming an elongated tapering pyramid, of which of the upper part, for three feet, is productive of cones. Having cut down some trees, I found to my regret that the cones were but half-grown, and had been frost-bitten. In more sheltered situations, towards the sea-shore, the same happened to be the case; and I was thus precluded all hope of introducing this remarkable Fir into Europe.

In the first paragraph of the preceding excerpts from Hartweg's text he states that he employed as a guide a man who was "Well acquainted with the intricate mountain paths of the district that I intended to visit." According to John G. Lemmon (1890, p. 154):

John Meyers, now an aged citizen of Monterey, related to the writer recently the prominent events of the prosecution of this work of Hartweg—for Mr. Meyers accompanied the botanist.

He describes Hartweg as a tall, slim, but strong, good looking man of dark complexion, large, observant eyes, and quite yet attractive demeanor.

They started out with two burros and what other equipment they thought necessary, and after several days of terrible struggle and almost fatal hardships, they reached the trees and secured a "Flower sack full of cones."

The seeds were sent to London, and when two years old the few plants that were produced were sold for 25 guineas apiece, or about $130.

The next season, 1847, they planned a second trip with four burros and better additional equipments in every respect; but although they reached the grove and scanned every tree, not a cone was to be seen (the firs were not fruiting that season), a fact which they might have previously ascertained with little trouble by examination of other species nearer at hand, but no one at that time had observed this habit of the fir family skipping a year occasionally.

Hartweg was blamed by his employers for failing to forward seeds and accused of playing false to them, which embittered the sensitive man and he left their service.

Although it appears that there is no evidence that Meyer's account about Hartweg was true, according to Beidleman (2006):

Karl Theodore Hartweg may have been the ultimate plant and seed collector, almost to the exclusion of paying much attention to the rest of California's diversified natural history. Yet on his return Hartweg seemed unappreciated by the London Horticultural Society and soon left its employment. Among other things, the society was irritated because he failed to bring back seeds of the Bristle Cone Fir from California.

WILLIAM LOBB (1809-1864).

William Lobb was the next botanical explorer who made an expedition to the Santa Lucia Mountain in order to procure *Abies bracteata* seeds, and his efforts in late 1849 were successful. Mr. Lobb had been sent to California by Veitch & Company, an English horticultural firm that specialized in coniferous trees. According to Murray (1859), John Meyer of Monterey, who served as Hartweg's guide, also served in this capacity for Lobb. Lobb's *Abies bracteata* seeds arrived in England in 1850 (Ewan 1973), and in 1853 the young plants were sent to market. In the editorial column of the Saturday, July 9th, 1853 edition of *The Gardener's Chronicle*, John Lindley stated that:

The finest of the race of Silver Firs is probably *Abies bracteata*, a tree originally found in California by Dr. Coulter, and afterwards by the unfortunate Douglas. The first met with it on the mountainous range of Santa Lucia, running parallel to the coast, and about 1,000 feet less than *Pinus coulteri*, or *macrocarpa*, forming a very slender tree, 120 feet high, and as straight as an arrow. Douglas speaks of it as a most beautiful object, attaining a great size and height, and never found at a lower elevation than 6,000 feet above the sea, on the California mountains, in latitude 36° N… Hartweg sent none [no seeds] home from California; so that this charming species has long been one of the greatest desiderata among unintroduced coniferous trees. We are therefore peculiarly happy to announce to all eager coniferomaniacs that Messrs. Veitch & Co. are about to send it into market, as announced in an advertisement in another column [this ad first appeared in the subsequent edition of this weekly publication]. Their industrious collector, Mr. William Lobb, transmitted seeds some years ago, from which a crop of fine healthy plants has been obtained. Mr. Veitch has been so good as to furnish us with the following extract from one of Mr. W. Lobb's letters:

This beautiful and singular tree forms here the most conspicuous ornament of the arborescent vegetation. On the western slopes, towards the sea, it occupies the deepest ravines, and thus attains the height of 120 to 150 feet, and from 1 to 2 feet in diameter; the trunk is as straight as an arrow, the lower branches decumbent; the branches of the upper part are numerous, short, and thickly set, forming a long tapered pyramid or spire, which gives to the tree that peculiar appearance which is not seen in any other kinds of the *Pinus* tribe. When standing far apart, and clear from the surrounding trees, the lower branches frequently reach the ground, and not a portion of the trunk is seen from the base to the top.

Along the summit of the central ridges, and about the highest peaks, in the most exposed and coldest places imaginable, where no other Pine makes its appearance, it stands the severity of the climate without the slightest perceptible injury, growing in slatey rubbish which, to all appearances, is incapable of supporting vegetation. In such situations it becomes stunted and bushy, but even the foliage maintains the same beautiful dark green colour, and when seen at a distance it appears more like a handsome grown Cedar than a Pine. No doubt it is one of the hardiest trees of the Californian vegetation, and is equally

well adapted for clothing the mountain tops as the sheltered valley.

The cones, too, are quite as singular as the growth of the tree is beautiful; when fully developed, the scales, as well as the long leaf-like bracts, are covered with globules of thin transparent resin, presenting to the eye a curious and striking object.

Douglas was mistaken in saying that this fir does not occur below 6000 feet elevation. On the contrary, it is found as low as 3000 feet, where it meets *Taxodium* [*Sequoia*] *sempervirens*" [Coast Redwood].

PICEA BRACTEATA.

MESSRS. VEITCH AND SON, of Exeter, and the Exotic Nursery, Chelsea, have much pleasure in stating that they have been fortunate enough to raise a limited number of Seedling Plants of the above beautiful NEW CALIFORNIAN PINE; of which a full description was given by Dr. Lindley, in the leading article of the *Gardeners' Chronicle* of last week. The Plants are two years' Seedlings, established in small pots, price 63*s.* each. Specimens of the cone and foliage can be seen by visitors, at either of Messrs. VEITCH'S Nurseries.—July 16.

The advertisement for *Picea* (*Abies*) *bracteata* seedlings that ran in *The Gardener's Chronicle* in 1853.

Later on that year (1853) a full page chromolithographic plate of one of Mr. Lobb's cone specimens was featured in volume 79 of *Curtis's Botanical Magazine* (tab. 4740), and in the accompanying text Sir William Jackson Hooker stated that:

> The present is among the most remarkable of all the true Pines, particularly in the nature of its cones, and has long been a desideratum to our *Pineta*. The Messrs. Veitch, of Exeter, and King's Road, Chelsea, have a plentiful supply of young plants, and we are indebted to them for the opportunity of giving the accompanying figure, they kindly furnishing well prepared native specimens with a perfect cone; all other well ripened cones have fallen to pieces almost before reaching England… Perhaps the introduction of no other *Conifera*, not even that of the Deodar, has excited a more lively interest in horticulture and arboriculture than that of the present species, with its porcupine like fruits.

Shortly afterwards full page chromolithographic plates of *Abies bracteata* were also featured in volume nine of *Flore des Serres et des Jardins de L'Europe* (1853-1854), and in volume one of *L'Illustration Horticole* (1854). As intact cones were not available to the illustrators of these journals, these figures represent imitations of the illustration that was published in *Curtis's Botanical Magazine*.

A. F. BEARDSLEY.

In his "Notes upon Californian Trees" (1859), Andrew Murray stated that:

> My brother, Mr. William Murray of San Francisco, having, at various times, in sending home seeds of trees and plants from California, accompanied them with remarks either of his own or of others upon the plants themselves, and sometimes with figures of the more striking… Having for some time been desirous to obtain seeds and cones of this singularly beautiful pine, I interested my brother in the subject; and although his other avocations prevented his undertaking the expedition himself, he caused two different expeditions to be made to procure it, one in 1856, and the other last season (in 1858). The first of these expeditions was conducted by his old fellow traveler and co-explorer Mr. Beardsley.

Andrew Murray (1812-1878) was a Scottish lawyer and naturalist who was at that time the president of the Botanical Society of Edinburgh, and according to Brewer (1880), A. F. Beardsley was a plant collector who worked for Lawson & Company of Edinburgh from about 1852 to 1854, and probably for other companies later on. Beardsley's expedition to the Santa Lucia Mountains was conducted in October of 1856. The following is Mr. Beardsley's account of this expedition as published in Andrew Murray's "Notes upon California Trees" (1859):

> After finishing my collections in this vicinity [Monterey], I set out for the Santa Lucia Mountains below the mission of San Antonio; our equipage from Monterey consisted of a waggon drawn by two horses, three loose animals, to ride and pack into the mountains, one Dutchman, one greaser, one rifle, two revolvers, two bowie knives, camping utensils, &c., and provisions for twelve days. We reached the Mission the third day; here we left our waggon, and proceeded on horseback into the mountains, in search of *Abies bracteata*, which we found on the second day, on the western slope of the range, about 30 miles from the Mission, and about 10 miles from the sea-coast, by the worst trail that I have ever traveled in this or any other country. After passing the divide, and descending to the west, I fell in with the tree, occupying the mountain sides as well as the ravines, and not 'exclusively the ravines,' as described by Hartweg.
>
> I was greatly disappointed in finding the cones too ripe to be able to obtain a supply of seed. I tried cutting the top off, but a few strokes of the hatchet shattered the cones in pieces, and scattered the seeds to the winds. The only plan was to climb to a most dangerous height and pick off the few cones which could be reached. They went to pieces in my hand the moment they were touched. The cones only occupy a few feet of the top, hence the difficulty and danger in obtaining them.
>
> I have never seen any description that does justice to this most beautiful of all the firs; it rises to the height of 130 feet, straight as a line, the trunk tapering regularly from the ground to the top; clothed with branches, which are slim and graceful, down to the ground; the outlines of the branches taper almost as regularly as the trunk, giving the appearance of an "elongated pyramid," as Hartweg describes it; but I would rather call it a tall spire with a pyramidal base of two thirds of the lower part of the tree; the pencil of the artist could not give it a more regular shape than it appears in nature. I saw no tree deprived of its lower branches, except in thickets where it was impossible for them to grow; and there was none, with the above exceptions, that I could not step from the ground on to its branches. Not the least remarkable thing is, that these branches bear fine foliage down to the ground, and the branchlets often touch the ground. I have found it occupying exclusively the calcareous districts abounding with ledges of white, veined, and gray marble [a marble deposit extends through much of the length of the South Fork of Devil's Canyon, which is a tributary to Big Creek].
>
> We encamped for the night on the point of a ridge, the only place to be found level, and large enough to make down our beds; in the evening, it commenced raining, and increased into a regular driving storm. We passed the most horrible night that ever fell to my lot to experience; we were totally unprovided, as there was no appearance of a storm when we lay down a short time after dark. We had provided wood only to cook with, and we were obliged to get it with great labour, and at the risk of breaking our necks, to keep from freezing. With great difficulty we kept our fire up until morning. The mountains here are as steep as the law of gravity will admit, and in a state of disintegration; the rocks from the ledges above were detached by the rains, and came tumbling down past us, making a fearful crashing among the trees, increasing in speed

Abies bracteata as illustrated in volume 79 of *Curtis's Botanical Magazine*, 1853.

Abies bracteata as illustrated in volume nine of *Flore des Serres et des Jardins de L'Europe*, 1853-1854.

Abies bracteata as illustrated in volume one of *L'Illustration Horticole*, 1854.

until they landed among the rocks at the bottom of the ravine below us, with a noise which sent its reverberations up among the hills like peals of thunder. The impenetrable darkness of the night, the howl of the tempest, the crashing of falling rocks, together with the severity of the cold rain, almost snow, made the night truly awful. We saw a large grizzly bear just before dark, and plenty of fresh tracks everywhere, which added nothing to the enjoyments of the night. Day-light came at last, and with it a clear sky, which I hailed with more gratitude, I think, than I ever did in my life—thankful that I was alive.

I had intended to have spent a portion of the day in collecting what few seeds I could; but the storm had beaten them off, so that all attempts in this vicinity were useless. After breakfast, we packed up and took the back track. After passing the first ridge, I descended into a deep gulch where there were a few trees, and found all the seeds gone. I descended again on the north side, and found one small tree that had a few shattered cones left, and obtained about a handful. I attempted to cut off the top, but the first few strokes of the hatchet knocked them off, and I was obliged to give it up for the season. We reached Monterey after an absence of nine days. We had killed on the trip, four deer, three antelopes, one hare, one wild cat, and seen two grizzly bears.

It is most probable that is was from the *Abies bracteata* seeds that Mr. Beardsley collected that the type specimens of adult *Megastigmus pinus* wasps emerged, for this insect was first named and described by the English entomologist Edward Parfitt in 1857.

WILLIAM LOBB'S SECOND ATTEMPT, AND THE BIG TREE.

In October of 1857 William Lobb made another expedition to the Santa Lucia Mountains, but on this outing "He found that the seeds were subject to the attacks of an insect in their green state, from which, of course, no precaution in the way of gathering, drying, or packing, can protect them" (Murray 1859).

By this time Lobb's fame for introducing *Abies bracteata* into European gardens had been exceeded by that of his introducing *Sequoiadendron giganteum* (the Giant Sequoia of the Sierra Nevada) into European gardens. In 1853, and within months after the founding of the California Academy of Sciences in San Francisco, Dr. Albert Kellogg, one of the academy's founding members, "Took Mr. Lobb to the California Academy of Sciences, and showed him the first specimens he ever saw of this marvelous, now world renowned, Washington Cedar, which was so named by me, before he ever saw the tree" (Kellogg 1882, p. 21). As Kellogg's specimens lacked reproductive features, he was waiting for better specimens before formally describing the species. At that time there was also on display in San Francisco of a 21 foot tall section of the lower bark of a recently felled tree. The longitudinal sections of bark were put back "In the natural form" to create "A spacious carpeted room" that was 29 feet in diameter; the room contained "A piano and seats for 40 persons" (Lindley 1853 b). Lobb wasted no time in getting to the Sierra Nevada, where he collected from a recently felled tree—perhaps the same tree—many specimens and a large supply of seeds, and upon his return to San Francisco he boarded the first ship that was bound for England. In the Christmas eve, 1853 edition of *The Gardener's Chronicle*, John Lindley published the first formal description of this species, which he named *Wellingtonia gigantea*, in honor of the Duke of Wellington (Lindley 1853 b; Ewan 1973). This was less than six months after the introduction of *Abies bracteata* into European gardens, and according to Lobb's employers, James Veitch & Sons:

> The lively interest [in *Abies bracteata*] alluded to by Sir W. Hooker [in *Curtis's Botanical Magazine* 79: sub tab. 4740] was thence immensely heightened, and at once transferred to and concentrated on the "Big Tree." *Abies bracteata* receded to the back ground, and has never since been again to the front; its growth in England in its young state is slow, compared with that of the *Wellingtonia* [*Sequoiadendron*]. The introduction of both trees is still fresh in the memory of hundreds of horticulturalists as great events in the annals of their profession, and they can now look upon large trees of *Wellingtonia* growing in this country; but there are no specimens of the grand fir from the Santa Lucia that much exceed the height of 25 feet, and they are few and far between (Veitch 1881, p. 92).

WILLIAM PEEBLES.

In September of 1858 William Peebles made an expedition to the Santa Lucia Mountains to collect *Abies bracteata* seeds, but "He found that the cones were so ripe that the trees could not be cut without scattering the cones to the winds, so that all he got were obtained by climbing the trees and carefully picking the cones." Mr. Peebles also reported that the padres at Mission San Antonio used the resin of this species to make incense, and the fragrance of a sample that was sent to Scotland was described as "Pleasantly terebinthine." Mr. Peebles also produced a landscape drawing of trees growing in their native habitat, which was published in the Andrew Murray's "Notes upon California Trees" (1859). In this text Murray stated that:

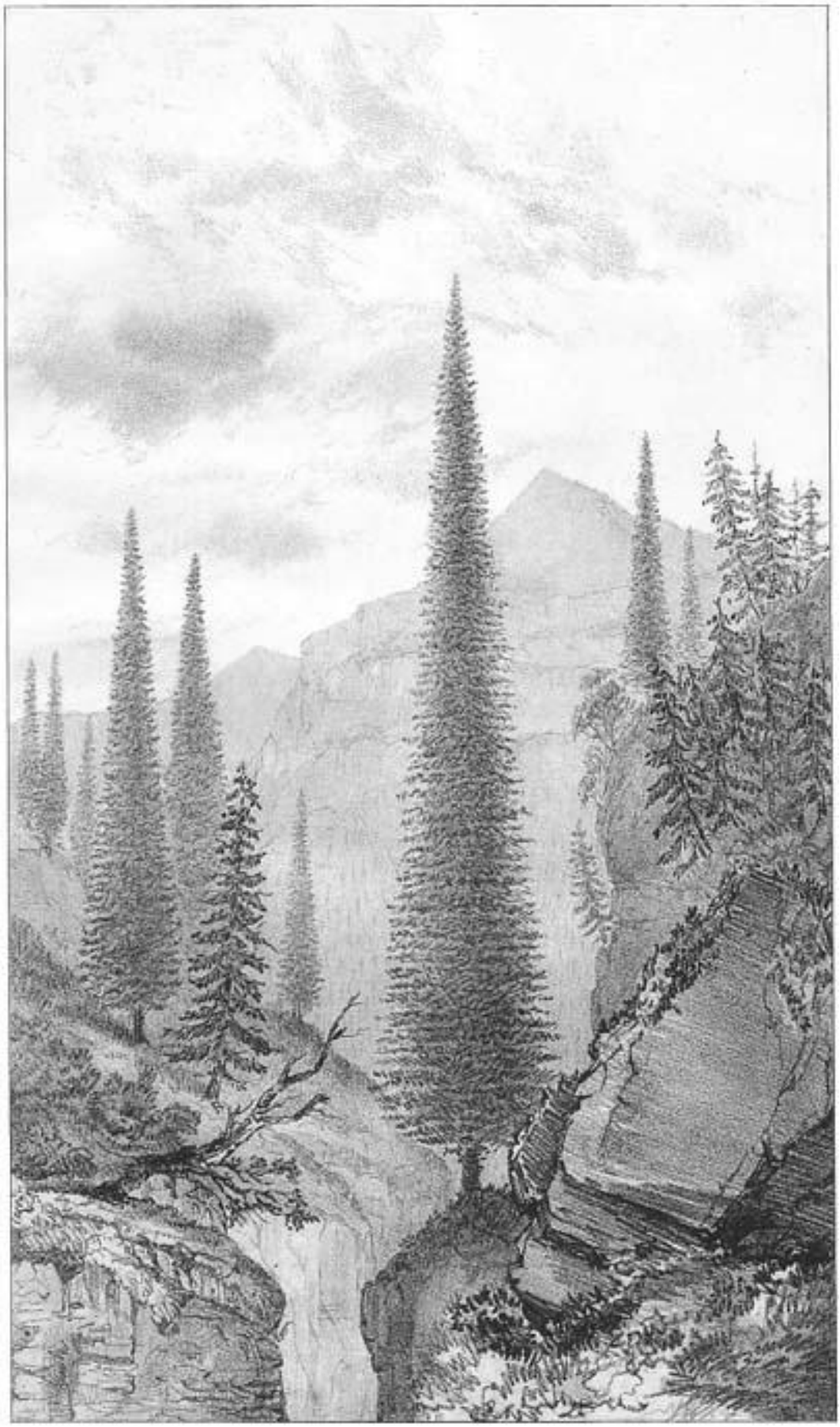
> For the benefit of any future expedition, I may mention that a man by the name of Meyers accompanied both Lobb and Peebles as guide, and he knows the station perfectly. It is exceedingly unlikely, however, that any fresh expedition will be tried until the country is more opened up. The expense, danger, chance of bad seed, and small returns, will deter anyone from trying it as mercantile speculation, and there is little in the district to induce an explorer to try such difficult ground which has already been examined.

Although Murray appears to have been correct in his prediction regarding those who would make an expedition "As a mercantile speculation," a number of botanists subsequently made expeditions to the Santa Lucia Mountains for purely scientific reasons.

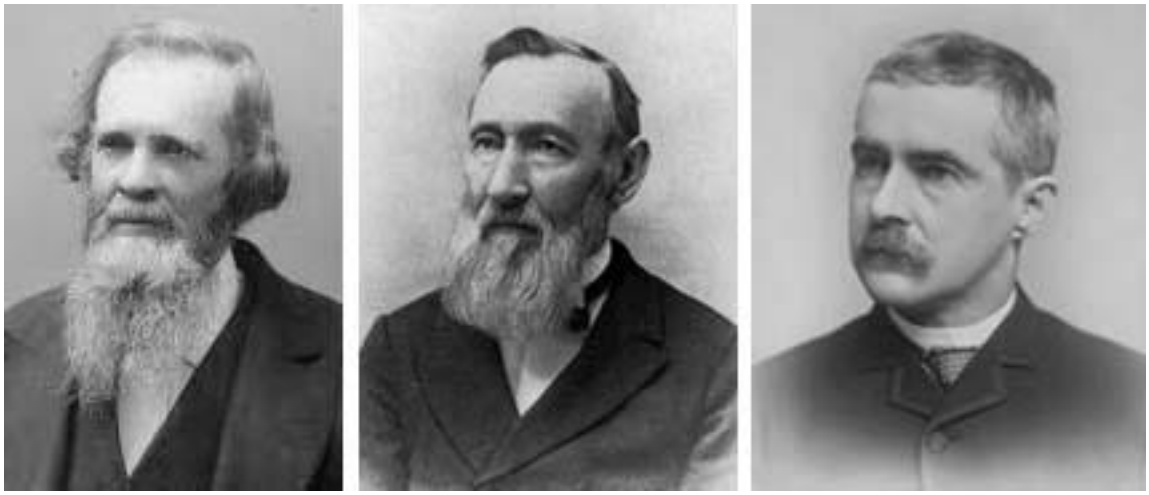
ALBERT KELLOGG (1813-1887).

In October of 1870 Dr. Albert Kellogg, of the California Academy of Sciences, made an expedition to the Santa Lucia Mountains, where he collected specimens of *Abies bracteata* (Harvard University Herbaria 00311234), but as his notes and specimens at the Academy of Sciences were destroyed during the San Francisco earthquake and fire of 1906, no further details are known. Mr. Kellogg was quite enamored with *Abies bracteata*, as evidenced by the following fanciful excerpts from his Forest Trees of California (1882):

> This exceedingly elegant steeple-shaped Fringe Cone Fir is of the most extraordinary aspiring beauty, and quite unlike any other silver fir of the Pacific… Although the limbs above the middle and near the summit are mostly horizontal or spreading, and very slender, yet exceedingly tough and reliable even when long dead—arranged in whorls; but there is scarcely strength in the main leader body of the very tender long attenuated top to make it at all safe to climb to the cones, which, as in all firs, sit upright, like birds upon the branches; and if neither apparently, with figure and metaphor, nor actually fringed with a crown of gold, yet the fruit is worth many times its weight in gold, so exceedingly scarce and valuable it is esteemed.
>
> This invaluable, rare, and hitherto little known fir, rises from one to two hundred feet high, and from two to four feet in diameter; trunk as trim and straight as an arrow, but full of knots that extend well to the center; branching so low, it furnishes little or no proper lumber, but is a perfect pattern of sylvan perfection on the symmetrical plan. Arctic or alpine trees of this extremely attenuated type—the slender parts are frequently broken in outline by the severity of their clime, and



William Peebles's 1858 landscape illustration of *Abies bracteata*. The mountain in the far distance is probably Cone Peak, and the nearer peak is probably Twin Peak.



Left to right: Albert Kellogg, George Vasey and Townshend Brandegee.

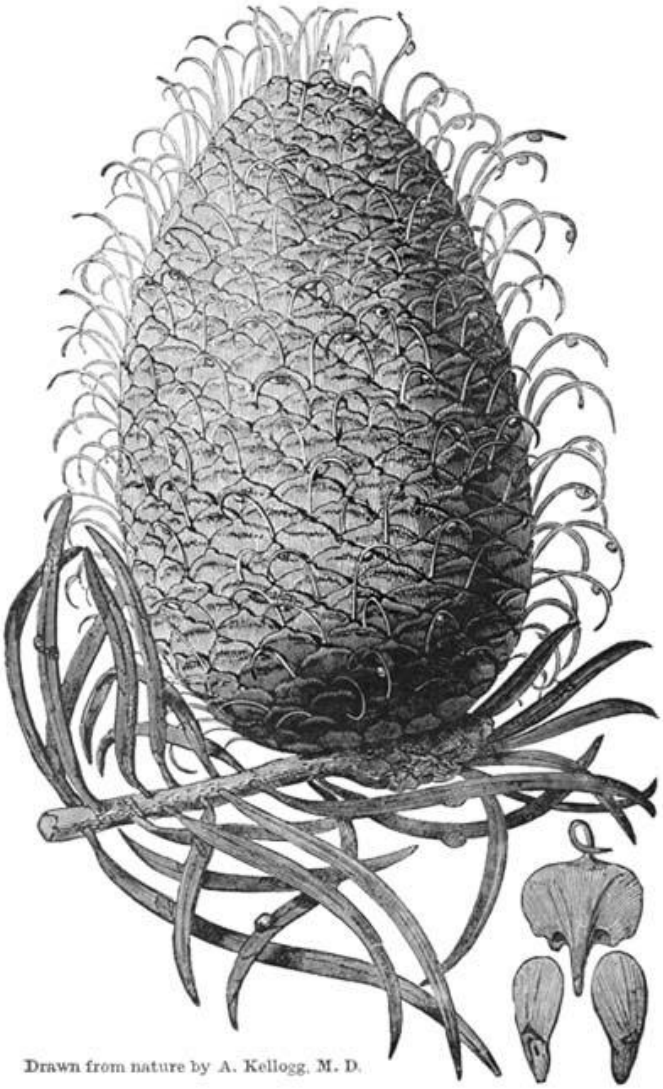
> hence exhibit more variety, often bordering upon the fantastic—but these are so sheltered by the deep gorges in which they grow, and being so thickly branched below, as well as throughout, and clad in a light green dress of silvery sheened foliage nearly or quite to the feet, gives them the most exquisitely feminine expression it is possible to conceive [at that time women commonly dressed in broad based full length skirts]. Besides the modest plumy-fringed cones, evanishing up in the blue amid a kind of gossamery webby haze, is eminently pleasing; the foliage is gemmed with golden drops of gum, that glitter in the sunlight like radiant beaded jewels, thus sparkling all over, from crown to foot, with gold and dewy diamonds, contribute no little to effect beauty and to more oriental ornamentation of this fringe fir. According to our taste, this is the loveliest of California's silver firs—most ornamental, most valuable—but it is only a half-hardy tree, not well suited to great extremes of temperature or exposure to violent winds. So far as we know, this fir is only found in the Santa Lucia Mountains, latitude thirty-six of Southern California, altitude from four to six thousand feet.

Kellogg also made an illustration of a cone, which, in 1886, was published in J. M. Hutchings' *In the Heart of the Sierras*.

GEORGE VASEY (1822-1893).

In late July of 1880 George Vasey, the chief botanist of the U. S. Department of Agriculture and the curator of the United States National Herbarium, ventured into the Santa Lucia Mountains, where collected specimens of *Abies bracteata* (Harvard University Herbaria 00311165). Vasey reported that "The *Abies bracteata* Nutt., locally called silver pine, extends from the northern boundary of San Luis Obispo County forty miles northward, in cañons on both sides of the Santa Lucia Range. It is a handsome and striking tree, 100 to 150 feet high, in shape pyramidal, with an elongated peak. The white under surface of the leaves produces a silvery sheen when the sun shines upon them at the right angle" (Comstock 1880). As Mr. Vasey also noted that this species occurred on "Moist, cold soil, occupying four or five canyons between 3,000 and 6,000 feet elevation, generally west of the summit of the range" (Hansen 1892), he must have collected his specimens from one of the southern groves, and probably from those that occur in the canyon of San Miguel Creek, which were accessible via the trail from Jolon to the Los Burros Mining District on the coast.

From the Jolon post office Vasey shipped the cones he had collected to the United States Department of Agriculture's Division of Entomology, for they were infested with larvae. The seeds were infested with chalcid (wasp) larvae, and the cone scales of one of the cones was also infested by a moth larvae (Comstock 1880). As the moth species was new to science, it was named for its host as *Grapholitha bracteatana* by Charles H. Fernald (it was later assigned to the genera *Laspeyresia* and *Cydia*, and *Cydia bracteatana* is its currently accepted name).



Albert Kellogg's illustration of *A. bracteata* that was published in J. M. Hutchings' *In the Heart of the Sierras*, 1886.

PICEA BRACTEATA IN THE PINETUM BRITANNICUM.

Picea (*Abies*) *bracteata* was one of the species that was included in Edward Ravenscroft's *Pinetum Britannicum, A Descriptive Account of Hardy Coniferous Trees Cultivated in Great Britain*, which was published in 1884. This monumental work consists of three gigantic folio volumes, in which the treatment of *Abies* (*Picea*) *bracteata* is included in volume two. The text for this species, which was written by Maxwell Masters, was accompanied by two full page chromolithographic plates, one of which was a landscape illustration that was titled "*Picea bracteata*, tree at Santa Lucia." The delineator of this illustration was William Murray of San Francisco, who was the brother of Andrew Murray, the author of "Notes upon California Trees" (1859). In this text Andrew Murray stated that "Having been for some time desirous to obtain seeds and cones of this singularly beautiful pine, I interested my brother in the subject; and although his other avocations prevented his undertaking the expedition himself, he caused two different expeditions to be made to procure it," It thus appears that William Murray eventually made an expedition to the Santa Lucia Mountains.

TOWNSHEND BRANDEGEE (1843-1925).

In 1885 Townshend Brandegee of the California Academy of Sciences arrived in the Santa Lucia Mountains in search of *Abies bracteata*, and his mission was to collect a section of a trunk for the Jesup Collection of North American Woods in the American Museum of Natural History in New York City. According to Sargent (1898) the log specimen "Cut by T. S. Brandegee in one of the canyons of the Santa Lucia Mountains facing the ocean, is twenty-four and three quarters inches in diameter inside the bark and one hundred and twenty-four years old, with an inch of sapwood consisting of forty-one layers of annual growth." Sargent also noted that:

> The wood of *Abies venusta* (*bracteata*) is heavy, not hard, and coarse grained; it is light brown tinged with yellow, with paler sapwood, and contains broad conspicuous resinous bands of small summer cells and numerous obscure medullary rays. The specific gravity of the absolutely dry wood is 0.6783, a cubic foot weighing 42.27 pounds. Although it is perhaps occasionally used for fuel, the inaccessibility and steepness of the canyons which this tree inhabits and the sparseness of the population of the region have prevented employment of the wood for other purposes.

JOHN LEMMON (1831-1908).

At some time during the later 1800s John Gill Lemmon, the botanist of the California State Board of Forestry, and his wife, Sara Allen Plummer (1836-1923), collected an undated specimen of *Abies bracteata*, and the stated location is simply the Santa Lucia Mountains of Monterey County (DS 165385). Due to the following information I have a hunch that this specimen may have been collected in Miller Canyon between 1892 and 1895. In his Report of the Botanist (Cone-bearers of California) in the Third Biennial Report of the California State Board of Forestry (1890), Lemmon states that this species is "Found only in four or five narrow canyons on the ocean side and near the highest peaks of the Santa Lucia Mountains, half way between Monterey and San Luis Obispo." In the first edition of his Handbook of West American Cone Bearers (1892), Lemmon states that *Abies bracteata* is "Extremely local in the Santa Lucia Mountains of California," but in 1895, in the third edition of his handbook, Lemmon states that this species is "Extremely local, stranded high up in the Santa Lucia Mountains of California… Only a few trees, tall and very symmetrical, in Miller's Canyon and neighboring canyons." Lemmon's report of the presence of this species in Miller Canyon is noteworthy, for at that time the only populations that were known to most botanists were in the vicinity of Cone Peak and in a few canyons further south, as stated in the first of Lemmon's texts that are quoted above.

CHARLES SPRAGUE SARGENT (1841-1927).

On September 12, 1896, Charles Sargent, the director of the Arnold Arboretum at Harvard University, collected specimens of *Abies bracteata* from the groves that occur in San Miguel Canyon (A 00355174; UC 401292). According to Alice Eastwood, "Professor C. S. Sargent, on a recent trip into the Santa Lucia Mountains, obtained fruiting specimens of the rare and local *Abies bracteata*. The cones are infested with the larvae of some insect and very few seeds are untouched" (*Erythea* 4: 174, 1896).

At that time Sargent was serving as the chairman of a National Academy of Sciences committee that had been appointed to study the nation's forest reserves and to make recommendations to the Congress of the United States related to their purposes and management. The Forest Reserve Act of 1891 (26 Stat., 1095-1103), which granted to the President of the United States the power to proclaim Forest Reserves (now National Forests), failed to state the purposes of the reserves and to make provisions for their management, and repeated attempts to get the needed supplementary legislation through Congress had failed. The members of the commission gathered in Montana in July of 1896, and from there they proceeded to Oregon, California, Arizona and Colorado; they arrived in the nation's capital in October of that year (Steen 1991).

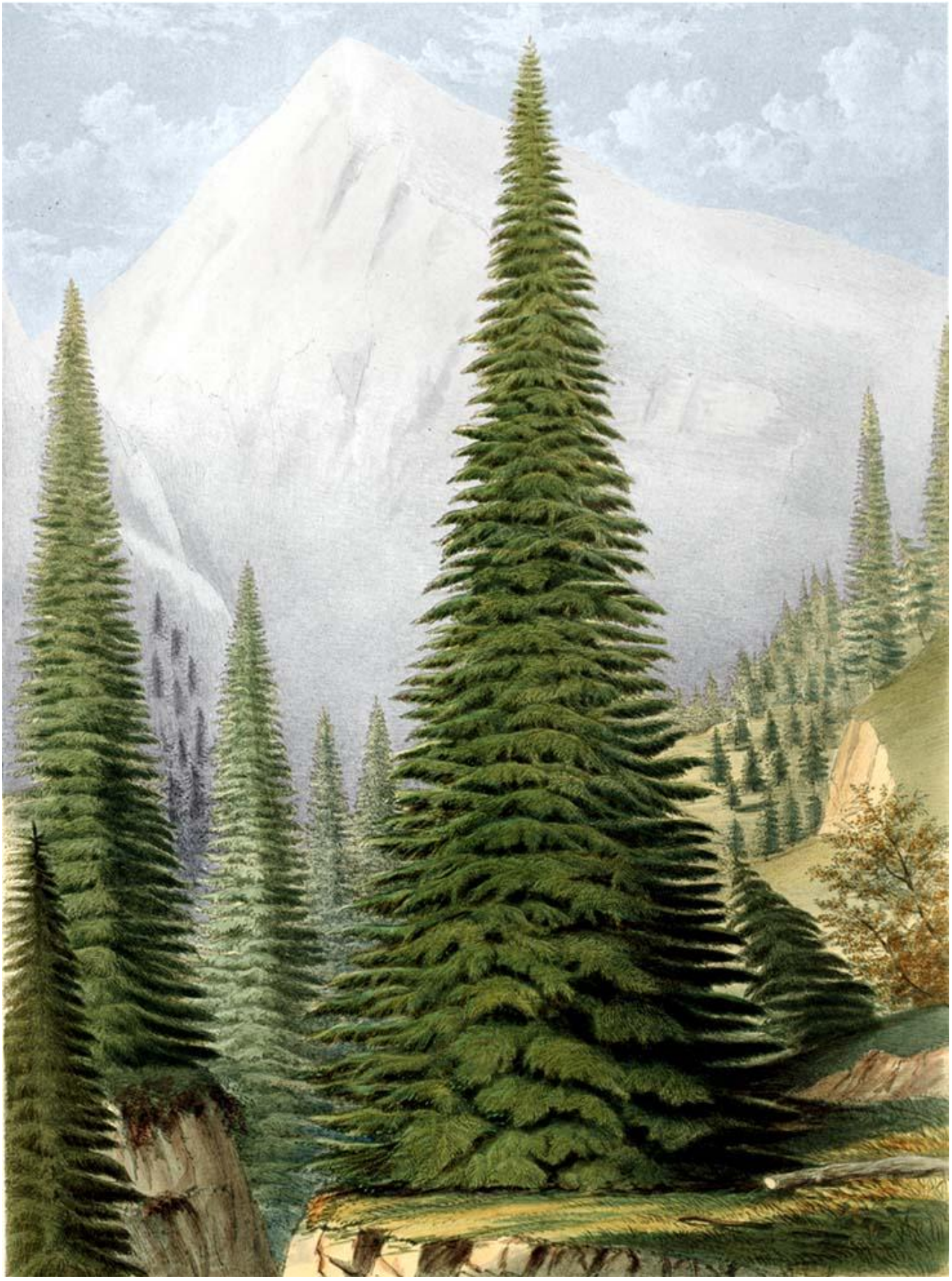
As the commission did not always travel together (Williams & Miller, 2005), this gave Sargent the time to make the diversion from the scheduled route; he probably left the train at King City and rented horses and perhaps a wagon.

Sargent was the author of monumental *The Silva of North America*, which was published in fourteen volumes between 1891 to 1902. In his treatment of *Abies venusta* (*bracteata*) in volume 12 of this work, which was published in 1898, Sargent stated that:

> Of the species of *Abies* now known no other occupies such a small territory, for it grows only in a few isolated groves, the largest containing not more than 200 trees, scattered along the moist bottoms of canyons, which in summer often become completely dry, usually at elevations of about three thousand feet on both slopes of the outer western ridge of the Santa Lucia Mountains in Monterey County, California… The most southern point from which *Abies venusta* has been reported is in Bear Canyon, which faces to the east, and is about twenty five miles south of Los Burros Mines, near Punta Gorda, where there is a grove of about two hundred trees. It is scattered along the banks of the San Miguel Canyon on the eastern slope of the coast ridge, just south of the trail from King City to Los Burros Mines, and grows in a canyon immediately north of the San Miguel Canyon, and in a canyon at the head of the Nacimiento, while ten miles farther north the presence of two trees has been reported… Fortunately this beautiful tree, one of the handsomest and most interesting of its race, has thus found a foothold in the Old World, for the fires which are frequent and destructive in the forests of the dry coast ranges of southern California seem destined sooner or later to exterminate it from its last retreat in America… Since Lobb's time fire has probably destroyed all the trees except those which were protected by the moisture in the bottoms of the deepest canyons.

In response to Sargent's claims, Adolphus Kent, the editor of the second edition of *Veitch's Manual of the Coniferae* (1901),wrote:

> In view of the threatened extinction of this noble tree in its native home, I append a list of all the finest specimens in Great Britain known to me, in the hope that the owners will not allow the seeds that may hereafter be produced by them to be wasted or lost. Boconnoc, Cornwall; Castlewellan, Co. Down; Castle Kennedy, Wigtownshire; Eastnor Castle, Ledbury (2); Foothill Abbey, Wilts; Fota Island, Cork; Highnam Court, Glou-



"*Picea bracteata*, tree at Santa Lucia," *Pinetum Britannicum* volume 2, 1884.

A *Picea* (*Abies*) *bracteata* cone and foliage as illustrated in volume 2 of the *Pinetum Britannicum*, 1884.

cester; Kentfield Hall, Canterbury; Kinnettles, Forfar; Newcourt, Exeter; Orton Hall, Peterborough; Possingworth, Sussex; Streatham Hall, Exeter (2); Tortworth Court, Gloucestershire (2); Upcott, Barnstaple; Warnham Court, Horsham.

ALICE EASTWOOD (1859-1953).

In the spring of 1897 Alice Eastwood, the curator of botany at the California Academy of Sciences, made an expedition to the Santa Lucia Mountains, and one of her primary objectives was to collect specimens of staminate and pistillate flowers of *Abies bracteata*, from which illustrations of these features could be made for plate 615 in volume 12 of Charles Sargent's The Silva of North America, which was published in the following year.

Two years earlier, in June of 1895, Eastwood had made another expedition to the Santa Lucia Mountains, where she collected a specimen of *Abies bracteata* along the "Trail from Snowbergs to Rockland Lime" (Arnold Arboretum Herbarium 00355318). According to Donald Clark's Monterey County Place Names (1991), Rockland Landing was "The site of a former landing along the Pacific Ocean at the mouth of Limekiln Creek, about 2 m. SE of Lucia. Named for its owner and builder, the Rockland Lime and Lumber Company which operated from 1888 to sometime in the 1890s." According to Griffin (1975), who reviewed Eastwood's memoirs, she had "Hiked from the

Left to right: Charles Sargent, Alice Eastwood, Willis Jepson.

Kirk Ranch [Sec. 35, T. 21S R. 5E] to the Dani Ranch [Sec. 9 T. 21 S R. 4E], crossing the Cone Peak study area somewhere near the summit of the present Gamboa Trail."

Shortly after her return from her 1897 expedition Eastwood wrote a report on the coniferous trees of the Santa Lucia Mountains (*Erythea* 5:71-74), and her text regarding *Abies bracteata* is as follows:

> Looking down into the deep canyon of San Miguel Creek, south of the trail, but nearby, and off into the distant canyon on the north that marks the headwaters of the Nacimiento River, peculiar trees can be seen lifting spire-like summits above all the others. These trees are known botanically as *Abies bracteata*, the rarest existing fir, and confined to a few canyons of these mountains. When once seen these trees can recognized as far as the eye can reach. While there are few individuals, comparatively, the number of small trees coming up in San Miguel Canyon assures us that the species is in no danger of extermination.
>
> Mr. E. C. Mansfield and the writer visited this locality May 1 of the present year, to obtain flowering specimens, which had, until then, never been collected. The trees were in full flower; the pollen had begun to float through the air, and near the tops of all large trees female flowers were plainly to be seen. Coulter records that only the middle branches bear cones. This was not so with the trees observed in this canyon. Owing to the great difficulty experienced by Mr. Mansfield in reaching the topmost boughs and in securing specimens, only a few pistillate flowers were obtained, and these Mr. Mansfield carried down, holding the twigs, to which they were attached, in his mouth, so as to keep them intact on the branches. The specimens are in the Herbarium of the California Academy of Sciences, duplicates having been sent to Prof. C. S. Sargent to be represented in the *Silva of North America*. The staminate flowers were more abundantly collected, being so much more easily obtained.
>
> The firs seen in this canyon had lost their lower branches, and therefore, lacked the symmetrical outline from the base to the summit which the most perfect specimens exhibited. The writer, some years ago, saw two trees in a gulch further north which the Santa Lucia trail crosses, where the lowest branches reached almost to the ground, and the trees tapered to perfect cones with long, pointed tops waving plume-like in the breeze. The trunk, at the upper part, sends down long, slender branchlets that droop as do those of the weeping willow or weeping spruce. Even the upper boughs have a tendency to grow downward, thus rendering the foothold of an adventurous climber somewhat precarious, since the slightest breath of wind sways the slender upper axis back and forth.
>
> The mountaineers were all enthusiastic in their admiration of this tree, which they name the "Silver Fir." When the cones have attained full growth they have a purplish hue, and the long, slender exserted bracts become gemmed with drops of resin. The upper part of the tree seems full of odd-looking birdnests set with diamonds. The beauty of the fruit-laden branches can perhaps be imagined.

THE BOTANICAL EXPLORATIONS OF 1901.

In 1901 three botanical explorations were performed in the Santa Lucia Mountains, and the findings of two of these resulted in major expansions of the range of *Abies bracteata* as previously known to botanists.

One of these expeditions was made by Joseph Burtt Davy (1870-1940), who was then an assistant botanist at the University of California's Agricultural Experiment Station. Mr. Davy explored the Big Sur Coast in May and June of that year, and on May first he collected specimens of *Abies bracteata* in the watershed of the South Fork of the Little Sur River (A 355316, DS 61611, UC 66531), which is about twenty five miles northwest of the most northern populations that were then known to botanists. Davy appears to have been unaware of the importance of his discovery, for, according to his bibliography, he did not address this subject it in his published writings.

WILLIS LINN JEPSON (1867-1946).

Another one of the 1901 botanical explorations of the Santa Lucia Mountains was performed by Willis Linn Jepson, the well known professor of botany at University of California, and the person for whom the Jepson Herbarium and *The Jepson Manual* are named. Like that of previous botanical explorers, he traveled from the Avila ranch near The Indians (in section 28 T 21S R5E) to the Dani ranch near Lucia (in section 9, T 21S R4E), via the general route of what are now known as the Carrizo and Gamboa trails, and thus he crossed the summit of the range in the vicinity of Cone Peak.

In book seven of his field notes, Jepson at first referred to this route as the "Arroyo Hondo Trail," but he later wrote at the top of four of these pages "San Antonio Trail! not called correctly," with an arrow pointing to the name Arroyo Hondo Trail. He also noted that "The cañon marked Arroyo Hondo on the pages preceding should read Arroyo Grande, the Americans call it Big Creek." On pages 16, 18 and 19 of these notes, Jepson wrote:

> Palo Incensio—*Abies venusta*—we first saw trees on the eastern side of Pico Blanco [he later corrected this as "The point marked Pico Blanco should read Twin Peaks, Pico Blanco proper is up on the Sur"], hanging on by their teeth and hundreds and perhaps thousands reaching down into the cañon below. This was before we reached the summit and began to

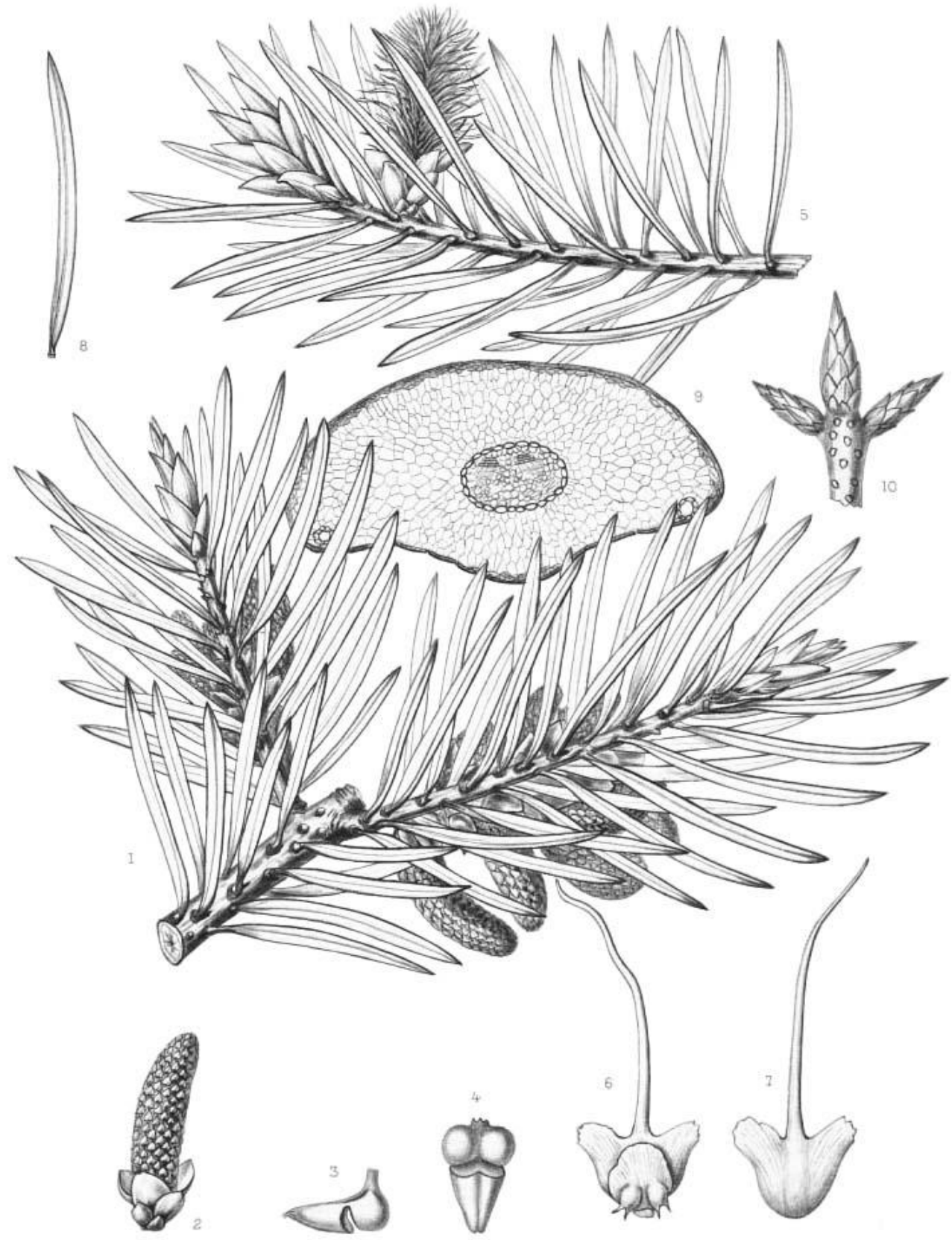


Plate 615 in volume 12 of C. S. Sargent's *The Silva of North America*, 1898.

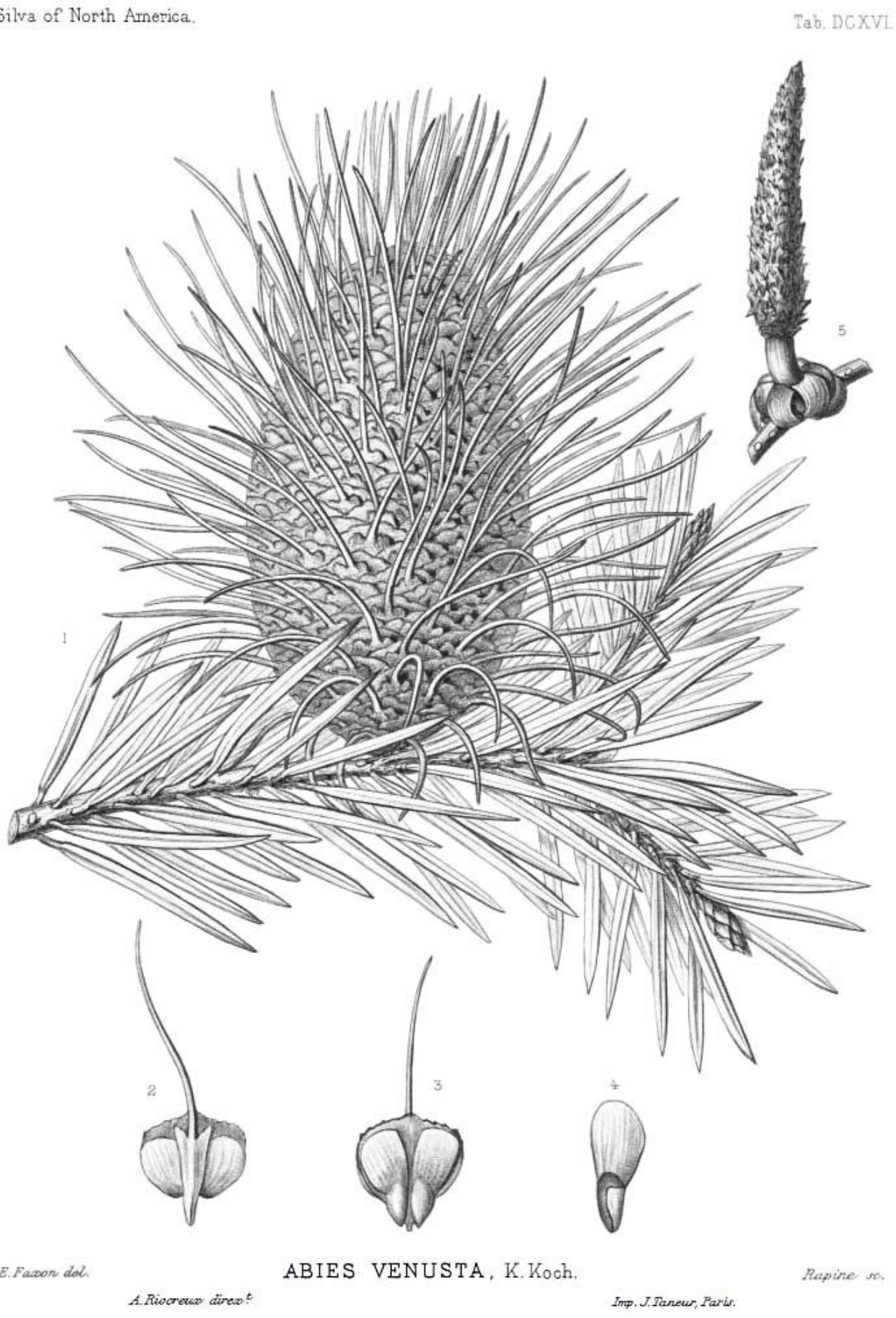


Plate 616 in volume 12 of C. S. Sargent's *The Silva of North America*, 1898.

go down the La Honda trail. On the western side they covered the cañon wall pretty well on the north side and reached up to the very summit of Pico Blanco, but in hollows and nooks on the south slope of the ridge to the north there were many trees here and there. One tree measures 9 ft. 4 in. (at 4 ft.) and another 3 ft. 4 in., in circumference… The cones of Palo Incensio hang in clusters at the top of the tree [below this he made a sketch of a cone]. The cones look so much like burs that some of the local people call them burs. Otherwise they are called "hedgehogs." The clusters of cones in the top of the tree are very noticeable—they hang so densely. The cones are borne only in the very tip top, and are of course borne erect on the branches, but their weight bears down the branches so that they seem to hang. The trees are very slender and shaped like a church spire but the top is very attenuate. They are striking trees so that one notices them at considerable distances. I should readily say that there are thousands of trees to be seen from the various points on the Arroyo Hondo Trail.

In his *The Silva of California*, which was published nine years later (in 1910), Jepson listed this locality, which was one of the eleven that were known to him, as follows:

7. Twin Peak, 4700 feet, and Cone Peak, 5000 feet altitude. These peaks stand in the main axis of the coast ridge and are scarcely a mile apart. The San Antonio Trail to the coast from Mission San Antonio passes over the ridge here and descends into the Arroyo Grande. The trees cling to the abrupt eastern side of the peaks, with hundreds and perhaps thousands reaching down into the canyon below, which is on the headwaters of the Nacimiento [actually the San Antonio]River. On the western side of the divide they cover the canyon wall pretty well and climb to the very summit of the peaks; even on the south slope of the canyon, in hollows and nooks, there are many trees here and there. The writer crossed the range by this trail in 1901, and believes Twin Peaks to be the locality visited by Coulter, Douglas and Lobb.

WILLIAM DUDLEY (1849-1911) AND A. D. E. ELMER (1870-1942).

The most noteworthy of the botanical explorations of the Santa Lucia Mountains that occurred in 1901 was performed by William Russell Dudley, a professor of botany at Stanford University and a member of the board of directors of the Sierra Club, and A. D. E. (Adolph Daniel Edward) Elmer, one of his students. Unlike the previous expeditions, this one was conducted in the upper watersheds of the Carmel and Arroyo Seco rivers, and as these regions had been not yet been explored by botanists, Dudley and Elmer were the first of their profession to discover that *Abies bracteata* had a much greater range than previously thought.

I was able to reconstruct the routes and time frame of Dudley and Elmer's explorations from the dates and localities given on the labels of Dudley's specimens (all of Elmer's specimens have preprinted labels that state the location as Tassajara Hot Springs and the date as June, 1901, but most of these have notes that are enclosed in envelopes that are pasted to the sheets that state the exact location of collection). This information also provides the earliest known usages of number of Ventana Wilderness place names, and it included some names that are no longer in use.

After collecting specimens along Carmel Valley and Tassajara roads on the tenth of June, Dudley and Elmer made it as far as Chew's Ridge, where they collected specimens near the summit and in the "Woods east of Miller Canyon." On the following day they arrived at Tassajara Hot Springs, where they spent five days. During this period they collected plants in the immediate vicinity of the hot springs, and Elmer ventured out as far as the Horse Pasture.

Their first excursion from the hot springs began on June 16th, when they headed north-northwest, via the "Trail to Church's," and after passing through "Grindstone Canyon" (now known as the Windcaves), they collected specimens of *Abies bracteata* near "Church's place" and at "Caves at Churches." Although Dudley and Elmer were certainly quite surprised to find *Abies bracteata* at The Caves, they must have been astounded by the number of trees that they were soon to discover.

From The Caves Dudley and Elmer continued northward through the "Pass" between "Pine Valley and Church's" (the Church Creek Divide), and arrived at Pine Valley by June 18th, where they established a base camp from which they explored the upper watershed of the Carmel River.

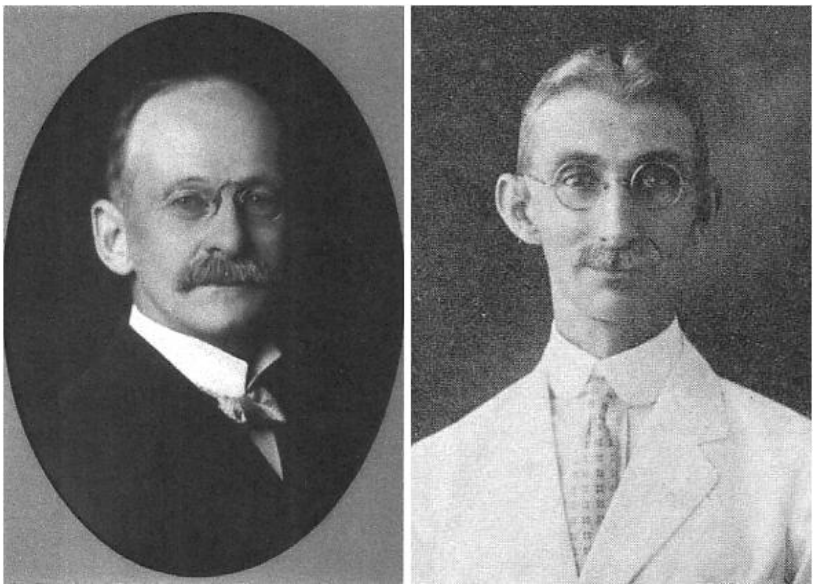
From Pine Valley they crossed over the "Ridge between Pine Valley and Miller Canyon," and got as far as a "Meadow in Miller Canyon." At that time there was certainly a trail directly linking Pine Valley and Miller Canyon, for the only privately held land in both localities were in the possession of John McKay. Mr. McKay purchased a patent to 160 acres of land in Pine Valley in 1891, and he purchased the former Chew homestead in Miller Canyon in 1893 (MCPB D: 466; MCDB 40: 128).

They next headed to the north-northwest, and descended to the Carmel River via the "Spanish Trail" through "Spanish Canyon" (now known as Hiding Canyon), where Dudley collected plants at the "Mouth of Ventana Creek, Carmel River." Dudley's Ventana Creek is certainly the same stream that is now known as Ventana Mesa Creek. Elmer collected plants in the vicinity of a waterfall in what he called "Silver Fir Canyon," and there is a waterfall on Ventana Mesa Creek a short distance above its confluence with the Carmel River. There are also a very large number of 'Silver Firs' in the canyon of Ventana Mesa Creek.

They next explored the "Canyon in Gap of Carmel [River] below Pine Valley Camp," "Trap Rock Hill near Bear Basin," "Bear Basin" and the "Ridge slope between Bear Basin and Big Pines." The later name certainly refers to the Pine Ridge summit, for prior the Marble Cone Fire of 1977, this ridge was graced by an old growth coniferous forest that was dominated by *Pinus ponderosa*.

Dudley and Elmer had returned to Tassajara Hot Springs by June 23rd, and by the 26th they had set off on another excursion to the south-southwest. After crossing the ridge south of the hot springs via "Tony's Trail," they arrived at "Willow Creek," and then they headed eastward along what is now known as the Marble Peak Trail. Dudley referred to this trail as "Leigh's Mountain Trail," for at that time John Wickham Leigh, the long-time owner and editor of the *Monterey Democrat* newspaper, owned three properties that were accessed by this route: one was near the beginning of the trail in the vicinity of the Horse Bridge (The Adobe ranch), another was in and near Indian Valley (he had purchased the Higgins homestead in 1889), and the third property was in Lost Valley (MCPB H:113; MCDB 23: 79; MCPB B: 436). Dudley also applied the name "Leigh's Mountain Valley" to what is now known as Strawberry Valley, but Elmer applied the name "Little Valley" to this location. Place names in this vicinity included "Zigzag Creek," "Head of Zigzag Creek at Oak Camp," and probably Elmer's "Black Oak Camp" (this camp is now known as Tan Oak Camp). One of Elmer's collection sites was along "Zigzag Creek near junction of trails," and Dudley collected specimens at "Canyon of N. branch of Sur River" [actually south branch], and at "Dry ridge near head of trail from Sur River to Leigh's Trail," and thus what is now known as the South Fork Trail was in existence by that time.

From Strawberry Valley Dudley and Elmer proceeded to "Higgins Cabin," and from there they took the "Trail along Higgins Creek to Lost Valley." After collecting specimens in Lost Valley on the 27th, they returned to Higgins Cabin, and then proceeded west to "Indian Valley" and the "Ocean Ridge." They had returned to Willow Creek by the 30th, and probably camped at Willow Springs Camp, for they both collected specimens of the endemic Santa Lucia Gooseberry (*Ribes sericeum*), which is common along Willow Creek at that locality. By the first of July they had returned to



William Russell Dudley, left, and A. D. E. Elmer.

Tassajara Hot Springs, where they collected a few more specimens before making their departure.

In the following year the following report was published in the May, 1902 edition of *Forestry and Irrigation* (Volume 8 [5]: 193-198). It is noteworthy that Dudley chose to have this text published in this magazine, which was published by the American Forestry Association (of which Dudley was a fellow), instead of a botanical journal.

A NOTEABLE CALIFORNIA FIR.

ABIES VENUSTA, KOCH.

BY WILLIAM RUSSELL DUDLEY,

Professor of Botany, Leland Stanford, Jr., University.

This remarkable representative of the Fir type of the *Coniferae* is confined to the western part of Monterey County, California, in a portion of those rough, scarcely explored ranges of government lands known as the Santa Lucia Mountains. When noticed at all by the local residents it is called the "Silver Fir" or "Silver Pine," and to distinguish it from the Silver Fir of the Sierras (*Abies magnifica*), with which some of the inhabitants confuse it, it should be called the "Santa Lucia Silver Fir."

It is a tree of singular beauty. Its foliage resembles that of *Torreya*, dark green above when mature; its leaves are coriaceous, shinning, and exceedingly prickly pointed. The tree is not large, rarely over 75 or 100 feet in height, but its outline is like no other conifer. Its very long, slender spire and its swelling outline towards the base, abruptly contracting near the ground; its situation, usually springing out above some bold rock on a river bank or inaccessible mountain crag; its foliage whitish below and dark green above, render it a most striking object.

It is like a fir only in the character of its erect cones and the upper fertile branches, and it surely has had a different line of descent from any of the other species of *Abies*. It is the only living representative of its type. With the Monterey Cypress, the Torrey Pine, and some other Coniferae, it gives to the coast ranges of California and absorbing interest in the mind of the student of decent and geographical distribution.

This paper intends to set forth briefly two important facts in connection with this species:

First. That its range, through the author's personal explorations during the past year, is much more extended and its members much greater than were before supposed.

Second. That with this extension of its range over the mountain mass of the northern Santa Lucias, and the head-waters of several rivers, the species is seen to have an economic bearing on the question of protection of these river sources.

Concerning the rarity of this species and its distribution, as understood previous to this year, I cannot do better than to quote from Sargent's Silva, vol. xii (1898): "Of the species of *Abies* now known no other occupies such a small territory, for it grows only in a few isolated groves, the largest containing not more than 200 trees, scattered along the moist bottoms of canyons, which in summer often become completely dry, usually at elevations of about 3,000 feet on both slopes of the outer western ridge of the Santa Lucia Mountains in Monterey County."

Sargent then mentions four canyons near the Pacific, in the southern part of county, where the species is known to occur. My knowledge of it in this part of the country corresponds substantially with this record. In other words, it was supposed by recent botanists to occur only at these four or five stations, about five miles from the ocean, over a region less than 25 miles in length. In this region too, it will be observed, that it was reported only from canyons.

From the explorations of the past year, in the much more extensive, rugged, and elevated masses of the northern Santa Lucias, it is found that its range may be extended for over 50 miles from north to south; that it occurs at least 18 miles eastward from the ocean [Dudley may have seen the Anastasia Canyon grove]; that its favorite habitat is crag, rocky ridge, and slope, although it occurs in canyons and along streams. Instead of growing at about 3,000 feet elevation, it ranges in this region, its true home, from 1,500 to over 5,000 feet above the sea.

Although not pertinent to this paper, I will refer to the fact, to be treated more fully elsewhere, that this extension of the range is in part a rediscovery of the locality of the species mentioned by Lobb in 1853, who refers to as "Growing on the highest peaks and most exposed places, in slate which to all appearances is incapable of supporting vegetation." Sargent, in commenting on the above, says "Since Lobb's time, fire has probably destroyed all of the trees except those which were protected by moisture in the bottoms of the deepest canyons." As a matter of fact, although fire has ravaged these regions

with unparalleled fury, the truer explanation of Lobb's puzzling passage would suggest that Lobb never saw the trees which modern botanists believed to be the only ones in existence; and strange as it may seem, the latter did not know of the trees found by the former. Coulter, Lobb and Douglas all entered these mountains from Monterey, which lies to the north of them, and undoubtedly saw the northwestern portions of the area of their northern extension [as the readers of this text now know, Dudley made an erroneous assumption, and my hunch as to why he did not pursue his "Fact, to be treated more fully elsewhere," is that his subsequent research lead him to conclude that the historical record did not support his notion]. In regard to the relative numbers in the two sections, I should say that where the southern extension might number its trees by the hundreds, in the northern [extension] they might be numbered in the tens of thousands.

The writer feels confident of having completely outlined their area of distribution, and in so doing his ideas of their climatic and ecological affinities have changed. From the fact that they were found in the southern mountains, but little higher in the canyons than the redwoods, and were only a few miles from the ocean, he was led to infer that they belonged to the fog-belt of the coast ranges. It is now clear that they do not belong that belt, and consequently not to those stream basins west of the westernmost coast range, but belong to the ranges next within, which have abundant precipitation, but are semi-arid in summer, and which give rise to streams whose flow, though often uncertain, is important to several towns and a rich valley—the Salinas—of this region.

This brings us to the second part of this paper—the economic aspects of the distribution of the distribution of *Abies venusta*. In regard to the southern extension of the species—south of the latitude of Santa Lucia [Junipero Serra] Peak, the highest point of these mountains—I should say that it is at present only of the slightest importance to the protection of the stream sources of the Nacimiento, one of the three chief branches of the Salinas River. Quite probably, however, if this region was protected from fire, and the *Abies venusta* extensively propagated in this basin, which must be well adapted to it, it would insure a steady flow of this uncertain stream.

To understand its economic relation in the northern extension, it is necessary to explain that it occupies here practically a triangular area, whose eastern angle reaches at least 18 miles from the coast among mountains often over 4,500 and 5,000 feet in elevation, largely covered with chaparral, but in favorable localities producing considerable tracts of *Pinus ponderosa*, *Pinus coulteri*, and *Abies venusta*, only the first named creating the effect of a forest. With these are mixed the Black Oak, Valparaiso Oak, Tanbark Oak, and Madrone.

From the northern Santa Lucias spring three streams of considerable size, besides the smaller ones flowing toward the Pacific. The first of these is the Sur River, draining the western slope of the outer range; it has a considerable body of Redwood at lower elevations, and scattered groves of the Silver Fir on the high rocky ridges, and flows northwestward into the Pacific. The second is the Carmel River, draining the north slopes of this mountain mass. In this irregular drainage occur most of the groves of *Pinus ponderosa*, and the largest areas occupied by the Silver Fir, besides considerable Tanbark Oak, Madrone and Valparaiso Oak. Much of the mountain portion of this drainage indeed appears to bear a true forest. Here also, in Bear Basin and Ventura [Ventana] Creek, *Abies venusta* appears at its best. It nowhere shows a tendency to a forest, but occupies either the rocky faces of steep canyons, the crests of rocky ridges, or bottoms of the canyons; always scattered, or in groups of from three to ten or twelve, with the rocks or other trees interspersed. Its preference is the north slopes or the vicinity of a mountain stream. Its roots evidently seek the moisture found in these situations.

One of the photographs that accompanied Dudley's article in the May 1902 edition of *Forestry & Irrigation*. The subcaption reads: "Margins of woods in Bear Basin, Santa Lucia Mountains, showing specimens of Silver Fir, Coulter's Pine, *Libocedrus* [*Calocedrus*], and *Pinus ponderosa*."

The waters of the Carmel are of growing importance, as they furnish the towns on the Monterey Bay, such as Pacific Grove, Monterey, and the Hotel del Monte, with their domestic water supply.

The third stream is the Arroyo Seco, one the three chief branches of the Salinas River. The Arroyo Seco drains eastwardly, rises in the heart of the northern Santa Lucias, and its watershed occupies a greater share of their territory. The ridges are of great steepness, the canyons sometimes impassable and the elevations of a greater share of its mountains from 3,000 to 5,500 feet above the sea, Santa Lucia [Junipero Serra] Peak, on its southern boundary, rising to a height of 5,967 feet. A great deal of this basin is covered with chaparral, with a limited amount of hardwood timber on the north slopes, some *Pinus coulteri*, and occasional tracts of the Silver Fir, which becomes rather common in the northwestern part of the basin, where the waters approach the sources of the Carmel and the Sur. In this basin there would be much more timber than exists at present if forest fires of great destructiveness had not repeatedly swept it steep mountains. These fires are known to have been purposely set in some cases. I have photographs of Silver Firs destroyed by the fire of 1898; but the greatest destruction was among the oaks. *Pinus ponderosa* 2 feet in diameter were killed, and the *Pinus attenuata*, which is supposed in southern California to resist and check forest fires, was burned into the roots and destroyed.

The Salinas Valley is a very rich valley, and is the center for the sugar beet industry in northern California. Water has been sought at considerable expense through pumping plants, which have not been very successful, I am told. So important is the water supply for this valley that, in 1900, the Arroyo Seco was selected as one of the first basins to be examined by engineers under the authority of the United States Government and the

California Water and Forest Association, and several sites for storage reservoirs were mapped.

The engineer in charge proposed that I look over the forest conditions of the Arroyo Seco. I have now acquainted myself with the character of the whole, and the actual growth of more than half the basin. A few of the results of the work have been set forth in this paper, one of the most interesting of which, to a botanist, was the discovery that *Abies venusta* occupied not infrequent areas in this and the Carmel River drainage, and might under proper care become an important factor in the question of the conservation of an abundant rain and snow fall.

Therefore, in closing, let me suggest certain conclusions which seem pertinent to me: If the Arroyo Seco is to have storage reservoirs, holding a water supply gathered by steep slopes, and consequently rapid drainage, the protection of the existing ligneous growth and the propagation of additional forest growth within this basin is the rational accompaniment of the engineering work.

Fire must be kept out, and I am satisfied that the Silver Fir would be one of the best species to encourage or to propagate over certain large, rocky tracts where few trees naturally grow. The best hardwoods to accompany it would be the Tanbark and Valparaiso Oak—the two oaks economically most valuable on the coast.

Furthermore, the water supply from the Carmel River will soon become inadequate or inferior for the growing seaside towns on the Monterey Bay, if the same protection from fire is not accorded to the woods at the head of the stream.

In this protection of the Carmel and the Arroyo Seco, one of the most interesting conifers in the world, the Silver Fir of the Santa Lucias, would be cared for in its original home.

Dudley's discussion of the reasons as to why the watersheds in which *Abies bracteata* occurs should be protected was reflective of his very strong interests in conservation matters. At that time Dudley was a member of the Board of Directors of the Sierra Club, on which he served as the Corresponding Secretary, and in his roles as a member of the Sempervirens Club (an organization dedicated to the preservation of redwood forests) and as the secretary of the Redwood State Park commission, he was influential in the creation of Big Basin Redwoods State Park in the Santa Cruz Mountains. Dudley also played a role in the creation of Pinnacles National Monument. According to Dudley's fellow Stanford University botanist Douglas Campbell, Dudley was "An intimate friend of Gifford Pinchot" [the Chief Forester of the U. S. Forest Service] who "Always stood for the most enlightened views of forest conservation. The State has never had a more devoted advocate of sound and modern methods of forestry than Professor Dudley" (Dudley Memorial Volume; The National Cyclopedia of American Biography 22: 336-337).

Although in the preceding text Dudley did not specifically propose the creation of a national forest as the means by which to protect the watersheds of the Santa Lucia Mountains, it must have been on his mind, and it is probably the reason why he chose have his observations made known in a publication of the American Forestry Association.

THE CREATION OF THE MONTEREY RANGER DISTRICT OF LOS PADRES NATIONAL FOREST, AND THE CREATION OF THE VENTANA AND SILVER PEAK WILDERNESSES.

On February 15th, 1904, the United States General Land Office, at the request of the United States Geological Survey's Division of Geography and Forestry, withdrew approximately 287,336 acres of land in the Santa Lucia Mountains of Monterey County in order to have it surveyed for forestry purposes (Land Status Atlas, 1934). It was the standard procedure of the General Land Office (now the Bureau of Land Management) to withdraw proposed forest reserve lands in advance of public notifications in order to prevent last minute rushes by land speculators and/or settlers while the preliminary survey was being conducted (Muhn, 1992). Surveyors of the U.S. Geological Survey's Division of Geography and Forestry were soon on the job, for according to a newspaper report from Jamesburg, datelined July 5, 1904, "A party of government surveyors were through this section last week taking observations in the interest of the government timber reserve" ("Jamesburg Gleanings," *Salinas Weekly Index*, 7/7/1904).

In contrast, William Dudley, in his "Forestry Notes" column in the January, 1906 edition of the *Sierra Club Bulletin* (vol. 6, part 1, p. 72), stated that "In October of the present year [1905] 343,000 acres were withdrawn from the public domain in the heart of Monterey County, in preparation for the proposed Santa Lucia Forest Reserve. It has been already pretty thoroughly inspected. It concerns the water supply of the Carmel River and the Arroyo Seco and other streams contributory to the Salinas Valley water supply."

The discrepancies regarding the stated acreages and the dates of this land withdrawal are almost certainly due to the fact that by that time two agencies were involved in the survey work related to proposed forest reserves: the U.S. Geological Survey's Division of Geography and Forestry, which was created by the Forest Management Act of 1897, and a unit of boundary men of the Department of Agriculture's Bureau of Forestry. According to the Chief Forester of the USDA's Bureau of Forestry, Gifford Pinchot (1947, p. 251):

> The language of our appropriation [for 1901] permitted us [the Bureau of Forestry] to "make and continue investigations on forestry, forest reserves, forest fires, and lumbering." That was enough. The work was done, and the President acted on the facts thus found. Soon after T. R. [Theodore Roosevelt] became president, he formed the habit of sending to me, for suggestion or approval, Gannett's Forest Reserve boundary recommendations [Henry Gannett was in charge of the U.S.G.S. Division of Geography and Forestry], and I arranged with Gannett that he would not mind if I changed the boundaries he proposed for Forest Reserves when T. R. sent them to me. Had the country been under a different kind of President than Theodore Roosevelt, the area of National Forests would have been far less than it is today, and so it would if our boundary men had been less enterprising, determined, and effective. When the boundary work began there was no time to lose. An army of timber cruisers was scouting the forests of the West for the choicest bodies of Government timber. Once discovered and reported, these prizes would be claimed, fairly or fraudulently, under lieu selection or under the Timber and Stone or other public land laws, and then their forests would be lost to Forestry and the people.

The U. S. G. S. Division of Geography and Forestry survey was lead by Fred Gordon Plummer (1864-1913), a veteran forest reserve surveyor who had previously performed numerous surveys in California, Washington, Arizona and New Mexico, and accompanying Plummer was a chief assistant, M. G. Gowsell. Plummer & Gowsell's report, "Forest Conditions in the Monterey Forest Reserve," was issued in 1905. Plummer and Gowsell estimated the total stand of *Abies bracteata* timber as 23,550,000 feet, board measure, and stated that:

> This beautiful fir has a very small geographic distribution limited to the area under consideration in this paper shown on plate 1. If a line is drawn from Uncle Sam to Mount Mars, it will fairly mark the location of a belt along the Santa Lucia Range, in which this species ranges from 2,250 to 5,000 feet elevation. Its inaccessible positions have saved it from logging, but it has suffered some from fires. It occupies the position where one would expect to find *Abies concolor,* which is found on both

higher and lower latitudes in the western states, but it is not to be mistaken for any other conifer. The tall, acute, and spire-like crown is not unlike that of *Abies lasiocarpa*. Its reproduction is good over the entire area, and it is fortunate that the creation of the Monterey Reserve will assure it a still wider distribution.

On June 25th, 1906, President Theodore Roosevelt signed the proclamation that created the Monterey Forest Reserve, and thus all the populations of *Abies bracteata*, except for those in San Luis Obispo County, where then included in lands that were administered by the U. S. Forest Service.

In March of 1907 the Forest Reserves were renamed National Forests; in 1919 the Monterey National Forest was merged into the Santa Barbara National Forest, and in 1936 the Santa Barbara National Forest was renamed as Los Padres National Forest.

The origin of the Ventana Wilderness began in 1929, when 45,000 acres were set aside as the Ventana Wild area. In 1931 this land received permanent protection and was renamed as the Ventana Primitive Area, and in 1937 it was enlarged to about 55,800 acres. With the passage of the Ventana Wilderness Act of 1969, the Ventana Primitive Area was abolished and replaced with 98,000 acre Ventana Wilderness. Additions to the Ventana Wilderness in 1978 and 1984 increased the acreage of the Ventana Wilderness to about 161,750 acres.

In 1992 the 14,500 acre Silver Peak Wilderness was established to the south of the Ventana Wilderness, and 38,800 acres were added to the Ventana Wilderness. Addition land was added to these wildernesses in 2002, bringing the total acreage of the Ventana Wilderness 240,026 acres, and that of the Silver Peak Wilderness to 31,555.

So thus the vast majority of the extant populations of *Abies bracteata* are now within the boundaries of national wildernesses.

TAXONOMY.

Linnaeus (Carl von Linne, 1707-1778), in volume two of his *Species Plantarum* (1753), included all fir and spruce trees within the genus *Pinus*. Because this was the first botanical text that listed every species then known strictly under the system of binomial nomenclature, it was chosen as the 'starting point' of botanical nomenclature. In the following year (1754) Philip Miller, in volume one of the fourth (abridged) edition of his *The Gardener's Dictionary*, placed fir trees in the genus *Abies*. Many botanists, however, continued to place fir trees in the genus *Pinus* until the 1830s and 1840s, and thus the generic name of the earliest descriptions of this species is *Pinus*.

Pinus bracteata David Don. *Transactions of the Linnean Society of London* 17: 442-444. July, 1836. Due to the date of its publication, this is the valid basonym for this species. Don's description was based on specimens that were collected by Thomas Coulter "On the sea side of the mountain range of Santa Lucia, about 1000 feet lower down than [*Pinus*] *coulteri*."

Pinus venusta David Douglas in Sir William Jackson Hooker, *Companion to the Botanical Magazine* 2: 152. December, 1836. Due to its earlier publication date, *Pinus bracteata* D. Don has priority. Douglas's name and description are unusual in that they were written in a letter to Sir William Hooker, and this letter would not have been published at such an early date (it at all) were it not for Douglas's accidental death in 1834. This letter was published in Hooker's "A Brief Memoir of the Life of Mr. David Douglas, with Extracts From His Letters."

Picea bracteata (D. Don) John Claudius Loudon. *Arboretum et Fruticetum Britannicum*, volume 4: 2348-2349, fig. 2256. 1838. Synonym. In reverse order to the understanding of other botanists, Loudon considered *Pinaceae* species with erect cones to represent the genus *Picea*, while those with pendant cones to represent the genus *Abies*.

Abies bracteata (D. Don) Hooker & Arnott. *The Botany of Captain Beechey's Voyage*: 394. 1841. This represents an erroneous assumption by some authors that it was in this text that *Abies* was first applied to this species, but it was actually listed as *Pinus bracteata* in this text. As a consequence, the authorship of this species has been listed as (D. Don) Hooker & Arnott in a number of texts.

Taxodium sempervirens (Lambert) Hooker. *Icones Plantarum* 4: tab. 379. 1841. Illustrated in this text was one of David Douglas's *Abies bracteata* specimens, which, due to the time of year when they were collected (March), lack reproductive features. It appears that Douglas forgot to label this specimen, for Sir William Jackson Hooker assumed that they represented *Taxodium sempervirens*, which was then the accepted name for *Sequoia sempervirens*, the Coast Redwood. In the accompanying text Hooker stated that:

> I regret that I am not able to give a more complete figure of a *Taxodium*, as it is supposed to be, which Mr. Douglas describes as the "Great beauty of the Californian vegetation, which gives the mountains a most peculiar, I was going to say awful, appearance—something which plainly tells that we are not in Europe. I have repeatedly measured specimens of this tree 270 feet long, and 32 feet round, at three feet above the ground. Some few I saw upwards of 300 feet high, but none in which the thickness was greater than those I have instanced."
>
> It does not so well accord with *Taxodium sempervirens* of Lambert, as to induce me to consider it decidedly that plant; but I hope the attention of Californian travelers may in future be directed to it, and that we shall be able, on some other occasion, to represent the flowers and the fruit of this most magnificent denizen of western America.

Douglas, in one of his letters to Hooker, informed the latter that he had collected "Fine specimens and seeds also" of the *Taxodium* species, but these must have been included in the shipment of Douglas's plant materials that got lost while in route to England. Hooker later on acknowledged his error, and stated that "The subject of my plate in reality belonged to *Abies bracteata*" (*Curtis's Botanical Magazine* 80: sub. tabs 4777 & 4778, 1854).

Abies bracteata (D. Don) Pierre Antoine Poiteau. *Revue Horticole* 4 (second series 4): 7. 1845. This is the valid binym for this species, which was published in a paper titled "Des Coniferes." This text, however, was overlooked by other botanists until the 1950s. Although the authorship of this species has often been written as (D. Don) ex Poiteau, this is erroneous, for Don's description was published nine years earlier.

Abies bracteata (D. Don) Nuttall. *The North American Sylva* vol. 3:137. 1849. Although in many texts the authorship of this species is listed as (D. Don) Nuttall, Nuttall's text was first published in 1849, and thus *Abies bracteata* (D. Don) Poiteau has priority.

Abies venusta (Douglas in Hooker) Karl Koch. *Dendrologie* 210-211. 1873. In this text Koch became the first botanist to place the synonymous name *venusta* in the genus *Abies*.

Charles Sprague Sargent, in his "Notes Upon Some North American Trees" column in the October 16, 1889 edition of *Garden and Forest*, stated that "David Douglas, who discovered this species, first described it, calling it *Pinus venusta*. His name was published in 1836 in the *Companion to the Botanical Magazine* (ii., 152), a year earlier than Don's *Pinus bracteata* (*Trans. Linn. Soc.*, xvii., 443), so that the name should now become *Abies venusta*."

Over the next 60 years many subsequent botanical writers, especially those in the United States, adopted the name *Abies venusta* for this species, but in 1952 clear priority for the name *Abies bracteata* was established. William Dayton, in "Some Notes on United States Tree Names" (*Rhodora* 54: 75, 1952), reported that, while doing research at the headquarters of the Linnean Society of London, he discovered, in their records for part three of vol. 17 of the Society's Transactions, a note that stated it was published "At end of June or beginning of July" of 1836. This note also stated "In Monthly Literary Advisor 1836." This is *Bent's Monthly Literary*

Advisor, from which Dayton was able to acquire a copy of the list of "New Publications, from June 9 to July 9, 1836," which was published in the July 11, 1836 edition of this publication. This list includes Transactions of the Linnean Society, Vol. 17, pt. 3. Thus David Don's name for this species has priority, for volume 2 of the *Companion to the Botanical Magazine* was published on December 1, 1836.

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PINUS. PINE TREES.

The genus *Pinus* includes 94 species, nearly all of which are endemic to the boreal, temperate and the tropical mountains of the northern hemisphere. *Pinus* is the Latin word for pine trees.

1a. Cone scale spurs elongated, stout, hooked and mostly 3 to 5 (-7) cm. long. Cones mostly 19 to 35 cm. (7½-14") long. Scattered nearly throughout the Tassajara region, and locally common to abundant in some areas. . . . . ***P. coulteri***.

1b. Cone scale spurs short, generally triangular, slightly hooked and less than 1 cm. long. Cones mostly 7 to 25 cm. (2¾-10") long. Restricted to higher elevations in the Tassajara region:

2a. Cones mostly 7 to 15 cm. (2¾ -6") long. Cone scales less numerous; when the cones are viewed from one side, the number of scales in the central and upper angled rows range from about 4 to 7. Locally common from the upper Church Creek watershed to Pine Valley and Pine Ridge. . . . . ***P. ponderosa***.

2b. Cones mostly 13 to 25 cm. (5-10") long. Cone scales more numerous; when the cones are viewed from one side, the number of scales in the central and upper angled rows range from about 7 to 11. Restricted to two small plantations on Chew's Ridge. . . . . ***P. jeffreyi***.

Pinus coulteri D. Don. BIG CONE PINE, COULTER PINE. This distinctive species is widely scattered in woodland habitats and sometimes in chaparral in the Tassajara region. On Chew's Ridge and in The Pines it is a very common member of the mixed evergreen woodlands. Elsewhere it occurs in small groups, or sometimes as a lone tree. The Marble Cone Fire of 1977 killed nearly all of the trees in The Pines, but this population had fully recovered by the time that the Basin Complex Fire of 2008 did the same thing. Based on the number young trees that sprouted after the fire of 1908, it appeared that this woodland would make a full recovery again, but the last time I hiked through The Pines (in May of 2015) no trees could be seen from the trail. Hopefully they were obscured by the dense brush. This species was named for Thomas Coulter, who in 1832 collected the type specimen "On the mountains of Santa Lucia, near the Mission of San Antonio, within sight of the sea and at a elevation of 3000 to 4000 feet above its level." ●R: Coast Ranges, from the Black Diamond Mines region and Mount Diablo in Contra Costa County southward, through the Transverse and Peninsular ranges of southern California, to the mountains of northern Baja California (where the species occurs at four known sites). ●H: evergreen trees with open pyramidal or sometimes asymmetrical crowns that range from about 12 to 25 m. (40-85') tall. The Bark is blackish brown and deeply fissured into scaly plates. The needles are bluish green and about 1.5 to 3 dm. long; they are produced in bundles of three's, and remain on the tree for about three or four years. The large and heavy cones are about 20 to 35 cm. (8-14") long, and tend to remain on the tree for several years after the seeds have fallen. The ellipsoid seeds are about 12 to 18 mm. long, and the wings are about 25 to 30 mm. long.

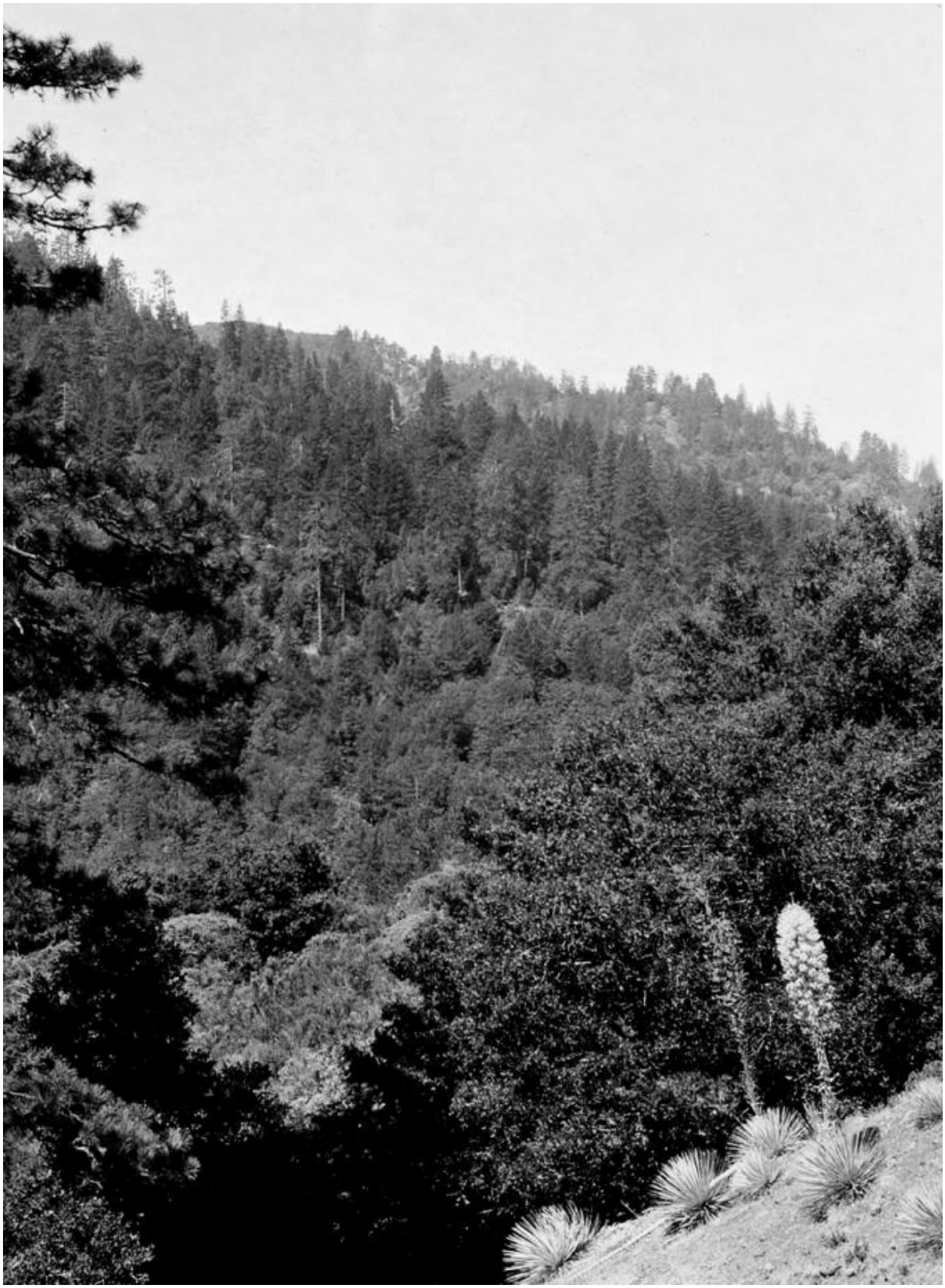
Pinus jeffreyi Greville & Balfour ex Murray (*P. ponderosa* var. *j.* Vasey. JEFFERY PINE. This species is limited to two groves that are located along the summit of Chew's Ridge, one is to the north of the fire lookout tower and the other is to the south of the lookout tower (the latter grove is easily accessible via the road to the MIRA Observatory). The groves were planted by the U. S. Forest Service in February of 1909.* Some of the trees on Chew's Ridge exhibit characteristics suggesting hybridization between *P. jeffreyi* and *P. coulteri*. ●R: Cascade Ranges, Sierra Nevada, and the Transverse and Peninsular ranges, from Douglas County Oregon to the higher mountains of northern Baja California. This species also occurs in the North Coast Ranges, from Lake County northward, and a very disjunct population occurs on San Benito Mountain in southwestern San Benito County and western Fresno County. ●H: evergreen trees typically with narrow crowns that range from about 20 to 53 m. (65-175') tall. The bark is generally reddish brown and deeply furrowed. The leaves, which are produced in bundles of threes, are bluish green and about 15 to 22 cm. long. The cones are about 15 to 25 cm. long, and the seeds are about 10 to 13 mm. long (the wings are about 3 cm. long).

*"Jamesburg Gleanings," *Salinas Daily Index* 1/20/1909; "Forest Ranger is Shut Out of Home," *Salinas Daily Index* 1/29/1909; Sloane, Norman, "Resources and Plan of Operation of the Monterey National Forest," 1914; Zobel, Bruce, under "News and Notes," "Jeffrey Pine in the South Coast Ranges of California," *Madrono* 11: 283-284, 1953.

Pinus ponderosa Douglas ex P. & C. Lawson. PONDEROSA PINE, WESTERN YELLOW PINE. Prior to the Marble Cone Fire of 1977, this well known species formed a large and nearly continuous stand that extended from the upper regions of the Church Creek watershed to Pine Valley, and westward and southwestward to Bear Basin and Pine Ridge. Pine Ridge was so named for its former old growth Ponderosa Pine forest. The Marble Cone Fire consumed the majority of the trees that existed on Pine and Miller ridges, and it did extensive damage elsewhere, except on the floor of Pine Valley. The Kirk Complex Fire of 1999 consumed most of the trees in the vicinity of the Church Creek Divide, and the Basin Complex Fire of 2008 caused more damage. With the exception of the floor of Pine Valley, only scattered remnants of this former forest remain. Prior to the fires of 1999 and 2008 this species was also scattered in the upper regions of Tassajara Creek, in Miller Canyon, and on Chew's Ridge. ●R: the most widespread and abundant pine in the mountains of western North America, from British Columbia and Montana to the mountains of northern Baja California and central Mexico. Trees of the Pacific slope are generally much larger than those of interior populations. ●H: evergreen trees typically with narrow and fairly open crowns that range from about 30 to 43 m. (100-140') tall, with larger trees ranging upward to about 70 m. (230') tall. The trunks can be as much as 2.5 m. (8'+) in diameter. The bark is reddish to yellowish brown, it is broken into large shield like plates, and covered with small scales that somewhat resemble the pieces of a jigsaw puzzle. The scales flake away, leaving sulfur yellow depresssions on the plates. The needles are deep yellow green, about 12 to 25 cm. long, and are produced in bundles of three's. The cones are mostly about 7 to 15 cm. long, and are rather light in relationship to their size. The seeds are generally ovoid and about 6 or 7 mm. long, and the wings are about 24 to 30 mm. long.

Pinus sabiniana Douglas. At the present time (as of 5/4/2019), the Consortium of California Herbaria database lists four specimens of *P. sabiniana* that were collected at "Tassajara Hot Springs." All are duplicates of A. D. E. Elmer's specimen number 3120, and they are actually specimens of *Pinus coulteri*. According to the note that is enclosed in an envelope that is pasted to one of the specimen sheets, the specimens were collected in the "Grindstone hills between Tassajara Hot Springs and Church's Ranch," and thus in The Pines.

Above: The Pines as photographed in June of 1992, fifteen years after the Marble Cone Fire of 1977. Below: The Pines as photographed in June of 2010, two years after the Basin Complex Fire. Two years after the Marble Cone Fire The Pines looked very similar to the lower photograph. Photographs by the author. A highly noticeable difference between these photographs is the presence of foliation that hides the route of the Horse Pasture Trail



The *Pinus ponderosa* forest at the Church Creek Divide as photographed in 1929. Image from the Weislander Vegetation Type Mapping Collection, courtesy of the Marion Koshland Bioscience and Natural History Resources Library, University of California at Berkeley.

The remnants of the same *Pinus ponderosa* forest at the Church Creek Divide as photographed by the author in May of 2009.

Jeffrey Pines on Chew's Ridge. Photographed by the author.

ANTHOPHYTA (*Angiospermae*). FLOWERING PLANTS. p. 56.

Recent estimates of the total number of flowering plants vary radically, from 223,300 (Scotland & Wortley, *Taxon* 52:101-104, 2003) to 422,127 (Govaerts, *Taxon* 50: 1085-1090, 2001). Anthophyta is by far the largest division of vascular plants, and in the present epoch it represents about 70% of all plant species, and about 95% of all terrestrial vascular plant species.

MAGNOLIIDS (*Magnoliidae*). THE MAGNOLIA CLADE.

The *Magnoliids* were formerly considered to represent a subclass within *Dicotyledoneae* (the *Magnoliidae*), but due to the findings of phylogenetic research, they are now recognized as a distinct clade. This primarily tropical clade includes about 20 families and approximately 8,500 to 9,000 species of trees, shrubs, lianas, vines and a few herbs. This clade consists of four orders, the *Canellales*, the *Laurales* (which includes *Calycanthus*, Spice Bush), the *Magnoliales* (which includes the magnolia and tulip trees, and also nutmeg, *Myristica fragrans*), and the *Piperales* (which includes *Piper nigrum*, black pepper).

LAURACEAE. LAUREL FAMILY.

Lauraceae includes about 54 genera and approximately 3,500 species of trees and shrubs, most of which are endemic to tropical regions. This family includes the laurels (*Laurus*), cinnamon and camphor (*Cinnamomum*), and avocado (*Persea*).

UMBELLULARIA. CALIFORNIA LAUREL.

The genus *Umbellularia* consists of one species that is endemic to temperate western North America. The name is based on the Latin word *umbellula*, a small umbel, and alludes to the structure of the inflorescens.

Umbellularia californica (Hooker & Arnott) Nuttall [*Tetranthera californica* H. & A.]. CALIFORNIA BAY LAUREL, OREGON MYRTLE, PEPPERWOOD TREE. This tree species is a common member of woodland habitats at all elevations in the Tassajara region, and it occasionally manifests itself as a large shrub in chaparral habitats. Like its European relatives, the leaves of this species are used as culinary herbs. ●R: Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Yamhill and Clackamas counties in northwestern Oregon to the higher mountains of northern Baja California. This species is most common in the Coast Ranges, from Humboldt County to San Luis Obispo County. ●H: aromatic evergreen trees or shrubs with more or less conically shaped crowns that range from up to 30 m. (100') or more in mixed evergreen forests to less than 4 m. (12') tall in chaparral. The barks is relatively thin, scaly, and reddish to greenish brown. The alternate leaves are short petiolate, and the blades, which are about 2 to 12 cm. long, are oblong-lanceolate to elliptic with entire margins. The flowers are produced in small umbels that are positioned in the axils of the outer leaves. Although the flowers lack petals, the six yellow or greenish yellow sepals resemble petals in color and texture. The sepals are oblong-ovate and about 6 to 8 mm. long. The aromatic fruits are roundish to ovoid dupes that are about 2 to 2.5 cm. long; they contain one large stone like seed. The fruits, which mature in late summer, in many ways resemble an olive or miniature avocado, for they have a thin green skin and an oily and greenish inner flesh. ❁February-May.

EUDICOTYLEDONEAE (Eudicotyledons, Eudicots).

The Eudicotyledons are by far the largest clade of flowering plants, for they represent about 70% of the taxa. The botanical term was introduced in 1991 in order to emphasize the later evolutionary divergence from the *Magnoliidae*.

ACERACEAE:

Due to the findings of phylogenetic research, *Aceraceae*, the maple family, has been transferred to *Sapindaceae*.

ADOXACEAE. MUSKROOT FAMILY.

As presently circumscribed, *Adoxaceae* consists of five genera and about 175 to 200 species. These genera have been segregated, due to the findings of phylogenetic research, from *Caprifoliaceae* (the Honeysuckle Family), and it is possible that future research will result in the reduction of *Adoxaceae* to a subfamily of *Caprifoliaceae*. *Adoxaceae* is represented on all continents except for Antarctica, and it is especially well represented in the temperate and subtropical regions of the northern hemisphere.

SAMBUCUS. ELDERBERRY.

Sambucus consists of about 20 species that primarily occur in temperate and subtropical regions of the northern hemisphere (this genus is also represented in South America and Australasia). The name is derived from the Greek word *sambuke*, a stringed musical instrument that was made from elder wood.

Sambucus nigra Linnaeus subsp. ***caerulea*** (Rafinesque) Bolli [*S. caerulea* Rafinesque; *S. glauca* Nuttall;. *S. mexicana* Presl ex deCandolle misapplied]. BLUE ELDERBERRY. Blue Elderberry plants occur at all elevations in the Tassajara region, and they tend to be manifested singularly or in small groups. This taxon is widely distributed in temperate western North America, from British Columbia to northern Baja California, and eastward to Montana, Wyoming, Colorado and New Mexico (subspecies *nigra*, which has black fruits, is widely distributed in eastern temperate North America and Europe). The plants are deciduous shrubs or sometimes small trees with hollow branches; the plants range from about 2 to 8 m. (6-26') tall. The leaves are opposite, and the blades are pinnately divided into 5 to 7 shortly petiolate leaflets. The serrately margined leaflets are ovate to oblong-lanceolate, and range from about 3 to 20 cm. long. The small flowers are numerous in large and generally flat topped or convex terminal cymes, and the five lobed corollas, which are white or yellowish white, are

about 5 to 6 mm. wide. The fruits are round purplish black berries that are about 5 to 6 mm. wide; they appear be light blue on account of a whitish bloom. ❀May-July.

Although ripened fruits are edible, green fruits and all other parts of the plant are toxic. The only documented case of elderberry poisoning in the United States occurred at Tassajara during an afternoon tea break in August of 1983. The text of the United States Center for Disease Control's report on this incident is as follows:

> On August 26, 1983, eight people with acute gastrointestinal and neurologic symptoms were flown by helicopter to a Monterey, California, hospital. Earlier that day, they had attended a gathering for 25 persons of a religious/philosophic group in a remote area of Monterey County. Within 15 minutes after drinking refreshments, 11 persons began to have nausea and vomiting. The eight person's most ill reported nausea, vomiting, abdominal cramps, and weakness. Some also complained of dizziness and numbness; one was stuporous and was hospitalized. Arterial blood gases were normal for all eight, as were serum cyanide levels (reported later). The San Francisco Bay Area Regional Poison Control Center was promptly consulted regarding treatment for possible cyanide poisoning, but specific treatment was not given because 4 hours had elapsed since exposure, blood gases were normal, and the patients were stable. All recovered quickly, including the patient hospitalized overnight.
>
> Investigation by the Monterey County Health Department revealed that staff at the religious center had gathered local, wild elderberries two days before the outbreak and had prepared juice from them the next day. Bunches of berries were crushed with their leaves and branches in a stainless-steel press. Apple juice, water, and sugar were added, and the mixture was stored overnight. The drink was served the next day in a stainless-steel pot to the group of 25 persons. Severity of illness correlated with the amount of elderberry juice consumed; those who drank only tea remained well. The hospitalized person [Dan Howe] had consumed five glasses of the juice; the others, much less.
>
> Editorial Note: The indigenous elder tree of the western United States, *Sambucus mexicana* [*S. nigra* subsp. *caerulea*], can grow to 30 feet and produces small (1/4-inch), globular, nearly black berries that can be covered with a white bloom at maturity. The berries are juicy and edible when mature. The cooked berries are commonly eaten in pies and jams, and berry juice can be fermented into wine. The fresh leaves, flowers, bark, young buds, and roots contain a bitter alkaloid and also a glucoside that, under certain conditions, can produce hydrocyanic acid. The amount of acid produced is usually greatest in young leaves.
>
> Although a review of the medical literature revealed no other reports of elderberry juice poisoning in the past 20 years, there are older, anecdotal reports of poisoning in children from the related elder, *S. canadensis* [*S. nigra* subsp. *c.*]. The religious center staff has been advised that, while elderberries may be safe to consume, particularly if cooked, leaves and stems should not be crushed in when making juice.

On August 24th of 1983, while Betsy MacGowan and I were hiking on Chew's Ridge, we came across an elderberry bush, and while we were eating ripe berries, the idea came to me that the berries would probably make a good juice—about as tart as cranberry juice, but with a richer and more fruity flavor. As only some of the berries were ripe, I gathered a number of the cymes that had the ripest fruits (these cuttings also included green fruits, stems and some leaves), with the idea that I would pick out the ripe fruits, from which a glass or two of juice could be made for my own consumption. Because I did not have the time to juice the berries myself until my next day off (which was several days in advance), I put the cymes in one of the refrigerators of the Tassajara kitchen, which was a huge mistake.

On the following day James Chidester, a summer work period student who was assigned to kitchen duty, took it upon himself to juice the berries, and in doing so he made no attempt to separate the ripe fruits from the green ones, or even the stems and leaves that were attached. Because the juice tasted so bad to him, he added water, apple juice and sugar, and it was served at the afternoon tea break on the following day.

The Center for Disease Control's report failed to mention that a number of those who had less acute symptoms were taken to Monterey in ambulances. On that day I was in Monterey on a Tassajara business trip, and while driving back to Tassajara on Carmel Valley Road, an ambulance in full alert mode (blaring siren and flashing lights) zoomed past me. It was quickly followed by two or perhaps three more ambulances, which were also in full alert mode. When I arrived at Jamesburg I asked Fu (Nancy) Schroeder if she knew anything about why so many ambulances were speeding along Carmel Valley Road, and it was then that I was first informed about the incident.

ANACARDIACEAE. CASHEW or SUMAC FAMILY.

Anacardiaceae consists of approximately 70 genera and about 850 species, and most of the species occur in tropical and warmer temperate regions. *Anacardiaceae* includes a number genera that produce edible fruits, such as cashews (*Anacardium*), mangos (*Mangifera*), pistachios (*Pistacia*), and mombin fruits (*Spondias*). This family also includes a number of trees that are widely planted for their ornamental appeal, such as pepper trees (*Schinus*) and smoke trees (*Cotinus*).

TOXICODENDRON. POISON OAK, POISON IVY, etc.

Toxicodendron consists of fifteen species of shrubs, vines and small trees that are native to North and South America and eastern Asia. In older texts the species of this genus are placed in the genus *Rhus*. The name is derived from the Greek words *toxikos*, poison, and *dendron*, tree.

Toxicodendron diversilobum (Torrey & A. Gray) E. Greene [*Rhus diversiloba* T. & G.]. POISON OAK. This well known species is common to abundant at lower and intermediate elevations in the Tassajara region (except for in open grassland habitats), but it becomes increasingly less common above about 3,000 ft., and it is generally uncommon to absent above about 4,000 ft. Contrary to its

name, poison oak is not an oak, nor is it truly poisonous, for the dermatitis which occurs in about 70 to 85% of people after contact with the surface urushiol oils of this and other *Toxicodendron* species (poison ivy, poison sumac, etc.) is an allergy that is unique to our species (the leaves are readily consumed by grazing animals). Allergies are malfunctions of the immune system, in which the body reacts to an innate substance as if it were toxic. The allergic reaction to poison oak is typically acquired, for susceptible individuals usually require one or more contacts before the onset of a reaction. ●R: Pacific Slope, from British Columbia to northern Baja California. ●H: highly variable deciduous shrubs or subshrubs that range from free standing bushes about 1 to 2.5 m. (3-8') tall, to lanky subshrubs which climb through the branches of other plants (this is the most common form in this region), and sometimes as woody vines that climb high into the branches of trees. The three foliate leaves are alternate and are on petioles about 1 to 10 cm. long. The leaflets are ovate to roundish and variously lobed or entire, and about 1 to 13 cm. long. The leaves turn red in autumn. The small flowers are produced in drooping axillary panicles, the corollas consist of five greenish white petals. The fruits are roundish and greenish white berries about 2 to 6 mm. wide. ❁March-May.

APIACEAE (*Umbelliferae*). CELERY, CARROT or PARSLEY FAMILY.

According to the Angiosperm Phylogeny Website, *Apiaceae* consists of about 434 genera and 3,780 species of annual and perennial herbs that primarily occur in temperate regions. This family is the source of a number of common vegetables, such as carrots, parsnips, fennel and celery, and due to the pleasantly aromatic scent of many species, it is also a major source of culinary herbs and spices, such as dill, anise, angelica, cumin, caraway, parsley, coriander (cilantro), chervil, lovage, etc. A number of species, however, are extremely poisonous, such as hemlock (*Conium*) and water hemlock (*Cicuta*). In many older texts the name that is applied to this family is *Umbelliferae*, on account of the umbellate inflorescences of most of the species. The name *Apiaceae* is based on that of the genus *Apium*, which is the Latin name for celery.

1a. Fruits covered with prickly structures (barbs, scales, bristles, hairs, etc.):
- **2a**. Prickly structures of fruits hooked above the base, often near the tip:
  - **3a**. Prickly structures consisting of stout barbs or scales. Axis of fruit not marked by an obvious structure. Perennial herbs from tuberous roots. . . . . ***Sanicula***.
  - **3b**. Prickly structures consisting of slender bristles or hairs. Axis of fruit marked by an obvious structure. Annual herbs:
    - **4a**. Prickly structures produced in distinct rows along the ribs of the fruit. . . . . ***Yabea***.
    - **4b**. Prickly structures not produced in rows:
      - **5a**. Fruits beaked (i.e., they have a two lobed appendage at the apex). . . . . ***Anthriscus***.
      - **5b**. Fruits beakless. . . . . ***Torilis***.
- **2b**. Prickly structures straight or angled from the base:
  - **6a**. Inflorescence consisting of open, spreading umbels. Fruits several times longer than wide and with small and remote prickles. ***Osmorhiza***.
  - **6b**. Inflorescence consisting of contracted head like umbels. Fruits densely bristly and not more than twice as long as wide. . . . . ***Daucus***.

1b. Fruits not covered with prickly structures (they range from glabrous to hairy):
- **7a**. Fruits not flattened and without prominently winged margins:
  - **8a**. Plants of constantly wet habitats. The petals are white:
    - **9a**. Leaves broadly lanceolate in outline and once pinnate. . . . . ***Berula***.
    - **9b**. Leaves narrowly ovate to triangular ovate in outline and one to three times pinnate. . . . . ***Cicuta***.
  - **8b**. Plants not of constantly wet habitats. The petals are yellow or yellowish green:
    - **9a**. Perennial herbs with leaves broadly deltoid in outline and two to three times pinnate. . . . . ***Tauschia***.
    - **9b**. Small annual herbs with opposite leaves that are lobed but not divided into leaflets. . . . . ***Bowlesia***.
- **7b**. Fruits more or less flattened and with prominent thin and often paper like wings on the margins:
  - **11a**. Plants much less than 1 m. (3') tall. Leaves finely dissected into numerous leaflets, the ultimate segments narrowly linear. . . . . ***Lomatium***.
  - **11b**. Plants quite robust and about 1 to 3 m. (3-10') tall. Leaves divided into three large and very broad leaflets. . . . . ***Heracleum***.

ANTHRISCUS. CHERVIL.

Anthriscus consists of about 15 species that are native to Eurasia and northern Africa. The culinary herb is *Anthriscus cerefolium*. The name is derived from an ancient Greek word for plants of this genus.

Anthriscus caucalis Bieberstein [*A. scandiciana* (Weber) Mansfeld, *A. vulgaris* (Linnaeus) Persoon; *Scandix anthriscus* Linnaeus]. BUR CHERVIL. In the first edition of this text I stated that this species is scattered in generally shady but grassy woodland habitats in the vicinity of Tassajara Hot Springs, and perhaps in other areas in the Tassajara region. During my botanical explorations in the vicinity of Tassajara during the first two springs after the Basin Complex Fire of 2008, I did not see (or perhaps I failed to notice) any plants of this species, but in early May of 2015 I found a few plants along a very recently built spur trail that runs from the Overlook Trail to the summit of Overlook Ridge. ●R: a common weed in North America; native to Europe. ●H: annual herbs with slender and generally branching stems that range from about 3 to 9 dm. (1-3') tall. The leaves are alternate and on petioles about 3 to 8 cm. long; the blades are about 5 to 15 cm. long and two to three times pinnately divided into small ultimate segments. The small flowers are produced in loose compound umbels, and the corollas consist of five greenish white petals. The two carpeled fruits are ovoid, about 4 mm. long, and armed with small hooked prickles, which allow the carpels to cling to the fur, socks, and trousers of passing animals, a very effective (but annoying) means of seed dispersal. ❁April-June.

BERULA.

Although *Berula* is a monotypic genus, its solo species is widely distributed in the temperate regions of the northern hemisphere. The name for the genus is an ancient Latin word for some kind of aquatic plant.

Berula erecta (Hudson) Coville [*Sium erectum* Hudson; *Sium angustifolium* Linnaeus]. CUT LEAF WATER PARSNIP. This species is rare in the Tassajara region. I have seen a few plants that were growing along accessible sections of Church Creek between The Caves and the Church Creek Divide, and James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), reported this species to be "Local in wet spots" on Pine Ridge and on Chew's Ridge. ●R: widespread in the temperate regions of the northern hemisphere, from western Europe and the Atlas Mountains of northern Africa to eastern North America. ●H: perennial riparian herbs with erect or ascending stems that range from about 2 to 8 dm. (8-32") tall. The leaves are alternate and on petioles about 4 to 12 cm. long; the blades are up to 15 cm. long and pinnately divided into five to nine pairs of leaflets about 1 to 8 cm. long. The leaflets have irregularly serrate or laciniate margins. The larger lower leaves are long petiolate and have blades that are mostly oblanceolate in outline and divided into fairly broad oblong to lanceolate leaflets, while the upper leaves are short petiolate and have blades that are mostly ovate in outline and divided into narrowly lanceolate to elliptic leaflets. The small flowers are produced in loose compound umbels, and the corollas consist of five white petals. The fruits are oval to orbicular, about 1.5 to 2 mm. long, and split into two carpels when mature. ❀July-October.

BOWLESIA.

Bowlesia consists of 16 species of annual herbs of temperate South America, one of which also occurs in temperate North America. The genus is named for the Irish naturalist William Bowles (1705-1780).

+Bowlesia incana Ruiz & Pavon. I first discovered this inconspicuous species in the Tassajara region during the spring 1999, and thus in the following year after the completion of the first edition of this text. The plants were growing on the steep rocky slope to the left as one is facing the lowest (and highest) waterfall of Waterfall Creek. In the spring of 2009, and thus the first spring after the Basin Complex Fire, I noticed two plants that were growing in the space between the Tassajara public parking lot and Cabarga Creek. ●R: in California this species ranges from Sonoma County in the Coast Ranges, and from Amador County in the Sierra Nevada, to northern Baja California. Its range also extends eastward to Texas and Louisiana. It also occurs in temperate South America, and its type locality is Peru. ●H: delicate annual herbs with ascending or trailing stems that range from about 1 to 6 dm. long. The leaves are opposite and have petioles that are about 1 to 12 cm. long; the blades are about .5 to 3 cm. wide, roundish to reniform or cordate in outline, and have 5 to 9 fairly deep lobes. The flowers are very small and produced singularly or in small umbels of up to 6 flowers, which are sessile or shortly pedunculate in the axils of the leaves. The corollas consist of five minute yellowish-green petals. The fruits are ovate to roundish, 1 to 2 mm. long, and split into two carpels in maturity. ❀March–May.

CICUTA. POISONOUS WATER HEMLOCK.

Cicuta consists of four highly poisonous species that occur in the boreal and temperate regions Eurasia and North America. The name for the genus is a Latin word for poisonous hemlocks.

+Cicuta douglasii (deCandolle) J. Coulter & Rose [*Sium d*. deCandolle]. This species is very rare in the Tassajara region, for its only known occurrence is in the perpetually muddy area below the spring (a. k. a., "Cold Spring") in the Pine Valley Campground. This species, along with *C. maculata*, are considered to be the most lethally toxic of all of the plants that are native to North America. ●R: widely distributed in western North America, from Alaska and Montana to southern California (San Diego County). ●H: perennial herbs with stems that range up to 2 m. (78") long. The leaves are narrowly ovate to triangular-ovate in outline, and one to three times pinnately divided into linear to widely lanceolate leaflets that range from 1 to 15 cm. long. The flowers are produced in compound umbels, and the petals are white. The fruits are roundish and about 2 to 4 mm. long, and split into two carpels in maturity. ❀June-Sept.

DAUCUS. CARROT.

Daucus consists of about 20 species that variously occur in the Americas, Eurasia, North Africa and Australia. The domestic carrot is *Daucus carota* subsp. *sativus*, and the often weedy *Daucus carota* subsp. *carota* (Queen Anne's Lace), is its wild ancestor. The name is derived from the ancient Greek word for carrot.

Daucus pusillus Michaux. RATTLESNAKE WEED, YERBA VIBRA, AMERICAN WILD CARROT. This species is widely scattered and locally common in the lower and intermediate elevations of the Tassajara region, and it occurs mostly in grasslands and in grassy openings in woodlands and chaparral. A poultice made from the leaves of this species was used by native Americans as an antidote to rattlesnake venom, and a decoction has been used as a blood purifier. The roots are said to be edible while still tender. ●R: this species is widespread in temperate North America, from southern Canada to northern Mexico; it is also native to temperate South America. ●H: annual herbs with erect stems that range from about 2 to 8 dm. (8-32") tall; the stems range from simple to upwardly branched or branched from the base. The lower leaves are long petiolate and have blades that are ovate to broadly lanceolate in outline, and two to four times pinnately dissected into narrow segments; these are about 3 to 10 cm. long. Upper leaves are smaller and become increasingly shorter petiolate, while the upper most leaves, which subtend the umbels, are sessile. The small flowers are produced in compact terminal umbels, and the corollas consist of five pale white petals. The two carpeled fruits are prickly and about 3 to 5 mm. long. ❀April-June.

HERACLEUM. COW PARSNIP.

Heracleum consists of approximately 60 species, most of which occur in Eurasia, but some species also occur in the higher mountains of northern and eastern Africa, and one species is endemic to North America. The genus is named for the mythological super hero Hercules, presumably for the large size of many of the species.

Heracleum maximum W. Barton [*H. lanatum* Michaux]. AMERICAN COW PARSNIP. These large perennial herbs are common in seepy areas in the vicinity of Divide Camp, and they are also scattered along an unnamed stream along the Pine Ridge Trail about half of a mile west of Divide Camp. In the past this species also occurred in a seepy area in the uppermost watershed of Church Creek, near to the Church Creek Divide, but this population appears to have expired. This species is also reported to occur somewhere on Chew's Ridge (re., James Griffin's "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975) & the CNPS list of Vascular

Plants of Chew's Ridge). ●R: widely distributed in the boreal and temperate regions of North America, from Alaska to the Atlantic Coast, and south to southern California and northern Georgia. In California this species ranges southward through the Coast Ranges to northwestern San Luis Obispo County, and through the Sierra Nevada to Kern County. A disjunct population occurs at the higher elevations of the San Bernardino Mountains of southern California. ●H: robust perennial herbs from thick horizontal rootstocks that annually produce stout stems that range from about 1 to 3 m. (3-10') tall. The blades of the alternate leaves, which are on petioles about 1 to 4 dm. long, are ternately divided into three large leaflets that are generally roundish to ovate in outline and about 10 to 40 cm. wide. The margins are lobed and coarsely serrate. The flowers are produced in large compound terminal umbels, and the five obovate petals are white. The outer petals of the outer flowers are enlarged. The fruits, which are about 8 to 12 mm. long, split into two strongly compressed winged carpels. ❁May-July.

LOMATIUM. HOG FENNEL, SHEEP PARSNIP.

Lomatium consists of about 64 species of perennial herbs that are endemic to temperate western North America. This genus is well represented in California, for 35 species (plus nine lesser taxa) occur within the boundaries of the state, and 19 species (plus four lesser taxa) are endemic to the California Floristic Province. The name is derived from the Greek word *loma*, border, in reference to the winged margins of the fruits.

1a. Ovaries scabrous, puberulent or hairy, fruits hairy (glabrous in age):
- **2a**. Petals tomentose. Mature fruits broadly oval to round, the wings wider than the body, and usually pink(ish) or purple(ish). . . . . ***L. dasycarpum***.
- **2b**. Petals not tomentose. Mature fruits lanceolate to broadly oblong, the wings colorful or not:
  - **3a**. Involucels radial, the bractlets oblanceolate to obovate, and not reflexed. Petals yellow. Fruits oblong to oblong-obovate, the wings about as wide or wider than the main body. . . . . ***L. utriculatum***.
  - **3b**. Involucels one sided, the bractlets linear to ovate, and reflexed. Petals white, purplish, or pale yellow. Fruits lanceolate or elliptic to narrowly oblong, the wings generally narrower than the main body. . . . . ***L. macrocarpum***.

1b. Ovaries and fruits glabrous:
- **4a**. Involucels radial, the bractlets oblanceolate to obovate, and not reflexed. Petals yellow. Fruits oblong to oblong-obovate, the wings about as wide or wider than the main body. . . . . ***L. utriculatum***.
- **4b**. Involucels one sided, the bractlets linear to ovate, and reflexed. Petals white, purplish, or pale yellow. Fruits lanceolate or elliptic to narrowly oblong, the wings generally narrower than the main body. . . . . ***L. macrocarpum***.

Lomatium dasycarpum (Torrey & A. Gray) J. Coulter & Rose [*Peucedanum d.* T. & G.]. This species is widely scattered in open and usually rocky areas in the Tassajara region, but it is generally uncommon. It is often found growing in thin soiled depressions on top of the massive sandstone outcrops that occur along the Church Creek Fault, and it also occurs on Pine Ridge and on Chew's Ridge. ●R: Coast, Transverse and Peninsular Ranges, from Del Norte and Siskiyou Counties to northern Baja California. ●H: distinctive perennial herbs with one to several erect or ascending stems that range from about 1 to 4 dm. (4-16") tall. The leaves are primarily basal and have petioles that are about 2 to 12 cm. long, the blades are about equal in length, these are oblong to ovate in outline and up to four times pinnately dissected into numerous small ultimate segments. Cauline leaves, if present, are like the basal leaves, except smaller. The flowers are produced in relatively broad compound terminal umbels, and the corollas consist of five small pale green petals; they appear to be white due to a coat of fine woolly hairs. The two carpeled fruits, which are about 10 to 22 mm. long, are orbicular to broadly oblong or obovate, and have pink to purple (or pinkish to purplish tinged) wings. The showy fruits are by far the most conspicuous feature of this species. ❁March-June.

Lomatium macrocarpum (Hooker & Arnott) J. Coulter & Rose [*Ferula microcarpa* H. & A.]. This species is lightly scattered on Chew's Ridge and on Pine Ridge, mostly on serpentine outcrops; it is not known to occur elsewhere in this region. ●R: widespread in western North America, from British Columbia and Manitoba to the Dakotas and Colorado, and southward through the mountains of the Pacific Slope, to the Transverse Ranges of Los Angeles County. ●H: perennial herbs with one to several erect or ascending stems that range from about 1 to 5 dm. (4-20") tall. The leaves are primarily basal and have petioles that are about 1 to 7 cm. long; the blades are about 2.5 to 15 cm. long, oblong to obovate in outline, and are at first ternate, then two to three times pinnately dissected into narrowly linear to oblong segments. The flowers are small and produced in terminal compound umbels, and the corollas consist of five very small petals that are white to pale yellow or purplish. The two carpeled fruits are about 9 to 20 mm. long, lanceolate to oblong or narrowly elliptic, and the wings are narrower to about as wide as the main body. ❁April-June.

Lomatium utriculatum (Nuttall in Torrey & A. Gray) J. Coulter & Rose [*Peucedanum u.* Nutt. in T & G]. COMMON LOMATIUM. This species is scattered in the clayey loam soils of grasslands along the Church Creek Fault, which both the Horse Pasture and Church Creek trails follow, and it is sometimes found in colonies. In May of 1937 Mildred Mathias collected a specimen of this species on Chew's Ridge (UC 659020; Mathias 1307). It was collected near Tassajara Road at an elevation of about 4,700 feet. ●R: Pacific Slope, from British Columbia to southern California (San Diego County). ●H: aromatic perennial herbs with erect or ascending stems that range from about 1 to 5 dm. (4-20") tall. The basal leaves have petioles that are about 2 to 10 cm. long; the blades are ovate to oblong in outline, 5 to 16 cm. long, and tripinnately divided into narrowly linear segments which vary considerably in length. Cauline leaves are smaller and have expanded, bladder like petioles (presumably this is what the species name refers to). The flowers are small and produced in dense compound terminal umbels, and the corollas consist of five yellow petals. The two carpeled fruits are ovate to oblong and about 5 to 11 mm. long. ❁March-June.

OSMORHIZA. AMERICAN SWEET CICELY.

Osmorhiza consists of ten species, and phylogenetic data suggests that the center of its distribution and diversity is in western North America. Five species are endemic to North America, one species is endemic to the tropical mountains of Central and South America, one species is endemic to temperate South America, and one species is endemic to eastern Asia and the Himalayan Mountains of southern Asia. Two species occur in both temperate North America and temperate South America. The name is derived from the Greek words *osme*, odor, and *rhiza*, root, on account of the aromatic roots of the species, which is similar to licorice. The true Sweet Cicely, *Myrrhis ordorata*, is native to Europe.

1a. Involucels (bracts subtending the umbels) conspicuous and about 2 to 10 mm. long. The larger leaves are divided into at least 20 distinct leaflets. . . . . ***O. brachypoda***.

1b. Involucels absent or just small rudiments. The larger leaves are divided into no more than 15 distinct leaflets. . . . . ***O. berteroi***.

Osmorhiza brachypoda Torrey. CALIFORNIA CICELY. This species is occurs in shady to partly shady woodland habitats at all elevations in the Tassajara region, and it is often common in such habitats. ●R: Coast Ranges, Sierra Nevada, Transverse and Peninsular ranges, from Contra Costa and Butte counties to San Diego County. Disjunct populations occur between 3,400 and 7,000 feet (1037-2135 m.) in the Sierra Ancha and the Mazatzal Mountains of central Arizona (the mountains to the north and northwest of Roosevelt Lake). ●H: aromatic perennial herbs from thick roots, which annually produce branching stems that range from about 3 to 8 dm. (12-32") tall. The alternate leaves are on petioles about 5 to 20 cm. long, the blades are ovate to broadly deltoid in outline, about 10 to 20 cm. long, and two to three times ternately divided into leaflets; these are generally ovate, and the margins are regularly to irregularly toothed or lobed. The upper most leaves are nearly or quite sessile and much reduced in size and complexity. The flowers are produced in produced in spreading umbels; the pedicels are up to 5 cm. long in fruit. The corollas consist of five minute and greenish white petals, and the two carpeled fruits are oblong to spindle shaped, and about 12 to 20 mm. long. ❀April-June.

Osmorhiza berteroi deCandolle [*Osmorhiza chilensis* Hooker & Arnott; *O. nuda* Torrey]. COMMON CICELY. This species, like *O. brachypoda*, is widely scattered in shady or partly shady woodland habitats at all elevations in the Tassajara region, and also like *O. brachypoda*, it is often common in such localities (these species are often found growing in association with each other). ●R: western North America, from southern Alaska through the mountains of the Pacific Slope to San Diego County, and through the Rocky Mountains and the 'sky islands' of the Great Basin, to Arizona and New Mexico, and extending eastward to southwestern Saskatchewan and the Black Hills of South Dakota. Disjunct populations occur on the Aleutian Islands, the northern Great Lakes region (northern Wisconsin, Michigan and southern Ontario), and in the northeastern United States and southeastern Canada, from New Hampshire and Quebec to Newfoundland Island and Nova Scotia. This species also occurs in temperate South America (Chile and in adjacent areas of Argentina), from the mountains around Santiago to Tierra del Fuego. The disjunct North American populations probably represent remnants of a more widespread pre-Pleistocene distribution of the species, while the South American populations are probably the result of long distance dispersal by migratory birds (the bristly fruits cling to feathers). ●H: aromatic perennial herbs from thick roots, which annually produce relatively slender and branching stems that range from about 3 to 12 dm. (12-48") tall. The alternate leaves have petioles about 5 to 16 cm. long, and the blades are broadly deltoid to ovate in outline, about 5 to 15 cm. long, and biternately divided into ovate-lanceolate to nearly orbicular leaflets, the margins of which are irregularly toothed. The flowers are produced in loose terminal umbels, and the corollas consist of five small and greenish white petals. The two carpeled fruits are linear-oblong and about 10 to 20 mm. long. ❀April-June.

Perideridia californica. The only listing for this species for in Howitt and Howell's "The Vascular Plants of Monterey County" (1964) is "Tassajara Springs." The voucher specimen, which is at the California Academy of Sciences Herbarium, was collected by Harriet Hatton, and its label reads "Tassajara Springs, Santa Lucia Mts., spring, 1917." Although this species occurs along streams in many locations in the Santa Lucia Mountains south of Cone Peak, I did not find it the Tassajara region, nor have I found any other references to its existence in or near this region.

SANICULA. SANICLE.

This genus is comprised of about 40 species that are widely distributed in temperate regions. The name is Latin and means to heal, presumably due to the alleged medicinal properties of some species.

1a. Basal leaf blades deeply lobed, but not entirely divided into separate leaflets (at least some leafy tissue is present along both sides of the axis of the primary vein):

2a. Outline of basal leaves rounded, the margins serrate. Plants usually branched well above the base. . . . . ***S. crassicaulis***.

2b. Outline of basal leaves sharply angled, the margins laciniate. Plants usually branched near the base. . . . . ***S. laciniata***.

1b. Basal leaves divided into distinct leaflets or segments:

3a. Fruits covered with thick but not prickly scales. . . . . ***S. tuberosa***.

3b. Fruits covered with hooked and prickly barbs:

4a. Blades of major leaves pinnately divided. Staminate flowers four to six per umbel and inconspicuous. . . . . ***S. bipinnata***.

4b. Blades of major leaves ternately divided. Staminate flowers seven to twelve per umbel and conspicuous. . . . . ***S. graveolens***.

Sanicula bipinnata Hooker & Arnott. PACIFIC SNAKEROOT, POISON SANICLE. This species is scattered in open and thus grassy woodland habitats at lower to intermediate elevations in the Tassajara region, and it is fairly common in some areas. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Shasta, Trinity and Humboldt counties to the Santa Anna Mountains of Orange and Riverside counties. ●H: aromatic perennial herbs from elongated tuber like roots, which annually produce erect or ascending stems that range from about 1 to 6 dm. (4-24") tall. The leaves become reduced in size and complexity upwards on the stems. The lower leaves have petioles as much as 14 cm. long, and the blades are up to 11 cm. long, these are generally ovate to oblong-ovate in outline, and two to three times pinnately divided into ovate to oblong or elliptic ultimate segments, the margins of which are variously lobed and toothed, and are sometimes entire. The small flowers are produced in small and compact head like umbels, and the corollas consist of five yellow petals. The two carpeled fruits are roundish to ovate, about 2 to 3 mm. long, and are armed with hooked bristles. ❀April-May.

Sanicula crassicaulis Poeppig ex deCandolle [*S. menziesii* Hooker & Arnott]. GAMBLE WEED, PACIFIC SANICLE. This species occurs at all elevations in the Tassajara region, and it is one of the most commonly seen plants at lower to intermediate elevations, where it is found in nearly all shady or semi shady habitats, both in woodlands and chaparral. It was even more common than usual during the first spring after the Basin Complex Fire of 2009. ●R: Pacific Slope of temperate western North America, from British Columbia to northern Baja California; this species is also native to temperate South America (Chile and Argentina). ●H: perennial herbs from taproots, with erect and branching flowering stems that range from about 3 to 10 dm. (12-40") tall. The alternate have petioles up to 24 cm. long; the blades are about 3 to 10 cm. long, roundish to deltoid or cordate in outline, and palmately cleft into three to five major lobes, the margins of which are variously toothed or lobed. Upper leaves are few, much reduced, short petiolate to sessile, and are often cleft into distinct segments. The small flowers are produced in compact umbels, and the corollas consist of five yellow petals. The fruits are roundish, about 2 to 5 mm. long, and

covered with stout hooked bristles. ֍April-May.

<>***Sanicula graveolens*** Poeppig ex deCandolle [*S. nevadensis* S. Watson, *S. septentrionalis* E. Greene]. SIERRA SANICLE. The only area in the Tassajara region where this species is known to occur is on the large serpentine outcrop that extends from Pine Ridge to Bear Basin. This is also the only known location for this species in the South Coast Ranges; the nearest populations to the north are in the Mayacamas Mountains of Sonoma and Lake counties, the nearest populations to the east are in the Sierra Nevada, and nearest populations to the south are in the San Rafael Mountains of Santa Barbara County. The local plants were first discovered by Steven Talley in 1972, during his field research for his Ph.D. dissertation "The Ecology of the Santa Lucia Fir (*Abies bracteata*), a Narrow Endemic of California" (1974). ●R: widespread in the mountains of temperate western North America, from British Columbia, western Montana and northwestern Wyoming to the mountains of southern California. This species also occurs in central Chile. ●H: perennial herbs from stout taproots which annually produce branching stems that range from about .5 to 4.5 dm. (2-18") tall. The alternate leaves are on petioles about as long to much longer than the blades, the blades are generally ovate in outline and ternately divided into pinnate or bipinnately divided leaflets. The small flowers are produced in compact umbels, and the corollas consist of five yellow petals. The fruits are ovate to nearly round, about 3 to 5 mm. long, covered with curved prickles, and split into two carpels when fully mature. ֍April-June.

+***Sanicula laciniata*** Hooker & Arnott. COAST RANGE SANICLE. The listing of Chew's Ridge Road as a location for *Sanicula laciniata* in Howitt & Howell's "The Vascular Plants of Monterey County" (1964), was based on a specimen that the co-author, Beatrice Howitt, collected along "Tassajara Road towards Chew's Ridge, about 2 miles south of Jamesburg" in May of 1955 (Howitt 0369; PGM 7057). ●R: Coast Ranges and western Transverse Ranges, from Coos County in southwestern Oregon to the Santa Ynez Mountains and San Miguel Island in Santa Barbara County. ●H: taprooted perennial herbs that range from about 5 to 30 cm. tall. The leaves are alternate, and the blades of the lower leaves are ovate in outline and sharply divided into three lobes, the margins of which are laciniate. Upper leaves become reduced in size, and those of the inflorescence are bract like. The small flowers are produced in terminal and axillary umbels, and the corollas consist of five tiny petals that are yellow. The fruits consist of two bristly carpels that are about 2 to 4 mm. wide. ֍March-May.

Sanicula tuberosa Torrey. TURKEY PEA. This species is lightly scattered in grassy areas in the Tassajara region, mostly in grassy woodlands, but sometimes on open slopes. It is most common in this region on the lower northern slope of the ridge that Tony's Trail crosses, and it was more common than usual in this area during the spring of 2009 (the first such season after the Basin Complex Fire). ●R: Coast Ranges, Sierra Nevada, Transverse and Peninsular ranges, from Curry and Josephine counties in southwestern Oregon to the mountains of northern Baja California. ●H: small perennial herbs from roundish tubers that annually produce erect stems that range from about 1 to 8 dm. (4-32") tall. The lower leaves have petioles that are about as long to much longer than the blades; the blades are about 2 to 13 cm. long, triangular to ovate in outline, and ternately or pinnately divided several times into small entire to pinnately lobed segments. Upper leaves are reduced in size, and the upper most are sessile. The flowers are produced in head like umbels, and the five yellow petals are about .5 to 1 mm. long. The two carpeled fruits are roundish, about 1.5 to 2 mm. long, and covered with upwardly appressed scale like formations. ֍April-June.

TAUSCHIA.

Tauschia consists of about 35 species that, collectively, range from northwestern temperate North America to Central America and northern South America. The genus is represented in the Tassajara region by two closely related species, and the characteristics of many of the local plants indicate a genetic interchange between the two. The genus was named for the Czech botanist I. F. Tausch (1793-1848).

1a. Bractlets subtending umbels generally lanceolate and about 5 to 12 mm. long, and at least several exceed the flowers and fruits in length. Leaflets about 2.5 to 6 cm. long. Fruits 4 to 7 mm. long and 4 to 5 mm. wide. . . . . ***T. hartwegii***.

1b. Bractlets subtending umbels linear and about 3 to 8 mm. long, and none exceed the flowers and fruits in length. Leaflets about 1.5 to 3.5 cm. long. Fruits 3 to 5 mm. long and 4 to 6 mm. wide. . . . . ***T. kelloggii***.

Tauschia hartwegii (A. Gray) Macbride [*Deweya h*. A. Gray; *Velaea h*. (A. Gray) Coulter & Rose]. This species is scattered in woodlands and in the shade of tall stands of chaparral at all elevations in the Tassajara region, but it is generally uncommon. ●R: Sierra Nevada, from Shasta County to Kern County, and in the Coast and western Transverse ranges, from Marin and Contra Costa counties to Los Angeles County. ●H: aromatic evergreen perennial herbs with erect or ascending flowering stems that range from about 3 to 10 dm. (12-40") tall. The leaves are basal and on petioles about 5 to 25 cm. long, the blades are about 12 to 24 cm. long, generally ovate in outline, and two to three times divided into ovate to oblong ultimate leaflets about 2.5 to 6 cm. long. The flowers are very small and produced in compound terminal umbels, and the corollas consist of five yellow petals. The fruits are roundish oblong, about 4 to 7 mm. long, and split into two carpels in maturity. ֍April-June.

∨***Tauschia kelloggii*** (A. Gray) Macbride [*Deweya k*. A. Gray; *Velaea k*. (Gray) Coulter & Rose]. This species is scattered in woodlands and in the shade of tall chaparral on the north slope of the ridge to the south of Tassajara Hot Springs, the one over which Tony's Trail crosses, and in June of 1901 William Russell Dudley collected a specimen "Along Leigh's Trail, head of Zigzag Creek at Oak Camp," and thus at what is now known as Tan Oak Camp. ●R: from southwestern Oregon to El Dorado County in the Sierra Nevada, and in the Coast Ranges to at least the vicinity of Tassajara Hot Springs in the Santa Lucia Mountains of Monterey County, and to the vicinity of Hernandez Reservoir in the Diablo Range (in San Benito County). ●H: aromatic evergreen perennial herbs with erect or ascending flowering stems that range from about 2 to 7 dm. (8-28") tall. The leaves are basal and on petioles about 5 to 15 cm. long, the blades are about 8 to 20 cm. long, ovate to roundish in outline, and two to three times divided into oblong to ovate leaflets. The leaflets are about 1.5 to 3.5 cm. long, and the margins are coarsely serrate and often irregularly lobed. The flowers are produced in compound terminal umbels, and the corollas consist of five small yellow petals. The fruits are about 3 to 5 cm. long, and split into two carpels when mature. ֍April-June.

TORILIS. HEDGE PARSLEY.

This genus is comprised of about 10 to 15 species of annual herbs that are native to Eurasia. The origin and meaning of the name is unknown.

!*Torilis arvensis* (Hudson) Link [*Caucalis a*. H.]. COMMON HEDGE PARSLEY, SPREADING HEDGE PARSLEY. My first observation of this species in the Tassajara region was in April of 1988, when I saw a small group of plants that were growing along the south side of the

path between the bridge to the old bath house and the new bath house. In the following year more plants were present at this site, and a few more were found that year by the cold water reservoir a short distance up Tassajara Road, and a few more were seen in the vicinity of the 4th culvert (about 1 mile north of the hot springs). This species has been spreading rapidly ever since, and it is now common to abundant nearly throughout the Tassajara region. Vern Yadon, in his unpublished field notes, "Bear Basin Trail from Pine Ridge Trail Junction, and Bear Basin, May 10, 1980," listed *Torilis nodosa* as "Common in grassy areas" (Yadon did not collect a voucher specimen). Based on the botanical literature of that time, *T. arvensis* was often misidentified as *T. nodosa*, and if this was the case, this represents the first report of *T. arvensis* in this region. *Torilis arvensis* was very abundant during the spring of 2009, the first one after the Basin Complex Fire. As this species has the capacity to form fairly dense stands, in many places it has largely replaced native species. ●R: a rapidly spreading weed in California and North America; it is native to Europe. ●H: erect annual herbs that range from about 3 to 10 dm. (12-40") tall. The leaves are alternate and on petioles about 1 to 8 cm. long; the blades are about 5 to 12 cm. long, ovate to broadly lanceolate in outline, and pinnately divided into leaflets which are again pinnately cleft into salient lobes. The flowers are produced in compound umbels, and the corollas consist of five white (or sometimes partly pink) petals. The petals are asymmetrical; the outer petals are larger, and the terminal one, which is the largest of all, is often two lobed. The two carpeled fruits are oblong-ovate and about 3 to 5 mm. long, and densely covered with spreading bristles. The carpels readily adhere to fur and fabric, an effective (but highly annoying) means of seed dispersal. ❀April-July.

YABEA. WESTERN HEDGE PARSLEY.

This is a monotypic genus of western North America; segregated from *Caucalis*. The genus is named for the Japanese botanist H. Yabe (1876-1931).

Yabea microcarpa (Hooker & Arnott) Kozo-Poljansky [*Caucalis m.* H. & A.]. WESTERN HEDGE PARSLEY. This species is widely scattered and locally common at lower to intermediate elevations in the Tassajara region, and it occurs mostly in shady but grassy areas within woodland habitats. ●R: widely distributed in western North America, from British Columbia to New Mexico and northwestern Mexico. ●H: annual herbs with slender and generally erect stems that range from about 1 to 3.5 dm. (4-14") tall. The alternate leaves have petioles that are about 2 to 3.4 cm. long; the blades are about 2 to 6 cm. long, generally ovate in outline, and two to four times pinnately dissected into narrow segments. The flowers are very small and produced in irregular compound umbels, and the five minute petals are white. The two carpeled fruits are about 3 to 7 mm. long, and are armed with vertical rows of hooked bristles. ❀April-June.

APOCYNACEAE. DOG BANE FAMILY.

According to the Angiosperm Phylogeny website, *Apocynaceae* is a widely distributed family that includes about 415 genera and approximately 4555 species. The species range from perennial herbs to woody vines and very tall tropical rainforest trees, and they are largely endemic to tropical and warmer temperate regions.

1a. Flowers produced singularly on long pedicels from the axils of the leaves. Corolla tube funnel shaped, but the lobes are widely spreading and range from very pale blue to dark purplish blue. . . . . ***Vinca***.
1b. Flowers produced in axillary and terminal cymes or umbels. Corollas cylindrical to campanulate or urn shaped, and not blue or purplish blue. Native plants:
2a. Flowers produced in umbels. Corollas divided into lobes nearly to the base. . . . . ***Asclepias***.
2b. Individual produced in cymes. Corollas united for at least half the length. . . . . ***Apocynum***.

APOCYNUM. DOG BANE, INDIAN HEMP.

The genus *Apocynum* consists of seven species that are endemic to temperate region of Eurasia and North America. The genus name is derived from the Greek words *apo*, away from, and *cyno*, dog, and refers to the use of some species as a dog poison.

1a. Plants of riparian habitats. Leaves ascending, the blades lanceolate to narrowly ovate, and about 5 to 10 cm. long. Corolla 2.5 to 5 mm. long. . . . . ***A. cannabinum***.
1b. Plants primarily of woodland habitats. Leaves spreading or drooping, the blades roundish to broadly ovate, and about 4 to 6 cm. long. Corolla 4 to 8 mm. long. . . . . ***A. androsaemifolium***.

Apocynum androsaemifolium Linnaeus [*A. pumilum* (A. Gray) E. Greene; *A. androsaemifolium* var. *pumilum* Gray]. BITTER or MOUNTAIN DOG BANE. This species is scattered in open pine forests on Chew's Ridge, and along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge. ●R: widely distributed in North America, from Alaska to Newfoundland, Georgia and Mexico. In California this species occurs in the Cascade Ranges, the Sierra Nevada and at higher elevations in the Coast, Transverse and Peninsular ranges, as far south as the mountains of San Diego County. ●H: evergreen perennial herbs with upwardly spreading stems usually less than 3 dm. (1') tall. The opposite leaves are shortly petiolate and slightly drooping, and the blades are generally oblong-oval or ovate and about 4 to 6 cm. long. The margins are entire. The flowers are produced in terminal and axillary cymes. The corollas are long campanulate with five shallow lobes, about 4 to 8 mm. long, and range from white to pink or reddish purple, and they often have red or reddish veins or markings. The fruits are slender and many seeded follicles that are about 7 to 11 cm. long. The small seeds have tufts of long hairs. ❀May-August (October).

Apocynum cannabinum Linnaeus [*A. c.* var. *glaberrimum* deCandolle]. COMMON DOG BANE, INDIAN HEMP. This species occurs on wet banks along the Arroyo Seco in the vicinity of the confluence of Tassajara Creek. According to the note that is enclosed in the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901 (Elmer #3180, DS), he collected it in "Lost Valley," which is about 5½ linear miles south of Tassajara Hot Springs. ●R: widely distributed in North America, from British Columbia to Newfoundland, Florida and Mexico. ●H: perennial herbs of wet habitats, with creeping rhizomes which produce erect or ascending stems that range from about 3 to 6 dm. (1-2') tall. The ascending leaves are mostly opposite, short petiolate to nearly sessile, and the blades are lanceolate to lance-ovate and about 5 to 10 cm. long. The small flowers are produced in terminal and axillary cymes; the five lobed corollas are cylindrical to urn shaped, about 2.5 to 5 mm. long, and pale green to nearly white. The fruits are slender and many seeded follicles about 6 to 9 cm. long, which hang pendulously in maturity. ❀April-August (October).

ASCLEPIAS. MILKWEED.

The genus *Asclepias* includes somewhere between 100 and 140 species that are endemic to the western hemisphere. I have found two etymologies for the name. One is that the genus was named after *Asclepius*, the Greek god of healing, and the other is that it was named for *Asklepios* (or *Aesculapais*), an ancient Greek physician. Most (if not all) of the species are larval hosts of Monarch Butterflies (*Danaus plexippus*).

1a. Plants dark green and glabrous or nearly so. Leaves linear to narrowly lanceolate. . . . . ***A. fascicularis***.
1b. Plants generally gray green due to a dense coat of white woolly hairs. Leaves broadly lanceolate to ovate:
2a. Stems erect or mostly so. Flower horns present and generally slightly exserted from the hoods. Widespread and locally common. . . ***A. eriocarpa***.
2b. Stems decumbent to ascending. Flower horns absent or minute. Rare in this region. . . . . ***A. californica***.

Asclepias californica E. Greene [*A. c.* subsp. *greenei* Woodson; *Acerates tomentosa* Torrey; *Gomphocarpus tomentosus* (Torrey) A. Gray]. CALIFORNIA MILKWEED, ROUND HOODED MILKWEED. I have seen this species only on a serpentine plug along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge. In his field notes, Vern Yadon reported seeing "A few plants along the Pine Ridge Trail" in June of 1979, and James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975), listed this species as uncommon above 1200 m. (3937') on Pine Ridge. In June of 1929 Lester Rowntree collected a specimen of it on Chew's Ridge (RSA 401654A), and according to the note that is enclosed in an envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of this species (Elmer #3175 DS), he collected it "On ridge northwest of Pine Valley Camp (Ventana View)" in June of 1901. ●R: Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Contra Costa and Mariposa Counties to northern Baja California. ●H: white woolly perennial herbs with decumbent or ascending stems that range from about 1.5 to 5 dm. (6-20") long. The mostly opposite leaves are sessile or on short petioles, and the blades are ovate to lance-ovate and about 5 to 15 cm. long. The margins are entire. The flowers are produced in terminal and sometimes axillary umbellate clusters. The purplish corollas are deeply divided into five lobes that are about 8 to 10 mm. long (the much more conspicuous hoods are dark maroon). The fruits are ovoid follicles that are about 5 to 8 cm. long. ❀April-July.

Asclepias eriocarpa Bentham. KOTOLO, INDIAN MILKWEED. This very conspicuous species is widely scattered in openings in chaparral and in open and grassy or more or less barren areas in the Tassajara region, and although it generally uncommon, it locally common to abundant in some areas, such as along Tassajara Road along the crest of Black Butte Ridge, and in areas along the Pine Ridge Trail between the first summit west of Tassajara Rd. and the Church Creek Divide. ●R: Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Humboldt Shasta counties to northern Baja California. Also on the Sutter Buttes. ●H: often robust perennial herbs from deep seated roots which annually produce relatively stout stems that range from about 4 to 12 dm. (16-48") tall. The leaves, which are opposite or in whorls of 3's or 4's, are sessile or on short petioles, and the densely woolly blades, which are about 6 to 20 cm. long, are broadly oblong-ovate to lanceolate (but upwardly folded from the mid vein), truncate to semi cordate at the base, and acute to rounded at the apex. The rather exotic flowers are produced in terminal umbellate clusters, and the off white or creamy corollas are deeply divided into five reflexed lobes that are about 4 to 5 mm. long. The much more conspicuous floral crowns are surrounded by five petal like and hood shaped structures which partially enclose the stamens and pistil. The fruits are many seeded and narrowly ovoid follicles that are about 6 to 9 cm. long. The follicles stand more or less erect on deflexed pedicels. ❀May-August (October).

Asclepias fascicularis Decaisne in deCandolle [*A. mexicana* misapplied]. NARROW LEAVED MILKWEED. According to James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks" 1975), this species is rare on serpentine plugs on above 1400 m. (4593') on Chew's Ridge, and rare in dry stream beds between 600 and 1200 m. (1968-3937') on Chew's Ridge. ●R: western North America, from Washington, Idaho and Utah to northern Baja California. ●H: perennial herbs with erect or ascending stems that range from about 2 to 9 dm. (8-36") long. The short petiolate leaves are produced in whorls of three's to five's, and the blades are narrowly lanceolate to linear and about 4 to 12 cm. long. The margins are entire. The flowers are produced in terminal and axillary umbellate clusters, and the greenish white or purplish corollas are deeply divided into five lobes that are about 4 to 5 mm. long. The fruits are narrow follicles that are about 6 to 9 cm. long. ❀May-October.

VINCA. PERIWINKLE.

The genus *Vinca* is comprised of 6 or 7 species that are native to southern Europe, North Africa and western temperate Asia. The name is the Latin word for periwinkle, and possibly means to bind or conquer.

Vinca major Linnaeus. LARGE FLOWERED PERIWINKLE. This species has been established in and around the developed area of Tassajara since at least the late 1970s. Due to the advice of Diane Renshaw, the plants that had spread to the old streambed depression in The Flats (now the site of the conference building) have been eradicated, but the plants that had spread to the hillside adjacent to the old bath house may still be extant. This species has the potential to spread into the surrounding wilderness, like it has in many other regions in California. ●R: a common weed in many parts of North America, native to temperate regions of Eurasia and northern Africa. ●H: evergreen perennial herbs with long and trailing sterile stems and more or less erect flowering stems. The opposite and petiolate leaves are generally round ovate and about 7 cm. long. The flowers are produced singularly in the axils of the leaves, and the large and showy funnel shaped corollas are violet to blue and about 3 to 5 cm. wide. The fruits are narrow follicles that are about 3 to 5 cm. long. ❀March-July (January).

ARALIACEAE. ARALIA OR GINSENG FAMILY.

Araliaceae consists of 43 genera and about 1,450 species of primarily tropical trees, shrubs, woody vines and perennial herbs. The family is particularly well represented in the tropical regions of southeast Asia and the Americas. *Araliaceae* includes the ginsengs (*Panax*), English Ivy (*Hedera helix*) and Octopus Trees (*Schefflera* species).

ARALIA. SPIKENARD, ELK CLOVER.

Aralia consists of about 30 species of North America and Asia. The genus includes the spikenards, hercules clubs, and angelica trees. The name is Latinized from the old French Canadian word *aralie*.

Aralia californica S. Watson. CALIFORNIA SPIKENARD. These large perennial herbs are frequently encountered along the perennial streams of the Tassajara region. Although this species normally occur in shady areas, due to loss of most of the riparian trees in this region during the Basin Complex Fire of 2008, nearly all of the plants that were observed in the spring of 2009 were exposed to full sunlight, which appeared to have no effect on them. ●R: Coast, Cascade, Transverse and Peninsular ranges, from Linn County in western Oregon to the mountains of San Diego County, and in the Sierra Nevada, as far south as Mariposa County. ●H: aromatic perennial herbs of riparian habitats, with large roots which annually produce robust stems that range from about 1 to 3 m. (3.4-10') tall. The leaves and stems are winter deciduous. The compound leaves are alternate and on petioles up to 3 dm. long; the blades are ternately divided into petiolate divisions that are pinnately divided into three to five large ovate to oblong-ovate leaflets about 15 to 30 cm. long. The leaflets are generally sub cordate at the base and the margins are serrate. The flowers are produced in roundish umbels which are scattered along a generally elongated panicle up to 4.5 dm. in length. The rachis, pedicels and flowers (inclusive of five petals that are about 2 mm. long) range from white to yellow or greenish white. The fruits are roundish and nearly black berries about 3 to 5 mm. in diameter; they contain 3 to 5 seeds. ❁June-August.

ASTERACEAE (*Compositae*). SUNFLOWER FAMILY.

This is a massive family that, according to the Angiosperm Phylogeny website, includes about 1,620 genera and approximately 23,600 species; the species range from small annual herbs to trees. While the family is of worldwide distribution, most of the species occur in temperate regions. *Asteraceae* is by far the largest family of Eudicotyledons, and is only exceeded in size by the primarily tropical *Orchidaceae* (the Orchid Family), which includes about 800 to 880 genera and approximately 25,000 to 27,800 species. *Asteraceae* is by far the largest vascular plant family in California, and it is represented in the Tassajara region by 47 genera and 73 species.

Asteraceae is the source of many ornamental plants, which include the many types of daisies, sunflowers and asters (primarily of the subfamilies *Astereae*, *Heliantheae* and *Helenieae*), marigolds (*Tagetes*), black eyed susan (*Rubeckia*), *Zinnia*, *Cosmos*, bachelor buttons or cornflowers (*Centaurea*), *Chrysanthemum* and *Calendula*, to name just a few. Food producing plants include the many varieties of the domestic lettuce (*Lactuca*), artichoke and cardoon (*Cynara*), endive (*Cichorium*), burdock root (*Arctium*), the oil producing seeds of safflower (*Carthamnus*), and the seeds of the giant variety of the common sunflower (*Helianthus annuus* var. *macrocarpus*). Some plants are used as flavorful and/or medicinal teas, such as chicory (*Cichorium*), chamomile (*Chamomilla*), yarrow (*Achillea*), and golden rod (*Solidago*).

What distinguishes *Asteraceae* from all other families of flowering plants are the composite flower heads that resemble a single flower. The heads are comprised of usually small flowers that are completely sessile and are tightly compacted on a common receptacle. The receptacle is usually disk like, but it may be conical, roundish or cylindrical in some species. The receptacle is typically surrounded by a calyx like involucre consisting of one or more series of bracts; the bracts are known as phyllaries. The phyllaries are usually green and herbaceous, but are sometimes dry and scale like (as in *Inuleae*, the Everlasting Tribe) or thorn like (as in *Cynareae*, the Thistle Tribe). The ovaries are inferior, and the styles are singular but two branched at the apex. The stamens number four or five, and the anthers are usually united into a tube that surrounds the style. The ovaries are commonly crested with highly modified calyx limbs that are known as pappus. The pappus segments vary from hair like to bristle like or scale like, and typically form one or more series of persistent or deciduous whorls at the apex of the fruit. The corollas are of two kinds. Ligulate or ray corollas are tubular at the base but are upwardly elongated into a strap formation that resembles a petal; these formations are known as ligules or rays. Disk or tubular corollas are narrowly cylindrical to funnelform, and range from entire to four or five lobed at the apex. Flower heads are of three types. Heads in which the flowers have only ligulate corollas are known as ligulate heads, heads in which the flowers have only tubular corollas are known as discoid heads, and heads in which the outer flowers have ligulate corollas while the inner flowers have only tubular corollas are known as radiate heads. Radiate heads are typically daisy like, with the ligules radiating outward and thus resembling petals.

1a. Flower heads ligulate (i.e., all of the corollas have petal like outer formations that are known as ligules or rays). The ligules are commonly 5 lobed or toothed at the apex. The vascular fluid is usually white or whitish:
- **2a**. Ligules white to lavender or pinkish:
  - **3a**. Leaves strictly or primarily basal, upper leaves, if present, are much reduced in size:
    - **4a**. Perennial herbs of shady woodland habitats and usually more than 4 dm. tall. Larger leaves mostly 8 to 15 cm. long, remotely toothed or entire, and densely hairy throughout. . . . . ***Hieracium***.
    - **4b**. Annual herbs generally of open habitats and usually less than 4 dm. tall. Larger leaves usually less than 8 cm. long, pinnately lobed, and usually with tufts of woolly hair at the base and between the lobes. . . . . ***Malacothrix***.
  - **3b**. Leaves not primarily basal (in *Stephanomeria* the leaves are often largely absent when the plants are fully mature):
    - **5a**. Ligules white. Achenes with a long and slender beak. Leaves relatively broad and persistent. . . . . ***Rafinesquia***.
    - **5b**. Ligules pale lavender to pink or flesh colored, or sometimes white. Achenes not beaked. Leaves relatively narrow and tending to fall before the peak of the flowering season. . . . . ***Stephanomeria***.
- **2b**. Ligules yellow:
  - **6a**. Leaves not primarily basal:
    - **7a**. Involucres cylindrical. Achenes with a long and slender beak. . . . . ***Lactuca***.
    - **7b**. Involucres bowl or bell shaped. Achenes not beaked. . . . . ***Sonchus***.
  - **6b**. Leaves basal or primarily basal (upper leaves, if present, are much reduced in size):
    - **8a**. Achenes (or at least the inner achenes) with long and slender beaks:
      - **9a**. All achenes beaked. Pappus bristles simple. . . . . ***Agoseris***.
      - **9b**. Outer achenes not beaked. Pappus bristles plumose. . . . . ***Hypochoeris***.
    - **8b**. Achenes not beaked:
      - **10a**. Pappus comprised of slender scales with an awn protruding from a bifid apex:
        - **11a**. Budding flower heads erect. The outer phyllaries are more than ¼ as long as the inner phyllaries. . . . . ***Uropappus***.

11b. Budding flower heads nodding. The outer phyllaries are less than ¼ as long as the inner phyllaries. . . . . ***Stebbinsoseris***.

10b. Pappus comprised of capillary bristles:

12a. Evergreen perennial herbs usually more than 4 dm. tall, and generally of shady or partly shady woodland habitats. Leaves densely hairy, remotely toothed; the larger are about 8 to 16 cm. long. . . . . ***Hieracium***.

12b. Annual herbs usually less than 4 dm. tall, and generally of open grasslands or disturbed areas in chaparral. Leaves glabrous or long hairy at the base, pinnately lobed; the larger are less than 10 cm. long. . . . . ***Malacothrix***.

1b. Flower heads radiate (the outer flowers have ligules [rays] while the inner disk flowers are tubular to funnel shaped) or discoid (all of the flowers are tubular or funnel shaped). The ligules of radiate heads are entire or two to three lobed or toothed at the apex. The vascular fluid is usually clear or translucent:

13a. Plants that are thistles or are thistle like. Phyllaries terminating with stiff and sharp spines. Flower heads discoid:

14a. Leaves with spiny margins. The flower heads are more than 2 cm. wide, and the corollas range from bluish, purplish, pale pink or bright red. . . . . ***Cirsium***.

14b. Leaves without spiny margins. The flower heads are less than 2 cm. wide, and the corollas are yellow. . . . . ***Centaurea***.

13b. Plants that are not thistle like. Heads discoid or radiate:

15a. Phyllaries, if present, not green. All flower heads are discoid:

16a. Phyllaries many, overlapping and mostly well imbricated; the phyllaries are dry, opaque to translucent, and white or whitish to yellowish or brownish. The flowers are not enclosed in woolly bracts. . . . . ***Pseudognaphalium***.

16b. Phyllaries absent or few, and not overlapping. The outer flowers are enclosed or nearly enclosed in woolly and sack like bracts that fall with the achene:

17a. Disk flowers with 15 to 30 pappus bristles. . . . . ***Logfia***.

17b. Disk flowers without pappus bristles or with fewer than 6 pappus bristles:

18a. Leaves generally opposite. Receptacle globose. Pappus none. . . . . ***Psilocarphus***.

18b. Leaves alternate. Receptacle convex to cylindrical. Pappus none or comprised of 1 to 5 bristles:

19a. Receptacle not longer than wide. Achenes greatly swollen on the outward side, and the styles are near the center of the inner side of the achenes. Disk pappus none or comprised of 1 bristle. . . . . ***Micropus***.

19b. Receptacle cylindrical and many times longer than wide. Achenes straight or nearly so, and the styles are terminal or sub terminal. Disk pappus comprised of 1 to 5 bristles. . . . . ***Stylocline***.

15b. Phyllaries generally green when young, or only the margins are dry, translucent or scale like. Flower heads discoid or radiate:

20a. Perennial herbs of wet streambed habitats. Leaves rising from the rhizome separately from the flowering stems; the blades are roundish in outline, up to 4 dm. wide, and palmately and deeply cleft into seven to ten lobes (leaves of the flowering stems, which are present only in winter and early spring, are bract like). Ray and disk flowers are white or pinkish. . . . ***Petasites***.

20b. Plants not like the above:

21a. Leaves pinnately divided into segments that are pinnately divided or lobed. Ray and disk corollas white. . . . . ***Achillea***.

21b. Leaves not like the above. If the leaves are pinnately divided, the corollas are not white:

22a. Most leaf blades, or at least the blades of the lower leaves, broadly ovate or deltoid, and very abruptly constricting to the petiole. The bases of the blades range from truncate to deeply cordate:

23a. Taprooted subshrubs. Leaves well distributed on the stems. . . . . ***Brickellia***.

23b. Rhizomatic perennial herbs. Leaves primarily basal. . . . . ***Arnica***.

22b. Leaf blades not like the above:

24a. Flower heads very large, the involucres 3.5 to 6 cm. wide. The broadly elliptic to obovate basal leaf blades are also large, from about 25 to 45 cm. long. . . . . ***Wyethia***.

24b. Flower heads small to moderately large, the involucres less than 2 cm. wide. Leaves of various sizes and shapes, the largest less than 22 cm. long:

25a. Receptacles round, the flower heads spherical. Ray corollas, if present, are small and turned downwards, parallel to the peduncle. Phyllaries spreading or turned downward; they are often hidden under the ray corollas. . . ***Helenium***.

25b. Receptacle flat to convex, the heads more or less daisy like in appearance (if roundish, the phyllaries are visible and are not spreading). Ray corollas, if present, are spreading:

26a. Flower heads discoid (they contain only tubular disk flowers):

27a. Annual herbs:

28a. Corollas of outer flowers enlarged, the lobes turned outward. Phyllaries in 4 or more alternating series, ... ***Lessingia***.

28b. Corollas of outer flowers not enlarged. Phyllaries in 2 unequal series, the outer (lower) series are much shorter than the inner series. . . . . ***Senecio***.

27b. Perennial herbs, subshrubs and shrubs:

29a. Plants dioecious (all of the flower heads have either staminate or pistillate flowers, but never both). . ***Baccharis***.

29b. Plants not dioecious:

30a. Small plants with exposed woody root crowns that are restricted to major rock outcrops and cliffs. . . . . ***Erigeron petrophilus***.

30b. Plants that are not like the above:

31a. Plants with oblong to cuneate-obovate leaves that have spiny toothed margins. . . . . ***Hazardia***.

31b. Plants with leaves of other shapes that do not have spiny toothed margins:

32a. Pappus absent or comprised of a minute crown. . . . . ***Artemisia***.

32b. Pappus comprised of bristles. . . . . ***Ericameria***.

26b. Flower heads radiate (they contain both tubular disk flowers and outwardly spreading ray flowers):

33a. Annual herbs (some are xerophytic, and thus they can produce flowers until late fall or early winter):

34a. Leaves opposite. . . . . ***Lasthenia***.

34b. Leaves alternate (or at least the cauline leaves are alternate):

35a. Phyllaries and upper bract like leaves terminated with prominent tack shaped glands. . . . . ***Calycadenia***

35b. Phyllaries and upper leaves not terminated by tack like glands (some of these may have gland tipped hairs):
36a. Pappus comprised of broad scales. . . . . ***Achyrachaena***.
36b. Pappus, if present, comprised of narrow scales or bristles:
37a. Achenes without pappus (disk achenes in *Deinandra* sometimes have scales less than 1 mm. long):
38a. Leaves, at least the lower and middle leaves, pinnately lobed. . . . . ***Deinandra***.
38b. Leaves entire (or sometimes minutely toothed):
39a. Plants glandular, especially on the upper stems. Leaves covered with rather coarse hair. . . . ***Madia***.
39b. Plants not glandular, except for small yellow glands at the base of the upper leaves and heads. Leaves covered with fine and semi silky hair. . . . . ***Lagophylla***.
37b. Achenes with pappus (or at least the inner most disk achenes are crested with pappus):
40a. Corollas white. . . . . ***Erigeron canadensis***.
40b. Ray corollas pale or deep yellow:
41a. Leaves narrowly linear and entire. Ray corollas usually pale yellow. . . . . ***Rigiopappus***.
41b. Leaves, at least the lower leaves, pinnately lobed. Ray corollas usually medium to deep yellow. . . . ***Layia***.

33b. Perennial herbs, subshrubs and shrubs:
42a. Ray corollas white to blue, purple or brownish purple or brownish red (the disk corollas are yellow):
43a. Leaf margins entire. . . . . ***Erigeron foliosus***.
43b. Leaf margins, or at least those of the lower leaves, toothed or serrate:
44a. Phyllaries in a single series and not or just slightly overlapping. Achenes long hairy and crested with 2 unequal pairs of pappus scales. . . . . ***Hulsea***.
44b. Phyllaries in several overlapping and well imbricated series. Achenes short hairy and crested with pappus bristles:
45a. Plants rhizomatic and tending to from leafy patches. Lower leaves broadly lanceolate and about half as wide as long. Style branches of disk flowers without a prominent tuft of yellow hairs. . . . . ***Eurybia***.
45b. Plants taprooted and with erect to decumbent stems. Lower leaves oblanceolate and less than ¼ as wide as long. Style branches of disk flowers with a dense tuft of stiff yellow hairs. . . . . ***Corethrogyne***.
42b. Ray corollas yellow (the disk corollas are also yellow):
46a. Leaves pinnately or irregularly divided into narrow segments:
47a. Ligules abruptly expanding into a generally broadly ovate formation. Phyllaries in 1 equal series. . . . ***Eriophyllum***.
47b. Ligules linear. Phyllaries in two unequal series, the outer (lower) series much shorter and outwardly spreading. . . . . ***Senecio flaccidus***.
46b. Leaves not divided into narrow segments:
48a. Receptacles with a ring of chaff scales between the ray and disk flowers. Plants of shady habitats. . . . . ***Anisocarpus***.
48b. Receptacles without chaff scales. Plants of open, semi open or wet habitats:
49a. Heads generally 5 to 15 mm. wide and terminal on the branches of an open panicle. Ligules 3 to 10 mm. long and usually quite evident. Pappus in two series (the outer bristles much shorter than the inner bristles) . . . . . ***Heterotheca***.
49b. Heads generally less than 6 mm. wide and clustered in dense panicles. Ligules about 2 to 5 mm. long and inconspicuous. Pappus simple:
50a. All leaves narrowly linear to linear-lanceolate and entire. Heads clustered at or near the ends of the panicle branches. . . . . ***Euthamia***.
50b. Lower leaves spatulate to oblong-ovate with serrate margins, the upper most much reduced and generally elliptic with entire margins. Panicles mostly spike like (or sometimes head like) . . ***Solidago***.

ACHILLEA. YARROW, MILFOIL.

The genus *Achillea* consists of about 115 species of perennial herbs that are endemic to the temperate and boreal regions of the northern hemisphere. The genus was named for Achilles, the legendary hero of Greek mythology.

Achillea millefolium Linnaeus [*A. m.* var. *californica* (Pollard) Jepson, *A. borealis* Bongard subsp. *c.* (Pollard) Keck]. COMMON YARROW. This distinctive species occurs at all elevations of the Tassajara region, and although it is often seen transitional habitats, it is most common in open woodland habitats. ●R: widely distributed in the boreal and temperate regions of Eurasia, North America and North Africa. ●H: aromatic perennial herbs with one to several erect stems that range from about 5 to 12 dm. (20-48") tall. In outline the alternate leaves are narrowly lanceolate to oblong, but they are two to three times pinnately parted into numerous narrow segments. The lower leaves are petiolate and about 10 to 15 cm. long, while the upper are shorter, sessile, and clasp the stem at the base. The flower heads are produced in generally convex to flat topped corymbose terminal clusters. The heads are radiate and the ray and disk corollas are white; the involucres are about 4 to 8 mm. long and the phyllaries are produced in three to four series. The ligules are roundish to ovate and about 3 to 4 mm. long, and the disk corollas narrow and about 2 to 3 mm. long. The achenes are about 2 mm. long and lack pappus. ❁March-July (-September).

ACHYRACHAENA.

This is a monotypic (one species) genus that is endemic to the California Floristic Province. The name is derived from the Greek word *achuron*, chaff, and the Latin word *achaenium*, an akene, in reference to the chaffy or scale like pappus of the achenes.

Achyrachaena mollis Schauer. BLOW WIVES. This species is common in the relatively flat meadows in the immediate vicinity of The Caves ranch, and Diane Renshaw found a previously unknown population along the Horse Pasture-Tassajara Cut Off Trail during

the first spring after the Basin Complex Fire of 2008. ●R: a common member of grassland communities of the California Floristic Province, from Douglas County in southwestern Oregon to northern Baja California. ●H: short annual herbs that range from about 1 to 4 dm. (4-14") tall. The leaves are linear and about 2 to 12 cm. long; the lower are opposite and fused at the base, and the upper are alternate. The margins are entire or remotely serrulate. The flower heads are produced singularly on peduncles up to 11 cm. long. The heads are radiate, relatively large (up to 3 cm. wide in fruit), and both the ray corollas and disk corollas at first yellow but turn red with age. The ray corollas are about 10 to 12 mm. long (the ligules 5 to 6 mm. long), while the disk corollas are about 6 to 10 mm. long. The achenes are black and about 5 to 8 mm. long. The achenes of the ray flowers are without pappus and are surrounded by a phyllary, while those of the disk flowers develop a conspicuous crown of oblong pappus scales; those of the outer series are about 3 to 6 mm. long, while those of the inner series are about 6 to 11 mm. long. The white pappus scales spread outward in maturity, thus causing the heads to become spherical in outline. ❁March-June.

AGOSERIS. WESTERN NORTH AMERICAN DANDELIONS, GOAT CHICORY.

Agoseris consists of 11 species, ten of which occur in western North America; the remaining species occurs in South America. The name is derived from the Greek words *aix*, goat, and *seris*, chicory.

1a. Annual herbs from slender taproots, leaves sometimes cauline. Fruiting involucre 1 to 2.5 cm. long, outer achenes sometimes wavy ribbed or inflated and ribless:
- **2a**. Ligules 2 to 6 mm. long, and about as long as the phyllaries. Anthers 1 to 1.5 mm. long. Leaf lobes mostly in 2 to 3 pairs. . . . . ***A. heterophylla*** var. ***heterophylla***.
- **2b**. Ligules 10 to 15 mm. long, and exceeding the length of the phyllaries. Anthers 2 to 4 mm. long. Leaf lobes usually 3 to 5 pairs. . . *A. heterophylla* var. *cryptopleura*.

1b. Perennial herbs from stout taproots, often with an exposed caudex, leaves basal. Fruiting involucre 2 to 6 cm. long, outer achenes usually straight ribbed:
- **3a**. Leaf lobes generally angled outward (or rarely backward). Achenes tapering to the long and slender beak. Corollas 7 to 14 mm. long. Pappus bristles not more than 15 mm. long and in 2 to 3 series. . . . . ***A. grandiflora***.
- **3b**. Leaf lobes generally angled backward. Achenes abruptly constricting to the long and slender beak. Corollas 16 to 35 mm. long. Pappus bristles more than 15 mm. long and in 4 to 6 series. . . . . ***A. retrorsa***.

Agoseris grandiflora (Nuttall) E. Greene [*Stylopappus grandiflorus* Nuttall]. LARGE FLOWERED AGOSERIS, WESTERN DANDELION. This species occurs at all elevations in the Tassajara region, and it is locally common in grassy habitats, both in semi shady woodlands and on open slopes and flats. ●R: western North America, from British Columbia, Montana and Utah to southern California (San Diego County). ●H: dandelion like perennial herbs from taproots; the leafless flower scapes range from about 1.5 to 6 dm. (6-24") tall. The leaves are strictly basal, and the blades are narrowly lanceolate to oblanceolate, mostly about 10 to 25 cm. long, and are usually irregularly pinnately lobed. The ligulate flower heads are singular and terminal on the scapes; the involucre is about 2 to 4 cm. long, and the corollas are yellow. The achenes are about 4 to 7 mm. long, and are terminated by a long and slender beak which is crested with capillary pappus bristles. ❁April-July.

Agoseris heterophylla (Nuttall) E. Greene [*Macrorhynchus h*. Nuttall]. ANNUAL GOAT CHICORY. This species occurs at all elevations in the Tassajara region, and it is locally common, mostly in grasslands and in open woodland habitats. ●R: western North America, from British Columbia and Montana to northern Baja California and New Mexico. ●H: annual herbs with flowering stems that range from about .5 to 4 dm. (2-16") tall. The leaves are primarily by not strictly basal, and the blades are narrowly oblong to spatulate, about 3 to 15 cm. long, and usually have shortly lobed or toothed margins. The flower heads are singular and terminal on the stems. The ligulate heads have involucres that are about 8 to 25 mm. long, and the yellow corollas are about as long to much longer than the phyllaries. The achenes are about 2 to 5 mm. long and are terminated by a long and slender beak that is crested with capillary pappus bristles. ❁April-June.

It is quite possible that *Agoseris heterophylla* var. *cryptopleura* occurs in this region, for it is present in Anastasia Canyon and on the Hastings Natural History Reservation. I have thus included it in the preceding key just in case.

Agoseris retrorsa (Bentham) E. Greene [*Macrorhynchus retrorsum* Bentham]. SPEAR LEAVED AGOSERIS. This species occurs at all elevations in the Tassajara region, primarily in open and thus grassy woodlands, where it is common at many localities. ●R: western North America, from Washington, Idaho and Utah to southern California (San Diego County). ●H: taprooted perennial herbs with leafless scapes that range from about 1.5 to 5 dm. (6-20") tall. The leaves are basal, and the blades are narrowly lanceolate to oblong-lanceolate in outline, about 8 to 30 cm. long, and usually have distinctive retrorse (backwardly angled) lobes. The ligulate flower heads are singular and terminal on the scapes. The heads have involucres that are about 2.5 to 4 cm. long, and the yellow corollas yellow generally exceed the phyllaries. The achenes are about 5 to 7 mm. long and are abruptly constricting to a long and slender beak that is crested with capillary pappus bristles. ❁April-August.

ANISOCARPUS. WOODLAND MADIA.

The genus *Anisocarpus* consists of two species that are endemic to Pacific Slope of western North America. The name is derived from the Greek words *anisos*, unequal or dissimilar, and *karpos*, fruit, and alludes to the contrasting ray (fertile) and disc (sterile) achenes of the type species, *Anisocarpus madioides*.

∨***Anisocarpus madioides*** Nuttall [*Madia madioides* (Nuttall) E. Greene]. MADIA LIKE ANISOCARPUS, WOODLAND MADIA. This species is lightly scattered in densely wooded areas of the higher elevations of the Tassajara region, such as along the Pine Ridge trail between the Church Creek Divide and Pine Ridge, on Chew's Ridge, and in Miller Canyon. ●R: Cascade and Coast ranges, from southern British Columbia to the Santa Lucia Mountains of San Luis Obispo County. Also in the northern Sierra Nevada, from Butte and Plumas counties to El Dorado County, and greatly disjunct populations occur in the higher mountains of San Diego County. ●H: perennial herbs with erect stems that range from about 1 to 8 dm. (4-32") tall. The leaves are linear to linear-oblong, entire or remotely toothed, and about 6 to 12 cm. long. The basal leaves are produced in spreading rosettes, the cauline leaves are opposite and ascending, and the upper most leaves are alternate and much reduced in size. The long pedunculate flower heads are few in terminal inflorescences that are somewhat racemose or cymose. The radiate heads have involucres that are about 4 to 6 mm. long, and the ray and disk corollas are yellow. The approximately 8 to 15 fertile ray flowers have deeply three lobed ligules that are about 4 to 10 mm. long, and

the staminate disk flowers, which number about 10 to 30, have tubular corollas that are about 4 to 5 mm. long. The laterally compressed achenes of the ray flowers are about 3 to 5 mm. long and somewhat bowed; they lack pappus or they sometimes have a crown of minute pappus scales. The sterile achenes of the disk flowers are about 3 or 4 mm. long and are crested with fringed pappus scales that are no more than 1 mm. long. ❀April-September.

ARNICA.

The genus *Arnica* consists of 29 species of perennial herbs that occur in the boreal and temperate montane regions of the northern hemisphere; the overwhelming majority of the species are endemic to North America. The name is an ancient Latin or Greek word for some plant.

1a. Heads radiate. Lower leaves mostly broadly ovate and strongly cordate at the base (and thus heart shaped) . . . . . ***A. cordifolia***.
1b. Heads discoid. Lower leaves mostly ovate to ovate-lanceolate and truncate at the base. . . . . ***A. discoidea***.

V<>***Arnica cordifolia*** Hooker. HEART LEAFED ARNICA. The only locality in the Tassajara region where I have seen this species is on a north facing slope along the Pine Ridge Trail a very short distance west of the Church Creek Divide. I first came across this population in late May of 1993, and it was still extant when I last visited the area in late May of 2009. I was not the first person to notice this population, for a specimen of *A. cordifolia* was collected in the "Santa Lucia Mountains-Church Creek Divide," on June 3rd of 1976 (Gordon, Kimbrough & Grayum 1485, SFV 8087). This species used to occur on Pine Ridge, where a specimen was collected by Leroy Abrams in May of 1920 (Abrams 7419, DS 111843 & POM 127203), but there are no subsequent reports of its existence there. The only other locality in the Santa Lucia Mountains where a specimen of this species has been collected is in the watershed of Los Burros Creek, which is on the eastern slope of South Coast Ridge in southern Monterey County. This specimen was collected by Clare Hardham in May of 1961 (Hardham 7037, JEPS 59036 & UCD 129105). ●R: from Alaska to Ontario and the upper Michigan Peninsula, and southward, through the Rocky Mountains and the mountains of the Pacific Slope, to the mountains of California and northern New Mexico and Arizona. In California the range of this species extends southward through the Sierra Nevada to the Greenhorn Mountains of Kern County, and to Mendocino and Glenn counties in the North Coast Ranges. Disjunct populations occur on Mount Hamilton in Santa Clara County and in the Santa Lucia Mountains of Monterey County. Philip Munz ("A California Flora," 1959) reported this species to occur in the Santa Ana Mountains, and in 1898 a specimen was collected in the Cuyamaca Mountains in San Diego County (UC 91044). ●H: rhizomatic perennial herbs with erect stems that range from about 2 to 6 dm. (8-24") tall. The cauline leaves are opposite, and the long petioled lower ones have broadly ovate-cordate (or occasionally reniform) blades that are up to 11 cm. long. The leaves become reduced in size upward on the stems, and the upper most are sessile. The flower heads are often produced singularly and terminally on the stems, but they can be produced three or more per stem, in which case the lateral heads arise from the axils of the upper leaves. The large heads are radiate and the corollas are yellow. The ray corollas range from slightly to much longer than the phyllaries, and their tips range from blunt and toothed to entire and acute. The narrowly linear achenes are about 6 to 10 mm. long, and are crested by a dense ring of hair like pappus bristles. ❀May-August.

Arnica discoidea Bentham [var. *alata* (Rydberg) Cronquist; var. *eradiata* (A. Gray) Cronquist]. RAYLESS ARNICA. This species is lightly scattered at higher elevations in the Tassajara region, where it occurs on Chew's Ridge, Black Butte Ridge, along the Pine Ridge Trail between China Camp and the Church Creek Divide, and according to Vern Yadon, on Never Again Ridge (the ridge between the watersheds of upper Tassajara Creek and Church Creek (Yadon field notes 6/23-24/1979). James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), listed this species as being uncommon on Pine Ridge below 4,000 feet, and William Dudley collected a specimen of it on "Trap Rock Hill near Bear Basin" in June of 1901 (DS 1890). ●R: Cascade Ranges, from Skamania and Klickitat counties in southern Washington southward, to Tulare County in the Sierra Nevada, southward through the Coast and western Transverse ranges to Ventura County, with disjunct populations in the Santa Ana Mountains of Orange County. ●H: rhizomatic perennial herbs with erect stems that range mostly from about 3 to 8 dm. (12-32") tall. The basal leaves are produced in sterile rosettes and the cauline leaves are opposite. The basal and the lower cauline leaves are long petiolate and have deltoid to broadly ovate or lanceolate blades that are up to 12 cm. long. The blades of the middle cauline leaves, which have winged petioles, are narrowly ovate to lanceolate, and the blades of the smaller upper most leaves, which are sessile, are generally ovate. The leaf margins are irregularly toothed. The relatively large flower heads are terminal and lateral, the lateral ones being produced in pairs in the axils of the upper leaves. The discoid heads have involucres that are about 10 to 17 mm. long; the yellow corollas are about as long or slightly longer than phyllaries, and the outer most corollas are sometimes enlarged. The achenes, which are about 6 to 8 mm. long, are crested with fine pappus bristles. ❀May-July.

ARTEMISIA. MUGWORT, SAGEBRUSH, WORMWOOD.

The genus *Artemisia* consists of about 400 species that primarily occur in the temperate regions of the northern hemisphere. Due to their aromatic properties, many *Artemisia* species are commonly known as sages, especially those which occur in the Great Basin, but the true sages belong to *Salvia*, a genus of *Lamiaceae* (the Mint Family). The genus was named for the Hellenic goddess Artemis.

1a. Shrubs or subshrubs. Achenes crested with minute pappus bristles. . . . . ***A. californica***.
1b. Evergreen perennial herbs. Achenes without pappus:
2a. Leaves gray green, usually white woolly on the lower surface, and variable in shape, but not narrowly linear. . . . . ***A. douglasiana***.
2b. Leaves dark green, nearly bald on both surfaces, and narrowly linear or cleft into linear segments. . . . . ***A. dracunculus***.

Artemisia californica Lessing. CALIFORNIA SAGEBRUSH, OLDMAN. This species is scattered at lower to intermediate elevations in the Tassajara region, primarily in transitional areas between chaparral and grasslands, and it tends to occur in colonies. ●R: Coast, Transverse and Peninsular ranges, from Mendocino and Napa counties to northern Baja California. ●H: aromatic and densely leafy gray green shrubs or subshrubs with fairly lanky branches that range from about 6 to 15 dm. (2-5') long. The leaves are alternate, and the lower ones, which are up to 8 cm. long, are pinnately or irregularly divided into linear segments. The upper leaves are mostly narrowly linear and entire. Smaller leaves are commonly clustered in the axils of the primary leaves. The small flower heads are produced in abundance on elongated racemose panicles that terminate the branches. The flower heads are discoid and about 20 to 40 flowered; the involucres are about 2 to 3 mm. long, and the pale yellow corollas are less than 2 mm. long. The achenes, which are

about .8 to 1.5 mm. long, are crested with minute pappus scales. ♔August-December.

Artemisia douglasiana Besser [*A. vulgaris* Linnaeus var. *heterophylla* Jepson]. CALIFORNIA MUGWORT. This well known species is locally common to abundant at all elevations in the Tassajara region, and although it is most common in semi shady and/or seasonally moist situations within riparian woodland habitats, it is not restricted to such environments. The sap of this species is an antidote to the development of dermatitis if applied to the skin soon after contact with poison oak. ●R: from northern Washington and northern Idaho to northern Baja California. In California it occurs in all counties except for Kings, which is in the San Joaquin Valley, and Imperial, which is in the Sonoran Desert. ●H: rhizomatic evergreen perennial herbs with numerous erect stems that range from about 5 to 20 dm. (20-78") tall. The aromatic leaves are alternate, gray green, and about 1 to 12 cm. long. They range from broadly oblanceolate in outline and 3 to 5 lobed towards the apex, to narrowly lanceolate or elliptic and entire. The very small flower heads are borne on elongated and leafy terminal panicles that produce of hundreds of heads. The discoid heads, which contain about 15 to 35 flowers, are about 2 to 4 mm. wide, and the pale yellow to nearly white corollas are less than 2 mm. long. The achenes, which lack pappus, are less than 1 mm. long. ♔June-October.

Artemisia dracunculus Linnaeus. TARRAGON, DRAGON SAGEWORT. This species is widely scattered at all elevations in the Tassajara region, but it is fairly uncommon, and it tends to occur singularly, or in small groups, in open or transitional areas, particularly on floodplains and on south facing slopes. The flavor of the local plants is very bland in comparison to the variety that is used as a culinary herb (var. *sativa*, a.k.a., French tarragon). The name *dracunculus* is derived from the Greek words *draconis*, dragon, and *unculus*, little, and the common name is derived from the French or Spanish word *estragon*, which also means little dragon. ●R: widely distributed in the northern temperate and arctic regions of the northern hemisphere. ●H: leafy evergreen perennial herbs with erect or ascending stems that range from about 5 to 15 dm. (20-60") tall. The deep green leaves, which are about 2 to 8 cm. long, range from narrowly linear to linear oblanceolate or linear lanceolate. Larger leaves are often cleft into linear segments towards the apex. The small and typically nodding discoid flower heads are produced in spike like terminal panicles. The roundish heads, which contain about 20 to 30 minute flowers, are about 2 to 3 mm. wide; the outer flowers are pistillate and the inner are staminate. The achenes, which lack pappus, are more or less ellipsoid and about .5 to .8 mm. long. ♔July-October.

BACCHARIS.

The genus *Baccharis* consists of 350 to 450 species of the Americas. Most of the species occur in tropical and in warmer temperate regions, and the genus is particularly well represented in eastern South America. The genus was named for Bacchus, the god of wine.

1a. Shrubs of dry habitats. Leaves oval to obovate, less than 4 cm. long, and mostly with remotely toothed margins. . . . . ***B. pilularis***.
1b. Shrubs or perennial herbs of riparian habitats. Leaves generally narrowly to broadly lanceolate, mostly more than 4 cm. long, and with entire or serrulate margins:
2a. Shrubs ranging from about 2 to 4 m. tall. . . . . ***B. salicifolia***.
2b. Perennial herbs from creeping rhizomes, the stems mostly less than 2 m. tall. . . . . ***B. glutinosa***.

Baccharis glutinosa Persoon [*B. douglasii* deCandolle; *B. salicifolia* misapplied]. MARSH BACCHARIS, DOUGLAS BACCHARIS. This species is common along the Arroyo Seco River in the vicinity of the confluence of Tassajara Creek, and also a short distance up Tassajara Creek, but it is not known to occur elsewhere in this region. Traditionally the name *Baccharis glutinosa* was mistakenly treated as a synonym of, rather than as a name that had been misapplied to, *Baccharis salicifolia*. ●R: Coast Ranges and mountains of southern California, from Curry County in southwestern Oregon to northern Baja California, and the Central Valley and the Sierra Nevada foothills (from Butte County to Tuolumne County), but less common. Also in temperate South America, which is the type locality. ●H: rhizomatic perennial herbs of riparian habitats, the stems erect and ranging from about 5 to 20 dm. (20-80") tall. The alternate leaves have petioles less than 1 cm. long; the blades are narrowly to broadly lanceolate, entire or serrulate, and about 3 to 10 cm. long. The flower heads are produced in terminal and generally flat topped corymbose clusters; the discoid heads are about 3.5 to 6 mm. long, and the phyllaries are produced in 2 to 3 series. Staminate heads have 26 to 40 flowers, and five lobed corollas that are about 3.5 to 4.3 mm. long, while pistillate heads have 80 to 150 flowers and inconspicuous narrow corollas that are about 1.7 to 3 mm. long. The fruit is a five ribbed achene about .6 to 1.5 mm. long; it is crested with pappus bristles about 2.5 to 7 mm. long. ♔July-October.

Baccharis pilularis deCandolle subsp. ***consanguinea*** (deCandolle) C. B. Wolf; *B. p.* var. *c.* (deCandolle) Kuntze]. COYOTE BRUSH, CHAPARRAL BROOM. This species is scattered in chaparral and transitional areas at lower and intermediate elevations of the Tassajara region, and although it is generally uncommon, plants can be fairly numerous in some areas. The typical form of this species, which is abundant along the coast of California, has been planted in the developed area of Tassajara. Such plants differ from the native plants by their low and spreading habit of growth. ●R: Coast, Transverse and Peninsular ranges, from Clatsop County in far northwestern Oregon to northern Baja California, and the Sierra Nevada foothills, from Butte County to Tuolumne County. Also on the islands off the coast of southern California and on the Sutter Buttes. ●H: densely leafy evergreen shrubs with more or less roundish crowns that range from about 1 to 3 m. (3-10') tall. The fairly stiff leaves are oval to obovate with cuneate bases and obtuse apices, and the margins are entire or (usually) with five to nine remote teeth. The discoid flower heads are produced in terminal and axillary clusters. The heads, which are about 3.2 to 5 mm. long, are exclusively staminate or pistillate, and the whitish corollas are very narrow. Staminate heads have 13 to 34 flowers with corollas that are 3 to 4.2 mm. long, while pistillate heads have 19 to 43 flowers and corollas that are mostly 2.5 to 3.5 mm. long. The ten nerved and somewhat compressed achenes, which are about 1 to 2 mm. long, are crested by capillary pappus bristles. ♔Aug.-December.

Baccharis salicifolia (Ruiz & Pavon) Persoon [*B. viminea* deCandolle, not *B. glutinosa* Persoon]. MULE FAT, SEEP WILLOW, WATER WALLY. These distinctive riparian shrubs are fairly common along perennial and seasonal streams at lower and intermediate elevations in the Tassajara region. ●R: North and South America, from northern California (from Mendocino, Tehama and Butte counties southward) and Colorado to Chile and Argentina. ●H: evergreen shrubs with somewhat lanky branches that range from about 2 to 4 m. (6-13') tall. The leaves have petioles that are short and winged, and the blades are lanceolate to narrowly lanceolate with acute apices, and about 2 to 10 cm. long; the margins are usually entire but they are sometimes remotely serrate. The flower heads are produced in corymbose panicles that are terminal on the main branches and the lateral branchlets. The discoid heads are about 3 to 6 mm. long, and the flowers are exclusively staminate or pistillate; the corollas are very narrow and whitish. Staminate heads have fewer than 50 flowers and corollas that are mostly 4 to 6 mm. long, while pistillate heads have 50 to 150 flowers and corollas that are about 2.2 to 3.5 mm. long. The five nerved and slightly compressed achenes, which are about .8 to 1.3 mm. long, are crested by capillary pappus bristles. ♔mostly March-July.

BRICKELLIA.

The genus *Brickellia* consists of about 100 to 110 species of North and Central America, and most of the species occur in the desert regions of the southwestern United States and Mexico. The genus was named for Dr. John Brickell (1749-1809), an early American botanist who resided in Savannah, Georgia.

Brickellia californica (Torrey & A. Gray) A. Gray (*Bulbostylis c*. T. & G.). CALIFORNIA BRICKELLIA, CALIFORNIA BRICKELBUSH. This inconspicuous species is widely scattered at lower to intermediate elevations in the Tassajara region, and it primarily occurs on rocky slopes and in dry gulches. ●R: Sierra Nevada foothills and the Coast, Transverse and Peninsular ranges, from Curry, Josephine and Jackson counties in southwestern Oregon to northern Baja California, and east to southern Idaho, Colorado, western Texas and northern Mexico. ●H: evergreen perennial herbs or subshrubs with generally spreading branches that range from about 5 to 10 dm. (20-40") long. The alternate and shortly petiolate leaves, which are about 1 to 6 cm. long, have blades that are mostly triangular ovate; the margins are irregularly serrate. The inflorescences are leafy spike like panicles in which the flower heads are clustered on short lateral branches. The discoid flower heads are about 12 to 14 mm. long; they contain about eight to eighteen flowers that have greenish white corollas. The slender achenes, which are about 2 to 3 mm. long, are crested with numerous capillary pappus bristles. ❁August-October.

CALYCADENIA. CUP GLAND, ROSIN WEED.

Calycadenia consists of ten species of the California Floristic Province. The name is derived from the Greek words *kalux*, cup, and *adenos*, gland, alluding to the cup or tack like glands that are clustered in the axils of the upper leaves and scattered along the upper stems.

∨***Calycadenia truncata*** deCandolle [*C. t.* subsp. *microcephala* Hall]. ROSIN WEED. This distinctive species is widely scattered and locally common on open and generally grassy slopes at all elevations in the Tassajara region. ●R: Cascade Ranges, Coast Ranges, and the Sierra Nevada, from Lane County in western Oregon to Fresno County in the Sierra Nevada, and to the Santa Lucia Mountains of northwestern San Luis Obispo County in the Coast Ranges. ●H: xerophytic annual herbs with erect and simple or upwardly branched stems that range from about 3 to 12 dm. (12-48") tall. The larger leaves, which are up to 10 cm. long and produced near the base of the plant, are usually shed before the plant reaches full maturity. The leaves are alternate, sessile, narrowly linear with inwardly turned margins, and sharply acute at the apex. Clustered in the axils of the smaller upper leaves and scattered along the upper stems are short cylindrical structures that bear a prominent and tack like sticky gland at the apex. The flower heads are sessile at the nodes of usually freely branched panicles. The radiate heads have involucres that are about 4 to 10 mm. long, and the corollas are yellow. The 3 to 6 ray flowers have broad and outwardly three lobed ligules that are about 7 to 12 mm. long, and these usually have a conspicuous red dot just outside the tube; the smaller disk flowers number from about 3 to 25. The achenes are about 3 or 4 mm. long. The ray achenes are generally broader, partly enclosed by the phyllaries, and without pappus, while the disk achenes are narrower and crested with short and chaffy pappus scales. ❁(July) August-November.

Carlquistia muirii. JOHN MUIR'S TARWEED.

Suitable habitats exist at higher elevations in the this region for *Carlquistia muirii*, a rare species that occurs on granitic rock outcrops, granitic talus and scree, and in soils that are derived from granitic rock. This is a rare species that only occurs in two far removed regions. One is the southern Sierra Nevada, where it occurs between 1100 and 2500 m. (3600-8200') and at only 15 known locations: most are in the watersheds of the Kings and Kaweah rivers, but it also occurs in the Greenhorn Mountains and on Church Dome in southern Tulare County, and on Owens Peak in northeastern Kern County. The other locality where *Carlquistia muirii* occurs is in the Santa Lucia Mountains of Monterey County, where it is only known to occur only on the Ventana Double Cone. This is a rhizomatic perennial herb with linear to lance linear leaves and yellow flowered discoid flower heads. The achenes are crested with pappus bristles. This species is the only member of the genus *Carlquistia*. Its insertion in the preceding key to *Asteraceae* would be under 32b, pappus comprised of bristles, and then by:

33a. Shrubs. . . . . *Ericameria*.
33b. Perennial herbs. . *Carlquistia*.

CENTAUREA. STAR THISTLE, KNAPWEED.

The genus *Centaurea* includes about 550 species that primarily occur in temperate regions of Eurasia and northern Africa. The name is derived from the Greek word *Centaurie*, a plant associated with the centaur Chiron, who was said to have discovered its medicinal uses.

1a. Plants branching mostly above the base. Phyllary spines purplish, the longest usually no more than 10 mm. long. . . . . ***C. melitensis***.
1b. Plants branching from the base. Phyllary spines yellowish, the longest about 10 to 25 mm. long. . . . . ***C. solstitialis***.

!*Centaurea melitensis* Linnaeus. TOCALOTE, PURPLE STAR THISTLE. This yellow flowered species is scattered in open and usually grassy areas in the Horse Pasture and in the Church Creek area, and occasionally around the developed area of Tassajara Hot Springs. It was exceedingly abundant at two sites along the Horse Pasture Trail during the first spring after the Basin Complex Fire of 2008. One was in the steep meadow between the trail head on Tassajara Road and the first summit, and the other was in a meadow about half way between the Horse Pasture Creek crossing and the junction with the Tassajara Cutoff Trail. ●R: a problematic weed in California; native to Europe. ●H: erect annual herbs about 2 to 9 dm. (8-36") tall. The leaves are alternate, and the basal leaves are lyrate-pinnatifid and up to 15 cm. long, while the upper leaves, which gradually become reduced in size, are narrow, sessile with decurrent bases, and mostly entire. The flower heads are produced singularly or in small groups, and the lateral ones are nearly sessile. The discoid flower heads have ovoid involucres that are about 10 to 15 mm. long, and the corollas are yellow. The phyllaries are terminated with slender and purplish spines that are about 5 to 10 mm. long. The achenes, which are about 2.5 mm. long, are crested with capillary pappus bristles that are about 2.5 to 3 mm. long. ❁May-June.

Centaurea solstitialis Linnaeus. YELLOW STAR THISTLE. This species is scattered in grassy or disturbed areas along the Horse Pasture Trail, from near the Flag Rock ridge summit to the Blackberry Creek area. ●R: a problematic weed in California; native to the Mediterranean region. ●H: erect annual herbs about 3 to 10 dm.

(12-40") tall. The basal leaves are pinnately lobed and about 5 to 15 cm. long, while the smaller upper leaves, which are narrow and have strongly decurrent bases, are unlobed. The basal leaves are largely absent by the time the plant begins to bloom. The flower heads are mostly terminal on the branches of an open panicle. The discoid heads have ovoid involucres that are about 13 to 17 mm. long, and the phyllaries are terminated by spines that are about 10 to 25 mm. long. The corollas, which are about 13 to 20 mm. long, are yellow. The achenes are about 2 to 3 mm. long; those of the outer flowers are dark and lack pappus, while those of the inner flowers are light colored and are crested with pappus bristles that are about 2 to 4 mm. long. ֍May-June.

CIRSIUM. THISTLE.

Cirsium consists of about 200 species of annual, biennial and perennial herbs that are endemic to North America and Eurasia. According to David J. Keil, the author of *Cirsium* in the Jepson eFlora, California "Native [California] thistles are part of an apparently actively evolving group of species with many geographical and ecological races and growth forms. Morphologically divergent species often are able to hybridize; unrecognized hybridization or intergradation often complicates identification. Stature, growth form, and proportions are subject to environmental influence." The genus name is derived from the Greek word *kirsion*, which was a name for some kind of thistle.

1a. Plants generally compact, low-growing and unbranched. Flower heads generally tightly clustered at stem tip; corollas 20 to 28 mm. long. . . . . ***C. scariosum***.
1b. Plants erect and upwardly branched. . . . . ***C. occidentale***.
2a. Outer face of outer and middle phyllaries with a long, sticky-resinous ridge that is milky when fresh, dark when dry, and occasionally very narrow . . . . . var. ***californicum***.
2b. Outer face of outer and middle phyllaries without a sticky-resinous ridge:
3a. Outer and middle phyllaries without short appressed bases. The phyllaries are lance-linear to ovate, and appressed or generally ascending to erect; the tip spines are 1 to 12 mm. long. . . . . var. ***californicum***.
3b. Outer and middle phyllaries with short appressed bases. The phyllaries are lanceolate to linear or needle-like, and the tips are ascending to stiffly spreading; the tip-spines are generally 1 to 35 mm. long:
4a. Phyllary tips conspicuously connected side-to-side by network of cobwebby or multi cellular hairs. . . . . var. ***occidentale***.
4b. Phyllary tips glabrous or hairy to densely tomentose but generally not conspicuously connected side-to-side by network of cobwebby or multi cellular hairs:
5a. Corollas generally bright red-pink to red. . . . . var. ***venustum***.
5b. Corolla white or cream to lavender, purple, or pale rose. . . . . var. ***californicum***.

Cirsium occidental (Nuttall) Jepson [*Cardus occidentalis* Nutt.] var. ***californicum*** (A. Gray) Keil & Turner [*C. cal*. Gray]. CALIFORNIA THISTLE, SIERRA THISTLE. This taxon is widely scattered and moderately common in the Tassajara region, and it mostly occurs in open and often rocky areas that are transitional between major habitat types. ●R: southern Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California. Also on Santa Cruz, Santa Catalina and San Clemente islands. ●H: biennial herbs with erect or ascending stems that range from about 5 to 15 dm (20-60") tall. The alternate are pinnately divided into wavy and sharply spiny lobes; the basal leaves are up to 3.5 dm. long and narrowly lanceolate to oblanceolate in outline, while the middle leaves are similar but become reduced in size and complexity, and the upper most leaves are sessile and more or less lanceolate. The large flower are mostly solitary; the lateral heads are on peduncles that are to 4 dm. long. The discoid heads have roundish involucres that are about 1.5 to 5 cm. wide. The bluish to reddish lavender or often pale pinkish white corollas are about 18 to 35 mm. long, and they extend well above the spine tipped phyllaries. The achenes are about 5 to 6 mm. long and are crested with a deciduous ring of fine pappus bristles ֍April-July.

+***Cirsium occidentale*** var. ***occidentale***. WESTERN THISTLE. This entry is based on two herbarium specimens. One is one of A. D. E. Elmer's "Tassajara Hot Springs" specimens that were collected in June of 1901 (Elmer 3171; DS 1374); according to the note that is enclosed in the envelope that is pasted to the sheet, Elmer collected it at "Springs." This specimen was originally assigned to *C. californicum*, and later to *C. occidentale* var. *californicum*. In 1992 it was assigned to var. *occidentale* by David J. Keil. Mr. Keil, a professor of biological science at the California Polytechnic State University in San Luis Obispo, was the family editor of *Asteraceae* in both editions of *The Jepson Manual*, and he was the co author of *Cirsium* in the first edition of *The Jepson Manual*, and the sole author of the genus in the second edition. The other specimen was collected at "Tassajara Springs" by Mrs. S. Earle (Junea) Kelley in June of 1917 (CAS 5845). ●R: Coast, Transverse and Peninsular ranges, from Mendocino County to San Diego County. Also on San Miguel, Santa Rosa, Santa Cruz, San Nicolas, Santa Catalina and San Clemente islands. ●H: biennial herbs that are similar to var. *californicum*, except for characteristics listed in the preceding key to this genus. ֍April-July.

Cirsium occidentale var. ***venustum*** (E. Greene) Jepson [*Cardus venustus* Greene; *C. proteanum* J. T. Howell; *C. coulteri* Harvey & A. Gray misapplied]. VENUS THISTLE, RED CALIFORNIA THISTLE. This taxon is scattered along Tassajara Road between Jamesburg and the Chew's Ridge summit. ●R: southern Cascade Ranges, the Sierra Nevada, and the Coast and Transverse ranges, from Josephine County in southwestern Oregon to Los Angeles and San Bernardino counties. Also on Santa Rosa Island, on the Sutter Buttes, and in the White and Inyo mountains of Inyo County. ●H: biennial herbs that are much like the other varieties, except for the red corollas. ֍April-July.

+<>***Cirsium scariosum*** Nuttall. MEADOW THISTLE, ELK THISTLE. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3156; DS 1293). This specimen was not assigned to a specific taxon until 1992, when David J. Keil assigned it to *C. scariosum* (see the text for *Cirsium occidental* var. *occidentale*). This is the only specimen of this species from Monterey County that is included in the Consortium of California Herbaria database; the nearest populations are in the Sierra Nevada in Tulare County, about 165 linear miles to the east. ●R: widely distributed in temperate western North America, from British Columbia and Alberta to northern Baja California and New Mexico. In California this species occurs in the southern Cascade Ranges and the Sierra Nevada, from Siskiyou County to Tulare County, and populations occur in the Tehachapi Mountains of Kern County, in the Mount Pinos region of southern Kern County and northeastern Ventura County, in the San Bernardino Mountains of San Bernardino County, and in the higher mountains of Riverside County, San Diego County, and northern Baja California. ●H: biennial or short lived perennial herbs with erect and often unbranched stems that range from about 1.5 to 20 dm. (6-80") tall (other varieties of this species lack stems). The leaves, which are often basal, are oblong to oblanceolate and about 1 to 4 dm. long. They have tapered or spiny

petioles, and the margins range from slightly to deeply lobed. The main marginal spines are about 2 to 10+ mm. long. The flower heads are more or less sessile in head or raceme or spike like clusters that are usually overtopped by small leaves. The involucres are 2 to 3.5 cm. wide, and the phyllary spines are about 1 to 8 mm. long. The corollas are white and about 2 to 4 cm. long. The achenes, which are about 2 to 6.5 mm. long, are crested with pappus bristles that are about 15 to 35 mm. long. ❀May-July.

CORETHROGYNE.

This genus consists of only one highly variable species that is endemic to the California Floristic Province. In the first edition of this text this species was included in *Lessingia*, due to its placement there in the first edition of *The Jepson Manual* (1993). The name is derived from Greek words *korethron*, a broom made of twigs, and *gune*, style (female), on account of the densely hispid style tips.

Corethrogyne filaginifolia (Hooker & Arnott) Nuttall [*Aster filaginifolius* H. & A.; *Corethrogyne californica* DeCandolle; *Lessingia filaginifolia* (H. & A.) M. A. Lane; *L. f.* var. *californica* (deCandolle) Lane; *Diplopappus incanus* Lindley]. CALIFORNIA ASTER. This species is occurs at all elevations in the Tassajara region, and it is locally common in semi open woodlands and in grassy openings in chaparral. ●R: from Coos County in southwestern Oregon in the Coast Ranges, and from Amador County in the Sierra Nevada, to northern Baja California. Also on the Channel Islands. ●H: woolly perennial herbs, sometimes woody at the base, with erect or ascending stems that range from about 4 to 12 dm. (16-48") tall. The alternate leaves diminish in size upward on the stems. The lower leaves are petiolate and up to 6 cm. long; the blades are spatulate to oblanceolate and are sometimes toothed towards the apex. The upper most leaves are lanceolate to linear, sessile, and often less than 1 cm. long. The flower heads are produced singularly or in corymbosely branched panicles. The heads are radiate, and the involucres are about 6 to 13 mm. long. The ray flowers number about 10 to 43 and have corollas that are about 10 to 12 mm. long; the violet to purple ligules are about as long to much longer than the tubes. The disk flowers number about 30 to 120, and have yellow corollas that are about 4 to 6 mm. long. The achenes are about 3 to 5 mm. long, and are crested with reddish brown pappus bristles ❀July-November.

DEINANDRA.

Deinandra consists of 21 species of southwestern temperate north America; the species were formerly placed in the genera *Hartmannia* and *Hemizonia*. Fourteen species occur in California, and 11 are endemic to the California Floristic Province. Edward Greene failed to state the meaning of *Deinandra* when he designated this genus in 1897, but Bruce Baldwin, in his treatment of the genus in the Jepson eFlora, offers the following explanation: "Greek: fierce man, probably for name it replaced, *Hartmannia* DC., meaning 'stag man,' stags being fiercely territorial."

+*Deinandra corymbosa* (deCandolle) B. G. Baldwin [*Hartmannia c*. deCandolle; *Hemizonia c*. (deCandolle) Torrey & A. Gray]. COAST TARWEED. This entry is based on a specimen that was collected by Harvey Monroe Hall on July 26th of 1913 (Hall 10080, UC 194203). Although the specimen label does not state a location other than Monterey County, according to Hall's field notes he collected it at "Gate at Bruce's ranch house, Tassajara Road," and thus in Bruce Flats. This species also occurs on the Hastings Natural History Reservation and at points along Carmel Valley Road between Carmel Valley Village and Tassajara Road. ●R: Coast Ranges, from Humboldt County to western Santa Barbara County. ●H: erect or decumbent annual herbs with branching or upwardly branching stems that range from about 1 to 10 dm. (4-40") tall. The lower leaves, which are about 3 to 10 cm. long, are linear to oblanceolate in outline and deeply pinnately lobed. The leaves become reduced in size and complexity upward on the stems. The inflorescence, which is often flat topped, varies from cymose to racemose to paniculate. The involucres are about 5 to 9 mm. long and 6 to 12 mm. wide. The ray flowers, which number about 15 to 35, are deep yellow and about 4 to 8 mm. long, while the much smaller disk flowers, which number about 24 to 70, are red to dark purple. ❀March-November.

ERICAMERIA. GOLDEN BUSH.

As presently circumscribed, *Ericameria* consists of about 36 species of shrubs, all of which are endemic to western North America. The name is derived from the genus name *Erica*, the heathers, and the Greek word *meros*, part or portion, alluding to the similarity of the leaves of some of the species.

1a. Shrubs with upwardly branched trunks and dense and generally rounded crowns up to 4+ m. tall. Leaves, and often young stems, dotted with round and more or less evenly spaced resin filled pits. Involucres less than 4.5 mm. long. Flowers 10 to 25 per head, the corollas 4.7 to 5.5 mm. long. . . . . ***E. arborescens***.

1b. Shrubs with spreading or ascending (or erect) stems less than 3 m. tall. Leaves and young stems lacking round resin pits. Involucres 6 to 14 mm. long. Flowers mostly 5 per head, the corollas 6 to 13 mm. long:

2a. Plants 5 to 28 dm. tall. Stems densely tomentose with tightly matted hairs. Leaves 15 to 30 mm. long, and largely absent during the flowering period. . . . . ***E. nauseosa*** var. ***mohavensis***.

2b. Plants 2 to 10 dm. tall. Stems loosely tomentose. Leaves 30 to 70 mm. long, and present during the flowering period. . . . . ***E. nauseosa*** var. ***speciosa***.

Ericameria arborescens (A. Gray) E. Greene [*Linosyris a*. A. Gray; *Haplopappus a*. (Gray) H. M. Hall]. GOLDEN FLEECE. This species is widely scattered in chaparral at lower and intermediate elevations in the Tassajara region, and it is tends to occur in colonies. Although it seldom occurs along the trails or roads of this region, its presence is easily observed beginning in late summer and extending well into fall, for when groups of plants are in full bloom they can be seen from long distances. ●R: Coast and Transverse ranges, from Curry and Josephine counties in southwestern Oregon to the San Bernardino Mountains in San Bernardino County, and the Sierra Nevada, from Butte County to Kern County. ●H: aromatic and densely foliated evergreen shrubs that range from about 1.2 to 3 m. (4-10') tall. The glandular leaves are narrowly linear to filiform, and are up to 6 cm. long. The flower heads are produced in dense and flat topped to rounded cymes terminate the erect upper branches. The heads are discoid and contain about 10 to 25 flowers; the corollas are yellow and about 4.5 to 5.5 mm. long. The five angled achenes are less than 2 mm. long, and are crested with fragile pappus bristles. ❀August-November.

Ericameria nauseosa (Pallas ex Pursh) G. L. Nesom & G. I. Baird var. ***mohavensis*** (E. Greene) Nesom & Baird [*Chrysothamnus nauseosus* (P. ex P.) Britton subsp. *mohavensis* (E. Greene) H. M. Hall & Clements]. MOHAVE RABBIT BRUSH. This species is scattered on or near serpentine outcrops on Chew's Ridge, and, at least at one time, near China

Camp, where Roxana Ferris collected a specimen in October of 1940 (Ferris #10311 DS). ●R: Coast Ranges, from Alameda County southward, and the southern Sierra Nevada, from Tulare County southward, to the Transverse Ranges, from Santa Barbara County to San Bernardino County, and eastward through the Mojave Desert to Nevada. ●H: often fastigiately branched and frequently nearly leafless shrubs that range from about 6 to 20 dm. (24-80") tall. The alternate leaves are narrowly linear and about 1.5 to 3 cm. long. The flower heads are produced in rounded to elongated thyrse like panicles. The heads are discoid and usually have five flowers; the corollas are yellow and about 7 to 10.5 mm. long. The achenes are about 3 to 8 mm. long, and are crested with fine pappus bristles. ❀August-October.

+∨***Ericameria nauseosa*** var. ***speciosa*** (Nuttall) G. L. Nesom & G. I. Baird [*Chrysothamnus nauseosus* subsp. *albicaulis* (Nutt.) H. M. Hall & Clements; *Ch. speciosus* Nut.]. SHOWY RABBIT BRUSH. This entry is based on a specimen that was collected by James Griffin on Pine Ridge "Near junction with Pine Valley trail" in November of 1973 (Griffin 3864; JEPS 73790). ●R: western North America, from British Columbia and Alberta to New Mexico and California. In California this taxon occurs from the Cascade Ranges southward, to Kern County in the Sierra Nevada, and to Marin County in the North Coast Ranges. In the South Coast Ranges this taxon occurs on Mount Hamilton and on Mount Umunhum in Santa Clara County, and on Pine Ridge and on the South Coast Ridge above Willow Creek in the Santa Lucia Mountains of Monterey County. ●H: similar to the preceding taxon, except for the characteristics stated in the key. ❀August-October.

ERIGERON. FLEABANE DAISY.

According to the Angiosperm Phylogeny website, *Erigeron* consists of about 200 species, but according the Jepson eFlora website, it consists of about 375 species. In any case, the species, as a whole, are represented nearly worldwide. The species of this genus range from annual herbs to subshrubs. The name is derived from the Greek words *eri*, early, or perhaps *erio*, woolly, and *geron*, old man.

1a. Stems usually less than 3 dm. long. Heads discoid and without pistillate flowers. Restricted to cliffs and major rock outcrops. . . . . ***E. petrophilus***.

1b. Stems 2 to 20 dm. long. Heads radiate or inconspicuously radiate, the ray flowers pistillate. Plants of various habitats:

2a. Annual herbs with inconspicuously radiate heads. Ray and disk flowers white. . . . . ***E. canadensis***.

2b. Perennial herbs with conspicuously radiate flower heads. Ray corollas range from purple, bluish purple, violet or sometimes nearly white; the disk corollas are yellow (or rarely reddish). . . . . ***E. foliosus***.

Erigeron canadensis Linnaeus [*Conyza canadensis* (L.) Cronquist]. HORSEWEED. This species is widely scattered in open and grassy or disturbed areas at lower and intermediate elevations in the Tassajara region. Although this species is an aggressive weed in urban and agricultural areas, the plants of this region behave as balanced members of the native flora, except in and around the developed area of Tassajara. I suspect that these plants represent a more aggressive strain that are not native to this region. ●R: widely distributed in the western hemisphere, from Canada to Chile and Argentina, and a naturalized weed in many parts of the eastern hemisphere. ●H: leafy annual herbs with erect stems that range from about 3 and 20 dm. (1-6.5') tall. The alternate leaves are entire or serrate, and range from about 1 to 10 cm. long. The lower leaves are narrowly lanceolate to oblanceolate and petiolate, while the upper are generally linear and sessile. The flower heads are small and produced in open panicles. The heads, which have involucres that are about 2.5 to 4 mm. long, are inconspicuously radiate (the ligules no more than 1 mm. long), and the disk and ray corollas are white and about 2.5 to 3 mm. long. The pistillate ray flowers number about 20 to 40 and the perfect disk flowers number about 7 to 13. The oblong-compressed achenes, which are about 1.5 mm. long, are crested with capillary pappus bristles. ❀June-October.

Erigeron foliosus Nuttall [*E. f.* var. *stenophyllus* (Nuttall) A. Gray] var. ***foliosus***. LEAFY DAISY. This species widespread and locally common in chaparral and in open or semi shady woodland habitats at all elevations in the Tassajara region, and it is particularly common in rocky or sandy soiled areas. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Plumas, Alameda and San Mateo counties to northern Baja California. Also on San Miguel, Santa Rosa, Santa Cruz, Santa Catalina and the Anacapa islands, and disjunct populations occur in Siskiyou County. This species is most common in southern California. ●H: perennial herbs with slender stems that range from about 2 to 10 dm. (8-40") tall. Plants of shady habitats tend to produce just a few long and lanky stems, while plants of open habitats tend to form dense tufts of numerous erect stems from an often semi-woody base. The alternate leaves are narrowly linear to narrowly oblong, and about 2 to 6 cm. long. The flower heads are terminal on the branches of an open corymbose inflorescence. The radiate heads have involucres that are about 4 to 7 mm. long, and the phyllaries are arranged in three to five series. The ray flowers, which number from about 20 to 45, have bluish purple corollas that are about 6 to 11 mm. long (they may be underdeveloped or absent in some heads), while the very numerous disk flowers have slender yellow corollas that are about 3 to 5 mm. long. The achenes, which are about 1 to 1.5 mm. long, are crested with fine pappus bristles. ❀May-October.

∨***Erigeron petrophilus*** E. Greene var. ***petrophilus***. ROCK DAISY. These distinctive plants are scattered on cliffs and major rock outcrops in the Tassajara region, such as on the massive sandstone boulders along the Church Creek Fault, at The Narrows, around Tassajara Falls, etc. ●R: southern Cascade Ranges and the Coast Ranges, from Josephine and Jackson counties in southwestern Oregon to the Santa Lucia Mountains of northwestern San Luis Obispo County. ●H: small evergreen perennial herbs with generally clustered and decumbent-ascending stems from an exposed woody root crown. The densely foliated stems range from about 1 to 3 dm. (4-12") long. The hirsute-pubescent leaves, which are usually evenly crowded, are linear to narrowly oblanceolate, and up to 4 cm. long. The flower heads are clustered at the end of the stems. The discoid heads, which are about 5 to 15 mm. wide, have involucres that are about 5 to 9 mm. long, and the phyllaries are arranged in three to five series. The corollas yellow or sometimes reddish and about 4.5 to 6.5 mm. long. The achenes, which are about 1 to 2 mm. long, are crested with slender pappus bristles. ❀June-September.

ERIOPHYLLUM. WOOLLY SUNFLOWERS.

The genus *Eriophyllum* consists of 13 species of western North America. All of the species (plus numerous lesser taxa) occur in California, and eight are endemic to the California Floristic Province. The name is derived from the Greek words *erion*, wooly, and *phyllon*, leaf.

Eriophyllum confertiflorum (deCandolle) A. Gray [*Bahia confertiflora* deCandolle; *E. c.* var. *laxiflorum* A. Gray]. GOLDEN YARROW. This showy flowered species is widespread and locally common at all elevations in the Tassajara region, primarily on open and rocky slopes in chaparral. Most of the plants of this region have heads that are nearly sessile and thus tightly compacted, the most typical

growth form of the species. Many plants, however, have heads that are borne in loose clusters on pedicels 1 to 3 cm. long. Such plants correspond to var. *laxiflorum* A. Gray. ●R: Coast Ranges, from Mendocino and Glenn counties southward, and the Sierra Nevada foothills, from Nevada County southward, to the Transverse and Peninsular ranges of southern California and northwestern Baja California. ●H: tufted subshrubs with erect or ascending branches that range from about 2 to 6 dm. (8-24") tall. The gray green leaves, which are about 1 to 5 cm. long, are cuneate to obovate in outline, and are mostly three to five parted or bipinnately parted into narrowly linear segments. The flower heads are produced in convex to flat topped terminal clusters. The radiate heads have bright yellow ray and disk corollas. The involucres are about 3 to 7 mm. long. The four to six ray flowers have roundish to ovate ligules that are about 2 to 5 mm. long, while the 10 to 35 disk flowers have tubular corollas that are about 2 to 3 mm. long. The four angled achenes, which are about 2 to 3 mm. long, are crested with pappus bristles that are about as long as the achenes. ❁May-August.

EURYBIA.

Eurybia consists of 22 species of North America and Eurasia; its members were formerly placed in the genus *Aster*. The name is derived from the Greek words *eurys*, wide, and *baios*, few, probably due to the leaves or ray flowers of *E. macrophylla*.

Eurybia radulina (A. Gray) G. L. Nesom [*Aster radulinus* A. Gray]. BROAD or ROUGH LEAVED ASTER. This species is lightly scattered in woodlands and in *Ceanothus* dominated chaparral along the Church Creek Fault, which the Horse Pasture and Church Creek trails follow, but it is not known to occur elsewhere in the Tassajara region. ●R: Cascade Ranges, Sierra Nevada, and the Coast and western Transverse ranges, from British Columbia to Madera and Santa Barbara counties, with disjunct populations on Santa Cruz Island and in the Santa Ana Mountains of Orange County. ●H: evergreen perennial herbs with flowering stems that range from about 2 to 7 dm. (8-28") tall. The creeping rhizomes typically produce densely leafy mats that can be several feet across. The basal and lower cauline leaves are short petiolate and have broadly oval-obovate to oblong-elliptic blades that are up to 10 cm. long; the upper leaves become increasingly reduced in size, and the upper most are sessile. The margins are sharply serrate. The flower heads are produced in freely branching terminal panicles. The radiate heads have involucres that are about 6 to 9 mm. long, and the phyllaries are arranged in five to seven series. The ray corollas, which are about 8 to 12 mm. long, range from violet to nearly white, while the disk corollas, which are about 7 to 8 mm. long, are yellow or sometimes reddish. The more or less compressed achenes, which are about 3 mm. long, are crested with capillary pappus bristles. ❁June-October.

EUTHAMIA. NARROW LEAFED GOLDENROD.

The genus *Euthamia* included 5 species that are endemic to North America. The name is derived from the Greek words *eu*, good or well, and *thama*, crowded, perhaps alluding to the branching pattern of stems of some of the species.

Euthamia occidentalis Nuttall [*Solidago occidentalis* (Nuttall) Torrey & A. Gray]. WESTERN GOLDENROD. This species is rare in this region, for I have seen it at only one site: a wet ditch along Tassajara Road a short distance north of China Camp. ●R: widely distributed in western North America, from British Columbia to Montana, Nebraska, New Mexico and northern Baja California. ●H: rhizomatic perennial herbs with erect and usually branched stems that range from about 6 to 20 dm. tall. The alternate leaves, which are sessile, are linear to lance linear, and about 4 to 10 cm. long. The inflorescences are panicle like, with the flower heads more or less clustered towards the ends of the terminal and ascending lateral branches. The radiate flower heads have involucres that are about 3 to 5 mm. long. The corollas of both ray flowers and disk flowers are yellow, and the 15 to 25 ray flowers have narrow ligules that are about 1.5 to 2.5 mm. long, while the 6 to 15 disk flowers have narrow corollas that are about 3 to 4 mm. long. The achenes, which are about 1 mm. long, are crested with a ring of fine pappus bristles. ❁July-November.

HAZARDIA.

Hazardia consists of 13 species that are endemic to western North America. The genus is named for Barclay Hazard, a 19th century California botanist.

^***Hazardia squarrosa*** E. Greene [*Haplopappus squarrosus* Hooker & Arnott] var. ***squarrosa***. SAW TOOTHED GOLDEN BUSH. This yellow flowered species is widely scattered and locally common at lower to intermediate elevations in the Tassajara region, and it mostly occurs in openings in chaparral or in transitional areas between chaparral and grasslands. ●R: Coast Ranges and western Transverse Ranges, from the Monterey Peninsula to the Santa Ynez Mountains of Santa Barbara County. This taxon is also reported to occur on Santa Cruz and Santa Catalina islands, and at scattered points along the coast of southern California, as far south as San Diego County. ●H: relatively short evergreen shrubs with generally rounded crowns that range from about 3 to 12 dm. (12-48") tall. The sessile leaves, which often have clasping bases, are oblong to cuneate-obovate with spiny toothed margins, and about 1 to 4 cm. long. The inflorescences are spicate to racemosely paniculate. The discoid flower heads have involucres that are about 11 to 15 mm. long, and the glandular phyllaries are typically recurving. The flowers number from about 18 to 30, and the corollas, which are 9 to 11 mm. long, are yellow. The achenes, which are about 5 to 8 mm. long, are crested with slender pappus bristles that are tawny yellow. ❁August-October.

HELENIUM. SNEEZEWEED, SNAKEWEED.

Helenium consists of about 32 species that are endemic to North and South America. The name is derived from a Greek word for some kind of plant that, according to Linnaeus, was named for Helen of Troy.

Helenium puberulum deCandolle. ROSILLA. This distinctive species is widely scattered in wet habitats in the Tassajara region, but it is not common. In recent years it has become established at the bathtub spring along the Church Creek Trail that is a short distance beyond the trail head on Tassajara Road. ●R: southern Cascade Range foothills, the Sierra Nevada foothills, and the Coast, Transverse and western Peninsular ranges, from Josephine and Klamath counties in southwestern Oregon to northern Baja California. Also on Santa Catalina Island. ●H: annual to short lived perennial herbs with erect and upwardly branched stems that range from about 3 to 15 dm. (1-5') tall. The basal leaves are produced in rosettes, and these, along with the lower cauline leaves, are generally oblanceolate and have winged petioles. The basal leaves are usually shed by the time the plants begin producing flower heads. The alternate cauline leaves, which are sessile and have long decurrent bases, are lance-oblong to linear, and about 3 to 15 cm. long. The flower

heads are solitary and terminal on peduncles that are about 9 to 17 cm. long. The round or roundish flower heads, which are about 1 to 1.5 cm. wide, are densely covered with innumerable small disk flowers that are about 2 to 2.7 mm. long; the budding flowers are usually brownish red or purplish but turn yellow when mature. The involucre and ray flowers (if present) are reflexed downward and are often nearly concealed, the ligules are yellow and about 3 to 8 mm. long. The achenes, which are about 1.2 to 1.9 mm. long, are crested by a ring of short awned pappus scales that are about 4 to 1 mm. long. ❀May-September.

HETEROTHECA. GOLDEN ASTER, TELEGRAPH WEED.

Heterotheca consists of 28 species of western North America. The name is derived from the Greek words *heteros*, different, and *theke*, a case or ovary, on account of dissimilarity of the ray and disk akenes.

Heterotheca sessiliflora (Nuttall) Shinners [*Chrysopsis s*. Nutt.] subsp. ***echioides*** (Bentham) Semple [*Chrysopsis e*. Benth; *Chrysopsis villosa* (Pursh) Nuttall var. *camphorata* (Eastwood) Jepson]. GOLDEN ASTER. This summer flowering species is widespread and locally common in open habitats at all elevations in the Tassajara region. ●R: Coast, Transverse and Peninsular ranges, from Sonoma and Solano Counties to San Diego County. Also in the San Joaquin Valley and the southern Sierra Nevada foothills, from Stanislaus and Madera counties to Kern County. ●H: aromatic perennial herbs, sometimes slightly woody at the base, with erect branches that range from about 3 to 8 dm. (1-3') tall. The alternate leaves are about 1 to 5 cm. long, and the larger lower leaves are generally oblanceolate and taper to the base, while the upper leaves are generally linear-oblong to lanceolate and are more or less sessile. The terminal inflorescences are cymose to paniculate. The radiate heads have involucres that are about 8 to 14 mm. long, and both the ray and disk corollas are yellow. The ray flowers number from about 3 to 30, and have ligules that are about 3 to 10 mm. long. The disk flowers number from about 30 to 50 and have corollas that are about 3 to 10 mm. long. The achenes, which are about 2 to 3 mm. long, are crested with a ring fine pappus bristles that are about 4 to 7 mm. long. ❀July-October.

HIERACIUM. HAWKWEED.

Estimates of the number of species that are included in *Hieracium* vary greatly, from about 250 to over 1,000. This genus is well represented in the Americas, Eurasia and Africa. The name is derived from the Greek word *hierax*, hawk, for it was believed that hawks utilized the sap of members of this genus to sharpen their eyesight.

1a. Ligules (petals) white. Phyllaries glabrous or with a few long hairs. . . . . ***H. albiflorum***.
1b. Ligules yellow. Phyllaries pubescent to hirsute. . . . . ***H. argutum***.

Hieracium albiflorum Hooker. WHITE HAWKWEED. This species lightly scattered to locally common in shady woodlands habitats along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge. Although this species was not seen elsewhere in this region, it probably occurs in suitable habitats in other areas, such as in Miller Canyon, Bear Basin, and the upper regions of Tassajara and Church Creeks. ●R: widely distributed in boreal and temperate western North America, from Alaska to Manitoba, South Dakota, Colorado and northern Baja California. This species is also reported to occur in Quebec and Wisconsin. ●H: perennial herbs with one to several erect and slender stems that range from about 4 to 8 dm. (16-32") tall. The densely hairy primarily leaves, which are basal and about 8 to 15 cm. long, are oblong to oblanceolate with winged petioles and entire or remotely toothed margins. Upper leaves are few, sessile and much reduced in size; they are mostly restricted to the lower half of the stems. The open inflorescences are cymose to paniculate. The ligulate flower heads have involucres that are about 9 or 10 mm. long. The heads contain about 15 to 30 flowers, and the pale white corollas have ligules that are about 3 to 4 mm. long. The reddish brown achenes, which are about 2 to 3 mm. long, are crested with white to tawny pappus bristles. ❀June-August.

!*Hieracium argutum* Nuttall [*H. a*. var. *parishii* (Gray) Jepson]. YELLOW HAWKWEED. This species is widely scattered and locally common in shady or mostly shady habitats at all elevations in the Tassajara region. It abundantly manifested itself during the first spring after the Basin Complex Fire of 2008. ●R: Sierra Nevada foothills, from Butte County to Madera County, and the Coast, Transverse and Peninsular ranges, from San Mateo County to San Diego County. Also on Santa Rosa and Santa Cruz islands. ●H: evergreen perennial herbs which annually produce a singular and erect stem that ranges from about 3 to 10 dm. (12-40") tall. The densely hairy leaves are primarily basal; they are oblong to oblanceolate with remotely toothed margins, and about 8 to 16 cm. long. Upper leaves are few, reduced, and mostly restricted to the lower half of the stem. The flower heads are produced in elongated racemose panicles. The ligulate heads, which contain about 14 to 22 flowers, have involucres that are about 7 to 10 mm. long. The ligules are pale to bright yellow and about 8 mm. long. The dark brown achenes, which are about 2.5 mm. long, are crested with sordid pappus bristles ❀June-October.

HULSEA.

Hulsea consists of seven species of western North America. All of the species occur in California, and three species plus three lesser taxa are endemic to the California Floristic Province. The genus was named for Dr. Gilbert W. Hulse (1807-1883), who collected plant specimens in California in 1851.

!*Hulsea heterochroma* A. Gray. RED EYED HULSEA. This showy flowered species is scattered in openings in chaparral and woodlands on the higher ridges of the Tassajara region, such as along the crest of Black Butte Ridge, on Chew's Ridge and along the Black Cone Trail between Pine Ridge and the Elephant's Back. This species was much more common in this region during the first spring after the Basin Complex Fire of 2008. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Sierra and Santa Clara counties to the mountains of San Diego County, and eastward to southwest Utah and New Mexico. This is a montane species that occurs mostly between 950 to 2,500 m. (3,100 to 8,200 ft). ●H: glandular aromatic perennial or biennial herbs with one to several erect stems that range from about 4 to 12 dm. (16-48") tall. The basal leaves, which are produced in rosettes, are broadly oblong to oblanceolate and about 10 to 20 cm. long. The margins are saliently dentate. The margins of the alternate and sessile cauline leaves, which become reduced in size upward on the stems, are also saliently dentate. The middle leaves are generally oblanceolate to obovate, while the upper are broadly to narrowly elliptic. The terminal inflorescences are cymose to paniculate. The large radiate flower heads have involucres that are about 10 to 20 mm. long and 10 to 15 mm. wide. The ray flowers number about 30 to 60, and the narrow corollas, which are about 6 to 20 mm. long, are red to brownish red or brownish purple. The corollas of the very numer

ous disk flowers are reddish brown while in bud and yellow upon opening, and as the outer flowers open first, flower heads are often seen in which the central area is dark and sunken, and thus eye like. The hairy and cylindrical achenes, which are about 6 to 8 mm. long, are crested with two unequal pairs of pappus scales that are less than 3 mm. long. ֍June-September.

HYPOCHAERIS. CAT'S EARS.

Hypochaeris includes 60 species that are native to Eurasia, North Africa and South America. The name is derived from the Greek words *hypo*, beneath, and *choiras*, pig. According to the Flora of North America, the name alludes to pigs digging for roots, but according to the Jepson eFlora, the meaning of the word is "Less than joyous, from weedy habit."

Hypochaeris glabra Linnaeus. SMOOTH CAT'S EARS. This species is weedy in and near the developed area of Tassajara, and it is most frequent in areas with poor, compacted, or disturbed soils. ●R: a common weed in much of North America; native to Europe. ●H: small annual herbs with erect, leafless, and simple or upwardly branched stems that range from about 1 to 4 dm. (4-16") tall. The leaves are produced in basal rosettes; they are mostly oblong-oblanceolate to oblong-spatulate with entire or irregularly toothed margins, and about 1 to 10 cm. long. The flower heads are terminal and singular. The ligulate heads have involucres that are about 12 to 16 mm. long, and the usually many yellow corollas scarcely exceed the length of the involucres. The achenes, which are up to 4 mm. long, are crested with feather like pappus bristles that are about 9 mm. long. ֍March-June.

LACTUCA. LETTUCE.

The genus *Lactuca* includes about 75 to 100 species that are primarily native to temperate regions of Eurasia. The various forms of the common garden vegetable were derived from *Lactuca sativa*. The name is based on the Latin word *lac*, milk, alluding to the milky sap of most of the species.

!*Lactuca serriola* Linnaeus. PRICKLY LETTUCE. In the first edition of this text I stated that this species was "Lightly scattered around the developed area of the hot springs, along Tassajara Road, in the Horse Pasture, etc." During the first two years after the Basin Complex Fire of 2008, this species was frequently seen in many more areas, including areas of burnt out chaparral. It was particularly common on the floodplains of Tassajara Creek, both upstream and downstream from the hot springs. ●R: a common weed in North America; native to Europe. ●H: coarse annual herbs with erect stems that range from about 6 to 15 dm. (2-5') tall. The alternate leaves, which are up to 16 cm. long, are sessile with clasping bases, and have spiny toothed margins. The middle leaves are typically at right angles to the axis of the stems. The larger lower leaves mostly oblong to oblong-lanceolate or oblanceolate in outline and pinnately few lobed, while the much reduced upper most leaves are unlobed and generally lanceolate. The flower heads are terminal and axillary on the branches of an open panicle. The ligulate flower heads have involucres that are 10 to 12 mm. long. The flowers number from about 14 to 20, and the ligules are pale yellow. The bodies of the generally oblanceolate achenes, which are about 6 to 7 mm. long, are terminating with long and slender beaks that are crested with capillary pappus bristles. ֍May-September.

LAGOPHYLLA. HARE LEAF.

The genus *Lagophylla* consists of four species of western North America. All of the species occur in California, and three are endemic to the California Floristic Province. The name is derived from the Greek words *lagos*, a hare, and *phyllon*, leaf, probably because the leaves somewhat resemble rabbit ears.

Lagophylla ramosissima Nuttall. COMMON HARE LEAF. This inconspicuous species is scattered in open and usually grassy habitats at lower and intermediate elevations in the Tassajara region, but it is easily overlooked. ●R: temperate western North America, from eastern Washington and western Montana to the mountains of San Diego County. ●H: annual herbs with erect and ultimately branching stems that range from about 2 to 10 dm. (8-40") tall. The lower most leaves, which are usually absent by time the plant reaches maturity, are generally linear oblanceolate to linear spatulate, toothed, and up to 12 cm. long. The alternate cauline leaves, which are about 2 to 6 cm. long, are narrowly oblong to oblong-linear or narrowly oblanceolate, and the margins are entire. The leaves are covered with dense coat of silky hairs that are grayish and appressed. The sessile flower heads are clustered or solitary at the summit and along the axis of the branches of an open panicle. The radiate and pale yellow flowered heads have involucres that are about 4.5 to 7.5 mm. long. The five ray flowers have inconspicuous ligules that are 3 to 5.5 mm. long, while the six disk flowers have corollas that are about 3.5 to 4 mm. long. The heads open in the late afternoon and close in the morning. The oblanceolate achenes, which are about 2.5 to 4 mm. long, lack pappus. ֍May-October.

LASTHENIA. GOLDFIELDS.

Lasthenia consists of 18 species, most of which are endemic to western North America, but the genus is also represented in southwestern South America (Chile). Sixteen species occur in California, and 10 are endemic to the California Floristic Province. The genus is named for Lasthenia of Mantinea, a female student of Plato, who attended his lectures while dressed as a man.

Lasthenia californica Lindley [*Baeria chrysostoma* Fischer & Meyer; *B. c.* subsp. *gracilis* (deCandolle) Ferris; *Lasthenia c.* (F. & M.) E. Greene]. COMMON GOLDFIELDS, SUNSHINE. This showy flowered species is scattered in open and generally grassy habitats at lower to intermediate elevations in the Tassajara region, and it is locally common to abundant in some years. This species has the capacity to transform mountain sides into huge patches of yellow that can be seen from many miles away. ●R: southern Cascade foothills, the Sierra Nevada foothills, and the Coast, Transverse and Peninsular ranges, from Douglas County in southwestern Oregon to northwestern Baja California, and eastward across the deserts to Arizona and Sonora Mexico. Also on the islands off the coast of southern California and Baja California. ●H: small annual herbs with simple or freely branched stems that range from about 1 to 3 dm. (4-12") tall. The opposite leaves, which are usually less than 6 cm. long, are sessile, narrowly linear and entire. The showy flower heads are singular and terminal on the stems and branches. The radiate heads have involucres that are about 5 to 10 mm. long, and both the ray and disk corollas are bright yellow. The ray flowers, which have ligules that are about 5 to 10 mm. long, number about 6 to 13. The many disk flowers have five lobed corollas. The achenes, which are about 2 to 3 mm. long, are usually crested with 1 to 7 slender pappus bristles or awned pappus scales, but sometimes they lack pappus. ֍March-May.

LAYIA.

Layia consists of 14 species, all of which occur in California, and 13 are endemic to the California Floristic Province. The genus was named for George T. Lay (1800-1845), one of the naturalists of the exploratory voyage commanded by Frederick W. Beechey, which visited San Francisco and Monterey in 1826 and 1827.

Layia glandulosa (Hooker) Hooker & Arnott [*Blepharipappus g.* Hooker; *L. g.* subsp. *lutea* Keck; *L. g.* var. *lutea* (Keck) Hoover]. YELLOW FLOWERED WHITE LAYIA. This is the correct name for the plants of this region that were tentatively assigned to *L. pentachaeta* in the first edition of this text. As I was uncertain that my specimens actually represented *L. pentachaeta*, I took them to the University of California/Jepson Herbarium in April of 1999 to get a second opinion. Bruce G. Baldwin (the curator of the Jepson Herbarium and the co-editor of *Layia* in both editions of *The Jepson Manual* and in the Flora of North America), assured me that they represented a yellow flowered form of *L. glandulosa*. Such plants, which occur in the mountains of San Benito and Monterey counties, represent what David D. Keck recognized as *L. glandulosa* subsp. *lutea*. I have seen this species at only to sites in the Tassajara region: in grassy areas along the Church Creek Trail between Wildcat Camp and The Mesa, and in an opening in chaparral along Tony's Trail, about two thirds of the way to the summit on the Tassajara side of the ridge. Rimo Bacigalupi collected a specimen of this species along "Tony's Boulevard Grade above Tassajara Hot Springs" in April of 1925 (DS 146157). ●R: this is primarily a species of the desert regions of temperate western North America. Its range extends from eastern Washington and western Idaho northern Baja California and western New Mexico. Its distribution extends to the coast in central and southern California, and in the Coast Ranges it distribution extends as far north as Lake County. ●H: annual herbs with erect or ascending and upwardly branching stems that range from about 1 to 3 dm. (4-12") tall. The basal leaves, which are up to 4 cm. long and produced in rosettes, are narrowly oblong to oblanceolate and pinnately lobed. The smaller upper leaves, which are alternate, are linear to narrowly lanceolate, and entire. The flower heads are singular and terminal on the branches. The radiate heads have involucres that are about 4 to 7 mm. long, and the ray and disk corollas deep yellow. The ray corollas are about 3 to 6 mm. long and have three lobed ligules that are about 2 to 4 mm. long. The disk corollas are about 3 to 5 mm. long. The achenes are about 2.5 to 4 mm. long. The ray achenes, which lack pappus, are compressed front to back and are surrounded by a phyllary, while the disk achenes are narrowly obconic and crested with slender pappus bristles that have an understory of plumose capillary hairs. ❁April-June.

It is quite possible that *Layia hieracioides* occurs somewhere in this region, for specimens of it have been collected on the Hastings Natural History Reservation, in the lower Arroyo Seco Canyon, and in Hanging Valley, which is a few miles south-southeast of the Tassajara Canyon.

LESSINGIA.

Lessingia consists of 12 species of western North America. All of the species occur in California, and 10 (plus 5 lesser taxa) are endemic to the California Floristic Province. The genus was named for the German botanist Christian F. Lessing (1809-1862), the author of *Synopsis generum Compositarum.*

1a. Style-branch appendage lanceolate and 0.3 to 1.3 mm. long; corolla tube not purple-brown banded inside. . . . . ***L. glandulifera***.
1b. Style-branch appendage short-triangular and 0.1 to 0.4 mm. long; corolla tube purple-brown banded inside. . . . . ***L. pectinata***.

Lessingia glandulifera A. Gray [*L. germanorum* Chamisso var. *glandulifera* (A. Gray) J. T. Howell] var. ***glandulifera***. This species is widely scattered on open and usually grassy slopes at all elevations of the Tassajara region, but is generally uncommon. ●R: Central Valley and the Coast, Transverse and Peninsular ranges, from Marin and San Joaquin counties to northern Baja California. Also in the southern Sierra Nevada, the Mojave Desert, western Nevada and northwestern Arizona. ●H: aromatic and usually much branched annual herbs that range from about 1 to 4 dm. (4-16") tall. The basal leaves, which are about 2 to 8 cm. long and often deciduous, are obovate to oblanceolate or oblong in outline and pinnately or bipinnately lobed. The lower cauline leaves are pinnately lobed and about 1 to 3 cm. long, and the uppermost leaves are bract like structures with tack like glands at the apex. The inflorescence is cymose to paniculate with the flower heads produced singularly and terminally on the branches. The discoid heads contain about 12 to 30 flowers. The involucres are about 4 to 7 mm. long, and the phyllaries have prominent tack like glands. The corollas are yellow, and the outer are often enlarged, and thus be mistaken for ligules. The achenes are about 1.5 to 3.5 mm. long and are crested with fine pappus bristles. ❁May-October.

+***Lessingia pectinata*** E. Greene [*L. glandulifera* var. *p.* (Greene) Jepson] var. ***tenuipes*** (J. T. Howell) Markos [*L. germanorum* var. *tenuipes* Howell]. This entry is based on two herbarium specimens. One was collected on "Top of ridge w. of China Camp, Pine Ridge Trail" by Milo S. Baker in August of 1934 (Baker 7853; UC 727407), and the other one was collected "Along Chew's Ridge, Pine Valley Trail" by Barry Tanowitz and Ed Mercurio in October of 1976 (T & M 1547; UCSB 31377), and thus probably in the same vicinity. ●R: Central Valley, Sierra Nevada foothills and the Coast Ranges, from Contra Costa and San Joaquin counties to Santa Barbara and Kern counties (the typical variety occurs in the Coast Ranges, from San Mateo County to Santa Barbara County). ●H: annual herbs with erect stems that are sometimes branched from the base and branched above, that range from about .5 to 7 dm. (2-28") tall. The basal leaves are oblanceolate in outline and pinnately divided into irregularly lobed segments. The lower cauline leaves are pinnately lobed or toothed, and the upper most leaves are bract like. The flower heads are produced singularly at the end of slender branchlets, and the funnelform corollas are yellow with a purple band in the throat. The achenes are about 2 to 3 mm. long, and are crested with pappus bristles that exceed the length of the achenes. ❁May-October.

Lessingia tenuis occurs in Hanging Valley, a few miles southeast of the Tassajara Canyon, and thus may be present somewhere in this region.

LOGFIA. COTTON ROSE.

Logfia consists of 12 species of that occur in temperate regions of the northern hemisphere. The name is an anagram of *Filago*, the genus in which the species were formerly placed.

1a. Leaves subtending flower heads about as long to about 1.5 times as long as the heads, and generally oblong to linear or narrowly lanceolate. Lateral heads or clusters produced in the axils of the leaves. Outer chaff scales evenly curved above achenes, the longest less than 3.3 mm. . . . . ***L. filaginoides***.
1b. Leaves subtending flower heads mostly about 2 twice as long as the heads or longer, and generally narrowly lanceolate with a sharply acute and awl like apex. Lateral heads or clusters mostly restricted to the axils of the branches. Outer chaff scales bent abruptly inward

above achenes, the longest 3.3 mm. or more in length. . . . . ***L. gallica***.

Logfia filaginoides (Hooker & Arnott) Morefield [*Gnaphalium filaginoides* Hooker & Arnott; *Filago californica* Nuttall]. CALIFORNIA COTTON ROSE. These woolly annual herbs are widespread and locally common in open habitats at all elevations in this region, particularly in poor soiled and sparsely vegetated areas. ●R: California Floristic Province, from Humboldt and Shasta counties to northern Baja California, and on San Miguel, Santa Rosa, Santa Cruz and Santa Catalina islands, and eastward and southward to southern Nevada, Arizona, southwestern New Mexico and northern Mexico. ●H: annual herbs with slender erect stems that range from about .5 to 4 dm. (2-16") tall. The leaves are alternate, sessile, linear to narrowly oblanceolate, and less than 2 cm. long. The flower heads are terminal and axillary and mostly clustered. The discoid heads are about 3 to 4.5 mm. long, and the outer most pistillate flowers (and achenes) are enclosed by white woolly chaff scales. The corollas of the four to seven disk flowers are tubular-filiform, generally reddish purple, and about 1.9 to 2.8 mm. long. The achenes of the outer flowers are about 1 mm. long and without pappus, while those of the inner perfect flowers are smaller and are crested with capillary pappus bristles. ❀March-June.

Logfia gallica (Linnaeus) Cossen & Germain [*Filago gallica* Linnaeus]. FRENCH or DAGGER LEAF COTTON ROSE. This species is widely scattered in open habitats at all elevations in this region, and it is locally common in barren or sparsely grassy areas. ●R: a common weed in California; native to Europe. ●H: woolly annual herbs with slender and erect stems that range from about 2 to 3 dm. (8-12") tall. The alternate leaves are narrowly linear and sharply acute, and less than 3 cm. long. The inflorescence is generally dichotomous with the flower heads produced in small clusters which are terminal and in the axils of the branches. The discoid heads are about 3.5 to 4.5 mm. long, and the outermost flowers (and achenes) are surrounded by woolly chaff scales. The corollas of the three to five disk flowers are brownish to yellowish and about 2 to 3 mm. long. The outer achenes are about 1 mm. long and without pappus, the inner achenes are smaller and are crested with fine pappus bristles. ❀April-June.

MADIA. TARWEED, GUMWEED.

The genus *Madia* consists of 10 species of temperate North America, and two species, *M. sativa* and *M. gracilis*, also naturally occur in temperate South America. All of the species occur in California, but only three are endemic to the California Floristic Province. The name is derived from *Madi*, a native Chilean word for the type species, *Madia sativa*.

1a. Plants small and very inconspicuous. Disk flowers 1 or 2 per head, ray flowers 5 to 8, the ligules not exceeding 1 mm. in length. . . . ***M. exigua***.

1b. Plants larger and more conspicuous. Disk flowers more than 15 per head, ray flowers 5 to 20, the ligules 2 to 20 mm. long:

2a. Lateral flower heads mostly subsessile or on peduncles shorter than the head. Disk flowers fertile (perfect). Ray flowers 8 to 12, the ligules 2 to 8 mm. long. . . . . ***M. gracilis***.

2b. Lateral flower heads mostly produced on peduncles longer to much longer than the head. Disk flowers sterile (staminate). Ray flowers mostly 8 to 20, the ligules 6 to 20 mm. long. . . . . ***M. elegans***.

Madia elegans D. Don ex Lindley [*M. e.* subsp. *densifolia* (E. Greene) D. D. Keck; *M. e.* subsp. *vernalis* Keck; *M. e.* subsp. *wheeleri* (A. Gray) Keck]. ELEGANT MADIA, COMMON MADIA. This showy flowered species is widely scattered and locally common at all elevations in the Tassajara region, and it mostly occurs in grassy openings in woodlands and chaparral. The treatment of this species in the first edition of this text followed that of David D. Keck in Philip Munz's *A California Flora* (1959). Keck's infraspecific taxonomy was also accepted in the first edition of *The Jepson Manual* (1993), but more recent molecular data has indicated the need for revision, and thus the lesser taxa are not recognized in the second edition of *The Jepson Manual* (2012). To a large extent Keck's lesser taxa were based on the size and flowering period of the flower heads, but it is common for plants with long flowering periods to at first have large flowers in the spring, which diminish in size onward during the dry season, and by autumn the flowers are quite small. A perfect example is the yearly flowering cycle of *Eschscholzia californica* (California Poppy). Individual plants produce large flowers in the spring, but they continually diminish in size onward through the dry season. ●R: from Yamhill County in northwestern Oregon, and Klickitat County in south central Washington, to northern Baja California. ●H: erect annual herbs with usually corymbosely branched stems that range from about 8 to 100+ cm. (3-40+") tall. The leaves, which range from about 3 to 20 cm. long, are lanceolate to linear; the larger basal leaves are commonly produced in rosettes. The cauline leaves become reduced in size upward on the stems. The radiate flower heads are produced in open and generally flat topped terminal clusters, and the involucres are about 4.5 to 12 mm. long. The ray flowers have bright yellow corollas; the rays range from about 4 to 22 mm. long, and they often a red or maroon spot at the base. The disk flowers have corollas that are about 2.5 to 5 mm. long, and they vary in color from yellow to orange or maroon. The ray akenes, which are nearly enclosed by the phyllaries, are laterally flattened and about 2.5 to 5 mm. long. The disk achenes do not develop. ❀March-November.

Madia exigua (J. E. Smith) A. Gray [*Sclerocarpus exiguus* Smith]. THREAD STEM MADIA, LITTLE TARWEED. This very inconspicuous species widely but lightly scattered in open grasslands and grassy openings in chaparral in the Tassajara region. I have seen this species only in grasslands along the Horse Pasture trail (in the Horse Pasture proper and in the section of the trail above Tassajara Road), in grassy openings in chaparral along Tony's Trail, and in Pine and Strawberry Valleys. ●R: western North America, from British Columbia and western Montana to northern Baja California. Also on Santa Cruz and Santa Catalina islands. ●H: small annual herbs with erect and very slender stems that range from about .5 to 3 dm. (2-12") tall. The alternate leaves are narrowly linear and about 1 to 4 cm. long. The small flower heads are produced in corymbose panicles; the peduncles are filiform and about 1 to 4 cm. long. The radiate heads usually have five to eight ray flowers that have ligules that are about 1.3 to 2 mm. long (inclusive of the tube). The one or rarely two disk flowers have corollas that are about 1.3 to 1.8 mm. long. The corollas of both the ray and disk flowers are pale yellow. The achenes are about 1.5 to 2.9 mm. long and lack pappus. The disk achenes are obovoid, and the ray achenes are laterally flattened, swollen to one side, and nearly enclosed within the glandular phyllaries. ❀May-July.

Madia gracilis (J. E. Smith) Keck [*Sclerocarpus g.* Smith; *M. dissitiflora* (Nuttall) Torrey & A. Gray]. SLENDER TARWEED, GUMWEED. This species is widespread and locally common at all elevations in the Tassajara region, and it is particularly common in grassy openings in woodland areas. ●R: western North America, from British Columbia and western Montana to Utah and northern Baja California. Also on Santa Cruz and Santa Catalina islands. This species is also native to Chile and Argentina. ●H: glandular aromatic annual herbs with leafy stems that range from about 1 to 10 dm. (4-40") tall. The lower leaves are mostly opposite and the upper leaves are alternate, and the blades are linear or oblong-linear or sometimes slightly oblanceolate. The lower and middle leaves are up to 10 cm. long, while the upper leaves are reduced in size. The flower heads are produced

in racemose to paniculate inflorescences; the terminal flower heads are often clustered, while the lateral heads are sessile to short pedunculate. The radiate heads have yellow ray and disk corollas. The three to nine ray flowers have ligules that are about 1.5 to 8 mm. long, while the two to twelve disk flowers have corollas that are about 3 to 5 mm. long. The achenes are generally alike, but the ray achenes are nearly enclosed within bract like phyllaries. The achenes, which are about 2.8 to 5 mm. long, are black, laterally flattened, slightly bowed, and without pappus. ❀April-October.

MALACOTHRIX.

Malacothrix consists of 20 species of perennial and annual herbs of western North America and southern South America. Fourteen species occur in California, and eight are endemic to the California Floristic Province. The genus name is derived from the Greek words *malakos*, soft, and *thrix*, hair, on account of the woolly hairs on the leaves of the type species, *M. californica*.

1a. Plants acaulescent, and thus the flower heads are produced singularly on scapes. The leaves are strictly basal and are divided into linear segments. . . . . ***M. californica***.

1b. Plants caulescent, and thus the flower heads are produced in branching inflorescens. The leaves are not strictly basal, but become much reduced in size and complexity upwards, and are variously lobed or toothed, but not into linear segments:

2a. Flowers bright yellow, the outer ligules generally exserted beyond the involucre less than 5 mm. . . . . ***M. clevelandii***.

2b. Flowers white (or sometimes yellowish or pinkish), the outer ligules exserted beyond involucre more than 5 mm. . . . ***M. floccifera***.

+*Malacothrix californica* deCandolle. CALIFORNIA DANDELION. Diane Renshaw identified this species from specimens she collected along the Horse Pasture Trail and on the Hog Back in April of 2009, and thus during the first spring after the Basin Complex Fire. ●R: Coast, Transverse and Peninsular ranges, from Colusa County to northwestern Baja California, and the Sierra Nevada foothills, from El Dorado County to Kern County. Also in the San Jacquin Valley and in the high Mojave Desert. ●H: acaulescent annual herbs with pinnatifid basal leaves about 6 to 14 cm long, which are divided into linear segments; the leaves are conspicuously woolly tomentose when young. The flower heads are produced singularly at the top of scapes about 10 to 40 cm. tall, and the ligulate flowers are yellow, or the outer becoming somewhat whitish with age. The light brown achenes are about 2.5 to 3.5 mm. long and crested with irregular pappus and two bristles ❀March-May.

!***Malacothrix clevelandii*** A. Gray. As mentioned in the first edition of this text, this species is often noted for being a pyrophyte (burn species). Prior to the Basin Complex Fire of 2008, this species was known to occur at only a few sites in this region. I first encountered this taxon at the summit of Tony's Trail on April 29th of 1988 (when I collected a specimen of it), and this was certainly the same site at which A. D. E. Elmer collected his "Tassajara Hot Springs" specimen of June 1901 (Elmer #3172 DS), for according to the note enclosed in an envelope pasted the sheet, it was collected at the "Divide between Springs & Willow Cr." (it is known that Elmer utilized Tony's Trail during his botanical exploration of this region). In May of 1980 Vern Yadon found a single plant on Black Butte, and in July of 1980 he found this species at "A few places" along the Black Cone Trail between Pine Ridge and the Elephant Back (White Cone), and at one of these sites he collected a specimen (Yadon field notes, 5/4 & 7/4 1980; PGM #2095). In contrast, in the spring of 2009 this species was common along the entire Tassajara (north) slope of Tony's Trail, and also in the outer flats and on the Hogs Back. This species was probably much more common in other areas that spring. ●R: Cascade foothills, Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Siskiyou and Humboldt counties to northwestern Baja California, and eastward to the mountains of Arizona. It also occurs on Santa Rosa Island. ●H: annual herbs usually with several slender stems from the base that range from about 1 to 4 dm. (4-16") tall. The leaves, which are primarily basal, are oblong to broadly linear in outline with pinnately lobed margins, and about 1 to 10 cm. long. Upper leaves are few and greatly reduced in size. The inflorescence is paniculately branched, with the flower heads produced singularly on slender peduncles. The ligulate corollas are bright to pale yellow and about 4.5 to 7.5 mm long. The achenes are linear oblong, about 1.2 to 1.8 mm. long, light brown, and crested with capillary pappus bristles, all except for one or two readily falling away. ❀April-June.

Malacothrix floccifera (deCandolle) Blake [*Senecio flocciferus* deCandolle; *M. obtusa* Bentham]. WOOLLY MALACOTHRIX. The first and only time I have seen this species was on May 24th of 2009 (in the first spring after the Basin Complex Fire), when I found a small group of plants along the Pine Ridge Trail about a quarter of a mile east of the Church Creek Divide. On July 4th of 1980 (and thus three years after the Marble Cone Fire of 1977) Vern Yadon found this species at one spot along the Black Cone Trail between Pine Ridge and the Elephant's Back, and James Griffin (1975) noted this species as being uncommon between 600 and 1,200 meters (1,968 to 3,937 ft.) on Chew's Ridge. A. D. E. Elmer's "Tassajara Hot Springs" specimen of June 1901 (Elmer #3155 DS) was collected, according to the note enclosed in an envelope pasted to the specimen sheet, in Lost Valley. This was three years after a major fire occurred in that region. ●R: Coast and western Transverse ranges, from Siskiyou County to Ventura County, and the Sierra Nevada, from Shasta County to Mariposa County. ●H: annual herbs with one to several erect or ascending stems that range from about 1 to 4 dm. (4-16") tall. The leaves, which are primarily basal and about 2 to 8 cm. long, are oblong to oblanceolate in outline and pinnately lobed, and often have tufts of woolly hair at the bases and between the lobes. Upper leaves are few and much reduced in size. The inflorescence is irregularly paniculate, and the ligulate corollas are white (or sometimes yellowish or pinkish tinged) and about 7 to 15 mm. long. The achenes are about 1.2 to 2 mm. long and crested by a ring of fine and readily deciduous pappus bristles. ❀April-July.

MICROPUS.

Micropus consists of five species of annual herbs, three of which are endemic to the Mediterranean Sea region, and two are endemic to western North America. The name is derived from the Greek words *micros*, small, and *pous*, foot.

Micropus californicus Fischer & C. Meyer. CALIFORNIA COTTONWEED, MOUSE TAIL. This species is widespread in the Tassajara region, and locally common to abundant in open areas at lower to intermediate elevations, especially in places where the soil is poor, disturbed, or compacted. ●R: from Yamhill County in northwestern Oregon to northern Baja California, mostly below about 1700 m. (5575'). ●H: woolly annual herbs with slender and erect stems that range from about .5 to 3.5 dm. (2-14") tall. The alternate leaves are linear-oblong with entire margins, and about .5 to 1.5 cm. long. The discoid flower heads are produced singularly or in small clusters at or near the summit of the stems; the 4 to 6 outer flowers are pistillate and enclosed in a gibbous and densely white woolly bract (from which the minute corollas and pistils are exserted through a tiny lateral slit), while the 2 to 5 disk flowers are staminate and with corollas about 1 to 2 mm. long. The pistillate (fertile) achenes are about 1.4 to 2.6 mm. long, laterally compressed and swollen on the

back side, and without pappus, while the vestigial sterile achenes of the disk flowers often have one deciduous pappus bristle. ❀April-June.

PETASITES. COLT'S FOOT, BUTTERBUR.

The genus *Petasites* includes 17 species that are endemic to the northern hemisphere. The name is derived from the Greek word *petasos*, a broad brimmed hat, on account of the large leaves of some of the species, such as those of the following species.

∨***Petasites frigidus*** Linnaeus var. ***palmatus*** (Aiton) Cronquist [*Tussilago palmata* Aiton; *P. palmatus* (Aiton) A. Gray]. WESTERN COLT'S FOOT. Colonies of this distinctive taxon occur at a number of sites along Tassajara Creek upstream from the hot springs, but I have not seen it elsewhere in this region. The most southern documented location for this species in California is along the Nacimiento River in the vicinity of Nacimiento and Ponderosa camps. ●R: boreal and temperate North America, from Alaska to Newfoundland and New England, and southward along the Pacific coast to the Santa Lucia Mountains of Monterey County. ●H: rhizomatic perennial herbs of wet stream bed habitats that send up flowering stems and leaves separately from the ground. The flowering stems, which are about 2 to 6 dm. (8-24") tall, are of relatively short duration, for they manifest themselves from early winter to early spring, while the leaves develop between mid winter to mid spring, and they persist until the first frosts of the following autumn or winter (if it does not get too cold, the leaves can persist throughout the rainy season). The leaves have petioles that are about 1 to 4 dm. long, and the blades are generally roundish to reniform in outline, about 1 to 4 dm. wide, and palmately cleft into 7 to 10 deep lobes. The leaves are dark green on the upper surface, and grayish green on lower surface. The bract like leaves of the flowering stems are generally lanceolate and upwardly appressed or ascending. The flower heads are produced in racemose to corymbose and typically convex terminal clusters. The radiate heads have involucres that are about 5 to 9 mm. wide, and the ray and disk corollas are white (they are sometimes pinkish tinged). The pistillate ray flowers have inconspicuous ligules that are about 2 to 7 mm. long, and the staminate disk flowers have corollas that are about 3.5 to 5 mm. long. Some heads have mostly pistillate flowers while others have mostly staminate flowers. The 5 to 10 ribbed achenes, which are about 3 to 4.5 mm. long, are crested with soft white pappus bristles that are about 6 to 13 mm. long. ❀January-April.

PSEUDOGNAPHALIUM. EVERLASTING, CUDWEED.

This is a widely distributed genus that includes about 84 species of annual and perennial herbs. The name means similar to *Gnaphalium*, the genus in which the following species were formerly placed. *Gnaphalium* is derived from the Greek word *gnaphalon*, a lock of wool, on account of the woolly pubescence of many of the species.

1a. Upper surface of leaves sparsely pubescent to subglabrous, and thus light to deep green:
- **2a**. Leaves green on both surfaces. . . . . ***P. californicum***.
- **2a**. Leaves deep green above and densely white woolly below. . . . . ***P. biolettii***.

1b. Leaves densely to loosely whitish to grayish woolly on both surfaces:
- **3a**. Plants densely white woolly and more or less aromatic. Basal leaves more or less strongly tufted. Perennial or sometimes biennial herbs:
  - **4a**. Lower leaves spatulate to oblanceolate and not strongly decurrent at the base. . . . . ***P. microcephalum***.
  - **4b**. Lower leaves narrowly oblong-oblanceolate and very strongly decurrent at the base. . . . . ***P. beneolens***.
- **3b**. Plants densely to loosely gray or whitish woolly and not or only slightly aromatic. Basal leaves often crowded but not strongly tufted. Annual or sometimes biennial herbs:
  - **5a**. Leaves strongly decurrent. Pappus bristles falling singularly. Flower heads 3.8 to 5.2 mm. long. . . . . ***P. stramineum***.
  - **5b**. Leaves not or only slightly decurrent. Pappus bristles falling in clusters. Flower heads 3 to 4.2 mm. long. . . . . ***P. luteoalbum***.

Pseudognaphalium beneolens (Davidson) Anderberg [*Gnaphalium b.* Davidson; *G. canescens* deCandolle subsp. *beneolens* (Davidson) Stebbins & Keil]. FRAGRANT EVERLASTING. This species is widely scattered and moderately common in open and usually grassy areas at all elevations in the Tassajara region, and it appears to be the only *Pseudognaphalium* species that occurs on the higher ridges. ●R: southern Cascade Ranges, Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Josephine County in southwestern Oregon to the mountains of northern Baja California. Also on Santa Rosa, Santa Cruz and Santa Catalina islands, and on the Sutter Buttes. ●H: white woolly and aromatic perennial or biennial herbs that range from about 5 to 11 dm. (20-44") tall. The leaves are alternate, sessile and strongly decurrent. The blades are mostly oblong-linear to narrowly oblanceolate or lanceolate, and the lower leaves are as much as 8 cm. long while the upper most are as little as 1 cm. long. The flower heads, which are ovoid to campanulate and about 5 to 6 mm. long, are clustered at the ends of the branches of open panicles. The dry and semi glossy phyllaries are off white and imbricated; the flowers number from about 30 to 45, and the corollas are about 2.5 to 4 mm. long. The achenes are less than 1 mm. long and are crested with a ring of fine pappus bristles. ❀July-November.

Pseudognaphalium biolettii Anderberg [*Gnaphalium bicolor* Bioletti illegitimate]. GREEN AND WHITE EVERLASTING. This easy to indentify species is locally common in open and often rocky habitats at lower to intermediate elevations in the Tassajara region. ●R: Coast, Transverse and Peninsular ranges, from Napa and Marin counties to northern Baja California, and the Sierra Nevada foothills, from Madera County to Kern County. Also on the islands off the coast of southern California. ●H: aromatic perennial herbs with erect and densely white woolly stems that range from about 4 to 9 dm. (16-36") tall. The alternate leaves are sessile and clasp the stem at the base; the blades are oblanceolate to lance-oblong and about 2 to 7 cm. long. The upper surfaces are dark green, while the lower surfaces are covered with a dense felt like coat of white woolly hair. The flower heads are produced in generally dense clusters that are mostly corymbosely arranged at or towards the summit of the stems. The ovoid to campanulate discoid heads are about 5 to 6 mm. long; the dry and off white phyllaries are well imbricated and have semi glossy sheen. The flowers number about 25 to 50 per head, and the corollas of the pistillate flowers are about 3 to 3.5 mm. long. The achenes are less than 1 mm. long and are crested with a ring of capillary pappus bristles. ❀April-June.

Pseudognaphalium californicum (deCandolle) Anderberg [*Gnaphalium c.* deCandolle; *G. decurrens* Ives var. *c.* A. Gray]. CALIFORNIA EVERLASTING. This species is widespread and locally common in open and often rocky habitats at lower and intermediate elevations in the Tassajara region. ●R: Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Clatsop County in northwestern Oregon to northern Baja California, and on the islands off the coast of southern California. ●H: erect aromatic biennial herbs that range from about 4 to 8 dm. (16-32") tall. The

alternate leaves have sessile and decurrent bases, and the oblong-oblanceolate to oblong lanceolate or linear blades are mostly about 2 to 10 (-15) cm. long; the larger lower leaves are often densely crowded. The showy flower heads are clustered at the summit of the main stem and often on lateral branchlets. The flower heads are roundish and about 5 to 6 mm. long, and the dry phyllaries are white, semi glossy and well imbricated. The flowers number from about 50 to 75 per head, and the corollas of the pistillate flowers are about 3 to 4 mm. long. The achenes are less than 1 mm. long and are crested with a ring of fine pappus bristles. ❀(January) April-July.

Pseudognaphalium luteoalbum (Linnaeus) Hilliard & B. L. Burtt [*Gnaphalium luteoalbum* L.]. WEEDY CUDWEED. This species is scattered in open habitats in the Tassajara region, but mostly in areas that have had more exposure to human activities. ●R: a common weed in temperate western North America; native to Eurasia. ●H: woolly annual herbs with erect or decumbent stems that range from about 2 to 6 dm. (8-24") tall. The alternate leaves are linear-oblanceolate to linear-lanceolate, and about 1 to 6 cm. long. The flower heads are produced in dense terminal clusters. The heads are about 3 to 4.5 mm. long, and the phyllaries are upwardly yellowish to whitish or brownish. The flowers number about 40 to 100 per head, and the corollas of the pistillate flowers are about 1.5 to 2 mm. long. The achenes are less than 1 mm. long and are crested with a ring of fine pappus bristles. ❀April-October.

Pseudognaphalium microcephalum (Nuttall) Anderberg [*Gnaphalium m.* Nuttall; *G. canescens* subsp. *m.* (Nuttall) Stebbins & Keil]. WHITE EVERLASTING. This species is widespread and locally common in open or mostly open habitats at lower and intermediate elevations in the Tassajara region. ●R: southern Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Humboldt and Siskiyou counties to northern Baja California, and on the islands off the coast of southern California. ●H: densely white woolly biennial herbs that range from about 5 to 10 dm. (20-40") tall. The alternate leaves are sessile and about 1 to 8 cm. long; the larger lower leaves are spatulate to oblanceolate with decurrent bases, while the upper leaves are generally oblong-linear to narrowly oblanceolate. The flower heads are produced in relatively small clusters that are corymbosely arranged at the ends of the stems and short lateral branchlets. The heads are about 5 to 6 mm. long, and the dry phyllaries are white and semi glossy. The flowers number from about 35 to 50 per head, and the corollas of the pistillate flowers are about 3 to 3.5 mm. long. The achenes are less than 1 mm. long and are crested with a ring of fine pappus bristles. ❀June-October.

Pseudognaphalium stramineum (Kunth) Anderberg [*Gnaphalium s.* Kunth; *G. chilense* Sprengel]. COTTON BATTING PLANT. This species is widely scattered at lower to intermediate elevations in the Tassajara region, and it occurs in open areas and sometimes in moist or seasonally moist habitats. ●R: western North America, from British Columbia and Montana to Mexico. This species is also native to temperate South America. ●H: woolly annual or biennial herbs with erect or ascending stems that range from about 1 to 7 dm. (4-28") tall. The alternate leaves are narrowly lanceolate to oblanceolate, decurrent at the base, and about 1 to 7 cm. long. The flower heads are produced in dense terminal clusters. The discoid heads have ovoid involucres that are about 4 to 5.5 mm. long, and the phyllaries are transparent to opaque and upwardly white to straw colored. The flowers number from about 65 to 110 per head, and the corollas of the pistillate flowers are about 1.8 to 2.5 mm. long. The achenes, which are less than 1 mm. long, are crested by a ring of fine pappus bristles. ❀March-October.

PSILOCARPHUS. WOOLLY ROUND HEADS, WOOLLY MARBLES.

Psilocarphus include five species of western temperate North America and western temperate South America (central Chile). The name is derived from the Greek words *psilos*, bare, and *karphos*, chaff, alluding to the papery paleae of the flower heads.

Psilocarphus tenellus Nuttall. The only area in the Tassajara region where this species in known to occur is in the Horse Pasture, where it mostly occurs in flat or relatively flat places with compacted clay loamed soils (it sometime manifests itself in trail beds). ●R: western North America, from British Columbia and Idaho to northern Baja California. Also on Santa Rosa, Santa Cruz, Santa Catalina and San Clemente islands. ●H: small and woolly annual herbs with several semi prostrate stems that range from about 2 to 10 cm. (1-4") long; the plants usually form small tufts. The leaves are opposite, spatulate to oblong, and about 4 to 15 mm. long. The flower heads are terminal and axillary, and are produced singularly or in small clusters. The heads are discoid, and the outer pistillate flowers, which are surrounded by woolly bracts, number up to 45 per head, while the naked inner staminate flowers number from about 2 to 10 per head. The fertile achenes of the pistillate flowers are about .6 to 1.2 mm. long, while the sterile achenes of the staminate flowers are vestigial; the achenes lack pappus. ❀April-June.

RAFINESQUIA.

This genus consists of two species of the southwestern United States and adjacent Mexico. The genus was named for the early North American naturalist Constantine S. Rafinesque (1783-1840).

!***Rafinesquia californica*** Nuttall. CALIFORNIA CHICORY. In the first edition of this text I stated that this species is Widely scattered in open or mostly open habitats at lower to intermediate elevations in the Tassajara region, but it is generally uncommon. I also mentioned that This species is noted for its preference for disturbed habitats, and is especially common after fires. It was very common this region during the first year after the Basin Complex Fire of 2008, and it was particularly abundant along the borders of Tassajara Road. ●R: southern Cascade Ranges, the Sierra Nevada foothills, and the Coast, Transverse and Peninsular ranges, from Klamath County in southwestern Oregon to northern Baja California, and eastward to mountains of southwestern Utah and central Arizona. Also on most of the islands off the coast of southern California, and on the Sutter Buttes. ●H: annual herbs with erect and upwardly branching stems that range from about 2 to 15 dm. (8-60") tall. The alternate leaves, which range from about 2 to 20 (30) cm. long, become reduced in size and complexity upward on the stems. The lower and middle leaves are generally oblong to elliptical in outline and regularly or irregularly pinnately lobed; the lower are on winged petioles and the middle are sessile and clasping bases. The uppermost leaves are greatly reduced, oblong to lanceolate, and the margins are toothed. The flower heads are terminal on the branches or branchlets of an open panicle. The ligulate heads have involucres that are about 14 to 20 mm. wide, and they contain about 15 to 30 flowers. The white ligules are about 5 to 8 mm. long, and slightly exceed the phyllaries in length. The achenes are about 4 or 5 mm. long, and have slender beaks that are 5 to 7 mm. long; the beaks are crested with numerous capillary pappus bristles. ❀April-July (September).

RIGIOPAPPUS. RIGID PAPPUS SLENDER STEM.

Rigiopappus is comprised of one unique species of western North America. The genus name is derived from the Greek words *rigios*, rigid or stiffened, and *pappos*, pappus, and the specific name means slender stem.

Rigiopappus leptocladus A. Gray. This species is widely scattered in grassy habitats at all elevations in the Tassajara region, but it is very inconspicuous thus easily overlooked. ●R: western North America, from north central Washington, southwestern Idaho and Utah to southern California. In California this species occurs in the Cascade Ranges, the Sierra Nevada and the Coast and western Transverse ranges, as far south as the mountains of Los Angeles County. ●H: small annual herbs with erect and very slender stems that range from about 1 to 3 dm. (4-12") tall. The leaves are alternate, narrowly linear, and about 1 to 3 cm. long. The flower heads are singular and terminal on the primary stem, and also on the lateral branches, which usually over top the primary stem. The radiate heads have pale yellow ray and disk corollas. The involucres are about 5 to 8 mm. long, and the ray flowers number about 5 to 15 and have corollas that are about 3 to 5 mm. long; the ligules are inconspicuous and less than half as long as the tube. The disk flowers number from about 5 to 35, and have narrowly tubular corollas that are about 2 to 3 mm. long. The linear achenes, which are about 3 to 5 mm. long, are crested with 3 to 5 narrow and rather rigid pappus scales. ❁April-June.

SENECIO. GROUNDSEL, BUTTERWEED, RAGWORT.

The genus *Senecio* includes about 1,000 species that, as a whole, are widely distributed. Most of the species occur in warmer temperate, subtropical and in higher elevations of tropical regions. The name is derived from the Latin word *senex*, old man, supposedly for the white pappus.

1a. Subshrubs up to 15+ dm (60+") tall. Leaves narrowly linear and entire or divided into narrowly linear lobes. . . . . ***S. flaccidus***.
1b. Annual herbs less than 6 dm. (2') tall. Leaves oblong in outline and regularly or irregularly pinnately short lobed. . . . . ***S. vulgaris***.

+***Senecio flaccidus*** Lessing var. ***douglasii*** (deCandolle) B. Turner & T. Barkley [*S. d.* deCandolle]. THREAD LEAF RAGWORT. Although I have not seen this species in this region, I have decided to include it just in case it was overlooked. The listing of Tassajara Springs as a location for this taxon in Beatrice Howitt & John Thomas Howell's "The Vascular Plants of Monterey County" (1964) was based on one of Junea Kelly's "Tassajara Springs" specimens of July 1916 (CAS 365003). There is also a specimen that was collected "On road to Tassajara Hot Springs" by B. C. Templeton in September of 1956 (RSA 472956 & SFV 5192). A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901 (Elmer 2978; DS 1693) is peculiar in that its number places it 136 specimens prior to the rest of Elmer's known Tassajara Hot Springs collections (3114 to 3415), and its date is later than the rest of the series: July 1901 (the rest are dated June 1901). The note enclosed in the envelope that is pasted to the sheet appears to read as follows: "Near Carmel, below S. H. & near brush place." This taxon is known to occur in the lower regions of the Arroyo Seco Canyon, as far west as the vicinity of Santa Lucia Creek (which flows into the Arroyo Seco between the Arroyo Seco Campgrounds and the confluence of Tassajara Creek). ●R:Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Tehama and Placer counties to northern Baja California. Also on Santa Cruz Island and in the Panamint Mountains of Inyo County. ●H: subshrubs with one many erect of arching branches that range from about 3 to 15 dm (12-60") long. The alternate leaves are sessile to short petioled, and the blades are narrowly linear to thread like, or divided into linear thread like lobes. The leaves range from about 3 to 10 cm. long. The radiate flower heads are produced in more or less flat topped compound clusters. The ray flowers number 8, 13 or 21, and the rays range from about 10 to 15 mm. long. The achenes, which are about 4.5 to 5.5 mm. long, are crested with minutely barbed pappus bristles. ❁June-October.

Senecio vulgaris Linnaeus. COMMON GROUNDSEL, OLD MAN IN THE SPRING, COMMON BUTTERWEED. In this region this alien species is weedy in and about developed areas, at a number of locations along Tassajara Road, and along some of the trails. ●R: a common weed in North America, native to Eurasia. ●H: annual herbs with simple to diffusely branched stems that range from about 1 to 5 dm. (4-20") tall. The alternate leaves are about 1 to 10 cm. long, the larger lower leaves are petiolate and generally pinnately lobed, while the middle to upper leaves are sessile and with clasping bases, and the margins are pinnately or irregularly jagged. The flower heads are produced in loose cymose panicles. The discoid heads have involucres that are about 5 to 8 mm. long, and the yellow disk corollas yellow are not much longer than the phyllaries. The achenes, which are about 1.5 to 2.5 mm. long, are crested with fine pappus bristles. ❁April-November.

SOLIDAGO. GOLDEN ROD.

The genus *Solidago* consists of approximately 150 species, most of which are endemic to North America, but the genus is also represented in South America and Eurasia. The name is derived from the Latin word *solidus*, whole, and the suffix *ago*, on account of the reputed medicinal value of some of the species.

Solidago velutina DeCandolle subsp. ***californica*** (Nuttall) Semple [*Solidago californica* Nuttall]. CALIFORNIA GOLDEN ROD, OROJO DE LIEBRE. This conspicuous species is widespread at all elevations in the Tassajara region, and it is locally common to abundant in woodlands, grasslands and in openings in chaparral. ●R: Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Douglas and Klamath counties in southwestern Oregon to northern Baja California. Also on Santa Rosa, Santa Cruz and Santa Catalina islands, on the Sutter Buttes, and in the White and Inyo mountains of Inyo County. They typical species is native to Mexico. ●H: rhizomatic (and thus spreading) perennial herbs with erect or ascending stems that range from about 2 to 12 dm. (8-48") tall. The leaves are alternate, and the larger lower ones, which are about 5 to 12 cm. long, are spatulate to oblong-obovate; the bases are attenuate and the margins are usually serrate. The leaves become reduced in size upwards on the stems, and the upper most are generally elliptic, sessile, and have entire margins. The small flower heads are produced in abundance in elongated spike like and commonly one sided panicles, or sometimes in short and generally pyramidal shaped panicles. The radiate heads have involucres that are about 3 to 5 mm. long, and the ray and disk corollas are yellow. The ray flowers, which number from about 6 to 12, have inconspicuous ligules that are about 3 to 5 mm. long, while the disk flowers, which number from about 5 to 17, have corollas that are about as long as the ligules. The achenes, which are about .7 to 1.5 mm. long, are crested with a ring of fine pappus bristles. ❁May-November.

SONCHUS. SOW THISTLE.

Sonchus consists of about 55 species that are native to Eurasia and northern Africa. The name is derived from a Greek word for some kind of thistle like plant.

Sonchus oleraceus Linnaeus. This alien species is scattered in areas of the Tassajara region that have had more contact with human activities, such in and around developed areas, in the Horse Pasture, along Tassajara Road, along some of the trails, at campsites, etc. ●R: a common weed in temperate North America; native to Europe, northern Africa and western Asia. ●H: coarse annual herbs that range from about 5 to 1.2 dm. (20-48") tall. The leaves are alternate and highly variable in shape, but all have sharply toothed margins. The larger lower ones, which are up to 35 cm. long, are regularly or irregularly pinnately lobed, sometimes runcinately so, and the larger terminal segment is generally triangular to deltate. The lower leaves also have winged petioles that clasp the stem. The middle leaves are similar to the lower leaves except that they are sessile and very strongly clasp the stem at the base. The smaller upper leaves, which are not lobed, also strongly clasp the stem. The flower heads are produced in irregular corymbs or cymes. The ligulate heads have involucres that are about 10 to 13 mm. long, and the yellow ligules are about as long as the tube. The achenes, which are about 2 to 3 mm. long, are crested with capillary pappus bristles. ❀April-November.

STEBBINSOSERIS. STEBBINS' CHICORY.

Stebbinsoseris is a recently recognized genus that consists of two species that are endemic to the California Floristic Province. Both species were derived from hybridizations between *Microseris douglasii*, *M. bigelovii* and *Uropappus lindleyi*; the later species was the staminate parent. The genus is named for the geneticist and evolutionist G. Ledyard Stebbins (1906-2000); the suffix, *seris*, is a Greek word for chicory.

+***Stebbinsoseris heterocarpa*** (Nuttall) K. L. Chambers [*Uropappus heterocarpus* Nuttall; *Microseris heterocarpa* (Nuttall) K. L. Chambers]. GRASSLAND SILVER PUFFS. This entry is based on a specimen that was collected along the "Pine Valley Trail" (Pine Ridge Trail) by Beatrice Howitt in late May of 1958 (PGM 5218; according to her field notes, Howitt began her hike that day from Tassajara Road); . It is likely that this species has been overlooked in other areas in this region, for the plants strongly resemble *Uropappus lindleyi*. This species was derived from hybridization between *Microseris douglasii* and *Uropappus lindleyi*. ●R: Central Valley and the Coast, Transverse and Peninsular ranges, from Marin, Lake and Butte counties to northern Baja California. Also on Santa Rosa, Santa Cruz, Santa Catalina, San Clemente and the Anacapa islands and in the mountains of central Arizona. ●H: annual herbs with scapes that range from 8 to 60 cm. tall. The leaves are strictly basal and are produced in rosettes. The leaves, which range from about 5 to 35 cm. long, are linear to narrowly elliptic, and the margins can be entire or pinnately short lobed; the lobes are spreading to upwardly ascending. The ligulate flower heads are terminal on the scapes; the involucres are about 6 to 30 mm. long, and the ligules vary from yellow to white. The achenes, which are about 5 to 10 mm. long, are crested with scale like pappus. The scales are about 5 to 10 mm. long, and from the bifid apex protrudes a slender awn that is about 4 to 8 mm. long. ❀April-June.

STEPHANOMERIA. WREATH PLANT.

Stephanomeria consists of 16 that are endemic to temperate western North America. The species range from annual herbs to subshrubs. Ten species occur in California, and four species, plus four lesser taxa, are endemic to the California Floristic Province. The name is derived from the Greek words *stephanos*, wreath or crown, and *meris*, division or part. Thomas Nuttall, who designated the term in 1841, failed to explain its meaning; it is presumed by some authors that it alludes to the appearance of the plumose pappus bristles.

1a. Sides of achenes not grooved. Pappus bristles plumose throughout. . . . . ***S. virgata***.
1b. Sides of achenes longitudinally grooved. Pappus bristles plumose throughout or not:
2a. Outer phyllaries erect. Pappus bristles thickened at base, the lower portion of bristles not plumose. . . . . ***S. exigua***.
2b. Outer phyllaries reflexed. Pappus bristles not thickened at base, the bristles plumose throughout. . . . . ***S. elata***.

+***Stephanomeria elata*** Nuttall. James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), listed this species as being uncommon on Chew's Ridge between 1,200 and 1,400 m. (3,937-4,593'). Although there is no voucher specimen, this species occurs at many locations in the Santa Lucia Mountains. This species was derived through hybridization between *Stephanomeria exigua* and *S. virgata*. ●R: Cascade, Coast and western Transverse ranges, from Lane County in western Oregon to Los Angeles County, and in the Sierra Nevada, from Butte and Plumas counties to Tulare County. ●H: annual herbs that are up to 15 dm. (60") tall; the branches are ascending or spreading. The basal leaves wither away before the plants begin to flower, and the cauline leaves are reduced and bract like. The flower heads are produced singularly or in clusters at the nodes and tips of the branches. The ligulate flower heads have involucres that are about 5 to 7 mm. long, and the 9 to 15 flowers have pink ligules. The achenes are about 2.8 to 4.5 mm. long and are crested with plumose pappus bristles. ❀July-November.

+***Stephanomeria exigua*** Nuttall subsp. ***coronaria*** (E. Greene) Gottlieb [*S. coronaria* Greene]. SHORT WREATH PLANT. Diane Renshaw identified this species from a specimen that she collected by the old helicopter landing site on the Hog's Back on April 25th of 2009. It is also listed on the California Native Plant Society's "Vascular Plants of Chew's Ridge," which is online. This taxon is probably more widespread in this region, for it occurs in many locations in the Santa Lucia Mountains (the type specimen was collected in the Santa Lucia Mountains of Monterey County in 1885). ●R: Great Basin mountains in Idaho and eastern Oregon, and the Coast, Transverse and northern Peninsular ranges, from Mendocino and Lake counties to Orange and Riverside counties. Also in the southern Sierra Nevada, from Madera County to Kern County, and on San Miguel, Santa Cruz and Santa Catalina islands. ●H: Erect annual herbs with upwardly branching stems that range from about 1 to 6 dm. (4-24") tall. The lower leaves, which are usually absent or withered by the time the flowers are produced, are generally oblong in outline and pinnately toothed, and about 2 to 5 cm. long. The upper leaves are reduced in size and bract like. The flower heads are produced singularly or in nodal clusters along the branches of the inflorescence; the peduncles are about 2 to 5 mm. long, and the lower phyllaries are upwardly appressed. The ligules range from white to pink. The achenes are about 2.3 to 3.1 mm. long, and the lower portion of the pappus bristles, which are basally fused in groups, are not plumose. ❀(April-) June-November.

It is possible that *Stephanomeria exigua* subsp. *carotifera* also occurs in this region, for it is present in the Santa Lucia Mountains. This taxon differs from subsp. *coronaria* in having flower heads that are produced on peduncles 1 to 4 cm. long, outer phyllaries that are reflexed, and pappus bristles that are plumose throughout.

!***Stephanomeria virgata*** Bentham subsp. ***pleurocarpa*** (E. Greene) Gottlieb [*Ptiloria p.* E. Greene]. TALL or TWIGGY WREATH PLANT. This taxon is widely scattered in generally open habitats in the Tassajara region, and is locally common on grassy slopes and in openings in chaparral. It was abundant in 2009, the year after the Basin Complex Fire. ●R: Coast, Transverse and Peninsular ranges, from Douglas County in southwestern Oregon to northern Baja California. Also in the Sierra Nevada, from Butte and Lassen counties to Kern County, and on the Sutter Buttes. ●H: xerophytic annual herbs with erect and upwardly branching stems that range from about 5 to 18 dm. (20-72") tall. The lower leaves are usually absent or withered by the time the plants begin to produce flowers. The lowermost leaves, which are up to 20 cm. long, are produced in rosettes, and the blades are oblong to spatulate in outline and pinnately toothed. The much smaller upper leaves are linear and bract like. The flower heads are usually singular at the nodes and tips of the inflorescence branches. The ligulate heads contain about 8 or 9 flowers; the involucres are about 5 to 8 mm. long, and the ligules, which are about 7 to 9 mm. long, vary from white to pale lavender or pinkish. The achenes are about 2.2 to 3.6 mm. long, and are crested with about 23 to 28 feather like and readily deciduous pappus bristles. ❁July-November.

STYLOCLINE. NEST STRAW.

This genus consists of seven species that are endemic to southwestern temperate North America. Although all of the species occur in California, only two are endemic to the California Floristic Province. The name is derived from the Greek words *stulos*, column, and *kline*, bed, on account of the long receptacles of the flower heads.

Stylocline gnaphaloides Nuttall. COMMON NEST STRAW, GNAPHALIUM LIKE NEST STRAW. This distinctive species is widely scattered in open and usually grassy habitats at lower and intermediate elevations in the Tassajara region, and it is fairly common in some areas. ●R: this species is most common in southern California and northern Baja California, but populations occur as far north as Lake County in the Coast Ranges, and as far north as Amador County (and perhaps Plumas County) in the Sierra Nevada. It also occurs on Santa Rosa, Santa Cruz, Santa Catalina and San Clemente islands, and in the mountains of Arizona. ●H: small woolly annual herbs with simple and erect stems, or more commonly with several decumbent or ascending stems; the stems range from about 5 to 20 cm. (2-8") long. The alternate leaves are linear-oblanceolate to oblong, and about 5 to 12 mm. long. The flower heads are terminal and axillary, and are produced singularly or in small clusters. The discoid flower heads are roundish and about 3 to 6 mm. wide; the outer flowers, which are pistillate, are enclosed in bracts that are densely woolly below but translucent and scale like above. The inner one or two flowers are staminate. The achenes of the pistillate flowers are about .8 to 1 mm. long and are without pappus, while the sterile achenes of the disk flowers are no more than .2 mm. long and have one to five pappus bristles less than 2 mm. long. ❁March-May.

UROPAPPUS.

Uropappus includes only one species that has been segregated from *Microseris*. The name is derived from the Greek word *uro*, tail, and pappus, and alludes to the slender terminal bristle on each pappus scale.

Uropappus lindleyi (deCandolle) Nuttall [*Calais lindleyi* deCandolle; *Microseris lindleyi* (deCandolle) A. Gray, *M. linearifolia* (Nutt.) Schultz-Bipontinus, *U. linearifolius* (deCandolle) Nuttall]. SILVER PUFFS. This species is widespread in open and usually grassy habitats in the Tassajara region; it is most common in areas with loose or disturbed soils. ●R: widely distributed in western North America, from Washington and Idaho to northern Baja California and western Texas. ●H: annual herbs with one to several flowering stems (scapes) that range from about 1 to 6 dm. (4-24") tall. The narrowly linear leaves, which are about 3 to 30 cm. long, are basal or nearly so, and the margins are entire or with narrow and remote lobes. The flower heads are singular and terminal on the scapes. The ligulate heads have involucres that are about 10 to 40 mm. long, and the five to many flowers have yellow corollas that are shorter to about as long as the phyllaries. The heads become spherical with the maturation of the achenes. The very slender achenes, which are about 8 to 16 mm. long, are crested with 5 narrowly lanceolate pappus scales that are about 5 to 15 mm. long; the scales are terminated with short capillary awns that are about 4 to 6 mm. long. ❁April-June.

WYETHIA. MULE EARS, COMPASS PLANT.

Wyethia consists of 10 species that are endemic to temperate western North America. All of the species occur in California, and eight are endemic to the California Floristic Province. The genus was named by Thomas Nuttall for the American explorer and inventor Nathaniel J. Wyeth (1802-1856), who was a correspondent of Nuttall.

∨***Wyethia helenioides*** (deCandolle) Nuttall [*Arlarconia h.* deCandolle]. GRAY MULE EARS. This species is scattered in grassy habitats within woodlands on Chew's Ridge and in Pine Valley, but it is not known to occur elsewhere in this region. ●R: Coast Ranges, from Mendocino and Tehama counties to the Santa Lucia Mountains of San Luis Obispo County, and in the Sierra Nevada, from Shasta County to Kern County. Also on the Sutter Buttes. ●H: perennial herbs from a large and upwardly branching taproot which annually produces generally unbranched stems that range from about 3 to 7 dm. long. The leaves are primarily basal, the petioles are about 4 to 10 cm. long, and the large blades are elliptic to obovate, and about 25 to 45 cm. long. The leaves are at first densely tomentose, but often becoming somewhat glabrous with age. Upper leaves are few and reduced in size. The large flower heads are usually singular on the stems, but sometimes the stems have one or two axillary heads produced on peduncles about 1 to 6 cm. long. The heads are subtended by large leaf like phyllaries. The heads have yellow ray and disk flowers; the disk flowers are at first green. The ray flowers number about 13 to 21 and have ligules about 2.5 to 5 cm. long, and the much more numerous the disk flowers have corollas about 1 cm. long. The achenes are about 12 to 15 mm. long, and are crested by two or more lanceolate to triangular pappus scales about 1 to 5 mm. long. ❁March-July.

Weeds belonging to the Sunflower Family that occur, or have occurred, in and about the developed area of Tassajara include *Matricaria chamomilla*, Chamomile, *Tanacetum vulgare*, Common Tansy, and *Silybum marianum*, Milk Thistle.

BERBERIDACEAE. BARBERRY FAMILY.

Berberidaceae consists of about 14 to 16 genera and approximately 700 species of shrubs, subshrubs, and perennial herbs that occur in tropical and temperate regions. This family includes the various Barberries and Mahonias (*Berberis*) and Heavenly Bamboo (*Nadina*).

BERBERIS. BARBERRY, MAHONIA.

The genus *Berberis* includes about 600 species of shrubs and subshrubs that are widely distributed in temperate regions. *Berberis* is an Arabic name for barberry.

Berberis pinnata Lagasca [*Mahonia p*. (Lagasca) Fedde]. CALIFORNIA BARBERRY, SHINY LEAF MAHONIA. This species is rare in the Tassajara region. I have seen only two plants, both of which were growing out a crack in a rock cliff near the top of the second (middle) waterfall on Waterfall Creek. It is likely that these plants actually represent two outgrowths of a single plant. In nearby areas this species also occurs in the upper watershed of Cachagua Creek (along Finch Creek) and in Hanging Valley, which is a few miles to the southeast of the Tassajara Creek watershed. ●R: scattered in the Coast, Transverse and Peninsular ranges, from Curry County in southwestern Oregon to northern Baja California. ●H: evergreen shrubs with more or less rounded crowns that range from about 3 to 15 dm. (1-5') tall. The alternate leaves are pinnately divided into 5 to 9 (-17) ovate to oblong and spiny margined leaflets that are about 2.5 to 5 cm. long. The leaflets are dark shiny green above and pale below. The flowers are produced in axillary and terminal racemes that are about 3 to 4 cm. long, and the corollas consists of six bifid petals. Both the petals and the larger sepals (which are up to 6 mm. long) are yellow. The fruits are ovoid to obovoid berries that are about 6 to 8 mm. wide; the berries are dark purplish blue and coated with a whitish bloom. ❁February-May.

Vancouveria planitpetala. The inclusion of this species in the first edition of this text was based on an entry in Beatrice Howitt's field notes, and on an entry in her and John Thomas Howell's "Supplement to the Vascular Plants of Monterey County" (1973). In Howitt's field notes there is an entry that is dated May, 15, 1956. There was only one specimen listed in that entry, that of *Collinsia childii*, which was collected "On trail down Church Creek to Church Ranch in grassy, shady place near stream." This was followed by a note stating "Also saw *Vancouveria* along this trail." The "Supplement to the Vascular Plants of Monterey County" lists one additional location for *Vancouveria planitpetala*: "Santa Lucia Mts. (Church Creek trail to Church Ranch)". As there is not a voucher specimen, and as *Vancouveria planitpetala* is a species that is restricted to coastal coniferous forests, especially redwood forests (the only documented localities in Monterey County are in the watershed of the Little Sur River), I have decided not to include this species in this edition of this text. I suspect that Howitt mistook some other three foliate species for *Vancouveria planitpetala*.

BETULACEAE. BIRCH FAMILY.

Betulaceae consists of six genera and about 150 species of trees and shrubs, nearly all of which are endemic to the northern hemisphere. This family includes the genera *Betula* (birch trees), *Alnus* (alder trees) and *Corylus* (the hazels, the source of hazelnuts or filberts).

ALNUS. ALDER.

The genus *Alnus* consists of about 25 species, nearly all of which are endemic to the temperate and boreal regions of the northern hemisphere (*Alnus acuminata* is endemic to the mountains of Central and South America). *Alnus* is the Latin word for alder.

!*Alnus rhombifolia* Nuttall. WHITE ALDER. This species is abundant along Tassajara Creek and the other perennial streams of this region. This species is well adapted to the streamside habitats of this region, for older trees are highly resistant to the torrents that follow major storms, and although the young trees are often swept away by such torrents, this loss is offset by the prolific production of seeds and the very rapid growth of the seedlings. Although the Basin Complex Fire of 2008 killed most of the trees along Tassajara Creek upstream from the hot springs, in the following spring the banks of this stream were blanketed with countless alder seedlings. During the drought years of the mid 1990s Tassajara Creek ceased to flow during dry seasons along a section of the stream immediately upstream from the hot springs. This caused the death of the alder trees along that section of the stream, but it was soon repopulated with alders at the end of the drought. The spreading branches of young trees are frequent obstacles while hiking along the perennial streams of this region. ●R: from British Columbia and Montana to northern Baja California. ●H: deciduous trees with generally conical or dome shaped crowns that range from about 10 to 35 m. (33-115') tall. The bark is thin, scaly, and grayish to brownish. The alternate leaves have petioles that are about 1 to 2 cm. long, and the blades, which are about 5 to 11 cm. long, are oblong-ovate to rhombic with rounded or acute apices, and the margins are doubly serrate. Staminate flowers are produced in dangling catkins that are about 3 to 8 cm. long; the catkins are quite conspicuous, for they are produced from late December to early February, months in which the trees are barren of leaves. The pistillate catkins are short and spike like. The fruits are small cone like structures that are about 12 to 22 mm. long; they contain numerous winged nutlets. ❁December-February.

BORAGINACEAE. BORAGE FAMILY.

Due to the results of phylogenetic research, the circumscription of *Boraginaceae* has been greatly expanded, for it now includes the subfamilies *Hydrophylloideae* (formerly *Hydrophyllaceae*, the Waterleaf Family) and *Lennooideae* (formerly *Lennoaceae*, the Lennoa Family). This family now consists of about 120 genera and approximately 2,300 species, that range from annual herbs to trees. *Boraginaceae* is represented on all continents except Antarctica, and it is especially well represented in the Mediterranean Sea region and in temperate western North America.

Boraginoideae:

1a. Fruits consisting of one to four nutlets. The ovary is deeply lobed, and the style bases are more or less hidden within lobes:

2a. Perennial herbs from stout roots. Leaf blades about 8 to 15+ cm. long, generally ovate, and abruptly constricting to a relatively long and clearly defined petiole. Corollas mostly blue, fading to rose violet with age. Nutlets armed with hooked barbs, and spreading outward in maturity. . . . . ***Cynoglossum***.

2b. Annual herbs. Leaf blades narrowly linear to lanceolate or oblanceolate, and sessile or gradually tapering to a poorly defined petiole. Corollas white, yellow or orange. Fruits not armed and not spreading outward in maturity (except in *Pectocarya*):

3a. Corollas orange to yellow. . . . . ***Amsinckia***.
3b. Corollas white:
4a. Nutlets with hooked prickles on the upper margins, and spreading widely from the base in maturity (and thus are fully exposed). Very small and thus inconspicuous plants. . . . . ***Pectocarya***.
4b. Nutlets without hooked prickles on the margins, and not spreading in maturity (and thus remain hidden within the calyx lobes, except in Plagiobothrys nothofulvus, in which the upper portion of the calyx falls as a unit). Larger and much more conspicuous plants:
5a. Nutlets with vertical groves at the point of attachment to the ovary. Calyces armed with prickly hairs. . . . . ***Cryptantha***.
5b. Nutlets with elevated scars at the point of attachment to the ovary. Calyces with coarse but not prickly hairs. . . ***Plagiobothrys***.

Hydrophylloideae:

1b. Fruits consisting of capsules that contain one or more (usually many more) seeds. Ovary entire or shallow lobed, the style base visible:
6a. Rhizomatic evergreen shrubs or subshrubs. Leaves entire or toothed, but not lobed or divided into leaflets. . . . . ***Eriodictyon***.
6b. Annual or perennial herbs (some perennial species may be slightly woody near the base). Leaves mostly deeply lobed or divided into leaflets (simple and sharply toothed in some annual species):
7a. Flowers produced in readily evident and mostly strongly coiled racemes. Calyces without reflexed appendages between lobes. Ovary two chambered:
8a. Flowers generally pendulous. Corollas yellow, becoming dry and paper like, and persisting after the fruits are mature. . . . . ***Emmenanthe***.
8b. Flowers generally facing upward or outward. Corollas not yellow (or only the tube is yellow), not becoming dry, and generally readily deciduous. . . . . ***Phacelia***.
7b. Flowers solitary or remote in weakly coiled racemes. Calyces with minute or well developed reflexed appendages between the lobes. Ovary one chambered:
9a. Stems with backwardly curved prickles that allow the plant to climb on other plants. Leaves strongly clasping the stem. . . . . ***Pholistoma***.
9b. Stems without prickles. Leaves not clasping the stem. . . . . ***Nemophila***.

AMSINCKIA. FIDDLENECK, FIREWEED.

Amsinckia consists of fourteen species of annual herbs that are native to western North America and southwestern South America. Due to human activity, some of the species have become weeds in other regions. This genus is very well represented in California, for 12 species and four lesser taxa occur within the boundaries of the state. The genus was named for William Amsinck (1752-1831), a patron of the Hamburg Botanical Garden.

1a. Corollas deep to pale orange, about 7 to 11 mm. long, the tubes exceeding the calyx lobes. . . . . ***A. intermedia***.
1b. Corollas pale yellow or orangish yellow, about 4 to 7 mm. long, the tubes barely exceeding the calyx lobes. . . . . ***A. menziesii***.

Amsinckia menziesii (Lehmann) Nelson & Macbride [*Echium m*. Lehmann]. SMALL FLOWERED FIDDLENECK. The only area in this region where I have noticed this species is in the immediate vicinity of The Caves, where it is common in open grasslands. ●R: widely distributed in temperate western North America, from British Columbia and Utah to northern Baja California. ●H: bristly annual herbs with decumbent to erect stems that range from about 1 to 6 dm. (4-24") tall. The alternate leaves are linear to lanceolate and about 3 to 12 cm. long; the lower leaves are petiolate and the upper are sessile. The flowers are produced in outwardly crowded terminal spikes that are coiled toward the apex. The pale yellow or slightly orangish corollas are funnelform, about 4 to 7 mm. long, and barely exceed the lobes of the calyx. The ovaries mature into four pear shaped and roughly textured nutlets about 2.5 to 3.5 mm. long. ❀April-June.

Amsinckia intermedia Fischer & C. Meyer [*A. menziesii* var. *intermedia* (Fischer & Meyer) Ganders]. COMMON FIDDLENECK. This conspicuous orange flowered species is widely scattered and locally common at lower and intermediate elevations in the Tassajara region, and it occurs mostly in open habitats that are grassy. ●R: western North America, from British Columbia and Idaho to northern Baja California. This species has become a naturalized weed in parts of Europe. ●H: bristly annual herbs with erect and usually upwardly branching stems that range from about 2 to 9 dm. (8-36") tall. The alternate leaves, which are linear to lanceolate and petiolate below and sessile above, range from about 3 to 15 cm. long. The flowers are produced in terminal and often sidereal spikes that are coiled at the apex. The funnelform corollas are light to deep orange, about 7 to 11 mm. long, and exceed the lobes of the calyx. The ovaries mature into four pear shaped and roughly textured nutlets about 2 to 3 mm. long. ❀April-June.

According the Consortium of California Herbaria data base, specimens of the following *Amsinckia* species have been collected in the nearby watershed of Paloma and Piney creeks: *A. douglasiana* (8 collections), *A. tessellata* var. *gloriosa* (2 collections) and *A. vernicosa* (4 collections).

CRYPTANTHA.

Cryptantha consists of about 200 species of annual and perennial herbs that are native to temperate western North America, southwestern South America, and northeastern Asia. The genus is well represented in California, for 65 species and 11 lesser taxa occur in the state, many of which are endemic to the California Floristic Province. The name is derived from the Greek words *cryptos*, hidden, and *anthos*, flower, on account of the cleistogamous (non opening) flowers of the type species, *C. glomerata* Lehmann.

1a. Nutlets produced in 4's, and roughened with pronounced bumps:
2a. Plants loosely branched, usually with several well developed ascending laterals. Corolla limbs 3 to 8 mm. in diameter. . . . . ***C. muricata*** var. ***muricata***.
2b. Plants with one erect stem or with several erect fastigiate laterals. Corolla limbs 1 to 3.5 mm. in diameter. . . . . ***C. muricata*** var. ***jonesii***.
1b. Nutlets singular or in 2's or 3's, and either minutely roughened or very smooth and shiny:
3a. Nutlets textured with minute rounded bumps and pits, and thus they are semi glossy:
4a. Stems strigose. Calyx in fruit angled away from the stem; the calyx lobes are oblong and not finely bristly. Corollas less than 3.5

mm. wide. Nutlets singular and 2.2 to 2.5 mm. long. . . . . ***C. corollata***.

4b. Stems strigose and spreading hispid. Calyx in fruit appressed to the stem; the calyx lobes are linear and finely bristly. Corolla up to 5 mm. wide. Nutlets often 2 (or rarely 3), and 1.5 to 2 mm. long. . . . . ***C. rattanii***.

3b. Nutlets smooth and shiny:

5a. Calyx hairs strongly hooked or curved. . . . . ***C. flaccida***.

5b. Calyx hairs straight, or just slightly curved:

6a. Fruiting calyx 1.5 to 2 mm. long, and with spines about as long or longer than the calyx. Styles less than half as long as the nutlets. . . . . ***C. microstachys***.

6b. Fruiting calyx 2 to 3.5 mm. long, and with spines less than half as long as the calyx. Styles almost as long as the nutlets:

7a. Flowers sessile or on pedicels less than ½ mm. long. Fruiting calyxes more or less appressed to stem, the lobes linear. Corolla limbs 1 to 2.5 mm. in diameter. . . . . ***C. clevelandii*** var. ***clevelandii***.

7b. Flowers on pedicels ½ mm to 1 mm. long. Fruiting calyxes not appressed to stem, the lobes ovate. Corolla limbs 2 to 5 mm. in diameter. . . . . ***C. clevelandii*** var. ***florosa***.

+***Cryptantha clevelandii*** E. Greene var. ***florosa*** I. M. Johnston. These white flowered annual herbs are scattered in open and often rocky places in chaparral and woodlands at all elevations in the Tassajara region. In the first edition of this text they were incorrectly assigned to *C. flaccida*. The plants of this region are supposed to represent the more northerly ranging var. *florosa*, but they often more closely key out to the typical variety, and thus I have included descriptions of both taxa in the preceding key. ●R: Coast, Transverse and Peninsular ranges, from Lake and Marin counties to northern Baja California. ●H: usually freely branched annual herbs that range from about 1 to 6 dm. tall. The lance-linear to linear leaves range from about 1 to 5 cm. long; the leaves become reduced in size upward on the stems. The flowers are produce in coiling spikes, and the limbs of the white flowers range from about 2 to 5 mm. in diameter. The lanceolate to lance-ovate nutlets range from about 1.5 to 2 mm. long. ֍March-June.

+∧***Cryptantha corollata*** (I. M. Johnston) Johnston [*C. decipiens* var. *c*. Johnston]. This species was reduced to a synonym of *Cryptantha decipiens* in the first edition of *The Jepson Manual* (1993), but in the second edition (2012) it is once again recognized as a distinct species. It is widely scattered and locally common at lower to intermediate elevations in the Tassajara region, primarily in grassy openings in chaparral and woodlands. ●R: Coast, Transverse and northern Peninsular ranges, from Monterey and San Benito counties to the San Jacinto Mountains of Riverside County. ●H: slender stemmed annual herbs with erect and usually branched stems that range from about 1 to 4 dm. (4-16") tall. The leaves are narrowly linear to oblong-linear, and about 1 to 6 cm. long. The small flowers are produced in coiling spikes, and the white corollas are about 2 to 5 mm. wide. The singular nutlets are about 1.5 to 2 mm. long. ֍March-July.

Cryptantha flaccida (Douglas ex Lehmann) E. Greene (*Myosotis f.* D. ex L.). The only reference to the existence of this species in this region is a specimen in the herbarium of the California State University at Northridge (SFV 8103), which was collected on June 3rd of 1976 from "Along trail from Church Creek Divide to Chew's Ridge." Just in case this species actually does occur in this region, I have included it in the preceding key.

Cryptantha microstachys E. Greene [*Krynitskia m*. E. Greene ex A. Gray]. These inconspicuous annual herbs are widely scattered at lower to intermediate elevations in the Tassajara region, mostly in grassy openings in chaparral and woodland habitats, but often in shady situations. Plants are sometimes found in shady habitats, and these tend to have a more lanky habit of growth and longer and broader leaves. ●R: scattered in the Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular Ranges, from Glenn and Kern Counties to northern Baja California. ●H: slender stemmed annual herbs that range from about 1 to 5 dm. (4-20") tall. The alternate leaves are narrowly linear to oblong-oblanceolate, and about 1 to 4 cm. long. The flowers are produced in ultimately coiling spikes which are commonly produced in two's or three's. The five lobed white corollas are about .5 to 1 mm. wide. The dark and shiny lanceolate nutlets are about 1.5 mm. long. ֍April-June.

!*Cryptantha muricata* (Hooker & Arnott) Nelson & Macbride [*Myosotis m*. H. & A.]. COMMON CRYPTANTHA. This, the most com-mon of the *Cryptantha* species in the Tassajara region, is frequent in open and rocky and/or loose soiled areas. It was even more common, and more widely distributed, during the first spring after the Basin Complex Fire of 2008. ●R: from Contra Costa County in the Coast Ranges, and from Kern County in the southern Sierra Nevada, to Orange County. ●H: prickly hairy annual herbs that range from about 1 to 10 dm. (4-40") tall. The linear leave are typically crowded and opposite at the base while remote and alternate above, and range from about 1.5 to 4 cm. long. The flowers are produced in densely floriferous coiling spikes, and the white corollas range from 3 to 8 mm. wide. The fruit consists of four roughly surfaced and generally pear shaped nutlets about 1 to 2 mm. long. ֍April-July.

+***Cryptantha muricata*** var. ***jonesii*** (A. Gray) I. M. Johnston [*Krynitskia j*. Gray]. This taxon was reduced to a synonym of *C. muricata* in the first edition of *The Jepson Manual* (1993), but it is recognize in the second edition (2012). Many of the plants of this region resemble the description of this taxon, and plants that exhibit intermediate characteristics between this and the typical variety are also common. ●R: Coast Ranges, Sierra Nevada, and the Transverse and Peninsular ranges, from Glenn and Nevada counties to northern Baja California, and eastward to Nevada and Arizona. ●H: similar to the typical variety, except for the characteristics noted in the key. ֍April-July.

+∨***Cryptantha rattanii*** E. Greene [*C. corollata* subsp. *r*. (E. Greene) Abrams; *C. decipiens* misapplied]. CENTRAL COAST CRYPTANTHA. This species was reduced to a synonym of *Cryptantha decipiens* in the first edition of *The Jepson Manual* (1993), but in the second edition (2012) it is once again recognized as a distinct species. It is scattered in open areas at lower and intermediate elevations in the Tassajara region, often in association with *C. corollata*, from which it is difficult to distinguish. ●R: South Coast Ranges, from Contra Costa County to the Santa Lucia Mountains of Monterey County. The large majority of specimens that are listed in the Consortium of California Herbaria database are from Monterey and San Benito counties, and there are also a few that are from the western Transverse Ranges. ●H: slender annual herbs with simple or freely branching stems that range from about 1.5 to 6 dm. tall. The leaves, which are about 1 to 6 cm. long, range from narrowly linear to narrowly lanceolate. The flowers are produced in coiling spikes, and the limbs of the white corollas range from 3 to 6 mm. in diameter. The lanceolate nutlets, which are produced singularly or in two's or three's, are about 1.5 to 2 mm. long. March-July.

CYNOGLOSSUM. HOUND'S TONGUE.

Cynoglossum is a widely distributed genus that consists of about 80 species. The name is derived from Greek words *kuno*, dog, and *glossa*, tongue, presumably for the shape (or perhaps the texture) of the leaves of some species.

∨***Cynoglossum grande*** Douglas ex Lehmann. GRAND HOUND'S TONGUE. This distinctive species is scattered along the Horse Pasture and Church Creek trails, from the Horse Pasture to Pine Valley (i. e., along the Church Creek Fault), and it also occurs on Chew's Ridge, in Anastasia Canyon and probably in Miller Canyon. It usually occurs in shady or semi shady woodland habitats, but it is sometimes found in shady places in chaparral. ●R: this species is endemic to the Pacific Slope of temperate North America, from British Columbia to central California. In California its range extends to the Santa Lucia Mountains of northwestern San Luis Obispo County in the Coast Ranges, and to Tulare County in the Sierra Nevada. ●H: taprooted perennial herbs with erect stems that range from about 3 to 9 dm. (1-3') tall; all of the above ground manifestations are annually produced during the rainy season, but they wither away with the onset of the dry season. The long-petiolate leaves are alternate and restricted to the lower third to one-half of the plant. The blades are broadly ovate to elliptic, mostly about 8 to 18 cm. long and up to 11 cm. wide, and are commonly broadly rounded to truncate or shallowly cordate at the base. The flowers are produced in panicles comprised of slightly coiling racemes; the inflorescence is at first compact but becomes open and elongated with age. The five-lobed and broadly salverform corollas are about 10 to 15 mm. wide, and are at first bright powder-blue, but fade to pale pinkish-lavender or whitish with age. Ringing the throat are five white and slightly two-lobed appendages. The fruits consist of four spreading and obovoid-globose nutlets that are about 5 to 9 mm. long, which are outwardly armed with short barbed prickles. ❁March-June.

EMMENANTHE.

The genus *Emmenanthe* consists of one species that is endemic to southwestern temperate North America. The author of this genus, George Bentham, derived its name from the Greek words *emmeno*, to abide, and *anthos*, flower, on account of the persistent corollas of this species.

!!! ***Emmenanthe penduliflora*** Bentham. WHISPERING BELLS. In the first edition of this text I stated that this distinctive species was:

> Widely scattered in the Tassajara region, but currently rare and restricted to disturbed areas in chaparral… Although I have seen this species only a few times in this region, on chaparral slopes with loose and slipping soils and along recently cleared trails (such as along Tony's Trail and the Horse Pasture-Tassajara Cutoff Trail, both in sections of the trails that had been cleared the year before), Vern Yadon reported its occurrence on Black Butte, along the Black Cone Trail, on Never Again Ridge and on the Elephant's Back in 1979 and 1980, two and three years after the Marble Cone Fire of 1977.

During the first spring after the Basin Complex Fire of 2008 this species was abundant just about everywhere, and it ranked third amongst the most overall most prolific 'burn species' that season. Along sections of Tony's Trail it formed dense and nearly pure stands. The plants that season were also exceedingly large and diffusely branched. The corollas of this species persist on the flowers well after anthesis, and after drying the produce a rustling or "whispering" sound in a breeze. ●R: Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Tehama and Nevada Counties to northern Baja California, and eastward to Utah and Arizona. ●H: annual herbs usually with one to several erect branches that range from about 1 to 5 dm. (4-20") tall. The pinnately lobed leaves, which range from about 1 to 8 cm. long, are generally narrowly oblong in outline; the lower leaves are short petioled and the upper are sessile. The pendulous light yellow flowers are produced in coiling terminal racmes, and the bell shaped corollas range from 6 to 15 mm. long. The fruit is a compressed and many seeded capsule about 7 to 10 mm. long. ❁May-July.

ERIODICTYON. YERBA SANTA.

Eriodictyon consists of eleven species of the southwestern United States and adjacent Mexico. Seven species occur in California, and six are endemic to the California Floristic Province. The name is derived from the Greek words *erion*, wool, *diktuon*, net, and refers to the densely tomentose leaves of the type species, *E. crassifolium*.

1a. Leaves dark green and sticky (or blackish & sooty when old). Corollas 8 to 17 mm. long, funnel shaped, and pale lavender to purple. . . ***E. californicum***.

1b. Leaves white woolly and not sticky. Corollas 2 to 5 mm. long, unshaped, and white to pale lavender. . . . . ***E. tomentosum***.

∨***Eriodictyon californicum*** (Hooker & Arnott) Torrey [*Wigandea californica* Hooker & Arnott]. YERBA SANTA, MOUNTAIN BALM. This well known species is locally common in the Tassajara region, and is found mostly in chaparral or in areas transitional between chaparral and other habitats. It vigorously re-sprouted after the Basin Complex Fire of 2008, and I recall seeing tufts of new leaves that were as much as 18 inches long. A tea made from the leaves of this species is commonly used as an herbal remedy for colds, and extracts have been used as flavoring for candies. ●R: Cascade Ranges, the Sierra Nevada and the Coast ranges, from Clackamas County in northwestern Oregon to Kern County and the Santa Lucia Mountains of northwestern San Luis Obispo County. ●H: rhizomatic evergreen shrubs with erect stems that range from about 6 to 22 dm. (2-7') tall. The leaves are alternate and short petioled; the blades, which are about 5 to 15 cm. long, are lanceolate to oblong and have toothed or sometimes entire margins. Young leaves are deep green, and are covered with a sticky or glutinous, aromatic resin. Older leaves tend to be covered with a black and sooty fungus belonging to the genus *Heterosporium*, which is believed to have a symbiotic (mutually beneficial) relationship with the plants. The flowers are produced in terminal panicles, the branches of which are coiled at the apex. The funnel shaped corollas are 8 to 17 mm. long, and are mostly pale violet to lavender. The fruit is a many seeded capsule about 2 to 3 mm. long. ❁May-July.

Eriodictyon tomentosum Bentham. WOOLLY YERBA SANTA, YERBA SANTA LUCIA. This species is widely scattered in chaparral in the Tassajara region, but it is generally uncommon, except for along the summit of Black Butte. ●R: Santa Lucia, Gabilan, Diablo and La Panza ranges, from Monterey and San Benito counties southern San Luis Obispo County. Of the 191 specimens that are presently listed on the Consortium of California Herbaria database, more than half are from the Santa Lucia Mountains. ●H: rhizomatic evergreen shrubs or subshrubs with erect or ascending branches that range from about 1 to 2 m. (3.3-6.5') tall. The white-woolly leaves, which are alternate and short petioled, are about 4 to 6 cm. long; the blades are elliptic-oblong to obovate and have entire or crenately toothed margins. The flowers are produced in compact terminal panicles, the branches which are coiled at the apex. The urn-shaped corollas, which are about 2 to 5 mm. long, barely exceed the length of the calyx; they range from white to lavender. The fruit is a hirsute capsule about 2 mm. long, that contains 10 to 12 seeds. ❁June-July.

Emmenanthe penduliflora along a section of Tony's Trail in May of 2009, and thus during the first spring after the Basin Complex Fire.

NEMOPHILA.

The genus *Nemophila* consists of eleven species of annual herbs that are native to temperate North America Two species occur in eastern North America, and the remainder are endemic to western North America. The genus is well represented in California, where eight of the species (plus six lesser taxa) occur, and four of these (plus four lesser taxa) are endemic to the California Floristic Province. The name is derived from the Greek words *nemos*, grove, and *phileo*, to love, on account of the shady woodland habitats in which the type species, *N. phacelioides*, occurs; most of the species of this genus also prefer shady habitats.

1a. Corollas 15 to 35 mm. wide, bright blue with white centers, and thus very conspicuous. Plants generally of open habitats. . . . . ***N. menziesii***.

1b. Corollas less than 7 mm. wide, white, bluish white or blue, and inconspicuous. Plants generally of shady habitats:

2a. Auricles (reflexed calyx appendages positioned between the sepals) up to 3 mm. long, and least 1/3 as long as the sepals. . . . . ***N. pedunculata***.

2b. Auricles rudimentary, or 1 mm. or less long:

3a. Larger leaves deeply cleft, but mostly not divided into distinct leaflets. . . . . ***N. parviflora***.

3b. Larger leaves pinnately divided into leaflets:

4a. All leaves opposite. Corollas white and about as long as the calyx lobes. . . . . ***N. pulchella*** var. ***fremontii***.

4b. Uppermost leaves of mature plants alternate. Corollas white to blue and well exserted beyond the calyx lobes. . . . . ***N. heterophylla***.

Nemophila heterophylla Fischer & C. Meyer. Diane Renshaw identified this species from a specimen that she collected along the Horse Pasture Trail in April of 2009, which represented its blue flowered form (white flowered plants that I had tentatively assigned to this species in the first edition of this text are now assigned to *N. pulchella* var. *fremontii*). According to Vern Yadon's unpublished field notes, "Bear Basin Trail from Pine Ridge Trail Junction and Bear Basin, May 10, 1980," *N. heterophylla* is common in Bear Basin. ●R: Cascade and Coast ranges, Sierra Nevada and the Central Valley, from southwestern Oregon to Kern County and eastern San Luis Obispo County. ●H: delicate annual herbs with erect or ascending stems that range from about 1 to 3 dm. (4 to 12") long. The lower leaves, which are opposite and about 1 to 4 cm. long, are oblong to ovate in outline and pinnately divided into 5 to 7 remote pedunculate lobes, which can be irregularly lobed or entire. The much smaller upper most leaves, which are alternate, are nearly sessile, lanceolate to ovate, and vary from irregularly lobed to entire. The slender pediceled flowers are produced in the axils of the leaves

and branches, and the five lobed corollas, which are about 5 to 10 mm. wide, range from white to blue. The fruit is a rounded capsule about 3 to 5 mm. long, which contain 2 to 5 seeds. ֍February-June.

!***Nemophila menziesii*** Hooker & Arnott. BABY BLUE EYES, CALIFORNIA BLUE BELLS, MARIANAS. Due to the showy corollas, this species ranks among the most well known of the wildflowers of California. In the Tassajara region it occurs at all elevations, and is locally common in open and usually grassy habitats. It was abundant during the first spring after the Basin Complex Fires of 2008. *N. menziesii* was a big hit among European gardeners after it was introduced from seeds collected by David Douglas in the early 1830s, and 36 illustrations of the species are listed (mostly under the synonymous name *N. insignis*) in *Iconum Botanicarum Index Londinensis*, 18 of which are full page chromolithographic plates. ●R: Sierra Nevada foothills and the Coast, Transverse and Peninsular ranges, from Humboldt and Shasta counties to San Diego County. Also on Santa Catalina Island. ●H: annual herbs typically with diffuse and generally ascending stems that range from about 1 to 3 dm. (4-12") long. The leaves are opposite, and the lower are petiolate while the upper are nearly sessile. The blades are oblong to oblanceolate in outline, about 1 to 5 cm. long, and pinnately divided into about 6 to 11 oblong to roundish lobes. The flowers are produced singularly in the axils of the leaves and branches, and are on pedicels about 2 to 6 cm. long. The five lobed corollas, which are broadly bowl shaped and mostly about 1.5 to 3 (+) cm. wide, are bright powder blue with dark blue veins distally, while the centers are white and speckled with blue dots. The fruit is a roundish and many seeded capsule about 5 to 12 mm. wide. ֍February-May.

!∨***Nemophila parviflora*** Douglas ex Bentham. These annual herbs are widely scattered and locally common in shady woodland habitats at lower and intermediate elevations in the Tassajara region, but are generally uncommon in drought years and/or in years in which the rains come at irregular intervals. It was very common during the first spring after the Basin Complex Fire of 2008. ●R: Cascade Ranges, from British Columbia southward, to Madera County in the Sierra Nevada, and to the Santa Lucia Mountains of northwestern San Luis Obispo County in the Coast Ranges. ●H: delicate annual herbs with weak trailing stems that range from about 1 to 6 dm. (4-24") long. The lower leaves are opposite and petiolate, and the upper most leaves are alternate and nearly sessile. The blades are about 1 to 4 cm. long, ovate to roundish in outline, and irregularly cleft into five lobes (inclusive of the terminal lobe). The inconspicuous flowers are produced in the axils of the leaves on pedicels less than 3 cm. long. The five lobed white corollas are about 1 to 5 mm. wide, and barely exceeding the lobes of the calyx. The fruit is a roundish two to four seeded capsule about 3 to 5 mm. wide. ֍April-June.

Nemophila pedunculata Douglas ex Bentham. In the first edition of this text I stated that this taxon was apparently rare in the Tassajara region, for I had found this species at only on a shady north facing slope near the summit of Tony's Trail (about three quarters of a linear mile south of Tassajara Hot Springs). During the first spring after the Basin Complex Fire of 2008 this species was seen at a number of sites along the northern grade of Tony's Trail, and also along the base of the same ridge between the northern trail head of Tony's Trail and the waterfall on Waterfall Creek. ●R: Pacific Slope, from British Columbia to northern Baja California. ●H: delicate annual herbs with weak and trailing stems that range from about 1 to 3 dm. (4-12") long. The leaves are opposite and petiolate, and the blades are about 1 to 3 cm. long, oblong to obovate in outline, and pinnately 5 to 9 lobed. The small flowers are produced in the axils of the leaves on pedicels about 4 to 12 mm. long (and up to 4.5 cm. long in fruit). The corollas are about 2 to 6 mm. wide, and range from white to bluish with purple blotches on the lobes and/or with dark veins or spots throughout (all the plants seen in this region had white corollas). The fruit is a roundish capsule about 5 mm. wide that contains 2 to 8 seeds. ֍April-June.

+***Nemophila pulchella*** Eastwood var. ***fremontii*** (A. D. E. Elmer) Constance [*N. f.* Elmer]. The plants that were tentatively assigned to *N. heterophylla* in the first edition of this text are now assigned to this taxon. *N. p.* var. *fremontii* is locally common in shady woodland habitats in the Tassajara region, at least in the vicinity of Tassajara Hot Springs and on Chew's Ridge, but it tends to be rare in drought years and/or in years in which the rains come at irregular intervals. ●R: from Santa Clara County in the Coast Ranges, and from Placer County in the Sierra Nevada, to the western Transverse Ranges of Santa Barbara and Ventura counties. ●H: delicate annual herbs with slender stems that range from about 1 to 4 dm. (4-16") long. The leaves are all opposite, the majority of which are about 2 to 5 cm. long (inclusive of the petioles). The blades are ovate to oblong ovate in outline, and pinnately divided into 5 remote and often irregularly shaped long stemmed leaflets (the leaflet of the larger leaves are usually three lobed). The much smaller upper most leaves range from pinnately five lobed to entire. The flowers are produced in the axils of the leaves on very slender pedicels about 1 to 3 cm. long. The white corollas are less than 5 mm. wide, and are about as long as the calyx. The fruit is a rounded capsule about 4 mm. wide. ֍April-June.

PECTOCARYA. COMBED NUT.

Pectocarya consists of 15 species of annual herbs that are native to temperate western North America and temperate South America. The name is derived from the Greek words *pectos*, combed, and *karua*, nut, and refers to the comb like teeth on the margins of the nutlets.

1a. Plants with prostrate stems and nutlets that are longer than wide. . . . . ***P. penicillata***.
1b. Plants with generally erect stems and nutlets that are nearly as wide as long. . . . . ***P. pusilla***.

Pectocarya penicillata (Hooker & Arnott) A. deCandolle (*Cynoglossum penicillatum* H. & A.). PROSTRATE COMBED NUT. In this region these very inconspicuous annual herbs are known to occur only in open, and usually sandy soiled locations, along the flood plains of Tassajara Creek, both upstream and downstream from the hot springs; they usually occur in groups that inhabit depressed sites. ●R: widely distributed in western North America, from British Columbia and Wyoming to northern Baja California. ●H: annual herbs with prostrate but outwardly slightly ascending stems that range from about 5 to 20 cm. (2-8") long. The leaves are alternate, linear to slightly spatulate, and about 1 to 3 cm. long. The minute flowers are produced singularly or in small clusters that are scattered along the stems. The white corollas are about 2 mm. long, and only slightly exceed the calyx lobes. The fruit consists of four oblong-oblanceolate nutlets that are about 1 to 3 mm. long, the margins of which are beset with hooked spines. ֍March-May.

∨***Pectocarya pusilla*** (deCandolle) A. Gray (*Gruvelia pusilla* A. deCandolle). TICK SEEDED COMBED NUT. These annual herbs are scattered in grassy woodland habitats in the vicinity of Tassajara Hot Springs and in the Horse Pasture; although I have not seen this species elsewhere in this region, the plants are very inconspicuous and easily overlooked. ●R: from Washington to the Santa Lucia Mountains of northwestern San Luis Obispo County in the Coast Ranges, and to Kern County in the Sierra Nevada. Also native to Chile. ●H: small annual herbs with slender and generally erect stems that range from about 5 to 30 cm. (2-12") tall. The leaves are linear and usually less than 2 cm. long. The lower leaves are opposite and the upper are alternate; the uppermost leaves subtend the singular flowers that are remotely scattered along the stems. The five lobed white corollas are less than 2 mm. wide, and the four spreading nutlets, which have hooked spines on the margins, are about 1.5 to 3 mm. long. ֍April-June.

PHACELIA.

Of all of the genera that are represented in the Tassajara region, *Phacelia* turned out to be the most remarkable during the first spring after the Basin Complex Fire of 2008, for two species that had not previously been known to occur in this region were discovered, and three of the species that had previously been known to occur in this region were amongst the most exceedingly abundant of the 'fire followers.' The most noteworthy of the later group were two species that had previously been very rare in this region, *P. grisea* and *P. brachyloba*; these species were first and the second most exceedingly abundant plants in the Tassajara region during the spring of 2009.

Phacelia is a highly variable genus comprised of about 210 species of annual and perennial herbs and subshrubs. The genus is represented in both North and South America, but nearly three quarters of the species are endemic to temperate North America, and over sixty percent of the North American species occur in occur in California; 42 species (plus 8 lesser taxa) are endemic to the California Floristic Province. The name is derived from the Greek word *phakelos*, cluster, on account of the densely flowered and coiling racmes of the type species; this characteristic is also manifested in many of the other species of this genus.

1a. Annual herbs (some can be very robust during the first spring after a fire):
- **2a**. Corollas mostly blue, purplish blue or purple:
  - **3a**. Corolla lobes blue. Main stem erect, simple or branched, the branches ascending. Cauline leaves well developed and simple. . . . ***P. viscida***.
  - **3b**. Corollas lobes purple to light blue. Stems basal and mostly prostrate to ascending. Leaves primarily basal and pinnately lobed. . . ***P. douglasii***.
- **2a**. Corollas white or mostly white (often pale or dingy white):
  - **4a**. Leaves pinnately or bipinnately divided into many pinnately lobed leaflets. . . . . ***P. distans***.
  - **4b**. Leaves not divided into distinct leaflets (in *P. malvifolia*, some of the largest lower leaves can be pinnately divided into three leaflets):
    - **5a**. Leaves narrowly oblong to narrowly elliptic or narrowly oblanceolate outline, and pinnately divided into many deep to shallowly cut lobes. Corolla throats yellow. . . . . ***P. brachyloba***.
    - **5b**. Leaves broadly elliptic, obovate or deltoid in outline, and simple (in *P. malvifolia*, some of the largest lower leaves can be pinnately divided into three leaflets): Corolla throats not yellow.
      - **6a**. Leaves elliptic to ovate or broadly obovate, the margins entire or shallowly to very deeply saliently lobed or toothed (all the leaves are simple). Stems without prickly bristles. . . . . ***P. grisea***.
      - **6b**. Leaves ovate to deltate, the margins shallowly to deeply serrately lobed (lower and main stem cauline leaves of larger plants are often three foliate). Stems armed with stiff and prickly bulb based bristles. . . . . ***P. malvifolia***.

1b. Perennial herbs, sometimes woody at the base, and generally evergreen:
- **7a**. Leaves pinnately divided into leaflets with variously lobed, cleft or toothed margins. . . . . ***P. ramosissima***.
- **7b**. Leaves simple or pinnately divided into simple leaflets, the margins are entire:
  - **8a**. Corolla more or less tubular, the lobes mostly erect or curving inward at the apex. Calyx lobes generally overlapping (imbricated) during the fruiting stage of the flowers. . . . . ***P. imbricata***.
  - **8b**. Corollas campanulate (bell or bowl shaped), the lobes curving outward at the apex. Calyx lobes not overlapping during the fruiting stage of the flowers:
    - **9a**. Corollas white or creamy white and 4 to 8 mm. in diameter. Calyx lobes 8 to 12 mm. long during the fruiting stage . . ***P. egena***.
    - **9b**. Corollas pale green to yellowish white and 3 to 6 mm. in diameter. Calyx lobes 5 to 8 mm. long during the fruiting stage . . . . . ***P. nemoralis***.

!!!^***Phacelia brachyloba*** (Bentham) A. Gray [*Eutoca b*. Bentham]. SHORT LOBED PHACELIA. While botanizing along Tassajara Road for the first of many times during the spring of 2009, the basal rosettes of this species where common to abundant at nearly every stopping point. The leaves of most of these rosettes were also much larger than they normally are, and those of some plants greatly exceeded the maximum as recorded in botanical literature. When the plants began to produce flowers, the full extent of its post fire abundance in this region became apparent. *Phacelia brachyloba* was exceedingly abundant on Black Butte, along the Pine Ridge Trail between Tassajara Road and the Church Creek Divide, in Pine Valley and on Chew's Ridge. It was also common to abundant in many places on the western slopes and base of the Black Butte Ridge, including the vicinity of the developed are of Tassajara. In sharp contrast, *Phacelia brachyloba* was uncommon on the north slope of the ridge to the south of Tassajara, over which Tony's Trail crosses, but it was probably common on the south slope (I did not have time to explore this section of the trail in 2009, which at that time was nearly impassable). In the first edition of this text I described the distribution of *Phacelia brachyloba* in the Tassajara region as follows:

> Widely scattered in the Tassajara region, but rare and restricted to openings in chaparral, especially in more or less disturbed and/or sandy soiled areas. I have seen this species in only in openings in chaparral along the crest of Black Butte, on Chew's Ridge near the lookout, and along a recently cleared section of Tony's Trail, about half way down the Willow Creek side of the grade. As this is one of the most noted 'burn species' in California, it is probably more common in this region after a fire. Miriam Bobcoff found this species in the developed area of Tassajara Hot Springs (on the hillside next to the upper barn) within the first few years after the Marble Cone fire of 1977.

Phacelia brachyloba was the second to the most abundant 'burn species' in the areas of the Tassajara region that I explored during the spring of 2009. ●R: Coast, Transverse and Peninsular ranges, from Monterey Bay (Fort Ord) to northern Baja California. ●H: generally erect annual herbs that range considerably in size. Very small plants consist of a rosette of small leaves and one stem less than two inches long, whiles large plants consist of rosettes of large leaves and a primary stem that is profusely branched, including from the base. Such plants can be as much as 6 dm. (24") or more tall. The leaves, which can be up to 7 cm. or more in length, are mostly restricted to the lower portion of the plant; the blades range from oblanceolate to narrowly elliptical in outline, and are pinnately divided into toothed or entire lobes or segments. Cauline leaves are alternate and reduced in size. The flowers are produced in crowded terminal and axillary coiling racmes. The five lobed corollas, which are about 7 to 10 mm. wide, range from campanulate to broadly funnelform; the throats are yellow and the limbs are white. The fruit is an ovoid 10 to 25 seeded capsule about 4 to 5 mm. long. ❀April-June.

Phacelia curvipes & *davidsonii*. Listed on page 76 of Beatrice Howitt and John Thomas Howell's The Vascular Plants of Monterey

Basal rosettes of *Phacelia brachyloba* (with pinnately lobed leaves) and *Phacelia grisea* (with saliently lobed leaves) on Black Butte in early April of 2009, and thus during the first spring after the Basin Complex Fire. Photographed by Diane Renshaw.

Phacelia brachyloba on Black Butte in May of 2009, and thus during the first spring after the Basin Complex Fire. In normal years this species is rare in this region and restricted to sandy soiled or disturbed areas in chaparral, such as along recently cleared trails. Photograph by the author.

County, California (1964), is "*Phacelia davidsonii* Gray. Santa Lucia Mountains (near top of Chew's Ridge, Allen Barbour)." James Griffin, in his Plants of the Highest Santa Lucia and Diablo Range Peaks, California (1975), listed this taxon as *Phacelia curvipes* var. *macrantha* (which is now treated as synonym of *P. davidsonii*), and stated that: "Howitt and Howell (1964) reported this plant (as *P. davidsonii* Gray) on top of Chew's Ridge. Hoover (1970) [The Vascular Plants of San Luis Obispo County, California] treated *P. curvipes* as part of *P. douglasii*, and it is possible that the *P. davidsonii* report is based on the same plants as *P. douglasii* in this text." It appears that no specimens of *P. curvipes* or *P. davidsonii* have ever been collected in the Santa Lucia Mountains. These taxa, which occur in the southern Sierra Nevada and the Transverse Ranges, are readily distinguishable from *P. douglasii* (and from each other) by the shape of their leaves. Griffin's text is probably the basis for the inclusion of *P. curvipes* in the California Native Plant Society's list of the vascular plants of Chew's Ridge, which is online.

!!***Phacelia distans*** Bentham. COMMON PHACELIA, WILD HELIOTROPE. In the first edition of this text I stated that this species was "Widely scattered at lower to intermediate elevations in the Tassajara region, mostly in grassy openings in woodlands or chaparral, and often in areas with rather loose soil." During the spring of 2009, the first spring after the Basin Complex Fire of 2008, this species was common to abundant nearly throughout the Tassajara region, and it produced large thickets in many places. ●R: Coast Ranges, Sierra Nevada foothills, Central Valley, southern Sierra Nevada, and the Transverse and Peninsular ranges, from Mendocino, Tehama and Madera counties to northern Baja California, and east to Nevada, Arizona, and Sonora, Mexico. ●H: simple to freely branched annual herbs that range from about 2 to 6 dm. (8-24") tall. The lower leaves are petiolate and the upper most are often sessile; the blades, which range from about 2 to 10 cm. long, are oblanceolate to ovate in outline and one to three times pinnately divided into ultimate segments or lobes. The flowers are produced in densely floriferous coiling racemes which are produced at or near the ends of the branches. The five lobed corollas are campanulate, and range from about 8 to 10 mm. wide. The corollas of the local plants are white with translucent veins and markings (and thus appear somewhat dingy), but plants from other regions often have blue or bluish corollas. The fruit is a roundish 2 to 4 seeded capsule about 2 to 3 mm. long. ❁April-June.

!***Phacelia douglasii*** (Bentham) Torrey [*Eutoca d.* Bentham]. BABY PURPLE EYES. This distinctive species is frequently encountered in open and usually grassy habitats at all elevations in the Tassajara region. *P. douglasii* was more common than usual in this region common during the first spring after the Basin Complex Fire of 2008. The common name is based on the resemblance of the corollas, except for the color, to those of Baby Blue Eyes (*Nemophila menziesii*). ●R: Coast Ranges, Central Valley, and the Transverse and Peninsular ranges, from Marin County and the Sutter Buttes in Sutter County, to San Diego County. ●H: showy flowered annual herbs with trailing or ascending stems that range from about .5 to 4 dm. (2-16") long. The leaves are primarily basal and about 1 to 8 cm. long; the blades vary from being pinnately short lobed to pinnately divided into irregularly shaped leaflets. The flowers are produced in few to many flowered racemes that are weakly coiled. The bowl shaped corollas are about 6 to 12 mm. wide; the lobes range from purple to bluish purple, and the center of the corolla is white or whitish. The fruits are ovoid capsules that are about 5 to 7 mm. wide; they contain about 10 to 20 seeds. ❁March-May.

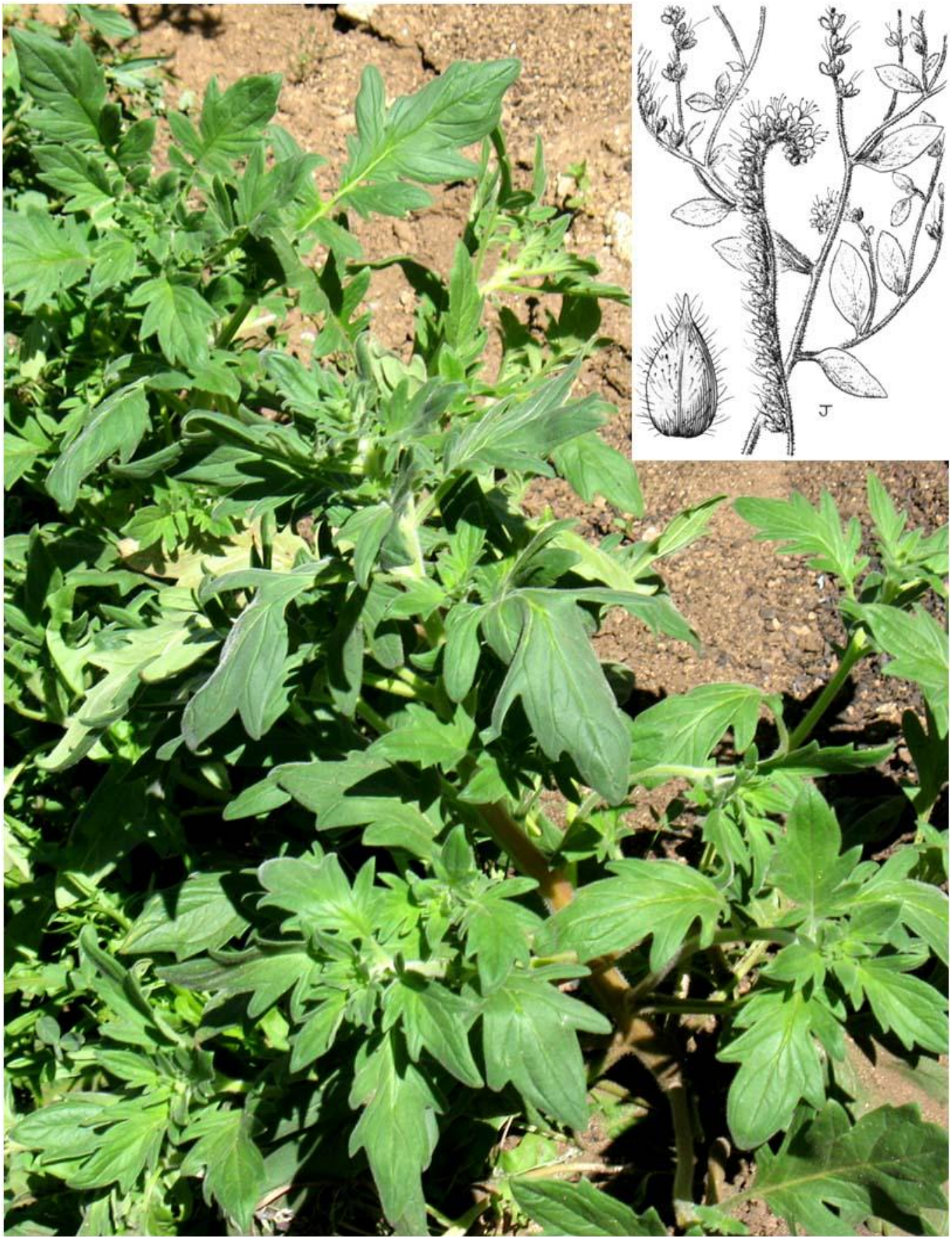
Phacelia egena (Brand) J. T. Howell [*P. magellicana* f. *egena* Brand]. LARGE FLOWERED ROCK PHACELIA. This species is widely scattered in the Tassajara region, but uncommon, and is often difficult to clearly distinguish from the very similar and much more common *P. imbricata*, with which it freely intergrades. ●R: Sierra Nevada and the Cascade, Coast and Transverse ranges, from Josephine and Jackson counties in southwestern to the mountains of Los Angeles and San Bernardino counties. This species is also reported to occur in mountains of Arizona, and in 1897 a specimen was collected on Stonewall Mountain in San Diego County. ●H: tufted and sometimes woody based perennial herbs with erect stems that range from about 1.5 to 6 dm. (6-24") tall. The leaves are primarily basal; these are petiolate and about 10 to 25 cm. long, and the blades are generally oblanceolate in outline and with a large and generally ovate-lanceolate terminal leaflet and three to five pairs of more or less lanceolate lateral leaflets that increase in size towards the apex. The terminal leaflet is often partially fused with the upper most pair of lateral leaflets. The smaller and remote cauline leaves are simple and entire. The flowers are produced in densely floriferous coiling racemes, and the corollas are pale white, campanulate, five lobed, and about 5 to 9 mm. wide. The fruits are narrowly ovoid and 1 to 2 seeded capsules that are about 3 mm. long. ❁May-June.

!!!!***Phacelia grisea*** Asa Gray. SANTA LUCIA PHACELIA. In the first edition of this text (1998) I stated that this species was:

> Apparently widely scattered in the Tassajara region, but currently rare. I have seen this 'burn species' only along the Pine Ridge Trail about 1/2 of a linear mile east of the Church Creek Divide (the yearly populations at this site varied from fairly common to absent), and along the Black Cone Trail between South Ventana Cone and the Elephant's Back. In contrast, Vern Yadon reported this species to be widely scattered and locally common to abundant on the higher ridges of the Tassajara region in 1979 and 1980, two and three years after the Marble Cone Fire of 1977.

To my great surprise *Phacelia grisea* turned out to be the most widespread 'burn species' in all of the areas of the Tassajara region that I had time to explore during the first spring after the Basin Complex Fires of 2008, and it was also the overall most abundant. The only locality were I found this species to be absent was in the bog in the large meadow in northwestern Pine Valley, and even there it was frequently seen near the margins of perpetually wet areas. Another great surprise was the much greater size and morphological complexity of the plants of 2009, and because their appearance was so different from anything I had ever seen before in this region, I was not able identify the species until plants began to produce flowers. The leaves of the large basal rosettes, which were broadly oblong to broadly elliptic, had deep to shallow salient lobes that were regularly placed on some leaves and irregularly so on others. Diane Renshaw and myself were both totally stumped as to what species these plants would turn out to be, and at some point I began to wonder if it was possible that an alien species could have manifested itself in this region so rapidly. Later on, as the main stems and their branches began to rise, these plants still offered no clues to me as to their identity, and thus it was not until Saturday, May 16th, 2009, while in the Outer Flats near the swing set, that I sighted a plant with flowers. At that moment I knew that this had to be *Phacelia grisea*, and that the reason I failed to recognize it earlier was due to the extremely robust habit of growth that season. ●Although *Phacelia grisea* is a very distinctive species, it was due to its rarity between fires that is was rather late in being named and described. The first botanical specimens were collected by the noted botanist and archaeologist Edward Palmer, "On Pine Mountain, back of San Simeon Bay, California," in 1876 (Pine Mountain is a short distance north-northeast of Hearst Castle in San Luis Obispo County). These specimens served as the type for the species, which was first named and described by the renowned Harvard University botany professor Asa Gray in 1877 (*Proceedings of the American Academy of Arts and Sciences* 12: 80). The first herbarium specimen from Monterey County was collected at Point Sur by Townshend Brandegee in 1888 (UC 107553), but Mr. Brandegee seems to have forgotten this, for in a paper, "New Localities for California Plants" (*Zoe* 4 (2): 148-160, 1893), he gave the credit to William Vortriede,

Phacelia grisea along Tony's Trail in May of 2009, and thus during the first spring after the Basin Complex Fire. Prior to 2009 I had seen this species only at one site along the Pine Ridge Trail east of the Church Creek Divide, and at one location along the Black Cone Trail.



Upper right, *Phacelia grisea* as illustrated in vol. 3 of the Illustrated Flora of the Pacific States, which represents the only published illustration of this species. The photograph depicts *Phacelia grisea* leaves as manifested in the Tassajara region during the first spring after the Basin Complex Fire of 2008.

who collected a specimen in the vicinity of the Little Sur River in 1892. In June of 1952 *Phacelia grisea* was discovered on Black Mountain in the La Panza Range (in south central San Luis Obispo County) by Robert Hoover (Hoover 8241, OB I13766 & RSA 2016608), and in May of 1956 *P. grisea* was discovered in the Santa Ynez Mountains of Santa Barbara County by Clifton Smith (Smith 4527 & 4533; SBBG 82416 & 82417). Smith collected his specimens in an area that had burned in September of the previous year (*Leaflets of Western Botany* 9 [5], p. 78-81, 1960). In May of 1967 a specimen of P. grisea was collected by Harry George in the Wheeler Gorge in western Ventura County (UCD 149939), and in 1999 it was discovered about 10 miles south of this site on Sulphur Mountain (Calflora interactive website for *P. grisea*). ●R: Santa Lucia, La Panza and western Transverse ranges, from Fort Ord in northern Monterey County to Sulphur Mountain in south western Ventura County. ●H: annual herbs with an erect main stem, and that vary greatly in size and complexity. Plants that occur during periods several years or more after a fire generally range from simple to upwardly short ascending branched at the nodes, and such plants range from 5. to 6 dm. (2-24") tall. Very robust plants that occur shortly after fires have many ascending nodal branches, and these branches are further branched at the nodes. Such plants, which can be as much as 12 dm. (4') tall, also produce whorls of very long branches from the base. The leaves are alternate and petiolate. The leaf blades of small plants are generally elliptic to ovate, and only the lower leaves are sometimes toothed, while in very robust plants the blades are broadly obovate to broadly elliptic, shallowly to very deeply saliently lobed or toothed (the lobes are fairly regularly placed on some leaves, but are very irregularly on others). Robust plants have few if any entire leaves. The leaves of small plants range from about 1 to 8 cm. long, while those of robust plants can be as much as 20 cm. long. The flowers are produced in crowded and generally one sided terminal and axillary racemes which are strongly coiled at the apex. The five lobed and broadly campanulate corollas range from about 5 to 7 mm. wide in small plants, but can be as much as 12 mm. or more wide in large plants. The corollas are basically white, but appear to be pale white at a distance, for they are variously patterned with translucent depressions. The fruit is an ovoid and 5 to 10 seeded capsule about 4 to 5 mm. long. ❀May-July.

Phacelia imbricata E. Greene [*P. californica* var. *imbricata* Jepson]. ROCK PHACELIA, IMBRICATE PHACELIA. This species is frequently encountered at lower and intermediate elevations in the Tassajara region, primarily in open and often rocky areas, and especially in transitional areas between woodlands and chaparral. ●R: Coast Ranges, Sierra Nevada and Transverse Ranges, from Humboldt and Shasta counties to the San Gabriel Mountains of northern Los Angeles County. ●H: often woody based perennial herbs with erect stems that range from about 2 to 10 dm. (8-40") tall. The leaves are primarily basal and form tufts; the basal leaves are petiolate and about 5 to 15 cm. long, with blades that are generally oblanceolate in outline and pinnately divided into three to five pairs of more or less lanceolate and entire lateral leaflets which increase in size towards the apex. The entire and generally ovate-lanceolate terminal leaflet is the largest, and it is often partially fused with the upper most pair of lateral leaflets. Upper leaves are few and reduced in size. The flowers are produced in open panicles comprised of densely floriferous coiling racemes, and the corollas are cylindric to slightly campanulate, pale white, five lobed, and about 4 to 7 mm. long. The fruit is a narrowly ovoid and one to three seeded capsule about 3 to 4 mm. long. ❀May-August.

+∨***Phacelia malvifolia*** Chamisso. STINGING PHACELIA. On May 17th of 2009, while botanizing along Tassajara Creek between the confluences of Oryoki and Church creeks, I came across a few plants that, because of the characteristics of the inflorescences, I at first assumed were either *P. distans* or *P. grisea*. But when I noticed the leaves I instantly knew that they represented a different species, and when I knelt down for a closer look at one plant, I noticed the bristly hairs on the stems, which were prickly to the touch. Later on that month I noticed this species at two other localities: near the bridge at the end of The Flats, and along the trail to The Narrows, near to the confluence of Horse Pasture Creek. According to James Griffin's "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), and the California Native Plant Society's list of the vascular plants of Chew's Ridge (which is online), this species also occurs on Chew's Ridge. ●R: Coast Ranges, from Curry County in southwest Oregon to the Santa Lucia Mountains of San Luis Obispo County. ●H: annual herbs with a generally erect main stems that range from about 2 to 10 dm. (8-40") tall; the stems range from simple to much branched, and some of the plants that I observed in this region had branches from the base. The stems and branches are armed with stiff and sharply pointed bulb based bristles. The leaf blades of smaller plants, and the upper leaves of large plants, are simple, ovate to deltate, and shallowly to deeply lobed; the lobes are serrate. The lower and main stem cauline leaves of larger plants are often three foliate, the terminal leaflet being the largest, and the margins of the opposing pair of petiolate leaflets vary from serrate to irregularly lobed. The flowers are produced in crowded terminal and axillary racemes that are strongly coiled. The broadly campanulate corollas are about 5 to 7 mm. wide, and appear to be dull white due to translucent or sometimes brownish markings; the corollas turn yellowish or brownish with age. The fruit is a roundish capsule about 2 to 3 mm. wide. ❀April-July.

+∨***Phacelia nemoralis*** E. Greene. WOODLAND PHACELIA, SHADE PHACELIA. This species was first discovered in this region by Diane Renshaw in the spring of 2009, and as I recall, she found it near the highest waterfall on Waterfall Creek. Later on that spring we both found this species at other locations in the vicinity of the hot springs; I probably failed to recognize this entity earlier due to its strong resemblance to both *P. imbricata* and *P. egena*. ●R: Cascade and Coast Ranges, from Washington to the Santa Lucia Mountains of San Luis Obispo County. ●H: short lived perennial herbs with one to several erect or ascending basal stems that range from about 5 to 15 dm. + (20-60") long. The lower leaves are long petiolate and generally have one large ovate and entire terminal leaflet and one or more pairs of much smaller entire leaflets that range from narrowly elliptic to ovate. The smaller and gradually reducing cauline leaves are simple and entire, and range from oblong to ovate. The flowers are produced in crowded terminal and lateral racemes, and the campanulate corollas are greenish white and about 3 to 4 mm. wide and 3 to 5 mm. long. The fruit is a globose ovoid capsule about 2 to 3 mm. long. ❀April-July.

Phacelia ramosissima Douglas ex Lehmann. BRANCHING PHACELIA. This species is scattered, and in some places common, on Chew's Ridge and on the Black Butte-Miller Ridge, as far north as slopes at the upper end of Pine Valley. It occurs in both woodlands and chaparral, but is most common in transitional areas between these habitats and grasslands, as evidenced at many places along the Pine Ridge Trail between China Camp and Pine Ridge. The plants of this region represent two varieties that were recognized in the first edition of *The Jepson Manual* (1993), but not in the second edition of this text (2012): the typical variety and var. *latifolia* (Torrey) Cronquist [*P. r.* var. *suffrutescens* Parry]. As described, these taxa are nearly identical, except for the long and stiff bulb based hairs on the stems below the inflorescence in var. *latifolia*. ●R: widely distributed in western North America, from British Columbia, Idaho and Utah to northern Baja California. ●H: perennial herbs with several widely spreading branches from a woody root crown. Plants growing in sunny areas, such as in openings in chaparral, tend to have fairly rigid and arcing branches less than 1 m. (39") long, while plants growing in shady habitats tend to have weak and trailing branches which are often much more than 1 m. long. The leaves are alternate and vary in size and complexity. The lower, which are petiolate and up 20 cm. (8") long, are ovate in outline and pinnately divided into leaflets that are pinnately lobed. The much small upper most leaves are nearly sessile and pinnately divided into irregularly shaped lobes. The flowers are produced in an open panicle com

prised of terminal and axillary spiraling racemes that become elongated with age. The five lobed corollas are campanulate, about 5 to 8 mm. wide, and range from white to lavender or blue. The fruit is an ovoid 2 to 4 seeded capsule about 3 to 4 mm. long. ֍May-August.

!!∧***Phacelia viscida*** (Bentham) Torrey [*Eutoca v*. Bentham]. STICKY (VISCID) PHACELIA, BRILLIANT BLUE PHACELIA. In the first edition of this text (1998), I stated that this species was:

> Currently rare in the Tassajara region, and restricted to disturbed sites in chaparral. I have seen this species only along two recently cleared sections of trails: the Horse Pasture-Tassajara Cutoff Trail (at the switch back through chaparral between the base and the top of the Horse Pasture Creek waterfall), and along Tony's Trail (about half way up the Willow Creek side of the grade). As this is a noted 'burn species,' it is likely to be much more common in this region during the first few years after a fire.

Although this species was much more common, and in some places very abundant, its distribution in this region during the spring of 2009 (i. e., the first one after the Basin Complex Fire of 2008), was patchy. The largest colony occurred along the south-southeast base of Flag Rock, from the vicinity of the waterfall on Horse Pasture Creek to the east end of the swimming pool (the plants that occurred in the developed area caught the attention many people, even of those who had little or no interest in botany, and I was repeatedly asked questions like "What is that showy blue flowered plant down by the barns?"). As Tony's Trail had not yet been cleared of deadfalls and the quicksand like silts that obstructed the trail bed beyond the summit, I was unable to get close to the populations that occur on the southern slopes of the ridge, although the many patches of blue that could be seen from the summit of the trail, and from other vantage points along the crest of the ridge farther to west, were almost certainly produced by *P. viscida*. I don't recall seeing this species elsewhere in this region, but Diane Renshaw discovered a previously unknown population in the spring of 2014. This was in the area that was consumed by the approximately 200 acre "Tassajara Fire" that burned in the vicinity of the confluence of Tassajara and Church creeks in July of 2013. *Phacelia viscida* was one of the many hundreds of plants that were collected in California by the famous botanical explorer David Douglas during the early 1830s, and the species was introduced into European gardens from seeds that Mr. Douglas included in his shipments of plant materials to England. Due to the showy flowers of this species, it became a frequent topic in European horticultural and botanical journals, and thirteen illustrations of this species, under its former names, *Eutoca viscida* and *E. viscosa*, are listed in "Iconum Botanicarum Index Londinensis," seven of which are chromolithographic, and five of these are full page plates. David Don, in his statements about this species in volume seven of *The British Flower Garden* (1837, t. 368), stated that "When in blossom few plants possess greater attractions from the extreme brilliancy of the flowers, which are of the deepest azure," and Sir William Jackson Hooker, in volume 64 of *Curtis' Botanical Magazine* (1837, t. 3572), stated that this was "A most lovely, hardy annual, flowering during the summer, and continuing, in Scotland, in great beauty through the month of September. The blossoms are of the most brilliant blue, and there is a constant succession of them during the fine weather." It thus appears that cultivated plants, if irrigated, can to produce their showy flowers until at least September. ●R: Coast, Transverse and Peninsular ranges, from Carmel Valley in Monterey County to northwestern Baja California, and on most of islands off the coast of southern California. ●H: annual herbs with erect stems that range from simple to many branched; plants range from about 1 to 7 dm. (4-28") tall. Some of the plants that were encountered during the spring of 2009 were as much as 9 dm (36") tall. The leaves are alternate and petiolate, the blades are about 3 to 9 cm. long, ovate to oblong ovate, cuneate to truncate at the base, and have irregularly serrate or doubly serrate margins. The flowers are produced in open panicles on elongating coiling racemes. The corollas, which are rotate and five lobed, range from about 8 to 18 mm. wide. They are mostly a brilliant medium to dark blue, and the centers, which at first appear to be off-white, are actually, when seen at very close range (and especially when seen under magnification), are white with a multitude of very small and irregularly shaped purple spots. The fruit is an oblong-ovoid capsule about 8 to 12 mm. long; these contain approximately 40 to 80 seeds. ֍April-June.

Phacelia species that occur in areas near to the Tassajara region include *P. ciliata* (rare on the Hastings Reservation), *P. cicutaria* and *P. cicutaria* var. *hispida* (in the lower Arroyo Seco Canyon) and *P. tanacetifolia* (in the lower Arroyo Seco Canyon).

PHOLISTOMA.

Pholistoma consists of thee species and one lesser taxon of southwestern temperate North America, and three of these taxa are endemic to California Floristic Province. The name is derived from the Greek words *pholis*, scale, and *stoma*, mouth, on account of the triangular corolla throat scales of the type species, *P. auritum*.

!!***Pholistoma auritum*** (Lindley) Lilja [*Nemophila aurita* Lindley]. FIESTA FLOWER, VELCRO PLANT. In normal years this species is common in shady or generally shady habitats at lower and intermediate elevations in the Tassajara region, but during the first spring after the Basin Complex Fire of 2008 it was exceedingly abundant, even in full sunlight. At a number of sites during that spring I saw large mounds of these plants, these being produced by the climbing nature of this species, and as they found no nearby supports, they climbed upon themselves. I also noticed plants along Cabarga Creek that spring that had white flowers. I have been told that it was due to the stickiness of the stems of this species that the flowers were frequently worn at fiestas, and hence the common name. ●R: Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Mendocino and Butte counties to northwestern Baja California. ●H: somewhat vine like and semi succulent annual herbs with weak and trailing stems that range from about 3 to 12 dm. (1 to 4') long. The angles of the stems are equipped with backwardly hooked prickles, which enable the plants to climb on other plants, as well as to cling to whatever passes by. The leaves, which can be as much as 16 cm. (6 ½") long, have petioles that are expanded at the base and clasp the stems; the lower leaves opposite and the upper are alternate. The blades are oblong to lance ovate in outline and pinnately divided into 3 to 6 pairs of more or less retrorse divisions or lobes. The flowers are produced in few flowered terminal and axillary racemes, and sometimes singularly in the axils of the leaves. The bowl shaped corollas range from about 1 to 3 cm. wide; the five rounded lobes are purplish blue or bluish purple, and gradually fade to whitish towards the center. The fruit is a one to four seeded roundish capsule about 5 to 10 mm. wide. ֍March-May.

Phacelia viscida as photographed in the vicinity of the lower switch back on the Tassajara Cut Off Trail in April of 2009.

A large clump of *Pholistoma auritum* plants growing along the Horse Pasture Trail in early May of 2009, and thus during the first spring after the Basin Complex Fire.

PLAGIOBOTHRYS. POPCORN FLOWER.

The genus *Plagiobothrys* consists of about 65 species of temperate western North America and temperate southwestern South America. Although 39 species occur in California, and 19 are endemic to the California Floristic Province, only three are known to occur in the Tassajara region. The name is derived from the Greek words *plagios*, on the side, and *bothrys*, a pit, and refers to the scar at the point of attachment of nutlets to the ovary.

1a. Lower leaves not forming a rosette. Lower cauline leaves opposite. Nutlets attached to receptacle near the base. . . . ***P. trachycarpus***.
1b. Lower leaves forming a rosette. Cauline leaves alternate. Nutlets attached to receptacle at or near the middle:
2a. Nutlets cross shaped (like the Red Cross emblem). . . . . ***P. tenellus***.
2b. Nutlets more or less pear shaped (but more abruptly constricted towards the apex):
3a. Stems generally erect or ascending. Calyx lobes generally curved over the nutlets. . . . . ***P. nothofulvus***.
3b. Stems generally prostrate, decumbent or ascending. Calyx lobes generally erect or spreading. . . . . ***P. canescens***.

+***Plagiobothrys canescens*** Bentham. VALLEY POPCORN FLOWER. This species was identified by Diane Renshaw from a specimen she collected on the Hog's Back in April of 2009 (i.e., during the first spring after the Basin Complex Fire of 2008). It was included in an early draft of the first edition of this text, but somehow I failed to include it in the final version. In any case, in the early draft I stated that these white flowered annual herbs are lightly scattered on open, grassy slopes and flats. They are physically quite different from our other popcorn flower species, with their sprawling, leafy branches. ●R: Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Siskiyou County to San Diego County. ●H: annual herbs typically with several stems from the base, which range from prostrate to decumbent (but ultimately ascending); sometimes plants produce generally erect stems. The lower leaves, which are produced in rosettes, are linear to linear oblanceolate and up to 5 cm. long, while the cauline leaves, which become reduced in size upwards, are linear. The flowers are produced in elongated terminal spikes that are strongly coiled at the apex, and the five lobed corollas are white and about 2 to 4 mm. wide. The fruit consists of (usually) four nutlets that are about 2 mm. long. ❀March-May.

!***Plagiobothrys nothofulvus*** (A. Gray) A. Gray [*Eritrichium nothofulvum* A. Gray]. COMMON POPCORN FLOWER. This well known wildflower is widespread and locally common to abundant in open and usually grassy habitats at all elevations in the Tassajara region. It was even more common during the first spring after the Basin Complex Fire of 2008. ●R: Pacific Slope of temperate North America, from Washington to northern Baja California. ●H: annual herbs with one to several erect or ascending stems that range from about 2 to 6 dm. (8-24") tall. The lower most leaves, which are produced in basal rosettes, are mostly oblong-oblanceolate and about 3 to 10 cm. long, while the cauline leaves are much reduced, oblong to lance-oblong, and remotely scattered on the stems. The flowers are produced in elongated terminal spikes that are strongly coiled at the apex, and the five lobed white corollas range from about 5 to 9 mm. wide. The fruits consist of one to three nutlets that are about 2 mm. long; the nutlets are at first enclosed by the enfolding calyx lobes, but the calyx eventually disarticulates below the lobes, and falls off as a unit. ❀March-May.

Plagiobothrys tenellus (Nuttall) A. Gray [*Myosotis tenella* Nuttall]. LITTLE POPCORN FLOWER. This rather inconspicuous species is widespread and locally common to abundant in open and usually grassy habitats at lower and intermediate elevations in the Tassajara region, especially in exposed areas with poor soils. ●R: widely distributed in temperate western North America, from British Columbia, Idaho and Utah to northern Baja California. ●H: annual herbs with one to several slender stems that range from about 1 to 3 dm. (4-12") tall. The lower most leaves are produced in basal rosettes, and are generally lance-oblong and about 1.5 to 5 cm. long. Upper leaves are few, much reduced, and remotely scattered on the stems. The flowers are produced in terminal spikes that are coiled at the apex. The five lobed white corollas are about 2 to 3 mm. wide. The fruit consists of four roughly textured and distinctively cross shaped nutlets about 1 to 2 mm. long. ❀March-May.

+***Plagiobothrys trachycarpus*** (A. Gray) I. M. Johnston [*Krynitzkia trachycarpa* Gray]. ROUGH FRUITED POPCORN FLOWER. This entry is based on a specimen that was collected along the Carmel River in Pine Valley by T. Gordon, K. Kimbrough and M. H. Grayum in June of 1976 (SFV 8069). Based on the number of herbarium specimens that have collected on and near the Hastings Reservation, this species appears to be rather common in the upper Carmel Valley region. ●R: Central Valley and the Coast and western Transverse ranges, from Marin, Butte and Placer counties to Ventura County. Also in the western Peninsular Ranges in San Diego County. ●H: annual herb of generally wet habitats with prostrate to ascending stems that range from about 5 to 40 cm. (2-16") long. The leaves range from linear obtuse to narrowly oblanceolate, and the larger lower leaves are up to 10 cm. long. The flowers are produced in lax and leafy bracted racemes, and the five lobed corollas range from about 1.5 to 4 mm. in diameter; the corollas are white with yellow appendages. The generally ovoid to wide ovate and roughly textured nutlets are about one to 2 mm. long. ❀March-May.

Plagiobothrys species that occur in areas of the Santa Lucia Mountains near to the Tassajara region include *P. bracteatus*, (Hastings Reservation), *P. collinus* var. *californicus* and var. *fulvescens* (Hanging Valley and Hastings Reservation), *P. reticulatus* and *P. reticulatus* var. *rossianorum* (Hastings Reservation), and *P. uncinatus* (Hanging Valley and Hastings Reservation).

BRASSICACEAE (*Cruciferae*). MUSTARD FAMILY.

Brassicaceae consists of about 330 genera and 3,780 species of annual and perennial herbs that are primarily native to the temperate regions of the northern hemisphere. This family includes many common vegetables, or 'cole crops,' such as bok-choy, turnips, radish, daikon, rutabagas, mustard greens (and seeds) and water cress. It is from one species, *Brassica oleracea*, that a number of vegetables have been developed; these include broccoli, cauliflower, cabbage, kale, brussels sprouts and kohlrabi. *Brassicaceae* also includes many weedy plants, as well as a number of plants that have been domesticated for their ornamental appeal. This family is well represented in California by both native and introduced species, and in the Tassajara region it is represented by thirteen native species and five introduced species. The name of this family is based on the name of one of its genera, *Brassica*, which is the Latin name for cabbage. In many older the name *Cruciferae* is applied to this family, and this name refers to the cross like pattern of the corollas of its species, which consist of four petals.

1a. Fruits less than three times longer than wide (silicles):
2a. Fruits one seeded:
3a. Fruits with conspicuous marginal wings, the body glabrous or nearly so. . . . . ***Thysanocarpus***.
3b. Fruits not winged, the body covered with short, stiff hairs. . . . . ***Athysanus***.
2b. Fruits two to many seeded:

4a. Fruits acute at both ends, and thus elliptical. . . . . ***Draba***.
4b. Fruits roundish to triangular, and usually notched at the apex:
5a. Fruits triangular to heart shaped, and containing many seeds. Plants erect. . . . . ***Capsella***.
5b. Fruits ovoid to orbicular and two seeded. Plants prostrate. . . . . ***Lepidium***.
1b. Fruits more than three times longer than wide (siliques):
6a. Small (bonsai-like) evergreen perennials with woody above ground roots that grow out of crevices in cliffs and rock outcrops. Petals reddish purple or sometimes pinkish white. . . . . ***Boechera***.
6b. Plants not like the above, and not restricted to cliffs and rock outcrops:
7a. Petals narrowly oblong or oblong linear, channeled, and curved backward. Sepals pouched at the base and turned inward toward the apex, and thus the calyx is urn shaped. Sepals nearly black or purplish black (*S. glandulosus*), or purple, purplish, gray green or yellowish (*S. tortuosus*). . . . . ***Streptanthus***.
7b. Plants with flowers that are not like the above:
6a. Siliques (fruits) turned downward in maturity. . . . . ***Caulanthus***.
6b. Siliques erect, ascending or widely spreading in maturity:
7a. Petals orange. . . . . ***Erysimum***.
7b. Petals not orange:
8a. Petals white, white with pink or rose tinges, or creamy white (sepals are yellow or yellowish in *Turritis*):
9a. Cauline leaves petiolate, and pinnately or palmately divided into leaflets. . . . . ***Cardamine***.
9b. Cauline leaves sessile and clasping, and simple with entire margins. . . . . ***Turritis***.
8b. Petals yellow or pale yellow:
10a. Plants generally of wet and/or deeply shady habitats (except after fires) . . . . . ***Barbarea***.
10b. Plants generally of open and dry habitats:
11a. Siliques terminating with a fairly stout and conspicuous beak. . . . . ***Brassica***.
11b. Siliques beakless or with a slender and obscure beak. . . . . ***Sisymbrium***.

ATHYSANUS. DWARF SAND WEED.

This is a very small genus that consists of only two species, both of which are endemic to temperate western North America. The name is derived from the Greek words *a*, without, and *thusanos*, fringe, on account of the wingless fruits (in contrast to winged fruits of the genus *Thysanocarpus*, to which the type species of this genus, *A. pusillus*, was originally assigned).

!***Athysanus pusillus*** (Hooker) E. Greene [*Thysanocarpus p.* Hooker]. These unique plants are widespread and locally common in open habitats at lower and intermediate elevations in the Tassajara region, and they are particularly abundant in sandy soiled areas on the flood plains of Tassajara Creek. They were even more common during the spring of 2009, due to the fire in the preceding year. ●R: western North America, from British Columbia and Montana to northern Baja California. ●H: small annual herbs with and erect and upwardly branched stem that range from about 1 to 3 dm. (4-12") tall. The leaves are about .5 to 2 cm. long and produced in the lower part of the plant, the lower most, which are sometimes produced in rosettes, are petiolate and mostly broadly elliptical with remotely toothed margins, while the upper are reduced, mostly ovate to oblong, sessile, and often have entire margins. The very small flowers are produced in elongating terminal racemes, and the corolla consists of four white petals about 1 to 2 mm. long. The fruits are orbicular and about 2 to 2.5 mm. wide, and are generally turned downward on pedicels about 1 to 4 mm. long. The fruits are by far the most conspicuous feature of this species. ❁March-June.

BARBAREA. WINTER CRESS.

Barbarea consists of twenty two species of North America, Eurasia, North Africa and Australia. The genus was named for Saint Barbara.

Barbarea orthoceras Ledebour. AMERICAN WINTER CRESS. Although this species occurs in wet or moist habitats at all elevations in Tassajara region, it is uncommon. ●R: widely distributed in the northern temperate regions of Eurasia and North America. ●H: perennial or biennial herbs with erect stems that range from about 2 to 4 dm. (8-16") tall. The petiolate and pinnately lobed lower leaves are up to 10 cm. long, and are generally oblanceolate in outline; the terminal leaflets, the roundish to oblong terminal leaflet is by far the largest (sometimes the leaves lack lateral lobes). The upper leaves are sessile and reduced in size. The flowers are produced in elongating terminal racemes, and the corollas consist of four yellow petals about 4 to 6 mm. long. The fruits are slender and upwardly appressed or ascending siliques about 2.5 to 3.5 cm. long. ❁March-May.

BOECHERA. ROCK CRESS.

Boechera consists of about 110 species that are native to temperate North America and eastern Siberia. This is a newly recognized genus that has been segregated from the genus *Arabis* due to the findings of phylogenetic research. The genus is named for the Danish cytogeneticist T. W. Boecher (1909-1983).

Boechera breweri (S. Watson) Al-Shehbaz [*Arabis breweri* S. Watson]. BREWER'S ROCK CRESS. These showy flowered bonsai like plants are rather common on cliffs and major rock outcrops at all elevations in the Tassajara region. ●R: Cascade, Coast and western Transverse ranges, from Curry and Jackson counties in southwestern Oregon to the Santa Lucia Mountains of Monterey County. Also in the northern Sierra Nevada foothills, from Butte and Plumas counties to Tuolumne County, on the Sutter Buttes, and a disjunct population occurs in the Rose Lake region of Ventura County. According to the Consortium of California Herbaria database, disjunct populations also occur in the southern Sierra Nevada: in the Kaiser Peak region of Fresno County and in the Spanish Needles region of Kern County. ●H: small evergreen perennials with woody above ground roots, and erect or ascending stems that range from about 8 to 20 cm. (3-8") tall. The basal leaves are petiolate and produced in dense tufts; the blades are spatulate to oblanceolate and about 1 to 3 cm. long. The cauline leaves are reduced in size, generally lanceolate, and have sessile, clasping bases. The flowers are produced in elongating terminal racemes, and the corollas consist of four reddish purple or sometimes pinkish white petals

about 6 to 9 mm. long. The sepals are often purple or purplish. The fruits are slender and outwardly spreading siliques about 3 to 7 cm. long; these contain numerous seeds about 1 mm. long. ֍March-July.

BRASSICA. MUSTARD.

This is a genus that consists of about 35 species of Eurasia and North Africa, and that is especially well represented in Mediterranean regions. *Brassica* is the Latin name for cabbage.

Brassica nigra (Linnaeus) Koch [*Sinapis n*. L.]. BLACK MUSTARD. This species is weedy in the vicinity of The Caves, and it has been seen along Tassajara Road in the vicinity of China Camp, and at the beginning of the road to The Caves. ●R: a common weed in California, native to Eurasia. ●H: annual herbs that range from about 3 to 20 dm. (12-80") tall. The leaves are highly variable. The lower leaves, which are about 10 to 20 cm. long, are generally obovate in outline and deeply pinnately lobed, the outer, and especially the terminal lobe, being the largest. The middle cauline leaves general deltoid to ovate and simple or irregularly lobed, and the upper most leaves are typically narrowly lanceolate and entire. The flowers are clustered at the ends of the elongating and racemose branches of an open panicle. The corollas consist of four yellow petals about 7 to 11 mm. long, and the fruits are upwardly appressed or ascending siliques about 1 to 2 cm. long. ֍May-July.

CAPSELLA.

Capsella is a small genus, for it includes only four species, all of which are native to Eurasia. The name is Latin and means a little box resembling a wallet or purse.

Capsella bursa-pastoris (Linnaeus) Medicus [*Thlapsi b.-p*. L.]. SHEPHERD'S PURSE. This easily identifiable species is scattered in areas of the Tassajara region that have had much exposure to human activity, such as in and around the developed area of the hot springs and at The Caves, along Tassajara Road, and occasionally along trails and at campsites. ●R: a common weed nearly throughout North America; it is native to Eurasia. ●H: annual herbs commonly branched at the base into several stems that range from about 1 to 4 dm. (4-16") tall. The basal leaves, which are about 2 to 8 cm. long and produced in rosettes, are generally oblanceolate in outline and deeply to shallowly pinnately lobed, the lobes being regularly spaced or not. The cauline leaves are reduced in size, sessile, generally lanceolate, and clasp the stem at the base. The small flowers are produced in elongating terminal racemes, and the corollas consist of four white or pinkish petals about 2 mm. long. The fruit is a generally heart shaped silicle about 4 to 8 mm. long. ֍February-June.

CARDAMINE. MILKMAIDS, BITTER CRESS.

Cardamine consists of about 200 species of annual and perennial herbs that occur in temperate regions nearly worldwide. The name is derived from the Greek word *kardamon*, which was a name for a cress species.

1a. Plants with fleshy tuber like rhizomes; the leaves are of two types: those that rise from the ground independently from the stems, and those that are produced on the stems. Leaves simple or divided into 3 (or sometimes 5) leaflets. . . . . ***C. californica***.
1b. Plants with vertical taproots; all the leaves are produced on the stems. Leaves divided into 7 seven or more leaflets. . . ***C. oligosperma***.

!*Cardamine californica* (Nuttall in Torrey & A. Gray) E. Greene [*Dentaria c*. Nutt. in T. & G.]. MILKMAIDS. Reed Rollins, in the first edition of *The Jepson Manual* (1993), recognized five varieties within the *C. californica* complex, and Philip Munz, in his *A California Flora* (1959), and Leroy Abrams, in volume two of his *Illustrated Flora of the Pacific States* (1944), recognized the same varieties, but under the synonymous name of *Dentaria californica*. Ihsan Al-Shehbaz, in the online version of second edition of *The Jepson Manual*, notes that critical studies of this complex reveal that only a fraction of the overall continuous variation of this species was formerly recognized, and because detailed molecular and cytological studies have not yet been made, a broader species concept has been adopted. In other words, the previously recognized varieties have been reduced to synonyms of the typical species for the time being. In any case, plants best fitting the descriptions of two of the previously recognized varieties occur in the Tassajara region:

1a. Rhizomatic leaves three foliate, the leaflet margins entire. Foliage thin. . . . . ***C. californica*** var. ***californica***.
1b. Rhizomatic leaves simple, the margins wavy lobed (sinuate). Foliage semi succulent. . . . . ***C. californica*** var. ***sinuata***.

The variety *californica* is scattered in shady woodland habitats in the upper regions of Church Creek and around the Church Creek Divide, and var. *sinuata* is locally common in shady habitats in the vicinity of Tassajara Hot Springs and along Willow Creek (where its occurs primarily on flood plains), and it also occurs on Pine Ridge. ●R: Coast Ranges, Sierra Nevada, Transverse and Peninsular Ranges, from southern Oregon to northern Baja California. ●H: perennial herbs from tuber like rhizomes which annually produce erect stems that range from about 1 to 4 dm. (4-16") tall. The primary leaves, which rise from the rhizome independently of the flowering stems, are simple and roundish or cordate (in var. *sinuata*), or divided into three roundish to ovate leaflets about 2 to 5 cm. wide (in var. *californica*). The smaller cauline leaves are petiolate and divided into three lanceolate or ovate leaflets or lobes, the margins of which can be either entire or toothed. The flowers are produced in terminal racemes on pedicels about 1 to 2.5 cm. long. The corollas consist of four petals about 9 to 14 mm. long, which are white or white with a pink tinge, or sometimes with darker shades of rose, particularly on the outside. The fruit is a linear and generally ascending silique about 2 to 5 cm. long. ֍January-April (May).

!!*Cardamine oligosperma* Nuttall. FEW SEEDED BITTER CRESS. In normal years this species is occasionally seen in shady areas along perennial and intermittent streams, and also on shady woodland slopes where the soil remains wet for extended periods of time. In sharp contrast, during the first spring after the Basin Complex Fire of 2008, *Cardamine oligosperma* was exceedingly abundant on flood plains, and up to the highest conceivable high water levels. This made me wonder if some of the seeds from which these higher level plants sprouted were deposited during the flood of late January, 1914. During this event it appears that both Tassajara and Cabarga creeks reached their highest known levels in the developed area of hot springs. The suspension bridge to the bath house and the bridge over Cabarga Creek were swept away, the basements of the kitchen and club house [now the guest dining room] "Vanished downstream," the camping grounds in The Flats were made "A wreck," and the vegetable garden, which was located in the vicinity the present bath house, was "Washed away" ("Jamesburg Notes," *Monterey Daily Cypress*, 2/4/1914; "Notes From Jamesburg," *Salinas Weekly Journal*, 2/7/1914). The full exposure to sunlight that most of

the plants of the spring of 2009 had to endure appeared not to have had a detrimental effect on them. During the drought years of the late 1980s this species was very rare in this region. ●R: Western temperate North America, from British Columbia, Montana and Colorado to northwestern Baja California. In the California Floristic Province the range of this species extends southward to at least Fresno County in the Sierra Nevada, and to northwestern Baja California in the Coast, Transverse and Peninsular ranges. ●H: annual or sometimes biennial herbs usually with several erect or ascending stems that range from about 1 to 3 dm. (4-12") tall. The lower leaves, which are usually produced in rosettes, are up to 9 cm. long, and are pinnately divided into five to 11 roundish to obovate petiolate leaflets, the terminal leaflet being the largest. The cauline leaves are similar, but become reduced in size upwards of the stems. The small flowers are produced in elongating terminal racemes, and the corollas consist of four white petals about 2 to 4 mm. long. The fruits are narrowly linear and upwardly ascending siliques about 15 to 25 mm. long. ❁March-June.

CAULANTHUS. WILD CABBAGE.

Caulanthus consists of seventeen species that are endemic to temperate western North America; most of the species occur in desert regions. The name is derived from the Greek words *kaulos*, stem, and *anthos*, flower. The name was applied to the genus by Sereno Watson, and in his description of the type species, *C. crassicaulis*, he stated that this species is "Known as 'wild cabbage,' and is sometimes used for a barely tolerable substitute for the cultivated plant. This fancied affinity to the cauliflower tribe of more favored regions has suggested the generic name" (Report of the Geological Exploration of the Fortieth Parallel, vol. 5, Botany, 1871).

!*Caulanthus lasiophyllus* (Hooker & Arnott) Payson [*Turritis lasiophylla* H. & A.; *Guillenia lasiophylla* (H. & A.) E. Greene; *Thelypodium lasiophyllum* (H. & A.) E. Greene]. CALIFORNIA MUSTARD. Prior to the Basin Complex Fire of 2008, this species was rare in the Tassajara region. I had seen it at one site, a small serpentine outcrop along the Pine Ridge Trail about ¼ of a linear mile east of the Church Creek Divide, and James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), listed this species as uncommon in grasslands on Chew's Ridge between 600 and 1200 m. (1,968-3,937'). During the spring of 2009 this species was a frequently sighted along the trails in the vicinity of the hot springs, and it was most common along Tony's Trail, were it often occurred in small groups. ●R: western North America, from British Columbia and Utah to northern Baja California. ●H: erect annual herbs with simple or upwardly branched stems that range from about 2 to 10 dm. (8-40") tall. The leaves are alternate, petiolate, and about 3 to 12 cm. long; the lower leaves, which are pinnately divided into fairly regular to highly irregular lobes, range from broadly lanceolate to oblanceolate or oblong in outline, while the upper leaves are reduced, generally linear, and entire. The small flowers are produced in elongating terminal racemes, and the corollas consist of four white to yellowish or pinkish petals about 3 to 6 mm. long. The reflexed fruits are slender siliques about 1 to 7 cm. long. ❁March-June.

Another *Caulanthus* species occurs in an area near to the Tassajara region: *C. coulteri* var. *lemmonii*, which present in the lower Arroyo Seco Canyon.

DRABA.

Draba consists of about 380 species of the temperate regions of the northern hemisphere and the tropical and temperate mountains of South America. The name is derived from the Greek word *drabe*, acrid, for the taste of crucifer leaves.

Draba verna Linnaeus [*Erophila v.* (Linnaeus) Chevall]. VERNAL WHITLOW GRASS. These small annual herbs are widely scattered at lower and intermediate elevations in the Tassajara region, and are locally common in areas with more or less poor and sandy soils, such as on open flats on the floodplains of Tassajara Creek. ●R: widely distributed in temperate and boreal North America and Eurasia. According to some texts this species is native only to Eurasia, while in others it is treated as circumboreal species. ●H: annual herbs with one to several slender stems from the base; the stems range from about .5 to 2.5 dm. (2-10") tall. The leaves are strictly basal and produced in rosettes; the blades are spatulate to oblanceolate with entire or toothed margins, and about 1 to 2.5 cm. long. The flowers are produced in terminal racemes, the corollas consist of four two lobed white petals about 2 to 3 mm. long. The fruit is a generally elliptical silicle about 5 to 10 mm. long; these contain about 30 to 60 minute seeds. ❁January-April.

ERYSIMUM. WALLFLOWER.

The genus *Erysimum* consists of about 150 species of North America, Eurasia and North Africa. The name is derived from the Greek word *eryomai*, to help or save, for the alleged medicinal properties of some species.

Erysimum capitatum (Douglas ex Hooker) E. Greene [*Cheiranthus capitatus* Doug. ex Hook.]. WESTERN WALLFLOWER. Due to its showy orange flowers, this species ranks among the most well known of the wildflowers of the Tassajara region. It is present at all elevations, and it usually occurs in small groups in open and often rocky places. ●R: widely distributed in temperate North America, from Washington and Ohio to central Mexico. ●H: biennial or short lived perennial herbs with erect and usually unbranched stems that range from about 2 to 10 dm. (8-40") tall. The leaves, which are crowded towards the base of the plant, are oblanceolate to linear-lanceolate, commonly with remotely toothed margins, and ranging from about 4 to 15 cm. long. The leaves become increasing remote and reduced in size upward on the stems. The showy flowers are produced in clusters terminating racemes which become increasingly elongated with age. The corollas consist of four bright orange petals about 12 to 20 mm. long, and the fruit is a slender four angled silique about 5 to 10 cm. long. ❁March-July.

LEPIDIUM. PEPPER GRASS.

Lepidium consists of about 220 species that are represented on all continents except for Antarctica. The name is derived from the Greek word *lepidion*, little scale, and refers to the shape of the fruits.

Lepidium strictum (S. Watson) Rattan ex B. Robinson in A. Gray et. al. [*L. oxycarpum* var. *s.* S. Watson]. WAYSIDE PEPPER GRASS. The only localities where this species is known to occur in the Tassajara region are both along the road to The Caves. One is the vicinity of the junction with Tassajara Road, and the other on The Mesa. Plants were seen on both the banks of the road and on its surface. This species also occurs in the lower Arroyo Seco Canyon and in the Cachagua area. ●R: an uncommon plant of the California Floristic Province, from southern Oregon to northern Baja California. ●H: annual herbs with several prostrate or nearly prostrate stems that

range from about .5 to 2 dm. (2-8") long; the stems radiate outward from the root crown. The basal leaves are about 3 to 7 cm. long and bipinnately divided into narrow and generally toothed segments; upper leaves become reduced in size and complexity. The minute flowers are produced in crowded racemes which terminate the branches. The corollas consists of four white petals that are about .2 to .5 mm. long. The fruit is an ovoid to orbicular and conspicuously notched silicle about 2.5 to 3.5 mm. long. ❁March-May.

SISYMBRIUM.

Sisymbrium consists of about 40 species that are native to Eurasia and northern Africa, and one that is native to North America. The name is derived from a generic Greek word for cruciferous plants.

1a. Siliques (fruits) widely ascending to widely spreading, and about 5 to 10 cm. long. . . . . ***S. altissimum***.
1b. Siliques upwardly appressed, and only about 1 to 1.5 cm. long. . . . . ***S. officinale***.

Sisymbrium altissimum Linnaeus. TUMBLE MUSTARD. This species occurs in and around the Church Ranch at The Caves, on the floodplains of Tassajara Creek, both above and below the hot springs, and occasionally in other areas in the Tassajara region. The common name refers to the tumbleweed nature of this species, for after they die, they become detached from the roots and, due to their roundish crowns, tumble along in a breeze (this is an effective means of seed dispersal). ●R: a common weed in North America; native to Europe. ●H: erect and extensively branched annual herbs that range from about 5 to 10 dm. (20-40") tall. The leaves are alternate and petiolate. The lower leaves are about 8 to 15 cm. long, mostly oblong-elliptical in outline, and pinnately or irregularly parted into generally ovate to lanceolate lobes. The smaller upper leaves are pinnately divided into narrowly linear segments. The flowers are clustered at the ends of the elongating and racemose branches of an open panicle. The corollas consist of four pale yellow petals about 6 to 8 mm. long, and the fruits are widely ascending or spreading siliques about 5 to 10 cm. long. ❁April-July.

Sisymbrium officinale (Linnaeus) Scopoli [*Erysimum o.* L.]. HEDGE MUSTARD. This *Sisymbrium* is also weedy in the vicinity of the Church ranch at The Caves, along the floodplains of Tassajara Creek, both upstream and downstream from the hot springs, and occasionally in other areas in the Tassajara region. ●R: a common weed in North America; native to Europe. ●H: erect annual herbs with simple or branched stems that range from about 2 to 10 dm. (8-40") tall. The leaves are highly variable. The basal leaves are long petioled, about 5 to 10 cm. long, generally oblanceolate in outline, and pinnately lobed or divided (the terminal lobe is the largest). The cauline leaves are divided into 1 to 2 (or 3) pinnate pairs of narrow and usually retrorse lobes, and terminated with a narrowly oblong lobe. The upper most leaves are sessile, hastate with long and narrow lower lobes and a much larger terminal lobe. The flowers are clustered at the ends of racemose branches of an open panicle. The corollas consist of four yellow petals about 3 to 4 mm. long, and the fruits are upwardly appressed or ascending siliques about 8 to 15 mm. long. ❁April-July.

STREPTANTHUS. JEWEL FLOWER.

The genus *Streptanthus* consists of 35 species of the southwestern United States and northern Mexico. This genus is especially well represented in California, for 28 species occur within the boundaries of the state, and 24 of these, plus nine lesser taxa, are endemic to the California Floristic Province. Five of the taxa that occur in California are uncommon, and sixteen are very rare. The name is derived from the Greek words *streptas*, twisted, and *anthos*, flower, on account of the backwardly curled and wavy margined petals. The common name refers to the inflated and usually colorful sepals, which give the flowers the appearance of precious stone.

1a. Upper leaves linear to lanceolate and usually with toothed margins. . . . . ***S. glandulosus***.
1b. Upper leaves oblong-ovate to orbicular, convex, and with entire margins. . . . . ***S. tortuosus***.

∨***Streptanthus glandulosus*** Hooker. COMMON JEWEL FLOWER. This distinctive species is widely scattered in the Tassajara region, but rare and restricted to serpentine outcrops or highly exposed slopes with poor or disturbed soils. I have seen this species at only four sites in this region: on a steep slope along the Horse Pasture Trail in the Horse Pasture, on a small serpentine outcrop along the Pine Ridge Trail about ¼ of a linear mile east of the Church Creek Divide, on a steep south facing slope along the Pine Ridge Trail about ½ of a linear mile east of the Church Creek Divide, and on serpentine outcrops on Chew's Ridge. Vern Yadon, in his unpublished field notes, reported this species to be frequent along the Black Cone Trail in July of 1980, three years after the Marble Cone Fire. ●R: Coast Ranges, from Tehama and Mendocino counties to the Santa Lucia Mountains of San Luis Obispo County. ●H: erect annual herbs with simple or branched stems that range from about 3 to 6 dm. (1-2') tall. The leaves are alternate, the lower are about 1 to 8 cm. long, petioled, generally oblanceolate, and with prominent callus tipped marginal teeth. The upper leaves are reduced in size, lanceolate to linear, with sessile, clasping bases, and entire or toothed margins. The flowers are produced in elongating terminal racemes. The corollas consist of four oblong-linear and reflexing petals about 6 to 12 mm. long, that are pale to dark purple. The more showy calyx is spherical, purplish black, and with a shiny, silky texture (ours). The fruits are narrow and ascending or spreading siliques about 5 to 9 cm. long. ❁April-May.

<>***Streptanthus tortuosus*** Kellogg. MOUNTAIN JEWEL FLOWER. According to Vern Yadon's unpublished field notes, "Elephant Back, NE corner of section 35" (1980), this species occurs on a rock outcrop on a northerly extension of the Elephant's Back (a.k.a. White Cone), above the upper watershed of Tassajara Creek. Mr. Yadon also collected a specimen of this species in June of 1979 at "Church Creek Camp (above W side)—SE corner sec. 14, NE corner sec. 23, Chew's Ridge Quad." [T19S R3E] (PGM 1938). This was on the ridge between the upper watershed of Tassajara Creek and the watershed of Church Creek, which Vern and Ron Branson named "Never Again Ridge," due to the difficulties these men experienced during their cross country exploration of it. ●R: Coast Ranges and Sierra Nevada, from Shasta County to Sonoma and Tulare Counties, with disjunct populations scattered at higher elevations in the Santa Lucia Mountains of Monterey and San Luis Obispo counties. ●H: annual or biennial herbs with simple or branching stems that range from about 1 to 10 dm. (4-40") tall. The lower leaves are petiolate, spatulate-obovate to oblong, entire or toothed, and about 3 to 8 cm. long. The upper leaves are oblong-ovate to orbicular, about 2 to 8 cm. long, convex with entire margins, and often so deeply clasp the stem that the point of attachment is near mid leaf. The flowers are produced in elongating terminal racemes. The corollas consist of four broadly linear and reflexed petals about 10 to 12 mm. long, that are rose purple or yellowish white and usually purple veined; the sepals are usually purple or purplish. The fruit is a narrowly linear and typically arcing silique about 8 to 12 cm. long. ❁May-Aug.

THYSANOCARPUS. LACE POD, FRINGE POD.

Thysanocarpus consists of six species that are native to temperate western North America. Four of the species occur in California, and two are endemic to the California Floristic Province. The name is derived from the Greek words *thusanos*, fringe, and *karpos*, pod, on account of the winged margins of the fruits.

1a. Plants usually glabrous throughout. Lower leaves not produced in rosettes, and linear oblanceolate and nearly entire to dentate or pinnately slender lobed. Cauline leaves linear to linear-elliptic, the bases not or only slightly auriculate (lobed and clasping), the blades entire to pinnately lobed or toothed. . . . . ***T. laciniatus***.

1b. Lower stems usually pubescent. Basal leaves in dense to very loose rosettes (or not), and nearly entire to dentate or pinnately round lobed. Cauline leaves generally lanceolate and usually strongly auriculate at the base:

2a. Silicles (fruits) 5.5 to 7 (-9) mm wide; the wings are perforated. . . . . ***T. curvipes*** subsp. ***elegans***.

2b. Silicles 3-5.5 (-6.5) mm wide; the wings are entire, crenate, divided into spoon-shaped lobes, or perforated. . . . . ***T. curvipes*** subsp. ***curvipes***.

Thysanocarpus curvipes Hooker subsp. ***curvipes*** P. J. Alexander and Windham. COMMON LACE POD. This taxon is widespread and locally common in open and usually grassy habitats at all elevations in the Tassajara region, particularly in areas with sandy or gravely soils, such as along the flood plains of Tassajara Creek. It is often found growing in association with subspecies elegans, and plants that are intermediate between the two are also common. ●R: temperate western North America, from British Columbia, Montana and Colorado to northern Sonora and northern Baja California. ●H: erect annual herbs with simple or upwardly branched stems that range from about 2 to 5 dm. (8-20") tall. The basal leaves are produced in rosettes or rosulate groups; these are petiolate and generally oblong-lanceolate to oblanceolate, about 1 to 7 cm. long, and have margins that range from remotely toothed to pinnately lobed. The cauline leaves, which become reduced in size upwards on the stems, are generally oblong-lanceolate to lanceolate, and have sessile and usually strongly clasping bases. The small flowers are produced in elongating terminal racemes, and the corollas consist of four petals about 1 mm. long; the petals are at first white, but turn rose lavender with age. The fruits are disk like silicles about 5 to 7 mm. wide, that have thin paper like wings. The silicles, which are turned downward on pedicels about 3 to 5 mm. wide, are by far the most conspicuous feature of this species. ❀February-June.

Thysanocarpus curvipes subsp. ***elegans*** (Fischer & C. Meyer) P. J. Alexander & Windham [*T. elegans* F. & M.; *T. curvipes* var. *elegans* (F. & M.) Robinson in A. Gray]. ELEGANT LACE POD. This taxon occurs in open habitats at all elevations in the Tassajara region, and it is often found growing in association with subspecies *curvipes*. ●R: widely distributed in the California Floristic Province. ●H: similar to the typical species, except for usually larger fruits that have perforated wings. ❀February-June.

Thysanocarpus laciniatus Nuttall [*T. l.* var. *crenatus* (Nuttall) Brewer]. NARROW LEAVED LACE POD. This species is widely scattered and locally common in open and usually grassy habitats in the Tassajara region, mostly at lower to intermediate elevations. Many of the local plants have silicle wings with well defined 'rays' or 'spokes;' such plants correspond to a taxon that has been recognized as var. *crenatus*. ●R: Coast Ranges, southern Sierra Nevada, Transverse and Peninsular ranges, from Shasta and Tulare counties to northern Baja California. This species also occurs on the four largest islands off the coast of southern California, in the Panamint Mountains of Inyo County, and in desert areas of southern California. ●H: slender stemmed annual herbs with simple or branching stems that range from about 1 to 4 dm. (8-16") tall. The narrow leaves are alternate and about 1 to 4 cm. long. The lower and middle leaves are generally oblong-linear and sub entire to pinnately slender lobed, while the upper are usually entire. The tiny flowers are produced in elongating terminal racemes, and the corollas consist of four white petals that are about 1 mm. long. The fruit is a disk like and one seeded silicle about 3 to 6 mm. wide (inclusive of the thin and paper like wings). ❀February-May.

TURRITIS. TOWER MUSTARD.

Turritis is a small genus that consists of only three species; two of these are native to Eurasia, and one is a circumboreal species. The name is Latin and means tower, on account of the habit of growth of the type species, *T. glabra*.

Turritis glabra Linnaeus [*Arabis g.* (L.) Bernhardi]. COMMON TOWER MUSTARD. This distinctive species occurs at all elevations in the Tassajara region, mostly in open and grassy woodland habitats, but it is generally uncommon, and it tends to occur singularly or in small groups. I have most frequently encountered this species along the lower portion of Horse Pasture Trail, in the vicinity of Blackberry Brook. ●R: widely distributed in the temperate and boreal regions of North America and Eurasia. ●H: Biennial or short-lived perennial herbs typically with a singular and very erect stem that range from about 4 to 15 dm. (16-60") tall. The leaves of the basal rosettes, which are petiolate and about 6 to 15 cm. long, are highly variable. They range from oblong to narrowly or broadly oblanceolate, and in some plants the margins can be pinnately deep lobed, while in others the margins can be faintly and irregularly toothed. The smaller cauline leaves, which increasingly become reduced in size upwards, are lanceolate to ovate, entire, and have sessile, clasping bases. The flowers are produced elongating terminal racemes that occupy the upper half of the plant in maturity. In some plants the inflorescence can be upwardly branched. The corollas consist of four creamy white petals about 5 to 7 mm. long, but at first glance the flowers may appear to be yellow, on account of the color of the sepals. The fruits are slender and upwardly appressed or ascending siliques about 4 to 10 cm. long. ❀March-June.

Rorippa palustris, a native *Brassicaceae* species, occurs in the lower Arroyo Seco canyon, and thus may be present somewhere in this region. *Brassicaceae* species that have been weedy in and about the developed area of Tassajara in the past include *Brassica rapa* (Field Mustard), *Hirschfeldia incana* and *Raphanus sativus* (Wild Radish).

CAMPANULACEAE. BELL FLOWER FAMILY.

Campanulaceae consists of about 84 genera and approximately 2,400 species that range from small annual herbs to shrubs and a few small trees. This family is widely distributed, but the majority of the species occur in the northern hemisphere and in southern Africa.

1a. Perennial herbs of wet habitats. Corollas strongly bilabiate. Filaments and anthers fused into a tube. . . . . ***Lobelia***.

1b. Annual herbs of dry or wet habitats. Corollas symmetrical or only slightly bilabiate. Filaments and anthers free or only the filaments are fused into a tube:

2a. Corollas white and slightly bilabiate. Leaves basal and cauline, but the basal leaves are often absent by the time the flowers open, and the cauline leaves are small, linear and bract like. Filaments fused into a tube above the base. . . . . ***Nemacladus***.

2b. Corollas mostly blue to purple and symmetrical. Leaves well developed on the stems (floral bracts are generally leaf like). Filaments free:

3a. All flowers opening. Capsules dehiscent at the apex. . . . . ***Githopsis***.

3b. Lower flowers cleistogamous (not opening). Capsules dehiscent on the side:

4a. Corollas cylindric and about 3 to 5 mm. long. Sepals broadly triangular. Plants of wet habitats. . . . . ***Heterocodon***.

4b. Corollas rotate and about 5 to 10 mm. long. Sepals narrowly triangular. Plants of dry habitats. . . . . ***Triodanis***.

GITHOPSIS. BLUE CUP.

Githopsis consists of four species (plus five lesser taxa) of annual herbs that are endemic to temperate western North America. Three of the species (and all of the lesser taxa) are endemic to the California Floristic Province. The name means *Githago* like; *Githago* is an obsolete genus of *Caryophyllaceae*, which included plants that are now assigned to *Agrostemma*, the Corn Cockles.

1a. Ovary cylindrical to slightly obconic, narrowed a bit near the middle, the base slightly swollen. . . . . ***G. diffusa***.

1b. Ovary obconic, top slightly narrowed, the base long tapered. . . . . ***G. specularioides***.

∧***Githopsis diffusa*** A. Gray subsp. ***diffusa***. In the first edition of this text I stated that this entry was based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3140, DS 7604), and that according to the note in the envelope that is pasted to the sheet, it was collected "Near Springs." In the spring of 2009 this species was found on the sandy soiled fans of the ravines that open onto the flood plain of Tassajara Creek to the east of the waterfall on Waterfall Creek. ●R: southern Sierra Nevada foothills and the Coast, Transverse and Peninsular ranges, from Monterey and Tulare counties to northwestern Baja California. Also on the Channel Islands. ●H: small annual herbs with simple to diffusely branched stems that range from about 3 to 30 cm. (1-12") long. The alternate leaves, which are about 3 to 15 mm. long, are sessile or nearly so, and the oblong to oblanceolate blades have toothed margins. The flowers are produced singularly at the nodes and ends of the stems. The narrow cylindrical corollas are about 3 to 5 mm. long; the tube is white and the lobes are deep blue. The fruits are club shaped capsules that are about 4 to 8 mm. long. ❀April-June.

Githopsis specularioides Nuttall. This species is widely scattered in open and usually grassy areas in the Tassajara region, but it is uncommon. ●R: from British Columbia and western Montana southward, to the La Panza Range in south central San Luis Obispo County in the Coast Ranges, and to Kern County in the Sierra Nevada. ●H: small annual herbs with simple or branched stems that range from about .5 to 4 dm. (2-16") tall. The alternate leaves are sessile or nearly so, and the blades are about 2 to 6 mm. long. The blades of the lower leaves are ovate and wither early, while the upper leaves have cuneate-obovate to narrowly oblong blades, the margins of which are remotely toothed. The flowers are produced singularly in the axils of the leaves and at the end of the stems. The funnel shaped corollas are about 4.4 to 14 mm. long and have lobes that are shorter than the tube; they are mostly deep to bright blue, and they are frequently exceeded in length by the narrow calyx lobes. The fruits are obconic three celled capsules that are about 4 to 14 mm. long. ❀March-June.

HETEROCODON.

The genus *Heterocodon* consists of one species that is endemic to temperate western North America. The name is derived from the Greek words *heteros*, different, and *kodon*, bell, on account of the bell shaped flowers that are of two kinds: those that open and are thus cross pollinated, and those that do not open, and thus are self pollinated.

Heterocodon rariflorum Nuttall. This inconspicuous species occurs along grassy banked brooks in Pine Valley, and occasionally in similar habitats in Strawberry Valley; it is not known to occur elsewhere in this region. According to the note in the envelope that is attached to the sheet A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901 (Elmer 3141, DS), he collected it in Pine Valley. ●R: widely distributed in western North America, from British Columbia and Montana to northern Colorado and the mountains of San Diego County. ●H: delicate annual herbs with simple or few branched stems that range from about .5 to 3 dm. (2-12") long. The leaves are alternate, sessile, generally roundish with dentate margins, and about 5 to 8 mm. long. The sessile flowers are produced singularly in the axils of the leaves. The lower flowers are cleistogamous (they do not open and are self fertile). The regular flowers have corollas that are about 3 to 5 mm. long; the tubes are white to pale blue, and the lobes are dark blue. The fruit is a capsule that is about 2.5 mm. in diameter. ❀April-July.

LOBELIA.

Lobelia is a widely distributed genus that consists of about 350 species of perennial herbs; many of the species are cultivated for their ornamental appeal. The genus was named for the Flemish botanist Matthias de l'Obel (1538-1616).

∧<>***Lobelia dunnii*** E. Greene var. ***serrata*** (A. Gray) McVaugh [*Palmerella debilis* Gray var. *s.* Gray]. CALIFORNIA LOBELIA. This species is scattered along perennial streams at lower elevations in the Tassajara region, and it most often occurs in seepy areas on cliffs and on rock outcrops; it seems to be particularly fond of such habitats that are in the immediate area of waterfalls. This species has manifested itself in thickets in and around the pool at the base of the lowest of the three waterfalls on Waterfall Creek, but the plants at this location eventually get washed away during high water events. All except for two of the reported or documented populations that occur in the Santa Lucia Mountains are from the watersheds of the Big Sur and Arroyo Seco rivers (the exceptions are a specimen that was collected at Point Sur by Townshend Brandegee in 1888 (UC 102207), and the listing of Slate's Hot Springs as a locality for this species in Howitt & Howell's "The Vascular Plants of Monterey County" [1964]). The Santa Lucia Mountains populations of this species are greatly disjunct, for the nearest ones are in the San Rafael Mountains of Santa Barbara County. ●R: Coast, Transverse and Peninsular ranges, from Monterey County to northern Baja California (the typical species is endemic to the mountains of northern Baja California). ●H: perennial herbs with decumbent to erect stems that range from about 3 to 5 dm. (12-20") long. The stems die back to the rhizome during the winter. The alternate leaves are about 2 to 7 cm. long, and the margins are serrate. The lower leaves are petiolate and the blades range from ovate to oblanceolate; the upper leaves are sessile (or nearly so) and range

from lanceolate to linear-lanceolate. The flowers are produced in terminal racemes. The bilabiate corollas are about 12 to 19 mm. long; the small upper lip is two lobed, and the much larger lower lip has three broad and outwardly spreading lobes. The corolla tubes vary from off white to yellowish white, and the lobes range from light to deep blue. The fruit is an obconic capsule about 6 to 12 mm. long. ֍July-September (October).

NEMACLADUS. THREAD STEM.

The genus *Nemacladus* consists of 18 species of southwestern temperate North America. All of the species occur in California, but only eight are endemic to the California Floristic Province. The name is derived from the Greek words *nemos*, thread, and *clados*, branch, on account of the very slender stems.

Nemacladus ramosissimus Nuttall. In the first edition of this text I stated that:

> This entry is based on two specimens that were collected in the vicinity of Tassajara Hot Springs in June of 1901. According to a note that is enclosed in an envelope pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen (Elmer #3350 DS), it was collected along "Hot Springs Creek, ½ mile above Springs." The exact site of the collection of William Dudley's specimen (DS) is unknown, for the label simply reads "Tassajara Hot Springs, June 11, 1901." This taxon should be looked for in open and dry areas with sandy or gravely soils, especially in openings or disturbed areas in chaparral.

I found a few plants of this very inconspicuous species on May 9th of 2009; they were growing near the base of a steep chaparral slope along on a flood plain of Tassajara Creek, near to the second outbound (from the hot springs) stream crossing of the upstream trail. And thus in was in the vicinity of where Elmer collected his specimen in 1901. ●R: Coast, Transverse and Peninsular ranges, from the Mt. Hamilton region of Santa Clara and Stanislaus counties to northern Baja California, and in the southern Sierra Nevada, from Mariposa County to Kern County. This species is also reported to occur in Utah and New Mexico, but there are no records of this in the USDA's Natural Resources Conservation Service plants database. ●H: small annual herbs with slender and freely branching stems that range from about .5 to 2.5 dm. (2-10") tall. The basal leaves are produced in rosettes; they are generally oblanceolate with toothed margins, and are about 1.3 to 4 cm. long. The basal leaves are shed by the time the flowers begin to open. The cauline leaves are small and narrow bract like structures. The minute flowers are produced in loose racemes on capillary and spreading pedicels that are about 8 to 20 mm. long. The slightly irregular white corollas, which are generally bell shaped, are less than 2 mm. wide. The fruits are bell shaped capsules that are about 1.5 to 2.5 mm. long ֍April-May.

TRIODANIS. VENUS LOOKING GLASS.

Triodanis consists of 7 species that occur in temperate regions and in tropical mountains of North and South America. The name is derived from the Greek words *treis*, three, and *odons*, tooth; I failed to find an explanation of its meaning.

+*Triodanis biflora* (Ruiz, Lopez & Pavon) E. Greene [*Campanula b*. R., L. & P.]. Although I have not seen this species in this region, James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), lists it as being uncommon on Chew's Ridge, and it is also included in the California Native Plant Societies list of the vascular plants of Chew's Ridge. This species usually occurs in disturbed habitats. ●R: widely distributed in the temperate regions of both North and South America. ●H: erect annual herbs with simple or branched stems that range from about .5 to 4 dm. (2-16") tall. The leaves are alternate, sessile, and range from about .5 to 1.5 cm. long. The blades range from ovate to broadly lanceolate or elliptic, and the margins are finely toothed. The sessile flowers are produced in the axils of the leaves. The cleistogamous flowers (small self fertilizing flowers that do not open) are produced on the lower and middle stems, while the opening flowers are produced near the top of the stems. The corollas range from about 5 to 9 mm. long, and the lobes, which are about 4 to 7 mm. long, range from blue to violet or lilac. The fruits are ellipsoid to ovoid capsules about 4 to 7 mm. long. ֍April-June.

CAPRIFOLIACEAE. HONEYSUCKLE FAMILY.

Caprifoliaceae is primarily northern temperate family that consists of five genera and about 210 species; the species range from subshrubs to small trees and vines. Due to the findings of phylogenetic research, many of the genera that have been placed in *Caprifoliaceae*, such as *Sambucus*, the elderberries, have been transferred to other families.

1a. Corollas strongly bilabiate and creamy yellow to reddish orange or greenish. Fruits red to yellowish and juicy. . . . . ***Lonicera***.
1b. Corollas urn or bell shaped, and white with a rose pink tinge. Fruits white, dry and waxy. . . . . ***Symphoricarpos***.

LONICERA. HONEYSUCKLE.

The genus *Lonicera* consists of about 180 species that occur in temperate and subtropical regions of the northern hemisphere. The genus was named for the German herbalist and physician Johann Lonitzer (1499-1569), or perhaps for his son, the German botanist Adam Lonitzer (1528-1586).

1a. Upper leaves united into disk like formations surrounding the stem. Leaves and stems nearly glabrous and not glandular. Corolla yellow to orangish red and glabrous. . . . . ***L. interrupta***.
1b. Upper leaves not (or rarely) united. Leaves and stems mostly covered with fine hairs, the hairs of the inflorescence glandular. Corolla creamy yellow to greenish and often hairy. . . . . ***L. subspicata***.

Lonicera interrupta Bentham. CHAPARRAL HONEYSUCKLE. These vine like plants are widespread and locally common in the Tassajara region, and they occur in all habitat types except for open grasslands. The floral scent is very similar to that of the domestic honeysuckle. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Josephine and Klamath counties in southwestern Oregon to the mountains of San Diego County. Also in the mountains of central Arizona. ●H: semi shrubby evergreen perennial herbs with lanky stems up to 2 m. (±6') or more in length; the stems tend to lean or become entwined on other plants. The opposite and short petiolate leaves are about 1.5 to 3.5 cm. long. The lower leaves have orbicular to elliptical blades, and the uppermost

leaves are fused into disk like structures that surround the stem. The flowers are produced in often elongated terminal panicles that are up to 16 cm. long. The bilabiate corollas are about 8 to 14 mm long, and range from bright yellow to orangish red. The fruits are bright red berries that are about 5 to 10 mm. in diameter. ❁April-June.

Lonicera subspicata Hooker & Arnott var. ***denudata*** Rehder [*L. s.* var. *johnstonii* Keck]. MORONEL. This species is widely scattered in chaparral at lower to intermediate elevations in the Tassajara region, but it is not common. ●R: Coast, Transverse and Peninsular ranges, from Napa County to northern Baja California. It also occurs in the northern Sierra Nevada in Butte County, and in the southern Sierra Nevada, from Mariposa County to Kern County. The typical variety occurs in the western Transverse Ranges. ●H: semi shrubby evergreen plants with long and slender branches that range up to 2.4 m. (3-8') long. The leaves are opposite and shortly petiolate; the blades are oblong to oval or ovate, and about 1 to 4 cm. long. The flowers are produced in terminal and often interrupted spike like panicles that are up to 12 cm. long. The bilabiate corollas, which are about 8 to 14 mm. long, range from creamy yellow to greenish. The fruits are red or yellow berries that are about 5 to 8 mm. long. ❁May-July.

SYMPHORICARPOS. SNOWBERRY, WAXBERRY.

Symphoricarpos consists of 15 species; 14 occur in North America and one is endemic to China. The name is derived from the Greek words *sumphoreo*, to bear together, and *karpos*, fruit, on account of the clustered berries.

1a. Plants erect and mostly about 6 to 18 dm. (2-6') tall. Corolla swollen on one side and glandular within the swelling. Inflorescence mostly 8 to 16 flowered. . . . . ***S. albus***.
1b. Plants sprawling and usually less than 6 dm. (2') tall. Corolla scarcely or not swollen to one side, and with five nectar glands below each corolla lobe. Inflorescence generally 2 to 8 flowered. . . . . ***S. mollis***.

Symphoricarpos albus (Linnaeus) Blake [*Vaccinium albus* L.] var. ***laevigatus*** (Fernald) Blake [*S. racemosa* var. *l.* Fern.; *S. rivularis* Suksdorf]. COMMON SNOWBERRY. This species is widely scattered in shady woodland habitats at lower and intermediate elevations in the Tassajara region, where it is often found near streams, and it tends to occur in small colonies. ●R: widespread in western North America, from Alaska and Montana to the mountains of San Diego County. The typical variety is widespread in the northern United States and Canada. ●H: erect deciduous subshrubs with slender stems that range from about 6 to 18 dm. (2-6') tall. The opposite leaves have short petioles, and the blades, which are about 2 to 3 cm. long, are generally oval; the margins range from entire to irregularly lobed. The flowers are produced in short terminal and axillary racemes or clusters. The bell shaped corollas are white with a pink tinge, and range from about 4 to 6 mm. long. The waxy fruits are roundish white berries that are about 5 to 12 mm. wide. ❁May-July.

Symphoricarpos mollis Nuttall. CREEPING SNOWBERRY, TRIP VINE. Trip Vine is an appropriate name for this species, for its spreading branches often do just that. It is widespread and locally common at all elevations in the Tassajara region, and it mostly occurs in shady woodland areas or under dense stands of tall *Ceanothus* dominated chaparral. ●R: temperate western North America, from British Columbia and Idaho to northern Baja California and New Mexico. ●H: deciduous subshrubs with laterally spreading stems that range from about 3 to 9 dm. (1-3') long. The leaves are opposite and short petiolate, and the blades, which are about 1 to 4 cm. long, are mostly roundish with entire or lobed margins. The flowers are produced in small terminal and axillary clusters. The bell shaped corollas are white with a pink tinge; they range from about 3 to 5 mm. long. The waxy fruits are roundish white berries that are about 4 to 8 mm. wide. ❁April-June.

CARYOPHYLLACEAE. PINK FAMILY.

Caryophyllaceae consists of either 83 or 89 genera and approximately 3,000 species of annual and perennial herbs. The species primarily occur in the temperate regions of the northern hemisphere, and many species are restricted to arctic and alpine regions. This family includes a number of common garden flowers, such as *Dianthus* (Carnations & Sweet Williams) and *Gypsophila* (Baby's Breath).

1a. Calyx united into a tube. . . . . ***Silene***.
1b. Calyx divided into distinct sepals:
  2a. Capsules cylindrical. . . . . ***Cerastium***.
  2b. Capsules roundish or elliptical:
    3a. Petals notched or lobed at apex. . . . . ***Stellaria***.
    3b. Petals entire:
      4a. Annual herbs that are common in the Tassajara region. Ovary three valved. . . . . ***Minuartia***.
      4b. Perennial herbs that are rare in the Tassajara region. Ovary six valved. . . . . ***Moehringia***.

CERASTIUM. MOUSE EARED CHICKWEED, POWDER HORN.

The genus *Cerastium* consists of about 180 species of widely distributed annual and perennial herbs; most of the species are native to northern temperate regions. The name is derived from the Greek word *cerastes*, horned, on account of the horn like fruits.

Cerastium glomeratum Thuillier [*C. viscosum* Linnaeus often misapplied]. This introduced species is now widely scattered in the Tassajara region, and it primarily occurs in open woodlands and in grasslands. ●R: a common weed in North America; native to Europe. ●H: pubescent annual herbs with erect or ascending stems that range from about 1 to 3 dm. (4-12") long. The leaves are opposite, and the lower ones are petiolate and the upper are sessile. The blades, which are about .5 to 3.5 cm. long, range from elliptic to narrowly obovate or oblanceolate; the margins are entire. The flowers are produced in terminal cymes. The corollas consist of five white petals that are about 1.5 to 5 mm. long; the petals are notched at the apex. The fruit is a slightly curved cylindrical capsule about 4 to 8 mm. long. The minute seeds are released through an opening at the top. ❁February-May.

MINUARTIA. SANDWORT.

Minuartia consists of about 175 species of annual and perennial herbs that occur in temperate and arctic regions of the northern hemisphere. The genus was named for the Spanish botanist and pharmacist Juan Minuart (1693-1768).

Minuartia douglasii (Fenzl ex Torrey & A. Gray) Mattfeld [*Arenaria d.* F. ex T.& G.]. DOUGLAS SANDWORT. This species is widespread and locally common at all elevations in the Tassajara region, and although it occurs in a variety of habitats, it is most common in places where the soil is loose or sandy. ●R: California Floristic Province, from Douglas and Klamath counties southwestern Oregon to northern Baja California. Also in the mountains of central Arizona. ●H: erect annual herbs with very slender and freely branched stems that range from about .5 to 3 dm. (2-12") tall. The leaves are opposite, sessile, very narrowly linear to filiform, and about .5 to 4 cm. long. The flowers are produced in loosely cymose terminal panicles, and the corollas consist of five white and generally obovate petals that are about 3 to 6 mm. long. The fruit is a subglobose capsule that is about 2.5 to 3.5 mm. long. ❁April-July.

MOEHRINGIA.

The genus *Moehringia* consists of about 25 species that are endemic to temperate and boreal regions of northern hemisphere, especially in Eurasia (only three species occur in North America). The genus was named for the Danzig (Gdansk) naturalist Paul. H. G. Moehring (1710-1791).

∨***Moehringia macrophylla*** (Hooker) Fenzl [*Arenaria m.* Hooker]. LARGE LEAVED SANDWORT. Specimens of this inconspicuous perennial herb have been collected in the vicinity of the highest point on Chew's Ridge (Griffin 3574, JEPS 73563; Yadon PGM 4786), and in Bear Basin (Yadon, PGM 3011). The only other documented locations for this species in the Santa Lucia Mountains are along the Carmel River Trail in Hiding Canyon (Hardham 10142; SBBG 18100 & RSA 151032), on the Ventana Double Cone (Hardham 10120; RSA 151034), and on the North Coast Ridge in the vicinity of the Pick Creek waterfall (Yadon, PGM 0160). According to the Calflora website, "Big Sur State Park and Pine Ridge Trail" is another Monterey County location for this species. ●R: widely distributed in North America and eastern Asia. In North America it ranges from British Columbia to California, Newfoundland and the northeastern United States (in New England it occurs in parts of Vermont, Massachusetts and Connecticut, and in the Great Lakes region it occurs on the northern Michigan peninsula, in far northern Wisconsin, and in far northeastern Minnesota). In the western United States it occurs in the Rocky Mountains, from Idaho to New Mexico, and on the Pacific Slope it occurs in the mountains of Washington, Oregon and California. In California this species occurs in the Cascade Ranges and in the Sierra Nevada (to Tulare County), and in the Coast Ranges it occurs from Mendocino County northward. Additional populations occur on Mt. Tamalpais in Marin County, on Mt. Diablo in Contra Costa County, on Grizzly Peak in Alameda County, on San Bruno and Montara mountains in San Mateo County, on Mt. Hamilton and on Loma Prieta in Santa Clara County, on Mariposa Peak in northeastern San Benito County, and in the Santa Lucia Mountains of Monterey County. ●H: small rhizomatic perennial herbs with slender stems that range from about .5 to 1.5 dm. (2-6") tall. The opposite leaves are sessile to very shortly petiolate. The blades, which are about 1 to 5 cm. long, range from lanceolate to elliptic, and the margins are entire. The flowers are produced singularly or in terminal cymes of up to 5 flowers, and the corollas consist of five white and generally roundish petals that are about 2 to 4 mm. long. The fruits are ovoid capsules that are about 5 mm. long. ❁April-July.

SILENE. CAMPION, CATCHFLY, INDIAN PINK.

The genus *Silene* consists of approximately 700 species of annual and perennial herbs that naturally occur in northern hemisphere, South America and Africa. Some of the species are now widely distributed weeds. The name is said to have come from Silenus, the drunken foster father of Bacchus (the god of wine), who was covered with foam, alluding to the sticky secretions of many species.

1a. Annual herbs:
- **2a**. Stems, leaves and calyces glabrous or subglabrous. Upper internodes sticky. . . . . ***S. antirrhina***.
- **2b**. Stems, leaves and calyces pubescent. Upper internodes not sticky. . . . . ***S. gallica***.

1b. Perennial herbs:
- **3a**. Petals bright red. . . . . ***S. laciniata*** subsp. ***californica***.
- **3b**. Petals white to yellowish or pinkish:
  - **4a**. Flowers nodding. Petal limbs reflexed and divided into 4 slender lobes. . . . . ***S. lemmonii***.
  - **4b**. Flowers erect or ascending. Petal limbs spreading and divided into 2 broad lobes. . . . . ***S. verecunda***.

Silene antirrhina Linnaeus. SLEEPY CATCHFLY, STICKY CATCHFLY. In the first edition of this text I stated that this entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3147, DS), which, according to the note in the envelope that is pasted to the specimen sheet, was collected "Near Springs," and that such plants should be looked for in open areas, especially where the soil is sandy or disturbed. I also noted that this species was likely to be more common in this region after fires, for it is frequently noted as a 'burn species.' During the spring of 2009 (the first spring after the Basin Complex Fire), plants were seen at a number of places in the vicinity of the hot springs, such as on the flood plains of Tassajara Creek, on the Hogback and on the summit of Flag Rock, but its presence was not noticed elsewhere in the Tassajara region. ●R: widely distributed in temperate North America, from British Columbia to Nova Scotia, and southward to Mexico and Florida. This species is also native to temperate South America. ●H: annual herbs with erect and often branching stems that range from about 1.5 to 8 dm. (6-32") tall. The leaves are opposite and sessile, and the blades are linear to narrowly oblanceolate, and about 1 to 6 cm. long. The margins are entire. The flowers are produced in terminal panicles and the corollas consist of five petals that range from white to pink. The petals are two lobed, about 4 to 8 mm. long, and they barely if at all exceed the length of the calyx. The fruit is a generally ovoid capsule about 4 to 8 mm. long. ❁April-July.

Silene gallica Linnaeus. COMMON CATCHFLY, WINDMILL PINK. This introduced species is scattered in open and more or less grassy habitats in the Tassajara region, mostly along trails and in areas that have been used as forage grounds (such as in the Horse Pasture), and it is fairly common in the immediate vicinity of Tassajara Hot Springs. ●R: a common weed in North America: native to Eurasia. ●H: annual herbs with erect or ascending stems that range from about 1 to 4 dm. (4-16") long. The leaves, which become gradually reduced in size upwards on the stems, are opposite and semi sessile; the blades, which are entire and about 1 to 5 cm. long, are generally oblanceolate. The flowers are produced in generally one sided terminal racemes, and the corollas consist of five pinkish white petals that are sometimes notched at the apex. The fruits are ovoid capsules that are about 6 to 8 mm. long. ❁March-June.

Silene laciniata Cavanilles subsp. ***californica*** (Durand) J. K. Morton

[*S. californica* Durand]. CALIFORNIA INDIAN PINK. This showy flowered taxon is scattered on and around cliffs and major rock outcrops at lower and intermediate elevations in the Tassajara region. Although this species is reported to occur in a number of habitats, it appears that all of the plants of this region occur in rocky areas. ●R: Sierra Nevada and the Cascade, Coast, Transverse and the far northwestern Peninsular Ranges, from Douglas County in southwestern Oregon to the Santa Ana Mountains of Orange County. The typical subspecies occurs in the Coast, Transverse and Peninsular ranges, from San Luis Obispo County southward to southern Mexico (Acapulco is the type locality). ●H: taprooted perennial herbs with erect or ascending stems that range from about 1.5 to 4 dm. (6-16") long. The opposite leaves are nearly sessile, and the blades, which are about 2 to 8 cm. long, range from ovate to obovate or oblanceolate; the margins are entire. The flowers are produced singularly or in few flowered terminal cymes, and the corollas consist of five bright red petals that are about 2 to 3 cm. long. The outwardly spreading corolla limbs, which are about 1 to 1.5 cm. long, are deeply divided into 4 to 6 lobes. The fruit is an ovoid capsule about 2 mm. wide. ❀April-August.

Silene lemmonii S. Watson. This species is lightly scattered in woodlands on Chew's Ridge and in the Pine Ridge, Church Creek Divide, Bear Basin and Pine Valley areas, but it is not known to occur elsewhere in the Tassajara region. According to the note that is enclosed in an envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901 (Elmer 3145; DS), it was collected "On ridge north of Pine Valley meadow in dry soil." ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Curry and Jackson counties in southwestern Oregon to the mountains San Diego County. ●H: perennial herbs with slender stems that range from about 1.4 to 4.5 dm. (6-18") tall. The leaves are opposite and petiolate to semi sessile. The blades, which are mostly about 2 to 3 cm. long, are narrowly lance elliptic to oblanceolate, and the margins are entire. The flowers are produced in open racemes, and the flowers generally facing downward or at a downward angle. The corollas consists of five white to yellowish (or sometimes pinkish) petals that are deeply cleft into four liner lobes. The petals are about 4.5 to 8 mm. long, and the limbs are reflexed. The fruit is an oblong to ovoid capsule that is about 2 to 3 mm. long. ❀May-August.

Silene verecunda S. Waston [*S. v.* subsp. *platyota* (S. Watson) Hitchcock & Maguire; *S. p.* Watson]. This species is rare in the Tassajara region, and it appears that the only documented location for it is on Pine Ridge, were Vern Yadon collected a specimen in July of 1980 (PGM 2564). According to James Griffin's "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), it is rare on both Pine and Chew's ridges. The plants of this region correspond to what has been recognized as subsp. *platyota*. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California, and eastward to Nevada and Utah. ●H: perennial herbs with erect stems that range from about 1 to 5 dm. (4-20") tall. The opposite leaves are sessile and about 1 to 9 cm. long; the larger basal leaves are usually crowded, and have blades that are linear-oblanceolate to obovate, while the blades of the upper leaves are lanceolate to linear lanceolate. The flowers are produced in cymose terminal panicles. The corollas consist of five white to pinkish petals that have outwardly spreading and deeply two lobed blades that are about 4 to 6 mm. long. The fruit is an oblong to ovoid capsule that is about 2 to 5 mm. long. ❀June-August.

STELLARIA. CHICKWEED, STARWEED.

Stellaria is a widely distributed genus that consists of approximately 190 species of annual and perennial herbs. The botanical name is based on the Latin word *stella*, a star, on account of the shape of the corollas of some species.

1a. Leaves crowded near base of the stem, the blades mostly linear-lanceolate. Stems glabrous or with scattered hairs. . . . . ***S. nitens***.
1b. Leaves more or less evenly spaced, the blades ovate. Stems with a line of hair on one side. . . . . ***S. media***.

Stellaria media (Linnaeus) Villars [*Alsine m.* L]. COMMON CHICKWEED. This introduced species is widely scattered and locally common in the Tassajara region, particularly in and near developed areas, along trails, at campsites, etc. It is very common in and about the developed area of Tassajara. ●R: a common weed in North America; native to Eurasia. ●H: annual herbs with weak and generally procumbent stems that range mostly from about 1 to 4 dm. (4-16") long. The opposite leaves are short petiolate to sessile, and the blades are generally ovate, entire, and mostly about 1 to 3 cm. long. The flowers are produced in the axils of the upper leaves, and the corollas consist of five white and deeply two lobed petals that are about 3.5 to 4.5 mm. long. The petals are slightly shorter than the sepals. The fruit is an ovoid capsule that is about 4 to 5 mm. long. ❀February-June.

Stellaria nitens Nuttall. SHINING CHICKWEED. Although the only areas in the Tassajara region where this species is known to occur is in Pine Valley and on Chew's Ridge, it is possible that it is more widely distributed, for the plants are very inconspicuous and thus easily overlooked. According to the note that is enclosed in the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of this species, he collected it in Pine Valley. ●R: from British Columbia and Alberta southward, to northern Baja California and New Mexico. ●H: erect or ascending annual herbs with simple or branched stems that range from about .5 to 2.5 dm. (2-10") tall. The opposite leaves range from about 5 to 15 mm. long, and are mostly restricted to the lower half of the stems. The lower most leaves are petiolate and have oblanceolate to obovate blades, while the upper leaves are sessile and have linear to lance-linear blades. The flowers are produced in terminal cymes, and the corollas consist of five white petals that are less than 2 mm. long, and less than half as long as the sepals. The petals are sometimes absent. The fruit is an oblong capsule that is about 3 to 4 mm. long. ❀March-June.

CHENOPODIACEAE. GOOSEFOOT FAMILY.

Chenopodiaceae consists of about 100 genera and 1,500 species of herbs and shrubs, and many of the species restricted to brackish marshes or salty and/or alkaline flats of desert regions. The family includes a few common vegetables, such as spinach (Spinacia), beets and chard (Beta), as well as many weedy species.

1a. Plants non-aromatic and more or less covered with a meal-like powder. . . . . ***Chenopodium***.
1b. Plants aromatic and covered with three-forked glandular hairs. . . . . ***Dysphania***.

CHENOPODIUM. GOOSEFOOT, PIGWEED.

The genus *Chenopodium* consists of about 100 species of annual and perennial herbs of that primarily occur in temperate regions. The genus includes many species that are common weeds. The name is derived from the Greek words *chen*, goose, and *pous*, foot, on account of the shape of the leaves of the type species, *Chenopodium rubrum*.

1a. Annual herbs. Calyx tube shorter than the lobes. Seeds horizontal. . . . . ***C. album***.
1b. Perennial herbs from a stout caudex. Calyx tube about as long or longer than the lobes. Seeds vertical. . . . . ***C. californicum***.

Chenopodium album Linnaeus. LAMB'S QUARTERS, WHITE GOOSEFOOT, COMMON PIGWEED. This species is weedy in and about the developed area of Tassajara Hot Springs and by the reservoir a short distance up the road. It also occurs in various places on Chew's Ridge. This is a variable species, and the plants of this region correspond to what has been described as var. *lanceolatum*. ●R: a common weed in temperate regions nearly worldwide; it is probably native to Europe. ●H: annual herbs with generally erect stems that range from about 2 to 10 dm. (8-40") tall. The leaves are alternate and petiolate; the blades, which are about 1 to 6 cm. long, are generally lanceolate with entire or sometimes wavy lobed margins, and they often have two larger opposing lobes near the base. The flowers, which are covered with granular substance, are produced in small glomerules that are scattered along terminal spikes. The fruit is an utricle (a seed with an adherent, bladder like pericarp). ❁June-October.

Chenopodium californicum (S. Watson) S. Watson [*Blitum c.* Watson]. CALIFORNIA GOOSEFOOT, SOAP PLANT. Although this species usually occurs in open areas with sandy or clayey soils, and thus may be present somewhere else in this region, this entry is based on one plant that I have seen and one herbarium specimen. The plant grew in gravelly soil in the immediate vicinity of the turnaround at the end of the road in the inner Flats, near to beginning of the trail to the former bridge over Tassajara Creek. Probably do to the shady situation in which it growing, it was sickly looking plant, but it persisted there from at least the late 1980s until the late spring of 2009 (it did not manifest itself in 2010). The herbarium specimen was collected in April of 1933 by Roxana Ferris (Ferris 8312; DS & UC 54218). According to the label, it was collected along "Tassajara Creek at Tassajara Hot Springs," and according to her field notes, she collected at a gravelly soiled site. I have wondered if it is possible that Ferris could have collected her specimen from the same plant (is it possible that plants of this species can live for more than seventy years?). It is possible that this species was introduced via hay from the Jamesburg area, where this species occurs, for reports of hay being hauled from that area to Tassajara were frequent in the Jamesburg new columns that ran in Salinas newspapers from 1888 to 1919. ●R: Sierra Nevada foothills, Central Valley and the Coast, Transverse and Peninsular ranges, from Tehama and Butte counties to northern Baja California. ●H: perennial herbs from a long, stout and fleshy root stock, with decumbent or ascending stems that range from about 2 to 9 dm. (8-36") long. The alternate leaves are short petiolate, and the blades, which are about 2 to 10 cm. long, are generally deltoid with truncate to cordate bases, and the margins regularly and sharply toothed. The small flowers are produced in glomerules that are densely clustered on elongating terminal spikes. The fruit is an utricle (a single seed with an adherent, bladder like pericarp) that is about 1.5 to 2 mm. in diameter. ❁March-September.

DYSPHANIA.

The genus *Dysphania* is comprised of about 25 species that, a whole, are widely distributed. The name is derived from the Greek word for obscure, apparently from the inconspicuous flowers.

+*Dysphania pumilio* (R. Brown) Mosyakin & Clemants [*Chenopodium p.* R. Brown]. This species was discovered at Tassajara by Diane Renshaw in September of 2019, who found more than 25 plants near the newly reconstructed front gate. ●R: a widely distributed weed in North America, native to Australia. ●H: strongly scented annual herbs with prostrate to ascending stems ranging from about 12 to 45 cm. (5-18") long. The blades of the alternate leaves, which are about 4 to 25 mm. long, are elliptic to lanceolate and the margins are wavy-dentate. The small flowers are produced in axillary clusters, and the fruits are about 1 mm. in diameter. ❁July-September.

CISTACEAE. ROCK ROSE FAMILY.

Cistaceae consists of 8 genera and about 175 species of perennial herbs and shrubs. Most of the species occur in temperate regions of the northern hemisphere, and the family it is especially well represented in the southeastern United States and in the Mediterranean region.

CROCANTHEMUM. ROCK ROSE, RUSH ROSE, SUN ROSE.

Due to the findings of phylogenetic research, the Californian species of *Helianthemum* have more recently been transferred to the genus *Crocanthemum* (they were included in *Helianthemum* in the second edition of *The Jepson Manual*, 2012). *Crocanthemum* consists of 21 species of deciduous perennial herbs and subshrubs that are endemic to North and South America. The name is derived from Greek and means yellow flower.

Crocanthemum scoparium (Nuttall) Millspaugh [*Helianthemum s.* Nuttall]. This semi shrubby species is widely scattered at lower and intermediate elevations in the Tassajara region, but it is largely restricted to rocky openings in chaparral, and it is most common on the massive sandstone outcrops that occur along the Church Creek Fault. The distinctive sepals provide an easy and sure way to identify this species: one sepal is clearly the largest, two are of equal and intermediate size, and the remaining two are tiny appendages. It is possible that some of the plants of this region represent the variety *vulgare* (Jepson) Sorrie. Such plants are taller (up to 4.5 dm), more erect and more floriferous. ●R: Sierra Nevada foothills, from El Dorado County to Fresno County, and the Coast, Transverse and Peninsular ranges, from Mendocino and Lake counties to northern Baja California, and on Santa Cruz, Santa Rosa and San Clemente islands. ●H: profusely branched subshrubs with erect or ascending stems that range from about 2 to 3 dm. (8-12") long. The leaves are alternate, narrowly linear, and about .5 to 3 cm. long. The flowers are produced in terminal panicles, and the corollas consist of five yellow petals that are obovate and about 4 to 7 mm. long. The petals are shed about one day after opening. The fruit is an ovoid capsule about 2.5 to 4 mm. long. ❁March-June.

CONVOLVULACEAE. MORNING GLORY FAMILY.

Convolvulaceae consists of about 55 to 60 genera and approximately 1,600 to 1,700 species; most of which are herbaceous vines, but the family also includes trees, shrubs and herbs. Most of the genera and species occur in tropical and subtropical regions. Well known plants include the various Morning Glories (*Calystegia*, *Convolvulus*, and *Ipomoea*), Sweet Potatoes (*Ipomoea batatas*), and the lawn like ground cover *Dichondra*.

1a. Calyx more than 7 mm. long. Corollas usually more than 3 cm. long. Stigma lobes cylindric or oblong, and more or less flattened. . . ***Calystegia***.

1b. Calyx less than 5 mm. long. Corollas less than 3 cm. long. Stigma lobes cylindric or thread like, and not flattened. . . . ***Convolvulus***.

CALYSTEGIA. MORNING GLORY.

The genus *Calystegia* consists of 25 species that are widely distributed in temperate and subtropical regions. This genus is very well represented in California, for 13 species occur in the state, and 8 species, plus 13 lesser taxa, are endemic to the California Floristic Province. The name is derived from the Greek words *kalux*, cup or calyx, and *stegos*, a covering, alluding to the floral bracts that in some species cover the calyx.

1a. Plants with prostrate and non climbing stems that are less than 1 m. (3') long. Leaves and stems densely woolly. . . . ***C. malacophylla***.

1b. Plants with sprawling and climbing stems that are up to 6 m. (20') or more long. Leaves and stems glabrous or short hairy. . . . . ***C. purpurata***.

Calystegia malacophylla (E. Greene) Munz [*Convolvulus malacophyllus* Greene] subsp. ***pedicellata*** (Jepson) Munz [*Con. m.* subsp. *pedicellatus* (Jepson) Abrams, *Con. villosus* var. *p.* Jepson]. WOOLLY MORNING GLORY. This species is widely scattered and locally common at higher to intermediate elevations in the Tassajara region (it is rarely found below about 2,000'), and it occurs mostly in openings in chaparral on south facing slopes. ●R: Coast Ranges and western Transverse Ranges, from Contra Costa County to Los Angeles County. The typical subspecies occurs in the North Coast Ranges and in the Sierra Nevada. ●H: rhizomatic, generally tufted, and densely white woolly perennial herbs with prostrate stems that range from about 1 to 3 dm. (4-12") long. The alternate leaves have petioles that are about .5 to 3 cm. long, and the blades are deltoid-hastate and about 2 to 4 cm. long. The showy flowers are axillary and are produced on pedicels about 6 to 9 cm. long. The broadly funnel shaped corollas are creamy white, and about 2.5 to 3.5 cm. long. The fruit is a roundish capsule about 2 to 3 mm. long. ♔April-July.

!!*Calystegia purpurata* (E. Greene) Brummitt [*Convolvulus luteolus* Greene var. *purpurata* Greene; *Con. occidentalis* A. Gray in part; *C. p.* subsp. *solanensis* (Jepson) Brummitt, *Con. occidentalis* Gray subsp. *solanensis* (Jepson) J. T. Howell, *Con. luteolus* var. *s.* Jepson] subsp. ***purpurata***. CHAPARRAL MORNING GLORY. In the first edition of this text I stated that this species was widely scattered and moderately common in chaparral at lower to intermediate elevations in the Tassajara region, but apparently absent on the higher ridges. During the first and second springs after the Basin Complex Fire of 2008, this species spectacularly manifested itself in areas of burnt out chaparral, and its long stems densely covered the remaining trunks and branches of the shrubs. ●R: Coast Ranges and western Transverse Ranges, from Humboldt County to Ventura County, and on the Sutter Buttes (subspecies *saxicola* occurs in the outer North Coast Ranges, from Mendocino County to Marin County). ●H: perennial vines from a woody caudex, with long and climbing stems that range up to 6 m. (20') in length. The stems wither away at the end of the growing season (late summer to fall). The alternate leaves are petiolate, and the blades are triangular-hastate, generally entire (but often somewhat wavy on the lower extremities), and about 1 to 5 cm. long. The showy flowers are produced in the axils of the leaves on pedicels about 2 to 6 cm. long. The corollas are broadly funnel shaped, creamy white with five dull purplish red stripes radiating from the center, and about 3 to 4 cm. long. The fruit a roundish capsule. ♔April-July.

CONVOLVULUS. MORNING GLORY, BINDWEED.

Convolvulus consists of about 250 species that primarily occur in temperate regions. The name is based on the Latin word *convolvere*, to entwine, on account of the vine like habit of growth.

+*Convolvulus arvensis* Linnaeus. WEEDY BINDWEED, COMMON MORNING GLORY. Harvey Monroe Hall collected a specimen of this common weed in Miller Canyon in July of 1915 (Hall 10073; UC 186146). The stated elevation was 4,000 feet, which would place the site of collection along the road to Miller Canyon not far below China Camp, but as this section of the road is dominated by a dense woodland in which there a very few herbaceous plants, I suspect that it was actually collected a bit lower down in the canyon, and in the meadow which was the site of Constantine Chew's homestead (and later on that of the Nason and Jeffery ranches). ●R: a common weed in North America; native to Eurasia. ●H: perennial herbs with prostrate or twining stems that range from about 3 to 10 dm. (12-40") long. The petiolate leaves have blades that are mostly about 1.5 to 3.5 cm. long, they are generally hastate-ovate with rounded or acute tips. The flowers are produced in the axils of the leaves, and the broadly funnelform corollas, which are about 1.5 to 2.5 cm. long, are usually white. The fruit is a roundish capsule about 8 mm. long. ♔May-Oct.

CUSCUTA. DODDER.

Cuscuta is a widely distributed genus that consists of about 180 species of annual parasitic vines; it is particularly well represented in the tropical regions of the Americas and in Polynesia. The name is derived from a Aramaic word meaning to cover, on account habit of growth of the species (they cover the crowns of their victims).

Cuscuta californica Hooker & Arnott. CALIFORNIA DODDER. These highly conspicuous annual vines are widely scattered and locally common at all elevations in the Tassajara region, and they occur on a variety of host species. The locations at which they occur vary considerably from season to season. ●R: western North America, from Washington to Wyoming, Colorado, Arizona and northern Baja California. ●H: orangish yellow parasitic vines with a profusion slender stems which more or less closely entwine the host plant. The small flowers are produced in cymose clusters, and the five lobed corollas, which are 2.5 to 5 mm. long, are cylindric-campanulate; they are of the same color as the rest of the plant. The fruit is a globose and one to four seeded capsule about 1.5 to 2 mm. long. ♔May-August.

Calystegia purpurata growing along the route from the Horse Pasture Trail to Flag Rock during the second spring after the Basin Complex Fire of 2008.

CORNACEAE. DOGWOOD FAMILY.

Cornaceae consists of about 12 genera and 100 species of trees, shrubs and perennial herbs that primarily occur in the temperate regions of the northern hemisphere.

CORNUS. DOGWOOD.

Cornus is a primarily northern temperate genus that consists of about 50 species of trees, shrubs and perennial herbs. The name is based on the Latin word *cornu*, horn, on account of the hard wood.

Cornus sericea Linnaeus subsp. ***occidentalis*** (Torrey & A. Gray) Fosberg. [*C. s.* var. *o.* T. & G.; *C. o.* (T. & G.) Coville; C. californica C. Meyer; C. stolonifera var. californica McMinn]. WESTERN DOGWOOD, CREEK DOGWOOD. This species is rare in Tassajara region, where it is lightly scattered in shady areas along streams in Pine Valley and on Chew's Ridge. According to the note that is in the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901 (Elmer 3115; DS 28033), it was collected along "Carmel [River] below Pine Valley Camp." ●R: western North America, from Alaska and Montana to the mountains of San Diego County. The typical subspecies, which also occurs in the Santa Lucia Mountains, occurs in all of the Canadian Provinces and all of the states of the United States north and west of Texas, Oklahoma, Missouri, Tennessee, and North Carolina. ●H: deciduous shrubs that range from about 1.5 to 4 m. (5-13') tall. The leaves are opposite and petiolate; the blades are ovate to lanceolate or elliptic, entire, and about 5 to 10 cm. long. The flowers are produced in terminal cluster like cymes, and the corollas consist of four white and generally lanceolate petals that are about 3 to 4.5 mm. long. The fruits are white to cream colored drupes about 7 to 9 mm. in diameter. ❀May-July.

Cornus glabrata may also be present in this region, for it occurs along Cachagua Creek and in the upper watershed of the Big Sur River.

CRASSULACEAE. STONECROP FAMILY.

Crassulaceae consists of about 33 genera and approximately 1,400 species of annual and perennial herbs and subshrubs. Most of the species occur in the drier temperate regions of the northern hemisphere and southern Africa. This family includes many species that are cultivated for their ornamental appeal.

1a. Minute annual herbs of open areas with poor and/or compacted soils. Leaves opposite and less than 4 mm. long. . . . . ***Crassula***.
1b. Succulent evergreen perennial herbs of cliffs, rock out crops, or rocky slopes. Leaves more than 1 cm. long and produced in basal rosettes:
2a. Plants unbranched and not forming mats. Leaves generally acuminate at the apex. . . . . ***Dudleya***.
2b. Plants branching and tending to form mats. Leaves generally rounded at the apex. . . . . ***Sedum***.

CRASSULA.

Crassula is a highly variable genus that consists of about 250 species of annual and perennial herbs and subshrubs. The annual species, many of which are aquatic, are widely distributed, but the perennials are mostly endemic to southern Africa. Jade plants are *Crassula ovata*.

Crassula connata (Lopez & Pavon) Berger [*Tillaea c.* L.& P.; *T. erecta* Hooker & Arnott]. SAND PYGMY. This very inconspicuous species is widely scattered in the Tassajara region, but it is mostly restricted to exposed places with poor or sandy soils. From late winter to early spring dense stands are often encountered that are growing in the compacted soils of trail beds. ●R: from Oregon and Texas to northern Central America. This species is also native to Chile. ●H: very small annual herbs with erect stems that are generally less than 6 cm. (2½") tall. The entire plant becomes colorful in maturity, adding red, orange, and yellow to the basic green. The opposite leaves are sessile; the blades are ovate to oblong and less than 3 mm. long. The minute flowers are produced in terminal and axillary clusters, and the five petals, which are generally shorter than the sepals, are less than 1 mm. long. The fruit is a follicle that splits into 3 to 5 one or two seeded carpels. ❁February-May.

DUDLEYA. LIVE FOREVER, ROCK LETTUCE.

The genus *Dudleya* consists of about 46 species of succulent perennial herbs of southwestern temperate North America. Twenty four species occur in California, and 22 (plus 14 subspecies) are endemic to the California Floristic Provence. The genus was named for William Russell Dudley (1849-1911), the first staff botanist at Stanford University.

1a. Rosette leaves up to 12+ cm. long. Flowering stems 1.5 to 3.2 (-4.5) dm. tall. . . . . ***D. cymosa*** subsp. ***cymosa***.
1b. Rosette leaves usually less than 5 cm. long. Flowering stems usually less than 1.5 dm. tall. . . . . ***D. cymosa*** subsp. ***pumila***.

∨***Dudleya cymosa*** (Lemaire) Britton & Rose [*Echeveria c.* Lemaire; *Cotyledon cymosa* Baker; *Dudleya laxa* (Lindley) Britton & Rose; *Echeveria purpusii* Schumann; *Cotyledon purpusii* (Schumann) J. D. Hooker] subsp. ***cymosa***. CANYON DUDLEYA. The taxon is widely scattered in rocky and shady or semi shady habitats at all elevations in the Tassajara region, but it is uncommon. ●R: from Siskiyou County southward, to the Santa Lucia Mountains of Monterey County in the Coast Ranges, and to Kern County in the Sierra Nevada. It is also reported to occur in the Santa Monica Mountains of Los Angeles County. ●H: evergreen perennial herbs from a short caudex, with the bulk of the plant consisting of a basal rosette of succulent leaves. The flowering stems, which are erect from decumbent bases, arise from the axils of the lower leaves, and range from about 1.5 to 3.2+ dm. (6-12+") tall. The leaves are about 2 to 12+ cm. long; they are mostly acuminate at the apex, and the lower are oblanceolate to spatulate, while the ones are smaller upper are mostly broadly lanceolate. The leaves of the flowering stems are much reduced, alternate, and ovate to triangular-lanceolate. The flowers are produced in terminal panicles, and the flowers are mostly on the upper side of branches that are often slightly coiled towards the apex when young. The corollas consist of five lanceolate to elliptic petals that are about 10 to 12 mm. long; the petals range from yellow to orange or red. The fruits consist of 5 many seeded follicles ❁April-July.

∧***Dudleya cymosa*** subsp. ***pumila*** (Rose) Nakai [*D. c.* subsp. *minor* (Rose) Moran; *D. goldmanii* Rose]. DWARF CANYON DUDLEYA. This taxon is widely scattered on cliffs, rock out crops and rocky slopes in the Tassajara region, and it primarily occurs in areas with full sunlight. A specimen that was collected by E. A. Goldman in "Pine Valley, head of Carmel River, Monterey County, California" in early August of 1902 served as the type specimen for Joseph Rose's *Dudleya goldmanii*. ●R: Coast, Transverse and Peninsular ranges, from the Santa Lucia Mountains of Monterey County to the mountains of San Diego County. ●H: succulent evergreen perennial herbs similar to the typical species, except for their smaller size. ❁April-August.

SEDUM. STONECROP.

Sedum consists of about 450 species of succulent perennial herbs that occur in temperate regions of the northern hemisphere, and also in the tropical mountains of South America and eastern Africa.. The name is Latin and means to assuage, due to the healing properties of some species of the related genus *Sempervivum* (houseleeks and hen & chicks), to which the name *Sedum* has been applied.

Sedum spathulifolium Hooker [*S. s.* subsp. *anomalum* (Britton) Clausen]. PACIFIC STONECROP. This distinctive species is scattered on cliffs and major rock outcrops in the Tassajara region, mostly in shady or semi shady situations, and often forming dense masses in some places, such as around the waterfall on Waterfall Creek and at The Narrows. Plants that occurred around the waterfall, in some other locations in this region, were totally consumed by the Basin Complex Fire of 2008. ●R: Pacific Slope of temperate North America, from northern British Columbia to California. In California this species ranges southward through the Sierra Nevada, Coast, Transverse and Peninsular ranges, to the mountains of San Diego County. ●H: evergreen perennial herbs with laterally spreading branches that tend to form dense mats on rock outcrops. The rosette leaves are mostly spatulate and about .5 to 3 cm. long, while the cauline leaves are alternate, elliptic-oblong to spatulate, and about .5 to 2 cm. long. The flowers are produced in cymosely branched panicles that are terminal on stems that are mostly about 5 to 15 cm. tall. The corollas consist of 5 five yellow and generally lanceolate petals that are about 5 to 8 mm. long. The fruits consist of 4 or 5 follicles that are about 4 to 8 mm. long. ❁April-August.

CUCURBITACEAE. CUCUMBER FAMILY.

Cucurbitaceae consists of about 98 genera and approximately 975 species of annual and perennial vines or vine like plants that primarily occur in tropical and subtropical regions. This family is particularly well represented in the dryer parts of Africa. Although many of the species have edible fruits, such as pumpkins and the various squashes, including zucchini (*Cucurbita*), watermelons (*Citrullus*), cantaloupes, honeydew melons, and cucumbers (*Cucumis*), and the Mexican chayote (*Sechium*), many have poisonous fruits, such as the following species.

MARAH. MANROOT.

The genus *Marah* consists of seven species of perennial vines that are endemic to western North America. Five species occur in California, and three are endemic to California Floristic Province. The genus was named by Dr. Albert Kellogg (1813-1887), who was one of founding members of the California Academy of Sciences. According to Kellogg: "The significance of the name we have chosen would be better understood by pursing Exodus xv: 22-26" (Proceedings of the California Academy of Sciences 1: 39, 1854). Lines 22 and 23 of this text are as follows: "So Moses brought Israel from the Red Sea, and they went out into the wilderness of Shur; and they went three days in the wilderness, and found no water. And when they came to Marah, they could not drink of the waters of Marah, for they were bitter: therefore the name of it was called Marah."

!*Marah fabaceus* (Naudin) E. Greene [*Echinocystis fabacea* Naudin]. CALIFORNIA MANROOT, MAN IN THE GROUND. This conspicuous species is widespread and locally common in woodland and chaparral habitats at all elevations in the Tassajara region. During the spring of 2009, the first one after the Basin Complex Fire, this species took full advantage of the increased sunlight, for plants sent out great profusions of their long stems. The common name alludes to the massive tubers, which are said to resemble a man in size and shape. Native Californians are reported to have used the ground seeds of this species to stupefy fish, and as a means of euthanasia for the aged. ●R: Sierra Nevada, from Shasta County to Mariposa County, and the Coast and western Transverse ranges, from Humboldt and Trinity counties to Los Angeles County. Also on the Channel Islands, San Nicolas Island and Santa Catalina Island. ●H: perennial vines from massive tubers that annually produced branches that can reach more than 7 m. (23') long; the stems wither away with the onset of the dry season. The alternate leaves have petioles that are about 3 to 6 cm. long; the blades are about 5 to 10 cm. wide, generally roundish in outline, and five to seven lobed. The flowers are axillary; pistillate flowers are solitary and the staminate flowers are produced in racemes. The corollas are pale white to yellowish, rotate and deeply five lobed, and about 7 to 10 mm. wide. The roundish fruits are about 4 to 5 cm. wide, and are covered with a green rind that is beset with non prickly spines; the spongy interior contains four stone like seeds. ❁February-May.

DATISCACEAE. FALSE HEMP FAMILY.

Datiscaceae is a very small but morphologically distinct family that consists of only one genus and two species (the genera *Tetrameles* and *Octomeles* have been placed here, but they have been transferred to *Tetramelaceae*).

DATISCA. FALSE HEMP.

The genus *Datisca* consists of two species of perennial herbs that are native to temperate regions of the northern hemisphere. One species is endemic to the California Floristic Province, and the other, *Datisca cannabina*, occurs from the Mediterranean island of Crete to the mountains of northern India. The Eurasian species was so named because its leaflets are nearly identical to those of the well known species *Cannabis sativa* (hemp, pot, weed, marijuana, etc.), but in *Cannabis* the leaflets are palmately divided, while in *Datisca cannabina* the leaflets are pinnately divided.

Datisca glomerata (C. Presl) Baillon [*Tricerastes g*. Presl; *Cannabina g*. (Presl) Kuntze; *Datisca g*. (Presl) Bentham and Hooker illegitimate]. CALIFORNIA FALSE HEMP, DURANGO ROOT. This unique winter deciduous perennial herb is widespread in or near the streambeds of both perennial and intermittent streams at all elevations in the Tassajara region. Although the leaves of *Datisca glomerata* less strongly resemble those of hemp than do those of *Datisca cannabina*, this species is also often mistaken for hemp plants. On a number of occasions while I was a resident at Tassajara, I was called upon to investigate sites at which suspected marijuana plants were growing, and at each location the plants actually represented *Datisca glomerata*. ●R: Cascade, Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California, and in the Sierra Nevada, from El Dorado County to Kern County. ●H: perennial herbs with erect and usually branching stems that range from about 7 to 18 dm. (28-72") tall. The stems die back to the root during the winter. The petiolate leaves are mostly alternate (the lower leaves are often sub opposite and sometimes appear to be whorled). The larger leaves are divided into three leaflets, the much larger terminal one being deeply cleft into forwardly angled lanceolate lobes. The margins are serrate. The upper leaves range from being two lobed at the base to simple. The flowers are produced in small clusters that are axillary in the upper leaves. Staminate flowers are about 2 mm. long and have 4 to 9 lobed calyces, while pistillate flowers are about 5 to 8 mm. long and have 3 toothed calyces. The flowers lack corollas. The fruit is an ovoid capsule about 8 mm. long, that contains numerous seeds that are about 1 mm. long. ❁May-July.

ERICACEAE. HEATH FAMILY.

As presently enumerated on the Jepson eFlora website, *Ericaceae* consists of about 100 genera and approximately 3,000 species, while according to the Angiosperm Phylogeny website, the family consists of about 126 genera and 4,010 species. In any case, the family consists of perennial herbs, shrubs and trees that, as a whole, are represented worldwide (except for in desert regions). This family includes *Rhododendron* (*Azalea*), *Vaccinium* (blueberries, cranberries and huckleberries) and *Erica* (the heathers).

1a. Small perennial herbs. Corollas divided into five reflexed petals. . . . . ***Chimaphilla***.
1b. Trees and shrubs. Corollas united and urn shaped:
  2a. Evergreen trees ranging from about 5 to 30 m. (16-100') tall. Leaves about 5 to 12 cm. long. Fruits soft and juicy. . . . . ***Arbutus***.
  2b. Evergreen shrubs ranging from about .3 to 6 m. (1-20') tall. Leaves about 1 to 5 cm. long. Fruits firm and dry. . . . ***Arctostaphylos***.

ARBUTUS. MADRONE, STRAWBERRY TREE.

The genus *Arbutus* consists of 20 species of shrubs and trees that occur in the temperate regions of the northern hemisphere, and in North America some of the species occur in tropical mountains. *Arbutus* is the Latin name for the type species, *A. unedo* Linnaeus.

Arbutus menziesii Pursh. PACIFIC MADRONE, GIANT STRAWBERRY TREE. This well known species is widely scattered and locally common in the woodlands of the Tassajara region, but mostly at higher elevations. Occasionally plants occur at lower elevations, such as the one at the base of Hawk Peak opposite of the old bathhouse at Tassajara. ●R: Pacific Slope of western temperate North America, from British Columbia to the higher mountains of northern Baja California. In California this species is abundant in the North Coast Ranges, and in the South Coast Ranges major populations occur in the portion of the Diablo Range that is east of San Francisco Bay, in the Santa Cruz Mountains, and in the Santa Lucia Mountains of Monterey and San Luis Obispo counties. In the Sierra Nevada this species is scattered from Butte County to Fresno County, and in southern California scattered populations occur in the western Transverse Ranges of Santa Barbara and Ventura counties, in the San Gabriel Mountains of Los Angeles County, in the Santa Ana Mountains of Orange and western Riverside counties, and in the mountains of San Diego County. This species also occurs Santa Cruz Island. ●H: broadleaf evergreen trees that range from less than 6 m. (20') tall in unfavorable habitats, to well over 30 m. (100') tall in densely forested areas. Unusually large trees can have trunks that exceed 3 m. (10') or more in diameter. The bark of the trunks of comparatively young trunks, and the upper branches of older trees, is very smooth and brownish red (and thus similar to the bark of manzanitas), but on older growth a dark and flaky bark develops. The alternate leaves have petioles that are about 1 to 2.5 cm. long; the blades are elliptic to sub ovate, dark glossy green above and paler beneath, and about 5 to 12 cm. long. The flowers are produced in large and showy paniculate clusters, and the urn shaped corollas, which are about 6 to 8 mm. long, are white with a pink tinge. The fruits are red to orangish berries about 8 to 10 mm. wide; they contain small stone like seeds about 2.5 mm. long. The berries ripen from late autumn to early winter. ❁March-May.

ARCTOSTAPHYLOS. MANZANITA, BEAR BERRY.

While I was completing the text on the genus *Arctostaphylos* for the first edition of this text (1998), which included only two species, I had a feeling that I had probably overlooked at least one or more, for 13 species (plus 6 subspecies) occur in the Santa Lucia Mountains of Monterey County. As it turns out, my hunch was correct, and my error was in part due to the faulty key in the first edition of *The Jepson Manual* (1993), in which many of the plants of this region key out to be *A. glandulosa* subsp. *zacaensis*, a taxon that is not recognized in the second edition of *The Jepson Manual* (2012). Due largely to the advent of the Consortium of California Herbaria database, the number of taxa that are known to occur in the Tassajara region has risen to nine: five species and four subspecies.

The genus *Arctostaphylos* consists of 66 currently recognized species. One species, *Arctostaphylos uva-ursi* (Bear Berry), is widely distributed in the arctic and temperate regions of the northern hemisphere, from western Europe to Greenland, and in North America its range extends southward to the mountains of Guatemala. The remainder of the species are endemic to western North America and Mexico. Sixty species occur in California, and 54 species (plus 33 subspecies) are endemic to the California Floristic Province. Many of the taxa are rare and/or have very limited distributions. Manzanita is a Spanish word that means little apple, and the botanical name is derived from the Greek words *arktos*, bear, and *staphyle*, a bunch of grapes.

1a. Shrubs without fire resistant burls at the base of the their trunks, and thus plants are killed by fires:
- **2a**. Budding inflorescence bracts generally leaf like and flat. Rare in the Tassajara region. . . . . ***A. canescens***.
- **2b**. Budding inflorescence bracts fleshy, scoop shaped or generally scale like, deltate to awl shaped, keeled or not:
  - **3a**. Inflorescence a panicle, usually three to eight branched. Stones connate into a single sphere. Locally common in the Tassajara region. . . . . ***A. glauca***.
  - **3b**. Inflorescence generally a raceme or raceme like, occasionally one or two branched. Stones free. Rare in the Tassajara region. . . . ***A. pungens***.

1b. Shrubs with fire resistant burls at the base of their trunks, from which they produce new growth after fires:
- **4a**. Leaves with stomata (pores) only on the under (abaxial) surfaces; the upper and lower leaf surfaces usually differing in hue and/or hairiness. Bark of older stems persistent, gray and shredded:
  - **5a**. Twigs glandular. . . . . ***A. tomentosa*** subsp. ***bracteosa***.
  - **5b**. Twigs not glandular:
    - **6a**. Lower surface of the leaves tomentose, at least when young. . . . . ***A. tomentosa*** subsp. ***tomentosa***.
    - **6b**. Lower surface of the leaves glabrous. . . . . ***A. tomentosa*** subsp. ***hebeclada***.
- **4b**. Leaves with stomata on both surfaces; the upper and lower leaf surfaces usually of the same hue and/or hairiness. Old bark smooth or pealing; the smooth bark is brownish red:
  - **7a**. Twigs glandular hairy or not, the bracts and/or young inflorescence stems glandular-hairy:
    - **8a**. Twigs glandular-hairy. . . . . ***A. glandulosa*** subsp. ***glandulosa***.
    - **8b**. Twigs not glandular-hairy. . . . . ***A. glandulosa*** subsp. ***howellii***.
  - **7b**. Twigs, bracts and young inflorescence stems not glandular-hairy:
    - **9a**. Twig hairs soft and wavy, and with longer white hairs. . . . . ***A. glandulosa*** subsp. ***mollis***.
    - **9b**. Twig hairs not soft and wavy. . . . . ***A. glandulosa*** subsp. ***cushingiana***.

+√***Arctostaphylos canescens*** Eastwood subsp. ***canescens***. HOARY MANZANITA. This entry is based on three herbarium specimens. One was collected by Carl B. Wolf at "The Chew's Ridge F. S. (Forest Service) lookout, between Jamesburg and Tassajara Hot Springs," on July 13th of 1941 (Wolf 11004; DS 339024), and two specimens were collected by Leroy Abrams on Pine Ridge on May 12th of 1920 (Abrams #7414 &7416; DS 111848 & 111864). ●R: Coast and Klamath ranges, from Coos and Douglas counties in southwestern Oregon to the Santa Lucia Mountains of San Luis Obispo County. Although the Santa Lucia Mountains are omitted as a location for this species in the texts for *A. canescens* in the first and second editions of *The Jepson Manual* (1993 & 2012), in the key to *Arctostaphylos* in the second edition (and presently in the Jepson eFlora), "Tassajara, Santa Lucia Range" is included in the final line for a location for this taxon. ●H: erect evergreen shrubs that range from about 3 dm. to 3 m. (1-10') tall. The non glandular twigs are covered with a coast of short canescent hairs. The erect leaves have petioles that are about 3 to 10 mm. long, and the blades are about 2

to 5 cm. long and 1 to 3 cm. wide. The blades, which are covered with grayish white canescent (hoary) hairs, are round-ovate, ovate or elliptic, and the bases are rounded to wedge shaped, while the tips are acute to abruptly soft pointed. The margins are flat and entire. The flowers are produced in 1 to 3 branched panicles (the budding panicles are pendant, bell shaped, and canescent). The canescent leaf like floral bracts are widely lanceolate and about 6 to 20 mm. long. The flowers have hairy pedicels that are about 5 to 9 mm. long, and the urn shaped and white to pinkish corollas are about 8 mm. long. The fruit is a dry depressed-globose berry about 5 to 10 mm. wide; the stones are distinct ❁January-May.

+***Arctostaphylos glandulosa*** Eastwood subsp. ***glandulosa*** [*A. g.* subsp. *zacaensis* (Eastwood) P. V. Wells]. EASTWOOD MANZANITA, STICKY MANZANITA. In the first edition of this text this taxon was placed under the name *A. glandulosa* subspecies *zacaensis*, for the characteristics of such plants corresponded to that taxon when using the diagnostic key to *Arctostaphylos* in the first edition of *The Jepson Manual* (1993). In the second edition of *The Jepson Manual* (2012), subspecies *zacaensis* has been reduced to a synonym of *A. glandulosa* subspecies *glandulosa*. This subspecies is widely scattered at higher to intermediate elevations in the Tassajara region, and it is common to abundant in many areas, especially on the summit of ridges. Many herbarium specimens of this taxon have been collected in the Tassajara region. ●R: Coast, Transverse and Peninsular ranges, from Lane County in western Oregon to northwestern Baja California. ●H: evergreen shrubs with crowns that range from about 3 to 25 dm. (1-8') tall. Plants growing on or near the summit of ridges are often semi prostrate. Older plants develop ground level burls, from which new branches are quickly produced after fires. The alternate leaves have petioles that are about 5 to 10 mm. long, and the blades are elliptic to ovate or obovate and about 1 to 4.5 cm. long. The flowers are clustered in nodding racemes that terminate the outer most stems, and the urn shaped corollas, which are about 6 to 8 mm. long, are white. The fruits are sticky green berries that are about 6 to 10 mm. wide; the fruits contain weakly consolidated stones. ❁January-April.

+***A. glandulosa*** subsp. ***cushingiana*** (Eastwood) J. E. Keeley, M. C. Vasey & V. T. Parker [*A. c.* Eastwood]. This entry is based on eight herbarium specimens that have been collected in the Tassajara region. The stated location for one of the specimens is "Tassajara Springs," but it was probably collected on Chew's ridge or at a point along Tassajara Road, as were the other specimens. This taxon is almost certainly more widespread in this region, for it typically occurs in mixed stands with subsp. *glandulosus*. ●R: Coast, Transverse and Peninsular ranges, from Del Norte County to northwestern Baja California. ●H: similar to the typical subspecies, except for the features listed in the key. ❁January-April.

e +***A. glandulosa*** subsp. ***howellii*** (Eastwood) P. V. Wells (*A. h.* Eastwood; *A. g.* subsp. *zacaensis* [Eastwood] P. V. Wells). This entry is based on four herbarium specimens, three of which were collected in the vicinity of China Camp and the other was collected at the top of Chew's Ridge. This taxon is probably more widely distributed in this region, for it is reported to be common in the watershed of the Arroyo Seco River. ●R: endemic to the Santa Lucia Mountains of Monterey and San Luis Obispo counties. ●H: similar to the typical subspecies, except for the characteristics listed in the key. ❁January-April.

A. glandulosa subsp. *mollis* (J. E. Adams) P. V. Wells [*A. g.* var. *m.* Adams]. Although a specimen in the herbarium of the Rancho Santa Ana Botanical Garden has been assigned to this taxon (RSA 25674), a duplicate specimen that is on file in herbarium of the California Polytechnic University in San Luis Obispo has been assigned to *A. glandulosa* subsp. *cushingiana* (OBI 14687). The specimen was collected by Carl B. Wolf at the "Chew's Ridge F. S. (Forest Service) Lookout, between Jamesburg and Tassajara Hot Springs," in July of 1941 (Wolf 11004). It appears that only three specimens that have been assigned to *A. g.* subsp. *mollis* have been collected north of San Luis Obispo County, this one and one that was collected in Contra Costa County, and another that was collected in Solano County. I have included *A. g.* subsp. *mollis* in preceding key just in case.

Arctostaphylos glauca Lindley. BIG BERRIED MANZANITA. In the first edition of this text I stated that this very distinct species was "Common in chaparral and in open areas at lower to intermediate elevations of the Tassajara region, and it is one of the most conspicuous and well known of the shrubs in this region." All of the plants that existed in the areas of the Tassajara region that I explored during the first two years after the Basin Complex Fire of 2008 were consumed by this fire, but young plants that sprouted from seeds are now established in many locations. ●R: Coast, Transverse and Peninsular ranges, from Mount Diablo in Contra Costa County to northern Baja California. ●H: evergreen shrubs or sometimes small trees that range from about 2 to 8 m. (6.5-26') tall; the branches often exhibit a fairly tortuous habit of growth. The bark is mostly very smooth and brownish red. The alternate leaves have petioles that are about 7 to 15 mm. long, and the gray green and glaucous blades, which are about 2 to 5 cm. long, are oblong to elliptic or ovate; the margins are entire. The flowers are produced in nodding panicles that terminate the outer most stems. The urn shaped corollas, which are white with a pinkish tinge, are about 8 to 9 mm. long. The fruits are roundish to ovoid berries that are about 12 to 15 mm. wide. The fruit is covered by a thin and sticky green skin that surrounds the solidly fused stones. ❁December-March.

+***Arctostaphylos pungens*** Kunth [*A. pseudopungens* Roof]. POINT LEAFED MANZANITA; MEXICAN MANZANITA. This entry is based on two herbarium specimens that were collected by William Russell Dudley in June of 1901. One specimen was collected along "Tassajara Road, Santa Lucia Mountains" (DS 27296), and the other specimen was collected along "Tassajara Road, near Church's place" (DS 27234). As Tassajara Road does not come close to the Church ranch at The Caves, I suspect that Dudley collected the later specimen near the Church Creek Trail head on Tassajara Road, or along the summit of Black Butte Ridge, where the road to The Caves (then a trail) intersects with Tassajara Road. In 1978 James Roof included Dudley's specimens in his text for *Arctostaphylos pseudopungens*, a taxon in which he assigned the *A. pungens* plants that occur in the Santa Lucia Mountains of Monterey County ("A New Manzanita Species from the Santa Lucia Range, Monterey County, California," *The Four Seasons* 5 (4): 8-11). ●R: this species occurs at scattered locations in California, from Humboldt and Nevada counties southward, and its distribution extends eastward to Utah, New Mexico and Texas, and southward to the state of Oaxaca in southern Mexico. ●H: erect evergreen shrubs that range from about 1 to 3 m. (40"-10') tall. The bark on older stems is persistent, reddish and smooth. The generally erect leaves have petioles about 4 to 8 mm. long, and the elliptic to lanceolate-elliptic blades, which are about 1.5 to 4 cm. long, have obtuse to cuneate bases. The leaves are shiny and range from bright to dark green. The twigs are sparsely short hairy. The flowers are produced in simple or one branched pendant racemes, and the reflexed ovate-deltate inflorescence bracts are scale like. The urn shaped corollas are about 6 mm. long, and are usually white or tinged with pink. The fruit is dry berry that contains distinct stones. ❁February-March.

+***Arctostaphylos tomentosa*** (Pursh) Lindley [*Arbutus t.* Pursh]. SHAGGY BARKED MANZANITA. This entry is based on two herbarium specimens. One was collected in June of 1901 by A. D. E. Elmer, and although the location as stated on the label is "Tassajara Hot Springs," according to the note in the envelope that is pasted to the sheet it was collected at "Ridge top, Tony's Trail" (Elmer 3181; DS 27395). The other specimen was collected "0.6 mi. s. of China Camp on road to Tassajara Hot Springs, alt. 4300 ft." in October of 1953 (E. K. Balls, P. C. Everett & B. K. Balls 18561; RSA 89783). ●R: from the Jasper Ridge Biological Preserve in San Mateo County to Tranquillon Mountain (near Point Arguello) in western Santa

Santa Barbara County, and a disjunct population occurs on Santa Cruz Island. Of the 235 specimens that are included in the Consortium of California Herbaria database, 205 are from Monterey County . ●H: erect or mound forming shrubs that range from about 1 to 3 m. (40"-10') tall. The older bark is persistent, gray and shredded. The alternate leaves are short petiolate, and the blades, which are about 2 to 5 cm. long, are oblong-ovate to oblong-lanceolate. The blades range from dark to bright green, and the upper surfaces are more or less shiny and the lower surfaces are generally dull. The flowers are produced in 2 to 8 branched panicles, and the urn shaped corollas are white and about 5 to 6 mm. long. The fruits are depressed-globose and about 6 to 10 mm. in diameter. ❁December-March.

+ **e *A. tomentosa*** subsp. ***bracteosa*** (deCandolle) J. E. Adams [*Andromeda b*. deCandolle; *Arctostaphylos b*. (deCandolle) Abrams). MONTEREY MANZANITA. This entry is based on three herbarium specimens. One was collected by Junea (Mrs. G. Earle) Kelly in June of 1917, and the location stated on the label is "Tassajara Springs" (CAS 38840). Another specimen was collected on Pine Ridge by Leroy Abrams in May of 1920 (Abrams 7415; DS 111847), and William Russell Dudley collected a specimen along "Tassajara Road, Santa Lucia Mts., on grade south of Jamesburg," in June of 1901 (DS 27235). Dudley spent three weeks in the Santa Lucia Mountains on that expedition, and during this time he collected two more specimens of *A. tomentosa bracteosa*. One specimen was collected in "Leigh's Mountain Valley" (Strawberry Valley), and the other was collected "Along canyon west of Higgins" (DS 27202 & 27201). The later is the most southern documented location for this taxon. ●R: from the Monterey Peninsula and vicinity to the Jamesburg, Tassajara and Indian Valley regions of the Santa Lucia Mountains. ●H: similar to the typical species, except for the characteristics noted in the key. ❁December-March.

+ **e *A. tomentosa*** subsp. ***hebeclada*** (deCandolle) V. T. Parker, M. C. Vasey & J. E. Keeley [*Arctostaphylos bracteosa* var. *hebeclada* Eastwood]. This entry is tentative, for it is based on two herbarium specimens that were collected in the San Francisco Botanical Garden in March of 1981, from plants that were raised from seeds that were collected along Tassajara Road in October of 1953 (CAS 645629 & 645630). The seeds were collected by E. K. Balls, P. C. Everett and B. K. Balls, who also collected a specimen of *A. tomentosa* subspecies *tomentosa* on the same outing, which is cited above. ●R: from the Monterey Peninsula and vicinity to the vicinity of Alder Peak on the South Coast Ridge of Santa Lucia Mountains of Monterey County. ●H: similar to the typical species, except for the characteristics noted in the key. ❁December-March.

CHIMAPHILA. PIPSISSEWA, PRINCE'S PINE.

The genus *Chimaphila* consists of four or five species of perennial herbs of the boreal and temperate montane regions of the northern hemisphere, and the range of one species extends southward to the mountains of Central America. The name is derived from the Greek words *cheima*, winter, and *philein*, love.

<>***Chimaphila menziesii*** (Brown ex Don) Sprengel [*Pyrola m*. B. ex D.]. WESTERN PIPSISSEWA, LITTLE PRINCE'S PINE. This distinctive species is lightly scattered in the (formerly) *Pinus ponderosa* dominated mixed evergreen forests along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge, and on the slope immediately south of Pine Valley Camp. It also occurs on the northwestern summit of the Elephant's Back, where Vern Yadon collected a specimen of it in early July of 1980 (PGM 2085); the Elephant's Back is the large mountain that forms much of the western boundary of the Tassajara Creek watershed between Oryoki Creek and the headwaters of Tassajara Creek). The plants of this region occur between about 3,200 and 4,800 ft. elevation. The only other locations in the Santa Lucia Mountains where this species is known to occur is on the Ventana Double Cone, and on and in the vicinity of, Cone Peak. Although this species is widely distributed, it is reported to be uncommon throughout its range. ●R: northern Rocky Mountains, from Idaho to British Columbia, and from there southward through the Cascade Ranges to California. In California this species occurs in the North Coast Ranges, from Mount Saint Helena in Napa County northward, and in the Sierra Nevada, from Tehama and Plumas counties to Tulare County. In the South Coast Ranges this species is only known to occur on Mount Hamilton in Santa Clara County and in the Santa Lucia Mountains of Monterey County. In the eastern Transverse Ranges this species occurs in the San Gabriel and San Bernardino mountains, and in San Diego County it occurs in the Palomar and Cuyamaca mountains. ●H: small evergreen perennial herbs with stems that range from about 1 to 1.5 (4-6") tall. The short petiolate leaves are alternate, opposite and often whorled in three's or more. The blades, which are about 1.5 to 3.5 cm. long, are ovate to lance-oblong, serrulate to entire, relatively thick, and shiny dark green above and paler below. The flowers are produced in terminal and sometimes axillary racemes about 4 to 5 cm. long. The corolla consists of five reflexed petals about 5 to 6 mm. long; the petals are at first white but turn pinkish with age. The fruit is a five celled capsule about 5 to 6 mm. wide. ❁June-August.

EUPHORBIACEAE. SPURGE FAMILY.

Euphorbiaceae is a large, highly variable, and primarily tropical and subtropical family that is comprised of about 218 genera and 6,745 species. The plants range from small annual herbs to tall trees. The family includes many ornamentals, some very exotic cactus like plants, and some plants that are of economic importance, such as tung oil trees (*Aleurites*) and para rubber trees (*Hevea*). The family also includes a few food producing plants, such as cassava (*Manihot*), from which tapioca is derived, and many highly toxic plants, such as castor bean (*Ricinus communis*).

1a. Plants sprawling and tufted, gray green, and strongly aromatic. Calyces present. . . . . ***Croton***.
1b. Plants erect, green, and not strongly aromatic. Calyces absent. . . . . ***Euphorbia***.

CROTON.

Croton is large genus that consists of perhaps more than 1,300 species that range from annual herbs to trees; the species primarily occur in tropical and warmer temperate regions. The name is derived from the Greek word *kroton*, tick, on account of the appearance of the seeds of some species.

Croton setiger Hooker [*Eremocarpus setigerus* (Hooker) Bentham]. TURKEY MULLEIN, DOVE WEED. This distinctive species is scattered in open grasslands along the Church Creek Fault, such as on the alluvial benches above Tassajara Creek northeast of the junction of the Horse Pasture and Marble Peak trails, in the Horse Pasture and in The Caves areas, and occasionally on the floodplains of Tassajara Creek. This species was originally named *Croton setigerum* by William Jackson Hooker ("Flora Boreali Americana" vol. 2, p. 141;

1838), but George Bentham reassigned the taxon to the monotypic genus *Eremocarpus* ("Botany of the Voyage of H. M. S. Sulphur," p. 53; 1844). There it remained in botanical literature until recently, and it is now placed in *Croton* section *Eremocarpus* (Bentham) G. L. Webster. ●R: western North America, from southern and eastern Washington and western Idaho to northern Baja California and northwestern Arizona. ●H: aromatic bluish gray green annual herbs with prickly hairy stems which form small to large tufts that range from about 1 to 8 dm. (4-32") wide. The plants are xerophytic, thus most of the growth occurs during the dry season. The leaves are generally alternate, but are often opposite upward on the stems; the petioles are about 1 to 5 cm. long, and the ovate to orbicular blades are about 1 to 6 cm. long. The staminate flowers are produced in terminal corymbs and the pistillate flowers are produced in the axils of the leaves. The fruit is a one seeded capsule about 4 mm. wide. ❀May-October.

EUPHORBIA. SPURGE.

According to the Angiosperm Phylogeny website, the genus *Euphorbia* consists of about 2,420 species, while on the Jepson eFlora website the estimated number of species is 1,750. In any case, the species range from annual herbs to trees, and they primarily occur in warm and/or dry temperate and tropical regions. One of the most well known species is *E. pulcherrima*, poinsettia, which is native to Mexico and Guatemala. The genus was named for Euphorbus, the physician of Juba II, the first century king of Mauritania (Morocco and northern Algeria).

1a. Petal like glands of staminate flowers crescent shaped, and thus the involucres are surrounded by eight slender horn like projections. Leaves entire. . . . . ***E. peplus***.

1b. Petal like glands of staminate flowers roundish to shortly oblong, and thus the involucres lack projections. Most leaf margins finely toothed. . . . . ***E. spathulata***.

Euphorbia peplus Linnaeus. PETTY SPURGE. This species has been a common weed in and about the developed area of Tassajara since at least the late 1970s. ●R: a common weed in North America and other parts of the world; native to the temperate regions of western Eurasia and northern Africa. ●H: erect annual herbs that range from about 10 to 30 cm. (4-12") tall. The lower leaves are alternate, while the upper leaves are opposite, and those that subtend the branches of the inflorescence are produced in whorls of threes. The shortly petiolate leaves have obovate to oblanceolate or elliptic blades that are about 1 to 3.5 cm. long. The small flowers, which lack corollas, are produced in the axils of the upper (inflorescence) leaves. The fruits are roundish and laterally lobed capsules that are about 2 mm. wide. ❀February-August (December).

Euphorbia spathulata Lamarck [*E. dictyosperma* Fischer & C. Meyer]. WART FRUITED or RETICULATE SEEDED SPURGE. The only areas in this region where this inconspicuous species is known to occur is along the Tassajara side of Tony's Trail, and along the Horse Pasture Trail between Tassajara Road and the Horse Pasture. In most years the plants are very lightly scattered in grassy openings in woodlands and chaparral, but in the Spring of 2009 (the first spring after the Basin Complex Fire), they were much more frequently seen (plants were quite plentiful along the Horse Pasture Trail at the Flag Rock Ridge summit). ●R: widely distributed in the Americas, from Washington to Ontario and Pennsylvania, and southward to temperate South America (the type locality is Uruguay). ●H: annual herbs with erect and upwardly branching stems that range from about 1 to 4 dm. (4-16") tall. The leaves range from .5. to 3 cm. long; the lower are alternate, oblong to obovate-spatulate, while the upper (floral) leaves are opposite and generally ovate elliptic to broadly ovate. The small flowers, which lack corollas, are produced in the axils of the upper (inflorescence) leaves. The fruits are roundish, three lobed and minutely warty capsules that are about 2 to 3 mm. wide. ❀March-June.

FABACEAE (*Leguminosae*). PEA, BEAN OR LEGUME FAMILY.

With about 730 genera and approximately 19,400 species, *Fabaceae* is the third largest family of vascular plants. It is also one of the most important plant families in regards to the development and maintenance of human civilization, and in this role it second only to that of *Poaceae* (the Grass Family). The many types of beans or legumes (including lentils, peas, peanuts, etc.) are exceedingly important food sources, and when combined with a carbohydrate rich foods (such as the grains of *Poaceae*), they provide a balanced source of primary human nutrition. Many plants, such as alfalfa, soybeans, and semi domesticated or feral species, are used extensively as forage or feed for livestock, which results in other major sources of nutrition for mankind, such as meats, milk (and other dairy products) and eggs. A large number of Fabaceae species have been domesticated simply for their ornamental appeal.

Fabaceae is divided into three subfamilies, two of which, *Mimosoideae* and *Caesalpinioideae*, are comprised mostly of tropical and subtropical trees and shrubs. The third and by far the largest subfamily, *Papilionoideae*, consists mostly of annual and perennial herbs (but includes shrubs and trees) that primarily occur in temperate regions. All of the *Fabaceae* species of the Tassajara region, both native and alien, belong to *Papilionoideae*.

The flowers of *Papilionoideae* are very distinctive, for they have five petals arranged in three asymmetrical series. The upper and usually largest petal is known as the banner or standard. The two lateral petals are known as the wings, which often obscure the two innermost (and often united) petals, which are known (collectively) as the keel. The wings and keel are partially united in some genera and by far the largest subfamily, *Papilionoideae*, consists mostly of annual and perennial herbs (but includes shrubs and trees) which occur mostly in temperate regions. The flowers of *Papilionoideae* are very distinctive, for they have five petals arranged in three asymmetrical series. The upper and usually largest petal is known as the banner or standard. The two lateral petals are known as the wings, which often obscure the two innermost (and often united) petals, which are known (collectively) as the keel. The wings and keel are partially united in some genera.

1a. Shrubs and subshrubs:
- **2a**. Leaves (or most leaves) divided into 3 leaflets:
  - **3a**. Shrubs. . . . . ***Genista***.
  - **3a**. Subshrubs (the stems woody only at the base):
    - **4a**. Stout stemmed plants of wet habitats. Flowers blue to purple. . . . . ***Hoita macrostachya***.
    - **4b**. Slender stemmed plants of dry habitats. Flowers yellow or mostly yellow. . . . . ***Acmispon glaber***.
- **2b**. Leaves divided into 4 or more leaflets:
  - **5a**. Leaves palmately divided into leaflets. Petals 5. . . . . ***Lupinus***.

5b. Leaves pinnately divided into leaflets. Petals 1. . . . . ***Amorpha***.
1b. Annual and perennial herbs:
6a. Vines or vine like plants. Stems and/or leaves terminating with coiling tendrils that allow the plant to climb on other objects:
7a. Styles with a ring of hair just below stigma. Wings and keel joined for more than half the length of the keel. . . . . ***Vicia***.
7b. Styles with a line of hairs along upper margin just below stigma. Wings and keel joined for less than half the length of the keel. . . ***Lathyrus***.
6b. Plants not vine like. Stems and/or leaves not terminating with tendrils:
8a. Leaves palmately divided into 5 or more leaflets (or rarely 4 in *Lupinus cervinus*) . . . . . ***Lupinus***.
8b. Leaves not palmately divided into 5 or more leaflets:
9a. Stipules at the base of the petioles very large and strongly resembling the leaflets. Stamen filaments free to the very base. Yellow flowered inflorescences strongly resembling those of lupines. . . . . ***Thermopsis***.
9b. Stipules absent, dot like or bract like, and if bract like, they are much smaller than the leaflets and do not resemble them. Stamen filaments united, or at least 9 are united or partially united. Inflorescences mostly not resembling those of lupines, but if so (as in *Hoita*), the petals are not yellow:
10a. Leaves irregularly divided into leaflets. . . . . ***Acmispon***.
10b. Leaves regularly divided into leaflets:
11a. Leaves (or most leaves) divided into 4 or more leaflets:
12a. Stipules expanded and membranaceous or leaf like. . . . . ***Hosackia***.
12b. Stipules absent or reduced to dot like glands:
13a. Flowers produced in racemes. Fruits becoming inflated with age. . . . . ***Astragalus***.
13b. Flowers produced singularly or in small groups or umbels. Fruits not becoming inflated with age. . . . . ***Acmispon***.
11b. Leaves divided into 3 leaflets:
14a. Leaves pinnately divided leaflets (there is a large gap between the terminal & lateral leaflets). Perennial herbs or subshrubs:
15a. Plants of wet habitats. Racemes spike like, the petals mostly purple or blue. . . . . ***Hoita***.
15b. Plants of woodlands or chaparral. Racemes not spike like, the petals greenish or yellowish white. . . . . ***Rupertia***.
14b. Leaves palmately or sub palmately divided into leaflets (the leaflets diverge from a common point or nearly so). Annual herbs (except for *Trifolium wormskioldii*):
16a. Leaflet margins entire. Flowers produced singularly or in umbellate or whorled clusters that are sessile in the axils of the leaves. . . . . ***Acmispon americanus*** & ***glaber***.
16b. Leaflet margins at least finely serrulate. Flowers produced in clusters or racemes that are not sessile in the axils or the leaves:
17a. Flowers produced in dense head like clusters. Fruits remaining concealed within the calyces. . . . . ***Trifolium***
17b. Flowers produced in small clusters or in dense or loose racemes. Fruits fully exposed:
18a. Fruits straight (except for the style). Flowers produced in elongated racemes. . . . . ***Melilotus***.
18b. Fruits curved or spirally coiled. Flowers produced in small clusters or in short and compact racemes. . . . ***Medicago***.

ACMISPON. DEER VETCH, DEER WEED.

The genus *Acmispon* consists of about 23 species of western North America and Mexico, and one that occurs in temperate South America. Twenty two species occur in California, and ten species, plus 12 lesser taxa, are endemic to the California Floristic Province. The name is derived from the Greek word *acme*, point or tip, probably for hooked tips of the fruits.

1a. Perennial herbs and subshrubs:
2a. Fruits dehiscent (readily opening when mature to discharge the seeds), straight or nearly so, and abruptly short beaked. . . . . ***A. grandiflorus***.
2b. Fruits indehiscent, often strongly curved, and tapering to an elongated beak:
3a. Broom like plants with many erect and ascending stems. Most leaves divided into 3 leaflets. . . . . ***A. glaber***.
3b. Plants with relatively few prostrate or decumbent-ascending stems. Most leaves divided into 4 or more leaflets:
4a. Inflorescence less than 1 cm. wide and loosely 4 to 8 flowered. Corollas 6 to 10 mm. long. . . ***A. argophyllus*** var. ***argophyllus***.
4b. Inflorescence more than 1 cm. wide and densely 10 to 15 flowered. Corollas 8 to 12 mm. long. . ***A. argophyllus*** var. ***fremontii***.
1b. Annual herbs:
5a. Petals basically white, pink or pinkish, but may turn red with age (in *A. americanus* the flowers are rarely yellow, and if so it can be distinguished from the other yellow flowered species by its leaves, most of which are divided into 3 leaflets, not 4 or more):
6a. Calyx lobes much longer than the tube. . . . . ***A. americanus***.
6b. Calyx lobes much shorter than the tube. . . . . ***A. parviflorus***.
5b. Petals basically yellow (but may turn red with age or be marked with red when still fairly young):
7a. Flowers pedunculate, the peduncles 3 to 25 mm. long:
8a. Wings conspicuously longer than the keel. Fruits strigose, the seeds squared. . . . . ***A. strigosus***.
8b. Wings about as long as the keel. Fruits glabrous, the seeds globose to oblong-ovoid. . . . . ***A. maritimus***.
7b. Flowers sessile or nearly so:
9a. Plants generally with a more or less dense coat of spreading hairs. Calyx lobes 1 to 2 times longer than the tube. Fruits mostly 3 to 4 mm. wide. . . . . ***A. brachycarpus***.
9b. Plants generally with a relatively sparse coat of short appressed hairs. Calyx lobes .8 to 1.2 times longer than the tube. Fruits mostly 2.3 to 3 mm. wide. . . . . ***A. wrangelianus***.

Acmispon americanus (Nuttall) Rydberg [*Lotus purshianus* (Bentham) Clements & Clements; *Trigonella americana* Nuttall; *Hosackia purshiana* Bentham; *Hosackia americanus* (Nuttall) Piper]. AMERICAN TREFOIL, SPANISH CLOVER. This species occurs at all elevations in the Tassajara region, and it is found in nearly all habitat types. ●R: widely distributed in temperate North America, from southern Canada to northern Mexico, and it is most common in western North America. ●H: annual herbs with erect to ascending stems about 1.5

to 8 dm. (6-32") long. The leaves are alternate, about 1 to 2.5 cm. long, and divided into 3 (or sometimes more) oblong to elliptical (or asymmetrically ovate) leaflets about 10 to 15 mm. long. The flowers are produced singularly in the axils of the leaves; the corollas are about 4 to 7 mm. long, and the petals vary from creamy white to dark pink. The legumes are about 1.5 to 2.5 cm. long and 2 to 2.5 mm. wide, and they contain about 3 to 7 seeds that are about 3 mm. in diameter. ֍May-October.

^***Acmispon argophyllus*** (A. Gray) Brouillet [*Lotus argophyllus* (A. Gray) E. Greene; *Hosackia argophylla* A. Gray]. SILVER LEAVED LOTUS. This species is uncommon in the Tassajara region. I have seen it in rocky areas along the Pine Ridge Trail a short distance east of the Church Creek Divide, and on sandstone outcrops along the lower portion of the Horse Pasture Trail, above Blackberry Creek. A. D. E. Elmer's "Tassajara Hot Springs" specimen of June 1901 (Elmer #3285 DS 35593) was collected, according to a note enclosed in an envelope attached to the sheet, in "Woods on ridge towards Ventana outlook northwest of Pine Valley." ●R: from Carmel Valley in the Coast Ranges, and from Mariposa County in the Sierra Nevada, to the Transverse and Peninsular ranges of southern California and northern Baja California. ●H: densely silvery pubescent evergreen perennial herbs with prostrate to decumbent branches that range from about 1 to 10 dm. (4-40") long. The alternate leaves are divided into 3 to 5 broadly oblanceolate to obovate leaflets about 4 to 12 mm. long. The flowers are produced in loose terminal umbels; the corollas are about 6 to 10 mm. long, and the petals are yellow (the banner turns brownish or purplish with age). The fruits are about 4 mm. long and barely exceed the lobes of the calyx; they contain one small seed. ֍April-July.

<>***Acmispon argophyllus*** var. ***fremontii*** (A. Gray) Brouillet [*Lotus a.* var. *f.* (A. Gray) Ottley; *Hosackia a.* var. *f.* A. Gray; *Hosackia f.* (A. Gray) Abrams]. This taxon is lightly scattered on the higher ridges of the Tassajara region, where occurs in rocky areas or on steep and exposed slopes. The most accessible of the known site is located along the road to The Caves, a short distance from its junction with Tassajara Road. The plants occur on rock outcrops on the upward side of the road cut. ●R: Sierra Nevada, from Butte and Plumas counties to Tulare County, with disjunct populations in the Santa Lucia mountains of Monterey County and on Santa Cruz Island. ●H: evergreen perennial herbs similar to the typical species, except for the larger and more densely arranged flowers, more robust habit of growth, and the more numerous and more densely foliated stems (the stems often form large spherical rosettes). ֍April-July.

Acmispon brachycarpus (Bentham) D. D. Sokoloff [*Lotus humistratus* E. Greene; *Hosackia brachycarpa* Bentham]. COLCHITA, SHORT FRUITED LOTUS. This inconspicuous species is lightly scattered at all elevations in the Tassajara region, and it usually occurs on steep south facing slopes with poor or loose soils. ●R: from Curry and Klamath counties in southwestern Oregon to northern Baja California, and eastward to southwestern Utah and southwestern New Mexico. It is also reported to occur in south central Idaho. ●H: small and densely whitish pubescent annual herbs with semi prostrate stems that range from about .5 to 2 dm. (2-8") long. The plants often form small tufts. The alternate leaves are divided into 3 to 5 obovate to oblanceolate leaflets about 4 to 12 mm. long. The flowers, which are nearly sessile, are produced singularly in the axils of the leaves. The corollas are about 5 to 9 mm. long, and the petals are at first yellow, but turn red with age. The usually three seeded legumes are about 6 to 12 mm. long; they are covered with a dense coat of villous hairs. ֍March-June.

!!***Acmispon glaber*** (Vogel) Brouillet [*Lotus scoparius* (Nuttall) Ottley; *Syrmatium glabrum* Vogel; *Hosackia scoparia* Nuttall ex Torrey & A. Gray; *Hosackia glabra* (Vogel) Torrey]. DEER WEED, CHAPARRAL BROOM, CALIFORNIA BROOM. In the first edition of this text I stated that:

> This species was extremely abundant in this region for the first few years after the Marble Cone Fire of 1977. During that time the canyon's walls changed in color according to this plant's yearly cycle: from green during the winter and spring, to yellow during the peak flowering season (late May to early July), to reddish as the flowers aged, then returning to green for a few weeks. As the leaves started to wither and fall, the slopes turned rusty red for about a month or so, then turned grayish for the rest of the dry season, for only the dormant stems remained.

The same phenomenon took place after the Basin Complex Fire of 2008. This species occurs at all elevations in the Tassajara region, and in normal years it is scattered open areas, especially within chaparral. ●R: Coast Ranges, from Humboldt County southward, and the Sierra Nevada foothills, from Butte County southward, to northern Baja California. ●H: broom like subshrubs tending to form rounded crowns comprised of numerous erect and ascending stems. The stems are rather slender and range from about 4 to 12 dm. (16-48") long. The leaves are alternate, nearly sessile, and divided into 3 (or sometimes 4 or 5) oblong or oblanceolate leaflets about 4 to 15 mm. long. The flowers are produced in umbellate or whorled clusters that are sessile in the axils of the upper leaves. The corollas are about 7 to 12 mm. long, and the petals are at first yellow, turn to red with age. The upwardly curved legumes are about 1 to 1.5 cm. long; they contain two seeds that are about 1.5 to 2 mm. long. ֍March-August.

Acmispon grandiflorus (Bentham) Brouillet [*Lotus grandiflorus* (Bentham) E. Greene; *Hosackia grandiflora* Bentham]. LARGE FLOWERED CHAPARRAL LOTUS. This species is lightly scattered in openings in chaparral and in wooded areas on the higher ridges of the Tassajara region. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Shasta County to northern Baja California. ●H: perennial herbs, sometimes slightly woody at the base, with stems that range from about 2 to 7 dm. (8-28") tall. The stems wither away in winter and new stems are produced in the spring. The leaves are alternate and pinnately divided into usually 7 to 9 obovate to elliptical-obtuse leaflets about 7 to 20 mm. long. The flowers are produced in umbels that are terminal on axillary peduncles about 4 to 8 cm. long. The corollas are about 1.5 to 2.4 cm. long, and the petals are at first yellow but turn red with age. The narrow legumes, which are about 3 to 4 cm. long, containing seeds that are 2 mm. long. ֍April-July.

+***Acmispon maritimus*** (Nuttall) D. D. Sokoloff [*Lotus salsuginosus* E. Greene; *Hosackia maritima* Nuttall]. Diane Renshaw was the first person to notice the presence of this species in the Tassajara region. She discovered it at two locations in April of 2009 (the first spring after the Basin Complex Fire of 2008). One was on the Hogback, and the other was in the saddle along the summit of Black Butte Ridge where Tassajara Road begins its descent to the hot springs. ●R: Coast, Transverse and Peninsular ranges, from Santa Cruz County to the Sonoran Desert and northern Baja California. ●H: Annual herbs with clustered stems that range from prostrate to outwardly ascending; the stems are about 5 cm. to 5 dm. (2-20") long. The alternate leaves are divided into 3 to 7 slightly obovate to slightly roundish leaflets that are about 5 to 15 mm. long. The flowers are usually produced in groups of 2 to 4 on axillary peduncles that are about as long as the leaves. The corollas are about 6 to 10 mm. long, and the petals are bright yellow. The narrow legumes are about 15 to 30 mm. long; they contain 5 to 9 seeds. ֍March-June.

Acmispon parviflorus (Bentham) D. D. Sokoloff [*Lotus micranthus* Bentham; *Hosackia parviflora* Bentham]. SMALL FLOWERED LOTUS. These inconspicuous annual herbs are widespread and locally common to abundant in more or less grassy areas at all elevations in the Tassajara region. ●R: Pacific Slope, from British Columbia to southern California. ●H: small annual herbs with several slender and nearly prostrate stems radiating from the root crown. The stems range from about 1 to 3 dm. (4-12") long. The leaves are alternate, about 1 to 1.5 cm. long, and pinnately divided into 3 to 5 oblong to oblanceolate or elliptical leaflets about 3 to 10 mm. long. The small flowers are singular in the axils of the leaves; they are sessile or on

Acmispon glaber (Deer Weed) on Flag Rock in early June of 2010, and thus during the second spring after the Basin Complex Fire.

peduncles up to 5 mm. long. The corollas are about 4 or 5 mm. long, and the petals range from pinkish white to nearly red. The slender legumes are about 1.5 to 2 cm. long, and contain about 5 to 9 seeds. ♔March-June.

Acmispon strigosus (Nuttall) Brouillet [*Lotus strigosus* (Nuttall) E. Greene; *Hosackia strigosa* Nuttall]. This species is widespread and locally common at all elevations in the Tassajara region, primarily in open grassy areas and in openings in chaparral. ●R: Coast Ranges, from Mendocino and Lake counties southward, and the Sierra Nevada foothills, from Butte and Plumas counties southward, to northern Baja California. ●H: annual herbs with several trailing or ascending stems that range from about .5 to 3 dm. (2-12") long. The alternate leaves are about 1 to 2.5 cm. long; they are divided into 4 to 10 small linear-oblong to elliptic leaflets that are about 5 to 12 mm. long. The flowers are singular or in 2s on slender axillary peduncles that are usually more than 1 cm. long. The corollas are about 6 to 10 mm. long; the petals are basically yellow, but are often marked with red. The slender legumes are about 1 to 3.5 cm. long, and they contain nearly square seeds that are about 1 mm. wide. ♔March-June.

Acmispon wrangelianus (Fischer & C. Meyer) D. D. Sokoloff [*Lotus wrangelianus* F. & M.; *Lotus subpinnatus* Lagasca and *Hosackia subpinnata* (Lag.) Torrey & Gray misapplied]. This inconspicuous species is widely scattered and locally common in open and grassy habitats at all elevations in the Tassajara region. ●R: California Floristic Province, from Jackson County in southwestern Oregon to northern Baja California. ●H: annual herbs with several decumbent to ascending stems that range from about 1 to 3 dm. (4-12") long. The alternate leaves are mostly less than 3 cm. long; they are divided into (usually) 4 elliptic to obovate leaflets about 4 to 15 mm. long. The flowers are nearly sessile, and are produced singularly in the axils of the leaves. The flowers are about 5 to 9 mm. long, and the petals are at first yellow, but become tinged with red with age. The oblong fruits are about 10 to 18 mm. long; they contain seeds that are about 1.5 to 2 mm. long. ♔March-June.

AMORPHA. FALSE INDIGO.

The genus *Amorpha* consists of about 15 species of shrubs that are endemic to North America. The name is derived from the Greek word *amorphous*, deformed, because the flowers have only one petal (the banner).

+∧*Amorpha californica* Nuttall. CALIFORNIA FALSE INDIGO, MOCK LOCUST. Although this species is not known to occur in or near the watershed of Tassajara Creek, I have decided to include it for two reasons. I am including all plant species that occur along Tassajara Road from Jamesburg southward, for residents and visitors to this region are likely to encounter them, and they might want to know

what they are. The other reason is that Tassajara Hot Springs has been cited in botanical literature as location for this species, and this is due to two herbarium specimens. One specimen was collected by Junea Kelly in July of 1916 (CAS 64645), and the stated location on the label is "Tassajara Springs." The other specimen was collected by A. D. E. Elmer in June of 1901(Elmer 3280; DS 35381, SBBG 33386), and although "Tassajara Hot Springs" is the location as stated on the label, according to the note that is enclosed in an envelope that is pasted to the specimen sheet, Elmer actually collected it "Near Jamesburg." This species occurs along Tassajara Road for the first two or three miles south of Jamesburg, and from Jamesburg northward it occurs to at least along Cachagua Road, about a half of mile from its junction with Tassajara Road (Yadon; PGM 7417). It also occurs on Lambert Flats (Howitt 718; CAS 475617). ●R: this species has an unusual pattern of distribution. Disjunct populations occur in the Cascade Range foothills, the Klamath Ranges and the inner North Coast Ranges, in Trinity and Shasta counties, on the Sutter Buttes in the Sacramento Valley, and in the Sierra Nevada, in Placer and El Dorado counties. The most northern documented populations in the Coast Ranges are in the Jamesburg region of the Santa Lucia Mountains, and from Monterey County southward populations occur in the Coast, Transverse and Peninsular ranges, as far south as northern Baja California. Disjunct populations are also reported to occur in the mountains of northwestern Arizona and southern Arizona (a disjunct variety of this species, var. *napensis*, occurs in Napa, Sonoma and Marin counties). ●H: deciduous shrubs that range from about 1.5 to 3 m. (5-10') tall. The short petiolate leaves are lanceolate to oblanceolate in outline, about 1 to 2 dm. long, and pinnately divided into 11 to 27 oblong elliptical leaflets that are about 1 to 3 cm. long. The flowers are crowded in terminal spike like racemes that are about 5 to 20 cm. long, and the banners, which are obovate-cuneate and about 5 mm. long, are reddish purple. The one to two seeded fruits are about 6 to 8 mm. long. ❁May-July.

ASTRAGALUS. MILK VETCH, LOCOWEED, RATTLE WEED.

Current estimates regarding the number of species that are included within the genus *Astragalus* range from over 2,500 to 3,270 (the Angiosperm Phylogeny Website places the number at 2,910), and thus it is the largest genus of vascular plants. Although 97 species plus numerous lesser taxa occur in California (many of which are uncommon to very rare), only two taxa are known to occur in the Tassajara region. The name is derived from the Greek word *astragalos*, ankle born or dice; perhaps for the seeds that rattle in the fully mature pods of some species.

1a. Annual herbs with erect or ascending stems. The corollas are about 2.5 to 3.3 mm. long. The fruits are less than 4 mm. wide and not strongly curved. . . . . ***A. gambellianus***.

1b. Perennial herbs with more or less prostrate stems radiating outward from the root crown. The corollas are about 10 to 12 mm. long. The fruits are about 5 to 16 mm. wide and strongly upwardly curved. . . . . ***A. lentiginosus***.

Astragalus gambellianus E. Sheldon [*A. nigrescens* Nuttall invalid]. DWARF LOCOWEED, LITTLE BILL LOCOWEED. This species is scattered in open grasslands and savannas in the Horse Pasture, in Pine Valley and on Chew's Ridge. Although this species is not known to occur elsewhere in this region, it is probably more widespread, for the plants are rather inconspicuous and thus easily overlooked. ●R: Cascade Ranges, Sierra Nevada foothills, and the Coast, Transverse and Peninsular ranges, from Jackson County in southwestern Oregon to northern Baja California. ●H: small annual herbs with slender and generally ascending stems that range from about .5 to 3 dm. (2-12") long. The alternate leaves are about 1 to 4 cm. long, and the blades are pinnately divided into 7 to 15 narrowly cuneate-oblong leaflets about 1 to 9 mm. long. The leaflets are commonly notched at the apex. The small flowers are produced in 4 to 15 flowered racemes that are terminal on slender peduncles that arise from the axils of the upper leaves. The racemes are at first crowed, but become more spacious with age. The petals are mostly white with a tinge of violet, and the banner is about 2.5 to 3.3 mm. long. The small legume is deflexed, two seeded, ovate to roundish when viewed from above, and about 3 to 4 mm. long. ❁April-June.

Astragalus lentiginosus Hooker var. ***idriensis*** M. E. Jones [*A. i.* (Jones) Abrams]. NEW IDRIA FRECKLED MILK VETCH. All references in botanical literature regarding the existence of this taxon in the Santa Lucia Mountains are based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer #3288, DS 34936 & 142794). According to the note that is enclosed in an envelope that is pasted to the specimen sheet, it was collected it in "Pine Valley, toward round meadow, gravely, rocky soil." Plants still occur at this site, which is on the low rise between Jack English's cabin and the large meadow to the north-northwest. This population appears to be prospering, for I counted 36 plants at this locality on May 20th of 1993, and 47 on May 24th of 2009. *Astragalus lentiginosus* is an extremely variable species, and 19 currently accepted varieties occur in California. ●R: Coast Ranges, western Transverse Ranges and the Tehachapi Mountains, from Santa Clara County to Ventura and Kern counties. The most northern known location is along the Arroyo Bayo section of San Antonio Road, between Mount Hamilton and the San Antonio Valley. The next known population occurs in western Fresno County, in the vicinity of the Little Panoche Reservoir, and the next population occurs in the vicinity of New Idria in southeastern San Benito County (this is the type locality and the place for which the taxon was named). To the southwest of New Idria, on the other side of San Benito Mountain, another population occurs in the Hernandez Valley area, and about 35 miles almost due west, across the Salinas Valley, the lone Pine Valley population manifests itself. The next known population to the south of San Benito County occurs in the Zapato Chino Canyon in southwestern Fresno County. The next populations occur in the Temblor Range in eastern San Luis Obispo County and in western Kern County, and the taxon once again manifests itself in the southern Sierra Madre and the eastern San Rafael Mountains of Santa Barbara County. In central Ventura County this taxon occurs in the upper most watershed of Sespe Creek (the Pine Mountain, Sespe Gorge and Rose Lake areas). Based on the number of herbarium specimens that have been collected, it appear that this taxon is most common in northern Ventura County and in adjacent areas of southern Kern County. Here it occurs in the Lockwood Valley, Mount Pinos, Frazier Mountain, Cuddy Canyon, San Emigdio Mountains and Tejon Pass areas. About 35 miles to the northeast populations of this taxon once again occur in the Tehachapi Mountains, in the vicinity of the town of Tehachapi. ●H: perennial herbs with several prostrate or ascending stems that range from about 1 to 4 dm. (4-16") long. The stems typically radiate outward from the root crown. The alternate leaves are about 1 to 4 cm. long, and the blades are pinnately divided into many small oblanceolate leaflets about 2 to 8 mm. long. The leaflets are often more or less truncate and sometimes notched at the apex. The flowers are produced in relatively short terminal racemes, and the five papilionaceous petals range from purplish pink to pale creamy white. The sharply upwardly angled banner is about 10 to 12 mm. long. The fruit is a laterally inflated legume about 5 to 10 mm. wide. The legume is strongly upwardly curved, and often the apex nearly touches the base. ❁April-July.

GENISTA.

Genista consists of about 90 species of that naturally occur in Europe, western Asia, northern Africa and on the Canary Islands. The name is Latin; it is from *planta genista*, from which the English Plantagenet monarchs took their name.

+***Genista monspessulana*** (Linnaeus) L. Johnson [*Cystis monspessulanus* L.]. FRENCH or MONTPELLIER BROOM. This extremely aggressive and poisonous weed has become established at points along Tassajara Road between Jamesburg and Bruce Flats. It has the capacity to form dense stands in which most other plant species cannot survive, and such areas are useless to grazing animals. Unless a major effort is undertaken to eradicate the local plants, they will certainly continue to spread. ●R: a now abundant weed in western North America and Australia; native to the Mediterranean region and the Canary Islands. ●H: erect evergreen shrubs that range from about 1 to 3 m. (3-10') tall. The leaves are divided into three oblanceolate to widely ovate leaflets about 10 to 15 mm. long; the leaflet margins are entire. The flowers are produced in short but densely flowered terminal and lateral racemes. The corollas are about 10 to 15 mm. long, and the petals are bright yellow. The legumes are about 15 to 25 mm. long; they contain about 3 to 6 seeds. ❀March-June.

HOITA. LEATHER ROOT.

Hoita consists of three species that were formerly included in *Psoralea*; all of the species are endemic to the California Floristic Province. The common name refers to the fibrous roots, which California Indians used for binding. According to Per Axel Rydberg, who designated the genus, *Hoita* is an "Indian name for the type species [*H. macrostachya*], the fiber of which has been used as threads" (*Flora of North America* vol. 24, pages 8-9, 1919).

1a. Stems erect. Leaflets lance-ovate to ovate-rhombic. . . . . ***H. macrostachya***.
1b. Stems prostrate and rooting at the nodes. Leaflets round to round-obovate. . . . . ***H. orbicularis***.

Hoita macrostachya (deCandolle) Rydberg [*Psoralea m*. deCandolle]. HOITA, COMMON LEATHER ROOT. This species is common along perennial streams at all elevations in the Tassajara region, and it is also sometimes found at springs and seeps. Due to the increased sunlight caused by the loss of riparian during the Basin Complex Fire of 2008, many of the plants of this region greatly flourished during the spring of 2009. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Shasta and Mendocino counties to northern Baja California, usually below about 5,000 feet. ●H: semi shrubby perennials of riparian habitats, with erect or ascending branches that range from about 6 to 30 dm. (2-10') tall. The alternate leaves have petioles about 1 to 6 cm. long, and the blades are pinnately divided into 3 lance-ovate to ovate-rhombic leaflets about 2 to 10 cm. long. The flowers are produced in broadly cylindrical terminal spikes about 5 to 12 cm. long, and the corollas consist of five asymmetrical petals about 8 to 10 mm. long; the banners and wings range from pink to purple or bluish purple. The fruit is a one seeded legume about 6 to 8 mm. long; the seed is about 5 to 7 mm. long. ❀May-Aug.

Hoita orbicularis (Lindley) Rydberg [*Psoralea o*. Lindley]. ROUND LEAFLET LEATHER ROOT. This distinctive species is scattered in wet habitats in the Tassajara region, such as in the bed of the Arroyo Seco at the confluence of Tassajara Creek, in Pine and Strawberry valleys, and on Chew's Ridge. At one time it existed in one of the seeps along Tassajara Road between China Camp and the road to The Caves, for in July of 1973 James Griffin collected a specimen of it "S. China Camp, in seep beside Tassajara Rd." (Griffin 3742; JEPS 74179). ●R: Sierra Nevada, Coast, Transverse and Peninsular ranges, from Shasta and Sonoma counties to northern Baja California. ●H: perennial herbs of wet habitats with prostrate stems which root at the nodes. The leaves have erect petioles about 1 to 5 dm. (4-20") long; and the blades are divided into 3 round or round-ovate leaflets about 3 to 8 cm. long. The flowers are produced in dense spike like racemes about .5 to 3 dm. long, which are borne on erect peduncles about 2 to 7 dm. (8-28") tall. The flowers are about 12 to 23 mm. long, and the banner and the wings range from pink to purple or bluish purple. The banner often has white spots on each side. The fruit is a one seeded legume about 8 mm. long, and the ellipsoid seed is about 5 mm. long. ❀May-July.

HOSACKIA.

The genus *Hosackia* consists of 11 species of temperate western North America, Mexico and Guatemala. Eight species occur in California, and five of these (plus 3 lesser taxa) are endemic to the California Floristic Province. According to John Lindley, this genus was dedicated to "David Hosack, M.D., F. R. S., &c., of New York, a gentleman to whom the scientific men of North America owe the same gratitude of those of England did to Sir Joseph Banks" (*Botanical Register* 15, sub. t. 1257, 1829).

1a. Plants of wet habitats. Leaflets narrowly oblong or elliptic. . . . . ***H. oblongifolia***.
1b. Plants of woodland or chaparral habitats. Leaflets broadly oblong to ovate or obovate:
  2a.. Plants usually more or much more that 5 dm. (20") tall. Stems glabrous or with appressed hairs. Stipules scarious, fragile and not leaflet like. . . . . ***H. crassifolia***.
  2b. Plants usually less than 5 dm. tall. Stems villous pubescent. Stipules often wide, persistent and leaflet like. . . . . ***H. stipularis***.

Hosackia crassifolia Bentham [*Lotus crassifolius* (Bentham) E. Greene; *Hosackia stolonifera* Lindley]. BROAD LEAVED LOTUS, BUCK LOTUS. This robust species is widely scattered in chaparral and sometimes wooded areas on the higher ridges of the Tassajara region, and it is common in some areas, such as in the vicinity of China Camp. ●R: in mountainous areas along the Pacific Slope, from Grays Harbor and Kitsap counties in western Washington to the Palomar and Cuyamaca mountains San Diego County. ●H: robust perennial herbs with arcing or erect stems that range from about 4 to 12 dm. (16-48") long. The rather stout and fistulous stems wither away with the first frosts of winter, and new stems are produced in late spring or early summer. The leaves are pinnately divided into 7 to 15 ovate to obovate leaflets about 1 to 3 cm. long. The flowers are produced in umbellate clusters borne on axillary peduncles about 3 to 8 cm. long. The flowers are about 9 to 12 mm. long; the petals are greenish yellow to white with purplish red markings. The fruit is a rather narrow legume that is about 3.5 to 6.5 cm. long that contains about 7 to 12 seeds. ❀May-August.

Hosackia oblongiflora Bentham [*Lotus oblongifolius* (Bentham) E. Greene]. NARROW LEAVED STREAM LOTUS, WITCH'S TEETH. This distinctive species is widely scattered in wet and usually sunny areas along streams and at springs or seeps in the Tassajara region. ●R: Cascades, Sierra Nevada, Coast, Transverse and Peninsular Ranges, from Lane County in western Oregon to northern Baja California. ●H: perennial herbs of wet habitats, with erect or ascending stems that range from about 2 to 5 dm. (8-20") tall. The alternate leaves

are pinnately divided into 7 to 11 elliptical to linear-lanceolate leaflets about 5 to 20 mm. long. The flowers are produced in umbellate clusters borne on axillary peduncles about 5 to 12 cm. long. The corollas are about 9 to 14 mm. long; and the petals are yellow with red veining on the banner, but tend to be reddish throughout when immature or aging. The legumes are narrowly linear and about 2.5 to 4 cm. long, and the seeds are about 1.5 to 2 mm. wide. ❀May-September.

+∨***Hosackia stipularis*** Bentham [*Lotus stipularis* (Bentham) E. Greene]. STIPULATE HOSACKIA. A specimen of this species was collected by Vern Yadon on "Pine Ridge summit above Bear Basin & above Pine Ridge Camp" on July 4th, 1980 (PGM 2566). ●R: From Jackson and Josephine counties in southwestern Oregon to the Santa Lucia Mountains of San Luis Obispo County in the Coast Ranges, and to Tulare County in the Sierra Nevada. ●H: perennial herbs with generally erect stems that range from about 1.5 to 5 dm. (6-20") tall. The leaves are pinnately divided into 9 to 19 oblong-elliptic to ovate leaflets that are about 5 to 20 mm. long. The flowers are produced in axillary umbellate clusters of 4 to 9 flowers, and the corollas are about 10 to 13 mm. long, and range from pink to reddish purple. The many seeded legumes are about 2 to 2.5 cm. long and about 3 to 4 mm. wide. ❀April-June.

LATHYRUS. WILD PEA, SWEET PEA.

The genus *Lathyrus* consists of about 150 to 160 species of North America, Eurasia, temperate South America and eastern Africa. The showy flowered sweet pea of gardens is *L. odoratus*. The name is an ancient Greek word for some kind leguminous plant.

Lathyrus vestitus Nuttall ex Torrey & Gray var. ***vestitus*** [*L. v.* subsp. *puberulus* (White) Hitchcock]. PACIFIC WILD PEA. This species is widespread and locally common in the Tassajara region, and it occurs in all types of habitats, except for treeless grasslands and dry southfacing chaparral slopes dominated by Chamise. ●R: Coast, Transverse and Peninsular Ranges, from Humboldt County to San Diego County. ●H: pubescent evergreen perennial vines with lanky stems that range from about 3 to 22 dm. (1-7') long. The stems climb on other plants by means of coiling tendrils. The alternate leaves are pinnately divided into about 10 broadly elliptic to narrowly oblong-lanceolate leaflets about 2 to 3.5 cm. long. The flowers are produced in 5 to 20 flowered axillary racemes. The corollas are about 14 to 20 mm. long, and the wings are white or nearly white, while the broad and upwardly bent banner is tinged bluish or reddish lavender and marked with violet or darker hued veins. The legumes, which are about 4 to 6 cm. long, strongly resemble snow pea pods. ❀April-July.

LUPINUS. LUPINE.

The genus *Lupinus* consists of about 220 species, most of which are endemic to temperate western North America. This genus is also represented in eastern North America, temperate and tropical South America, tropical eastern Africa, and in the Mediterranean Sea region. Lupinus is well represented in California, for 73 species occur within the state, and 42 are endemic to the California Floristic Province. *Lupinus* is the Latin word for wolves, and it is based on a mistaken belief that lupines rob soils of their nutrients.

1a. Shrubs, subshrubs and perennial herbs:
- **2a**. Shrubs and subshrubs:
  - **3a**. Erect shrubs ranging from about 6 to 20 dm. (2-6.5 ft.) tall. . . . . ***L. albifrons*** var. ***albifrons***.
  - **3b**. Tufted and spreading woody based subshrubs, commonly forming dense mats:
    - **4a**. Leaf pubescence appressed and silky. . . . . ***L. albifrons*** var. ***collinus***.
    - **4b**. Leaf pubescence woolly or shaggy. . . . . ***L. albifrons*** var. ***abramsii***.
- **2b**. Perennial herbs:
  - **5a**. Taprooted plants (the stem rising from a more or less vertical root stock). The leaves are concentrated toward the base of the plant; the leaflets are broadly oblanceolate to long-obovate, and mostly 1 to 3 cm. wide. . . . . ***L. cervinus***.
  - **5b**. Rhizomatic plants (the stems rising from a generally horizontal root stock). The leaves are well distributed on the stems; the leaflets are narrowly oblanceolate and mostly .5 to 1.5 cm. wide. . . . . ***L. formosus***.

1b. Annual herbs:
- **6a**. Banners yellow, wings rose pink. . . . . ***L. stiversii***.
- **6b**. Banners and wings of different colors:
  - **7a**. Petals basically white, but may be tinged with yellow and/or streaked with lavender. . . . . ***L. microcarpus densiflorus***.
  - **7a**. Petals mostly blue, reddish purple or lavender. Banners typically with a white or yellowish patch in lower center, which changes color (usually to a reddish to purplish shade) after fertilization:
    - **8a**. Most flowers produced in distinct whorls:
      - **9a**. Keel ciliate on lower margin near base. Leaves semi succulent, major stems usually hollow. Rare in this region. . . . . ***L. succulentus***.
      - **9b**. Keel not ciliate on lower margin. Leaves not succulent, stems solid. Locally to abundant:
        - **10a**. Flowers 8 to 15 mm. long, pedicels 3 to 5 mm. long. . . . . ***L. nanus***.
        - **10b**. Flowers 4 to 8 mm. long, pedicels 0 to 3 mm. long. . . . . ***L. bicolor***.
    - **8b**. Flowers produced singularly along the axis of the inflorescence (which can be densely or loosely flowered):
      - **11a**. Upper leaves usually intermixed with lower flowers. Leaves with relatively dense gray green hairs. Keel glabrous or nearly so. . . . . ***L. concinnus***.
      - **11b**. Upper leaves positioned below the lower flowers. Stems prickly hairy or nearly bald. Keel ciliate toward base:
        - **12a**. Leaves and stems covered with long, stiff, prickly hairs. Leaflets broadly cuneate-obovate and rounded at the apex. . . . . ***L. hirsutissimus***.
        - **12b**. Leaves and stems without long, stiff and prickly hairs. Leaflets narrowly linear to very narrowly oblanceolate . . . . . ***L. truncatus***.

Lupinus albifrons Bentham. SILVER BUSH LUPINE. This taxon is scattered in open areas along the Arroyo Seco River, and in the lower canyon of Tassajara Creek, from the vicinity of the Horsebridge to the vicinity of Tassajara Camp (at the confluence of Willow Creek). Although I have not noticed this taxon along Tassajara Road, Rimo Bacigalupi collected specimens of it along "Tony's Boulevard grade above Tassajara Hot Springs," in April of 1926 (Bacigalupi 1115 & 1118; DS 559713 & 625246), Delzie Demaree

collected a specimen of it "Between China Camp and Tassajara" in April of 1933 (Demaree 10316; DS 558837), and Beatrice Howitt collected a specimen of it "On left bank of Tassajara Springs Road, about 2 miles down" in May of 1955 (Howitt 345; CAS 537166). ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Clackamas County in northwestern Oregon to northern Baja California. ●H: erect evergreen shrubs with woody branches that range from about 6 to 15 dm. (2-5') tall. The leaves and stems are covered with a dense layer of silky and upwardly appressed hairs, giving the plants a silvery appearance. The leaves are produced on petioles that are about 2 to 5 cm. long, and the the blades are palmately divided into 6 to 10 oblanceolate to spatulate leaflets about 1 to 3 cm. long. The flowers are produced in more or less pyramidal terminal spikes that are up to 25 cm. long. The flowers are about 9 to 16 mm. long, and the petals are mostly reddish purple or lavender, with a pale patch in the center of the banner. The 5 to 9 seeded legumes are about 3 to 5 cm. long. ♔March-June.

e *Lupinus albifrons* var. ***abramsii*** (C. P. Smith) Hoover [*L. abramsii* Smith]. ABRAMS' SANTA LUCIA LUPINE. This variety is widely scattered and locally common at higher elevations in the Tassajara region (above about 2,500 ft.). ●R: endemic to the Santa Lucia Mountains of Monterey County and northwestern San Luis Obispo County. ●H: whitish woolly and densely foliated evergreen subshrubs with decumbent to ascending stems about 2 to 6 dm. (8-24") long. Older plants often form very large mats produced by woody branches up to a meter or so in length, which spread outward from the root crown (this habit of growth is quite evident in the remains of a dead plant). The petioles are about .5 to 7 cm. long, and the blades are palmately divided into 8 (or sometimes 9) generally oblanceolate leaflets that are mostly between 1 and 2 cm. long (but are sometimes up to 3 cm. long). The leaflets vary from acute to obtuse at the apex. The flowers are produced in densely to loosely flowered spike like racemes. The flowers are about 10 to 16 mm. long, and the petals are mostly reddish lavender to reddish purple (or sometimes bluish purple), with a yellowish patch on the banner. The 5 to 9 seeded legumes are about 2 to 4 cm. long. ♔April-July (-August).

+*Lupinus albifrons* var. ***collinus*** E. Greene. This entry is based on nine herbarium specimens that have been collected along Tassajara Road, or along the Pine Ridge Trail west of China Camp. In the first edition of this text I noted that many of the var. *abramsii* like of this region had a more or less upwardly and appressed pubescence that was suggestive of var. *collinus*. ●R: from Siskiyou County southward, to Fresno County in the Sierra Nevada, and to Santa Barbara County in the Coast Ranges. ●H: nearly the same as var. *abramsii*, except for the pubescence. ♔May-July.

!*Lupinus bicolor* Lindley [*L. b.* subsp. *tridentatus* (Eastwood) Dunn]. MINIATURE SKY LUPINE, DOVE LUPINE. This species is widespread and locally common in open and grassy habitats at all elevations in the Tassajara region. It was very abundant in this region during the first spring after the Basin Complex fire of 2008, and most of the plants were two to three times taller than they normally are. ●R: Pacific Slope, from British Columbia to northern Baja California. ●H: (usually) small villous-pubescent annual herbs with erect or ascending stems that range from about 1 to 4 dm. (4-16") tall. The petioles are about 2 to 7 cm. long, and the blades are palmately divided into 5 to 7 oblanceolate to cuneate leaflets about 1 to 3 cm. long. The mostly whorled flowers are usually produced in relatively short terminal spikes, but during the spring of 2009 most of the plants had much more elongated spikes. The petals are blue and the banner, which is about 6 to 9 mm. long, has a central white spot that turns reddish purple after fertilization. The 5 to 8 seeded legumes are about 1 to 3 cm. long. ♔March-June.

e *Lupinus cervinus* Kellogg [*L. latissimus* E. Greene]. SANTA LUCIA LUPINE. This very showy flowered species is scattered at higher elevations in the Tassajara region, and it occurs in both mixed evergreen forests and more or less open areas in chaparral. In the first edition of this text I stated that "The most accessible of the known sites is along the Pine Ridge Trail between Tassajara Road and the first summit to the west, where the species is lightly scattered in woodlands." This was before the Kirk Complex Fire of 1999 and the Basin Complex Fire of 2008. This population now appears to be extinct. Elsewhere in the Tassajara region this species occurs in woodlands from Pine Valley to Bear Basin and Pine Ridge, and it is locally common along the Black Cone Trail between South Ventana Cone and the Elephant's Back. According to Vern Yadon, it is abundant on the northwesterly extensions of Elephant's Back (the Elephant's Back is the large mountain that forms the western wall of the Tassajara Creek canyon between Oryoki Creek and the headwaters of Tassajara Creek). According to the note that is enclosed in an envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of *Lupinus cervinus*, he collected it in "Pine Valley, pine woods toward Bear Basin" ●R: endemic to the Santa Lucia Mountains of Monterey County and northwestern San Luis Obispo County. ●H: velvety pubescent evergreen perennial herbs with flowering stems that range from about 1.5 to 4.5 dm. (6-18") tall. The petioles are as much as 20 cm. long, and the blades are divided into 5 to 8 rather large oblong-ovate to broadly oblanceolate leaflets that are up to 6 cm. long and 3 cm. wide. The flowers are crowed in terminal racemose spikes about 12 to 30 cm. long. The flowers are about 14 to 16 mm. long, and the petals range from magenta pink to medium purplish blue (personal observation), and perhaps to light blue (reference texts); they fade to light brown with age. The banners have a pale yellow spot in the center. The fruit is a four to seven seeded legume about 3 cm. long. ♔May-July.

Lupinus concinnus Argardh [*L. c.* var. *agardhianus* (A. Heller) C. P. Smith]. BAJADA LUPINE, ELEGANT LUPINE. This species is widely scattered in the Tassajara region, but it is uncommon, and it usually occurs on highly exposed slopes with loose, rocky or poor soils. ●R: from Contra Coast County in the Coast Ranges, and from Eldorado County in the Sierra Nevada foothills, to northern Baja California, and eastward to Utah, southwestern Texas and northern Mexico. ●H: small and densely hispid annual herbs with one to several erect to spreading stems that range from about .5 to 2 dm. (2-8") long. The petioles are about 1 to 6 cm. long, and the blades are palmately divided into five to nine narrowly oblanceolate leaflets about .5 to 2 cm. long. The flowers are produced in terminal racemes in which the lower flowers are usually intermixed with the upper leaves. The flowers are about 7 to 9 mm. long, and the petals are a rich purplish blue, often lined with reddish purple, and the banners have a white or yellowish blotch in the center. The hairy 2 to 4 seeded legumes are about 1 to 1.5 cm. long. ♔April-May.

Lupinus formosus E. Greene [*L. f.* var. *bridgesii* (Watson) E. Greene]. LUNARA LUPINE, SUMMER LUPINE, LATE LUPINE. This species is locally common along the Pine Ridge Trail (between the first summit west of China Camp and the Church Creek Divide) and in Pine Valley. It is scattered elsewhere in the Tassajara region, where it is uncommon. ●R: California Floristic Province, from Siskiyou County to northern Baja California. ●H: pubescent perennial herbs typically with a number of more or less erect stems rising from a creeping rhizome. The stems are mostly about 3 to 8 dm. (12-32") long. The petioles are about 3 to 7 cm. long, and the blades are palmately divided into 7 to 9 narrowly oblanceolate leaflets about 3 to 7 cm. long. The flowers are produced in terminal racemes that are about 10 to 25 cm. long. The flowers are about 12 to 14 mm. long, and the petals are mostly blue violet, but are sometimes nearly colorless. The 5 to 7 seeded legumes are about 3 to 3.5 cm. long. ♔April-October (mostly May-June).

!*Lupinus hirsutissimus* Bentham. STINGING LUPINE, NETTLE LUPINE. This species is widely scattered and locally common at all elevations in the Tassajara region, and it primarily occurs in open and usually rocky habitats within chaparral. Although this is true in

most years, during the first spring after the Basin Complex Fire of 2008, this species was extremely abundant, especially in areas of burn out chaparral. The plants were also much larger than usual, and some were over 6 feet tall. I came across one plant that had a primary stem that was over four inches wide at the base. ●R: Coast, Transverse and Peninsular ranges, from San Mateo and Santa Clara counties to northern Baja California. ●H: prickly stemmed annual herbs with generally erect stems that range from about 3 to 10 dm. (12-40") tall. The stems are rather stout and often hollow. The petioles are about 5 to 18 cm. long, and the blades are palmately divided into five to eight broadly cuneate-obovate leaflets about 2 to 5 cm. long. The flowers are scattered on elongated terminal spikes up to 25 cm. long. The flowers are about 13 to 15 mm. long, and the petals are mostly reddish purple or violet, or sometimes purplish blue, with a yellowish white patch near the base of the banner. The bristly 6 to 8 seeded legumes are about 2.5 to 3.5 cm. long. ❀April-May.

Lupinus microcarpus Sims var. ***densiflorus*** (Bentham) Jepson [*L. d.* Bentham]. WHITE WHORL LUPINE, CHICK LUPINE, GULLY LUPINE. This showy flowered species is scattered in open and grassy areas along the Church Creek Fault (i.e., along the Horse Pasture and Church Creek Trails), and occasionally in other areas in this region. The plants are usually found in small colonies. This species was more plentiful than usual during the first spring after the Basin Complex Fire of 2008. During the spring months of most years a few plants usually manifest themselves in the vicinity guest season parking lot at Tassajara Hot Springs. ●R: California Floristic Province, from Humboldt and Siskiyou counties to northern Baja California. ●H: simple or branched annual herbs that range from about 2 to 4 dm. (8-16") tall. The petioles are about 3 to 10 cm. long, and the blades are palmately divided into 7 to 9 oblanceolate leaflets about 1 to 5 cm. long. The flowers are produced in dense and somewhat remote whorls on terminal spikes about 2 to 30 cm. long. The flowers are about 8 to 18 cm. long, and the petals are mostly white, but are often tinged with yellow and veined with violet or purple. The two seeded legumes are ovoid and about 1.5 cm. long. ❀April-June.

!***Lupinus nanus*** Douglas ex Bentham [*L. n.* subsp. *latifolius* (Bentham) D. Dunn, *L. vallicola* A. A. Heller, *L. v.* subsp. *apricus* (E. Greene) D. Dunn]. SKY LUPINE. This showy flowered species is locally common to abundant in open grassland habitats throughout the Tassajara region, and it is the lupine that sometimes profusely manifests itself along the rock stairway to the hill cabins at Tassajara. This species was even more abundant than usual during the first spring after the Basin Complex Fire of 2008. ●R: Pacific Slope of western North America, from British Columbia to San Diego County. ●H: pubescent annual herbs with a simple or branching stems that range from about 1.5 to 6 dm. (6-24") tall. The petioles are about 3 to 8 cm. long, the blades are palmately divided into 5 to 7 linear to broadly oblanceolate (or spatulate) leaflets about 1 to 3 cm. long. The flowers are produced in whorls on conically shaped terminal spikes that are about 3 to 20 cm. long. The flowers are about 8 to 15 mm. long, and the petals are blue, except for a white or pale yellow patch in the center of the banner. The spot turns rose lavender after fertilization. The 4 to 8 seeded legumes are about 2 to 4 cm. long. ❀March-June.

!<>***Lupinus stiversii*** Kellogg. HARLEQUIN LUPINE, ROSE AND YELLOW LUPINE. This very distinctive lupine is widely scattered in this region, where it occurs in open grasslands and in grassy openings in chaparral and woodlands; it usually manifests itself in colonies. Based on my observations, in some places it occurs on a regular basis, while in other locations it can be present in some years, but absent in others. One location where I have seen this species every year in which I had the opportunity to do so, is along Tassajara Road above the Bathtub Spring (The Cascades), where Wildcat Creek crosses the road (because Tassajara Road was not graded in the spring of 2009, quite a few plants manifested themselves on the road bed). I have also seen *Lupinus stiversii* on a regular basis at two other sites. One is along the Horse Pasture Trail, at the point where it crosses the intermittent Horse Pasture Creek, and the other is along the Church Creek Trail, between the Wind Caves and The Mesa, where the trail crosses unnamed intermittent stream. At other locations it appears irregularly, and in the spring of 2009 a previously unknown population manifested it self near the developed area of Tassajara Hot Springs. It was in the outer Flats, and immediately at the base of the very steep scree slope on the south side of the Overlook Ridge, a short distance from the start of Tony's Trail. I counted 20 plants at this site that season. Other areas where this species appears sporadically are at points along the Pine Ridge Trail between China Camp and the Church Creek Divide. I had passed along this route countless times during the spring months of prior years, but it was not until May of 1993 that I came across a population of these plants; they were located at a point about three quarters of a mile east of the Church Creek Divide. In his field notes of May 10th, 1980, Vern Yadon listed a population that he found along the Pine Ridge trail about mile from the China Camp summit, and he noted that "These had not previously been encountered along this portion of the trail, which I have walked many times this season." *Lupinus stiversii* has also been observed in Bear Basin and on Pine Ridge, and it also sometimes occurs in Pine Valley and in Miller Canyon, for according to the note that is enclosed in an envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of *Lupinus stiversii* (Elmer 3271, DS, June 1901), he collected it in "Pine Valley under pines; also seen in meadow in Miller Canyon." Elsewhere in the Santa Lucia Mountains this species occurs this species occurs along the Ventana Double Cone Trail between Pat Springs and Puerto Suelo, on the Coast Ridge in the upper watershed of Pick Creek, at points along the Santa Lucia Trail on both the northern and western slopes of Junipero Serra Peak, and in the vicinity of The Indians near Santa Lucia Creek, where very large populations can manifest themselves. ●R: this species primarily occurs in the Sierra Nevada, from Tehama and Plumas counties to Kern County, but disjunct populations also occur in the Santa Lucia Mountains of Monterey County, in the San Gabriel Mountains of Los Angeles County, and in the San Bernardino Mountains of San Bernardino County. ●H: simple to many branched annual herbs that range from about 1 to 4.5 dm. (4-18") tall. The petioles are about 3 to 8 cm. long, and the blades are palmately divided into six to eight cuneate to obovate leaflets about 1 to 4 cm. long. The flowers are produced in short and densely to loosely flowered terminal spikes. The flowers are about 13 to 18 mm. long and the petals consist of a yellow banner (the upper petal), which may have a few red spots in the center, two rose-pink or sometimes purple or purplish-blue wings, (the lateral petals), and a white or partially purplish keel (the two central and partially united petals that are obscured by the wings). The 5 to 7 seeded legumes are about 2 to 2.5 cm. long. ❀April-May.

Lupinus succulentus Douglas ex Koch. SUCCULENT LUPINE, ARROYO LUPINE. In the first edition of this text I stated that this species was rare in the Tassajara region, for only a few plants where found along the Church Creek Trail about ¼ of a mile south of The Mesa. I was expecting this species to be more common in this region during the first spring after the Basin Complex Fire of 2008, but I did not see any plants that season. Diane Renshaw included this species in her list of plants that she observed in the Tassajara region in April of 2009, but she failed to state the location. ●R: Sacramento Valley, including the Sutter Buttes, and the Coast, Transverse and Peninsular ranges, from Tehama and Mendocino counties to northern Baja California. Also on the Channel Islands. ●H: semi succulent annual herbs with relatively stout and often hollow stems that range from about 2 to 6 (or 10) dm. (8-24 -40") long. The leaves have petioles that range from about 6 to 12 cm. long, and the blades are palmately divided into 7 to 9 oblanceolate leaflets about 2 to 7 cm. long. The leaflets are often semi truncate at the apex. The flowers are about 12 to 18 mm. long, and borne in

Lupinus nanus performing its annual display on the east slope of Hawk Mountain.

whorls on terminal spikes petals that are about 9 to 15 cm. long. The flowers are deep purplish blue to pinkish lavender, and the banner has a white or yellow patch in the center. The patch turns reddish lavender after fertilization. The 8 to 10 seeded legumes are about 3.5 to 5 cm. long. ❀March-May.

Lupinus truncatus Nuttall. SQUARE TIPPED LUPINE. This species is widely scattered and fairly common at lower to intermediate elevations in the Tassajara region, and it primarily occurs in open and grassy woodland habitats. Unlike some of the other *Lupinus* species that occur in this region, this one tends to occur singularly or in small groups. ●R: outer Coast Ranges and more or less coastal slopes of the mountains of southern California, from Santa Cruz County to northern Baja California. Based on the number herbarium specimens that that have collected on the Channel Islands, this species appears to be very common there. ●H: annual herbs that range from about 3 to 10 dm. (12-40") tall. The plants typically have an erect primary stem and a number of shorter and ascending lateral stems. The petioles are about 5 to 10 cm. long, and the blades are palmately divided into five to seven linear leaflets about 1 to 4 cm. long. The leaflet tips are usually truncated (squared), and they are often notched. The flowers are spaciously arranged on elongated terminal spikes that are up to 25 cm. in length. The flowers are about 8 to 13 mm. long, and the petals are mostly purplish blue to purplish red. The 6 or 7 seeded legumes are about 3 cm. long. ❀April-May.

MEDICAGO. ALFALFA, MEDICK.

The genus *Medicago* consists of about 83 species of the northern temperate regions of the eastern hemisphere, and it is especially well represented in the Mediterranean region. The name is derived from the Greek word for alfalfa, *medike* or *medice*, which is said to have come to Greece from Medea. The scientific name for Alfalfa is *Medicago sativa*.

1a. Pods one seeded, more or less kidney shaped, and not prickly. . . . . ***M. lupulina***.
1b. Pods several seeded, spirally coiled, and with prickly margins (and thus burr like):
  2a. Leaflets usually with a dark or reddish brown central spot, which can be of various shapes. Stipule teeth less than a third as long as the stipules are wide. . . . . ***M. arabica***.
  2b. Leaflets without a dark central spot. Stipule teeth about half as long or longer than the stipules are wide. . . . . ***M. polymorpha***.

Medicago arabica (Linnaeus) Hudson [*M. polymorpha* var. *a*. Linnaeus]. SPOTTED BUR CLOVER. I first noticed the presence of this species in the spring of 2010, when a few plants were found in the developed area of Tassajara. ●R: a common weed in many regions of the world; native to the Mediterranean region. ●H: annual herbs generally with sprawling stems that range from about 1 to 4 dm. (4-16") long. The alternate leaves are divided into three obcordate leaflets that are about 1 to 2 cm. long and wide. The flowers, which are about 4 to 5 mm. long, are produced in 2 to 4 flowered clusters; the petals are yellow. The prickly margined fruits, which contain several seeds, are coiled in 4 to 6 turns. ❀March-June.

Medicago lupulina Linnaeus. BLACK MEDIC, NONESUCH, YELLOW TREFOIL. This species is found mostly in the lawns and gardens at Tassajara, but it is also scattered in places where garden refuse has been dumped, along trails, and in the streambed of Tassajara Creek, below the hot springs. ●R: a common weed in North America; native to the Mediterranean region. ●H: annual herbs with prostrate or ascending stems that range from about 1 to 4 dm. (4-16") long. The alternate leaves are generally remote, and divided into three obovate to roundish leaflets that are about 1 to 1.5 cm. long. The flowers, which are about 1.5 to 2 mm. long, are clustered at the ends of axillary peduncles about 1 to 2.5 cm. long. The minute petals are yellow. The one seeded fruits are black, slightly kidney shaped, and about 2 mm. long. ❀April-July.

Medicago polymorpha Linnaeus [*M. hispida* Gaertner]. BUR CLOVER. Like the preceding species, this one is also mostly found in the lawns and gardens at Tassajara Hot Springs, and it is also scattered in places where garden refuse has been dumped, along trails, and in the streambed of Tassajara Creek, downstream from the hot springs. ●R: a common weed in North America; native to the Mediterranean region. ●H: annual herbs with prostrate stems that range from about 1 to 4 dm. (4-16") long. The leaves are alternate and on petioles about 1 to 4 cm. long; the blades are divided into 3 obcordate leaflets about 8 to 20 mm. long. The flowers, which are about 4 to 5 mm. long, are produced in small clusters that are on axillary peduncles about .5 to 2.5 cm. long. The petals are yellow. The fruits, which are about 4 to 6 mm. in diameter, are spirally coiled and bur like, for they have prickly margins. ❀March-June.

MELILOTUS. MELILOT, SWEET CLOVER.

Melilotus consists of about 20 species of the northern temperate and subtropical regions of the eastern hemisphere. The name is derived from the Greek words *meli*, honey, and *lotos*, lotus.

Melilotus albus Medicus [*M. albus* Desrousseaux]. SWEET WHITE CLOVER, WHITE MELILOT. This species is common in and around the developed area of Tassajara, and also on the floodplains of Tassajara Creek, both upstream and downstream from the hot springs. It was abundant in this area during the first spring after the Basin Complex Fire of 2008. ●R: a very common weed in California; native to Eurasia. ●H: annual or short lived perennial herbs with generally erect stems that range from about .6 to 2 m. (2-6') tall. The alternate leaves are short petiolate, and divided into three broadly to narrowly oblong-lanceolate leaflets about 1 to 2 cm. long. The margins are serrate. The flowers are produced in axillary and terminal spike like racemes that are up to 10 cm. long. The flowers are about 4 to 6 mm. long, and the petals are white. The fruit is an ovoid 1 to 2 seeded legume about 3 to 5 mm. long. ❀April-September.

The yellow flowered *Melilotus indicus* L. has been weedy in and about the gardens at Tassajara Hot Springs for many years, but it has not been seen elsewhere in this region.

RUPERTIA. SCURF PEA.

The genus *Rupertia* consists of three species of western North America that have segregated from *Psoralea*. All of the species occur in California, and two are endemic to the California Floristic Province. The genus was named for the New York Botanical Garden botanist Rupert C. Barneby (1911-2000).

Rupertia physodes (Douglas ex Hooker) Grimes [*Psoralea p*. D. ex H.]. CALIFORNIA TEA. This species occurs in shady woodland habitats along the Marble Peak Trail, from near the Horse Bridge to Tassajara Camp, in chaparral habitats along the lower portion of the Horse Pasture Trail, in the Blackberry Creek area, in wooded and chaparral habitats along the fire break trail on the crest of the Black Butte-Miller Ridge, between the beginning of the road to The Caves the Pine Ridge Trail, and on Chew's Ridge. ●R: from British Columbia and northwestern Idaho to California. In California this species occurs in Coast, Transverse and northern Peninsular ranges, from Del Norte County to San Diego County. ●H: perennial herbs with erect or ascending stems that range from about 3 to 7 dm. (12-28") tall. Plants are typically found in what appear to be colonies, but such groups are largely produced by creeping rhizomes. The alternate leaves have petioles that are about 2 to 5 cm. long; the blades are divided into 3 ovate to orbicular leaflets about 2 to 6 cm. long. The margins are entire. The flowers are clustered in axillary racemes. The corollas are about 10 to 12 mm. long, and the petals are pale greenish white. The one seeded fruits are sub orbicular and compressed, and about 6 mm. long. ❀April-June.

THERMOPSIS. FALSE LUPINE.

Thermopsis consists of 23 species, 13 of which are endemic to northeastern Asia, and the remaining 10 are endemic to North America. The name is derived from two Greek words: *thermos*, lupine, and *opsis*, appearance, and thus it means lupine like. This is an appropriate name, for the inflorescences strongly resemble those of the genus *Lupinus*, but the leaves do not.

Thermopsis californica S. Watson var. ***californica*** [*T. macrophylla* Hooker & Arnott misapplied]. CALIFORNIA FALSE LUPINE. This distinctive species is locally common in Pine Valley, on Pine Ridge and in the vicinity of the Church Creek Divide. It also occurs along Tassajara Road in Bruce Flats, where for many years a thicket has been present immediately to the right (south) of the Anastasia Canyon Trailhead fence passage. ●R: Coast Ranges, from Mendocino and Lake counties to southern San Luis Obispo County. ●H: perennial herbs with erect or ascending stems that range from about 3 to 8 dm. (12-32") tall. The stems wither away upon the onset of winter, and new stems are produced in the spring. The alternate leaves have petioles about 2 to 3 cm. long, and the blades are divided into three obovate to oblanceolate leaflets about 3 to 7 cm. long. The leaves are subtended by two ovate and leaflet like stipules about 2 to 3 cm. long. The generally whorled flowers, which are about 17 to 19 mm. long, are produced in terminal racemose spikes about 7 to 30 cm. long, and the petals are bright yellow. The fruit is a legume that is about 5 to 7 cm. long. ❀May-June.

TRIFOLIUM. CLOVER.

In the spring of 2009 (the first spring after the Basin Complex Fire), Diane Renshaw identified five *Trifolium* species that had not been known to occur in the Tassajara region, four of which are natives. In addition to Diane's discoveries, the Consortium of California Herbaria database includes a specimen that was collected in this region, and which represents another previously unknown species. Two other taxa have been added due to their recognition in the second edition of *The Jepson Manual* (2012), and thus the number of taxa that are known to occur in the Tassajara region has grown from six to fourteen.

Due to the three foliate leaves and the head like inflorescences, *Trifolium* is a highly distinctive genus. It consists of about 300 species, most of which are native to the temperate regions of the northern hemisphere, but the genus is also represented in tropical mountains and in temperate South America and Africa. The name is a combination of the Latin words *tres*, three, and *folium*, leaf, on account of the three leaflets.

1a. Flower heads not subtended by disk or bowl shaped involucres:
- **2a**. Flowers borne on short pedicels and turning outward or downward with age, exposing the upper rachis of the inflorescence, which typically resembles a pin point:
  - **3a**. Leaflets obtuse (rounded) at the apex. Calyx lobe margins with short, flat and teeth like bristles on the margins. . . . ***T. ciliolatum***.
  - **3b**. Leaflets with an emarginate (notched) or retuse (slightly notched) apex. Calyx lobe margins glabrous or with fine hairs:
    - **4a**. Calyx lobe margins glabrous, the tube 1.5 to 2.5 mm. long. . . . . ***T. gracilentum***.
    - **4b**. Calyx lobe margins with fine hairs, the tube .08 to 1.4 mm. wide. . . . . ***T. bifidum***.
- **2b**. Flowers nearly sessile and tightly compacted, and not turning outward or downward with age:
  - **5a**. Leaflets oblanceolate to obovate and less than 3 times longer than broad. Flowers purple with white spots. . . ***T. albopurpureum***.
  - **5b**. Leaflets narrowly oblong to oblanceolate and 3 to 8 times longer than broad. Flowers pale pink to white. . . . . ***T. arvense***.

1b. Flower heads subtended by disk or bowl shaped involucres:
- **6a**. Involucres bowl or cup shaped:
  - **7a**. Involucre lobes entire. . . . . ***T. microcephalum***.
  - **7b**. Involucre lobes toothed. . . . . ***T. microdon***.
- **6b**. Involucres more or less flat:
  - **8a**. Plants generally of open and dry habitats, especially in grassy areas:
    - **9a**. Calyx lobes longer than the tube; the tube not splitting between the upper lobes. . . . . ***T. variegatum*** var. ***geminiflorum***.
    - **9b**. Calyx lobes shorter than the tube, the tube splitting between the upper lobes:
      - **10a**. Corollas exserted from the calyx tube for less than half their length. Involucres with about ten deep lobes. . . ***T. oliganthum***.
      - **10b**. Corollas exserted from the calyx tube for more than half their length. Involucres with about forty shallow spine like lobes. . . ***T. willdenovii***.
  - **8b**. Plants of stream banks or other wet or seasonally wet habitats:
    - **11a**. Rhizomatic perennial herbs. Banner tips notched. Fruits 2 to 4 (-6) seeded. . . . . ***T. wormskioldii.***
    - **11b**. Annual herbs. Banner tips not or only slightly notched. Fruits 1 or 2 seeded:
      - **12a**. Calyx lobes shorter than the calyx tube. . . . . ***T. obtusiflorum***.
      - **12b**. Calyx lobes longer that the calyx tube. . . . . ***T. variegatum***.
        - **13a**. Flower heads 1 to 1.5 cm. wide and containing 5 to 10 flowers. Corollas 6 to 10 mm. long. ***T. variegatum*** var. ***variegatum***.
        - **13b**. Flower heads 1.5 to 3 cm. wide and containing 10 or more flowers. Corollas 9 to 17 mm. long. . ***T. variegatum*** var. ***major***.

Trifolium albopurpureum Torrey & A. Gray. WHITE AND PURPLE CLOVER, RANCHERIA CLOVER. This species is common in open and generally grassy habitats throughout the Tassajara region. ●R: Pacific Slope, from British Columbia to northern Baja California. ●H: small villous pubescent annual herbs with trailing or ascending stems that range from about 1 to 4 dm. (4-16") long. The petioles are about .5 to 4 cm. long, and the leaflets are obovate to cuneate-oblong, obtuse, and about 6 to 18 mm. long. The margins are finely toothed toward the apex. The small flowers are borne in pubescent heads that are about 8 to 15 mm. long. The corollas are about 6 to 7 mm. long, and barely exceeding the lobes of the calyx. The petals are purple and white. The small fruits are one seeded. ♔March-June.

+*Trifolium arvense* Linnaeus. RABBIT FOOT CLOVER. Diane Renshaw discovered this species somewhere along the Horse Pasture Trail in April of 2009. ●R: a common weed in North America; native to Europe and western Asia. ●H: erect and usually branched annual herbs that range from about 2 to 4 dm. (8-16") tall. The leaflets are narrowly oblong to oblanceolate, obtuse, and about 5 to 25 mm. long. The densely flowered heads are ovoid to shortly cylindric, and about 1 to 4 cm. long. The heads are pinkish tinged due to the red calyx lobes; the lobes are plumose and greatly exceed the length of the corollas. The corollas are about 3 to 4 mm. long, and the petals vary from white to pale pink. The small fruits contain one seed. ♔April-June.

+***Trifolium bifidum*** A. Gray var. ***decipiens*** E. Greene. NOTCHED LEAF or PINOLE CLOVER. This entry is based on specimen that was collected in the "Santa Lucia Mountains, Church Creek Divide," in early June of 1976 (Gordon, Kimbrough & Grayum 1487, SFV 8089). The typical variety of this species has distinctive leaflets that are narrow and deeply notched at the apex, but in var. *decipiens* the leaflets are broader and shallowly notched to truncate at the apex, and thus it is possible that the specimen could have been mistaken for *T. gracilentum*. As this taxon occurs at many locations in the Santa Lucia Mountains, I have decided to include it just in case. ●R: Cascade, Coast and western Transverse ranges, from Chelan and King counties in western Washington to Ventura County, and in the Sierra Nevada, from Butte County to Mariposa County. ●H: annual herbs with slender erect or sprawling stems that range from about 15 to 40 cm. (6-16") long. The petioles are about 2 to 6 cm. long, and the oblanceolate to obcordate leaflets are about 5 to 20 mm. long. The flower heads are about 7 to 15 mm. wide, and the flowers become reflexed with age. The corollas are about 6 to 9 mm. long, and the petals range from dull yellow to pinkish purple. The small fruits contain 1 or 2 seeds. ♔April-June.

Trifolium ciliolatum Bentham [*T. ciliatum* Nuttall]. TREE CLOVER. This species is widely scattered and locally common in open grassy habitats at all elevations in the Tassajara region. ●R: Pacific Slope, from Klickitat County in southern Washington to northern Baja California. ●H: annual herbs typically with erect or ascending stems that range from about 2 to 5 dm. (8-20") tall. The petioles are up to 15 cm. long, and the obovate to oblanceolate leaflets are about 1 to 3 cm. long. The flower heads, which are about 7 to 20 mm. wide, are at first ovoid, but the flowers soon become more or less deflexed on pedicels that are up to 6 mm. long. The corollas are about 6 or 7 mm. long, and the petals are mostly pink to purplish. The small

fruits contain 1 or 2 seeds. ֍March-June.

+*Trifolium gracilentum* Torrey & A. Gray. PIN POINT CLOVER. This species was identified by Diane Renshaw from a specimen that she collected along the Horse Pasture Trail in April of 2009. While doing the research for the first edition of this text, I failed to notice that James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), listed this species as ranging from uncommon to common on Chew's Ridge. I also failed to notice that Vern Yadon listed this species as "Occasional in grassy spots," in his field notes "Bear Basin Trail from Pine Ridge Trail junction and Bear Basin, May 10, 1980." ●R: western North America, from Washington to Arizona and northern Baja California. ●H: annual herbs with erect to prostrate stems that range from about 1 to 4 dm. (4-16") long. The petioles range from about 2 to 7 cm. long, and the broadly obovate leaflets, which are about 5 to 15 mm. long, have emarginate (notched) tips and serrulate margins. The flower heads are at first globose to short ovoid and about 6 to 10 mm. long, but they become umbellate and from 10 to 15 mm. wide with age. The corollas are about 5 to 7 mm. long, and the petals range from pink to pinkish purple. The small fruits contain 1 or 2 seeds. ֍March-June.

Trifolium microcephalum Pursh. SMALL HEADED CLOVER. This species is widespread and locally common in more or less open and usually grassy habitats at all elevations in the Tassajara region. ●R: western North America, from British Columbia to Montana, Arizona and northern Baja California. ●H: annual herbs with decumbent or ascending stems that range from about 2 to 4 dm. (8-16") long. The petioles are about 1 to 3 cm. long, obcordate to oblanceolate leaflets about .8 to 2 cm. long. The leaflets are generally rounded and often notched at the apex, and the margins are serrate. The flower heads are small (about 5 to 8 mm. wide), and are subtended by bowl shaped involucres. The corollas are 4 to 7 mm. long, and the petals are pink or pinkish. The small fruits contain 1 or 2 seeds. ֍April-June.

+*Trifolium microdon* Hooker & Arnott. VALPARAISO CLOVER. This species was identified by Diane Renshaw from a specimen that she collected along the Horse Pasture Trail in April of 2009 (i. e., the first spring after the Basin Complex Fire). ●R: Pacific Slope of temperate North America, from British Columbia to Santa Catalina Island and the Santa Ana Mountains of Orange County. This species also occurs in temperate South America (the type locality is Valparaiso, Chile, and hence the common name). ●H: annual herbs with erect or decumbent stems that range from about 1 to 5 dm. (4-20") long. The petioles range from about .5 to 7 cm. long, and the obovate to obcordate leaflets are about 5 to 20 mm. long. The flower heads are about 7 to 14 mm. wide, and the corollas, which are about 4 to 6 mm. long, range from pink to white. The small fruits contain 1 or 2 seeds. ֍March-June.

Trifolium obtusiflorum Hooker. CLAMMY CREEK CLOVER. This species is scattered along perennial and intermittent streams at lower and intermediate elevations in the Tassajara region. ●R: from southwestern Oregon, through the Coast Ranges and Sierra Nevada, to the mountains of San Diego County. ●H: annual herbs with generally ascending stems that range from about 3 to 5 dm. (12-20") long. The petioles range from about 1 to 7 cm long, and the obovate to oblanceolate and serrately margined leaflets are about .5 to 3 cm. long. The flower heads are rather large (1.5 to 3 cm wide), and the corollas are about 10-18 mm. long. The petals are pale purplish hued to nearly white, and the banner has a conspicuous dark purple to purplish gray spot. The small fruits contain one or two seeds. ֍April-July.

+*Trifolium oliganthum* Steudel. FEW FLOWERED CLOVER. This species was identified by Diane Renshaw from specimens that she collected at two locations. One was at the saddle on Black Butte Ridge where Tassajara Road begins its descent to the hot springs, and the other was at some point along the Horse Pasture Trail. ●R: Pacific Slope of temperate North America, from British Columbia to Kern County in the Sierra Nevada, and to the San Rafael Mountains of Santa Barbara County, and again on Santa Cruz Island. ●H: annual herbs with ascending to erect stems that range from about 1 to 4 dm. (4-16") long. The petioles are about 1 to 3 cm. long, and the leaflets, which are about 5 to 20 mm. long, range from linear to cuneate oblong, obovate or elliptic; the tips can be obtuse or acute, and the margins can be entire or serrate. The flower heads range from 6 to 10 mm. wide. The corollas are about 5 to 8 mm. long and only slightly exceed the length of the calyx. The petals are usually lavender with white tips, and the keel is purple. The small fruits contain 1 to 3 seeds. ֍March-June.

Trifolium variegatum Nuttall. VARIEGATED CLOVER, WHITE TIPPED CLOVER. In the first edition of this text I stated that this species was widely scattered in moist or seasonally moist habitats in the Tassajara region, and this remains the case, but since then two varieties have been recognized, and the texts for these follow. ●R: western North America, from British Columbia to Montana, Colorado, Arizona and northern Baja California. ●H: annual herbs with trailing or ascending stems that range from about 1 to 5 dm. (4-20") long. The petioles are about .5 to 5 cm. long, and the obovate to oblong oblanceolate leaflets about 5 to 15 mm. long. The margins are serrate. The peduncles are about 1 to 8 cm. long, and the 5 to 10 flowered heads range from about 1 to 1.5 cm. wide. The corollas are about 6 to 10 mm long, and the lower portions of the wings and banner range from dark to medium purple or reddish purple, but they upwardly fade to white or nearly white. The small fruits are 1 or 2 seeded. ֍April-July.

+*Trifolium variegatum* var. ***geminiflorum*** (E. Greene) Vincent. LESSER VARIEGATED CLOVER. This entry is somewhat tentative, but I am almost certain it will hold once I get a chance to do more field research. In the "Distribution of Plants" section of his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), James Griffin listed *T. variegatum* as ranging from being common to uncommon on Chew's Ridge, and in his discussion of the plants he stated that this species was scattered in grasslands. If this is true, such plants certainly represent var. *geminiflorum*, for the other two varieties occur in moist to wet habitats. I suspect that this taxon has been overlooked in other areas, for the plants strongly resemble *T. willdenovii*, which is very common in this region. ●R: from Washington and Idaho to the Peninsular Ranges of San Diego County. ●H: this variety differs from the others in having stems that are usually less than 3 dm. (12") long, in having generally wedge shaped leaflets that are about 3 to 8 mm long, flowers heads that are less than 1 cm. wide and that contain 1 to 5 flowers, and in having corollas that range from about 3.5 to 9 mm. long. ֍April-June.

Trifolium variegatum var. ***major*** Lojacono [*T. appendiculatum* Lojac. var. *a.*; *T. variegatum* var. *melananthum* (Hooker & Arnott) E. Greene]. GREATER VARIEGATED CLOVER. I observed plants that clearly fit the description of this taxon at several locations along streams in the Tassajara region during the spring of 2009 (the first spring after the Basin Complex Fire). My first assumption was they represented *T. variegatum* plants that were greatly prospering due to the increased sunlight, as were so many other plant species that spring. They had stems that were more than a meter long, and the many flowered heads were at least 3 cm. wide. ●R: from southwestern Oregon to southwestern California. ●H: this variety differs from the typical one in having stems that are up to a meter long, flower heads that range from 1.5 to 3 cm. wide, and that contain more than ten flowers, and in having corollas that are about 9 to 17 mm. long. ֍April-July.

Trifolium willdenovii Sprengel [*T. tridentatum* Lindley]. TOMCAT CLOVER. This species widespread and locally common at all elevations of the Tassajara region, and it primarily occurs in open habitats that are grassy. It was exceedingly abundant in this region during the first spring after the Basin Complex Fire of 2008. ●R: Pacific Slope of temperate western North America, from British Columbia and Idaho to New Mexico and northern Baja California. This spe

cies also occurs in temperate South America. ●H: annual herbs with erect to ascending (or sometimes trailing) stems that range from about 1 to 6 dm. (4-24") long. The petioles are about .5 to 5 cm. long, and the leaflets are linear to narrowly lance-oblong, and about 1 to 5 cm. long. The margins are toothed. The flower heads are relatively lax and about 1 to 3 cm. wide, and the corollas are about 8 to 15 mm. long. The petals are reddish purple, and the banner fades to nearly white toward the apex. The small fruits usually contain 2 seeds. ❁March-June.

+Trifolium wormskioldii Lehmann [*T. fimbriatum* Lindley]. COW CLOVER. Diane Renshaw identified this large headed clover from a specimen that she collected in May of 2009. The plant was growing along Tassajara Creek, at the first stream crossing of the upstream trail beyond its junction with the trail over the Hogback. ●R: widespread in western North America, from Alaska to Montana, Colorado, New Mexico and northern Baja California. ●H: rhizomatic perennial herbs with decumbent branching stems that range from about 1 to 4 dm. (4-16") long. The petioles are about 2 to 7 cm. long, and the leaflets, which range from narrowly elliptic to widely ovate, are about 1 to 3 cm. long. The margins are serrulate, and the tips range from rounded and slightly emarginate to acute. The flower heads are about 15 to 30 mm. wide, and the corollas are about 8 to 15 mm long. The wings and keel are usually dark reddish purple, and the much longer banner, which is deeply notched at the apex, ranges from light purple to nearly white. The small fruits contain 2 to 4 (or sometimes 6) seeds. ❁May-October.

VICIA. VETCH, TARE.

The genus *Vicia* consists of about 160 species that primarily occur in temperate regions. The genus name is the Latin word for vetch.

1a. Flowers produced in three or more flowered axillary racemes. . . . . ***V. americana***.
1b. Flowers produced singularly (or in two's) in the axils of the leaves. . . . . ***V. sativa***.

Vicia americana Willdenow [*V. a.* subsp. *oregana* (Nuttall) Abrams, *V. a.* subsp. *o.* var. *linearis* Watson & var. *truncata* (Nuttall) Brewer]. AMERICAN VETCH. This species is widely scattered in open and grassy woodland habitats in the Tassajara region, but it is much less common than the very similar appearing *Lathyrus vestitus*. ●R: widely distributed in temperate North America. ●H: perennial vines with sprawling branches that range from about 6 to 12 dm. (2-4') or more in length. The branches climb on other plants by means of coiling tendrils. The alternate leaves are pinnately divided into 8 to 16 leaflets that range from about 1 to 3.5 cm. long. The leaflets vary considerably in size and shape from plant to plant, from fairly broadly ovate-elliptical to narrowly linear lanceolate (var. *linearis*) or short with an abruptly truncated apex (var. *truncata*). The flowers are produced in axillary racemes comprised of 3 to 10 flowers that tend to be spaciously arranged on one side of the axis. The corollas are about 1.5 to 2.5 cm. long, and the petals are at first purple or purplish, but tend to turn bluish with age. The legumes are about 2.5 to 3 cm. long; they contain several seeds that are about 4 mm. wide. ❁April-June.

Vicia sativa Linnaeus. COMMON VETCH, TARE. This species is scattered in grassy areas in the vicinity of Tassajara Hot Springs and in the Horse Pasture, and occasionally along Tassajara Road and some trails. ●R: a common weed in North America, native to Europe. ●H: annual vines with trailing or climbing stems that range from about 3 to 9 dm. (1-3') long. The alternate leaves are pinnately divided into 8 to 16 oblong to cuneate leaflets about 1.5 to 3.5 cm. long. The leaflets are mostly truncate and notched at the apex. The flowers are nearly sessile and are produced singularly or in 2's in the axils of the leaves. The corollas are about 1.8 to 3 cm. long, and the petals vary from pink purple to a dull blackish purple. The legumes are about 2.5 to 6 cm. long, and the seeds are about 5 mm. wide. ❁April-July.

FAGACEAE. BEECH OR OAK FAMILY.

Fagaceae is comprised of eight genera and about 900 species of trees and shrubs, most of which are native to the temperate regions of the northern hemisphere. This family includes the genera *Quercus* (oaks), *Fagus* (beech trees), *Nothofagus* (the beech trees of the southern hemisphere), *Castanea* (chestnuts), *Castanopsis* (the Asian chinquapins), *Chrysolepis* (the North American chinquapins), *Lithocarpus* (the Asian tanoaks), and *Notholithocarpus*, a newly recognized and monotypic genus of western North America.

1a. Staminate flowers produced in limber and dangling catkins; pistillate flowers produced in axillary clusters. Scales of acorn cups appressed and not slender. . . . . ***Quercus***.
1b. Staminate and pistillate flowers produced in catkins that are relatively stiff and generally erect from the point of attachment (the staminate flowers are positioned above the pistillate flowers). Scales of acorn cups spreading and slender. . . . . ***Notholithocarpus***.

NOTHOLITHOCARPUS. TAN OAK, TANBARK OAK, FALSE LITHOCARPUS.

This is a monotypic (single species) genus that is endemic to the Pacific slope of western temperate North America. It has been segregated from the genus *Lithocarpus* due to the findings of molecular studies, which indicate a closer relationship with the genera *Castanea*, *Castanopsis*, and *Quercus* than to *Lithocarpus*. The populations of this species have greatly declined in recent years due to the sudden oak death syndrome, which is caused by the plant pathogen *Phytophthora ramorum*. The name is derived from the Greek word *nothos*, false, and *Lithocarpus* (*Lithocarpus* is derived from the Greek words *lithos*, rock, and *karpos*, fruit, on account of the hard acorns).

Notholithocarpus densiflorus (Hooker & Arnott) Manos, C. H. Cannon & S. Oh [*Lithocarpus densiflorus* (Hooker & Arnott) Rehder; *Quercus densiflorus* H. & A.]. Prior to the outbreak of sudden oak death syndrome and the fires of 1977, 1999 and 2008, this distinctive species was common to abundant in the mixed evergreen forests at higher elevations in the Tassajara region, and in many areas it formed a nearly pure stands. One such stand was along the Pine Ridge Trail between Tassajara Road and the first summit to the west. Prior to the Marble Cone Fire of 1977 a very dense and nearly pure forest of Tan Oak trees stood along this section of the trail, and the trail could not be seen from vantage points on Chew's Ridge. The forest floor also included plant species that only occur in densely forested areas, such as Coral Root Orchid. The forest along this section of the Pine Ridge Trail was heavily damaged by the Marble Cone Fire of 1977, and thus sections of the trail could be seen from Chew's Ridge. As most of the Tan Oak trees sprouted from the root after this fire, the forest was well on its way to full recovery until it was again heavily damaged by the Kirk Complex Fire of 1999, and after the Basin Complex Fire of 2008 this area was nearly barren, and thus the entire length of this section of the Pine Ridge Trail could be seen from Chew's Ridge. Prior to the fire of 2008 a small grove was established along Tony's Trail, near to the summit on the hot springs side of the grade. A shrub form occurs (or occurred) in chaparral along the Black Cone Trail south of South Ventana Cone, and a few of

these shrubs were scattered in chaparral on summit of Black Butte Ridge. Perhaps the shrub like plants in this region should be assigned to var. *echinoides*, for the leaves are mostly without prominent teeth terminating the veins. The plants, however, appear not to be genetically distinct, for plants growing in gulches or on north facing slopes in areas immediately adjacent to populations of shrub like plants tend to be much taller, and the leaves are mostly with prominent teeth. ●R: Cascade, Coast and western Transverse ranges, from Douglas and Klamath counties in southwestern Oregon to the mountains of western Ventura County. Populations are also scattered in the mountains of Shasta County, in the northern Sierra Nevada, from Butte and Plumas counties to El Dorado County, and in the central Sierra Nevada in Tuolumne and Mariposa counties. H: evergreen trees typically with narrow conical shaped crowns that range from about 12 to 30 (45) m. (40-98' [150']) tall, or sometimes shrubs less than 3 m. (10') tall in chaparral habitats. The bark is thick and fissured. The alternate leaves have petioles that are about 1 to 2.5 cm. long, and the blades, which are 4 to 12 cm. long, are oblong to oblong-ovate, and the margins have serrate teeth terminating the pronounced and generally evenly spaced lateral veins. The flowers are produced in fairly stiff catkins that contain both staminate and pistillate flowers. Staminate flowers are located above the pistillate flowers. The fruits are large and generally ovoid acorns that are about 2.5 to 3.5 cm. long. The acorn cups are covered with relatively slender and spreading scales. ❁June-October.

QUERCUS. OAK.

The genus *Quercus* consists of approximately 600 species of trees and shrubs that primarily occur in the temperate regions of the northern hemisphere. *Quercus* is the Latin name for oak trees.

Leaf and bark based key:

1a. Evergreen trees and shrubs ('live oaks'). Leaves rather stiff, the margins ranging from coarsely toothed to entire, but not lobed: ***Q. parvula*** var. ***shrevei***.

2a. Bark rough and broken into numerous small segments:

3a. Leaves entire to spiny toothed and mostly about 2 to 6 cm. long; the blades are dark green or grayish green and shiny above, and pale or golden yellow puberulent below, becoming glabrous and dull grayish with age. Acorns maturing in 2 years. . . . . ***Q. chrysolepis***.

3b. Leaves toothed and mostly about 1.5 to 3 cm. long; the blades are medium shiny green above, and dull green and appressed puberulent below. Acorns maturing in 1 year. . . . . ***Q. berberidifolia***.

2b. Bark usually (but not always) smooth, and often becoming fissured into broad plates on the trunks of large trees:

4a. Leaves mostly convex; the lower surfaces usually with tufts of hairs scattered on the major veins. Acorns narrowly lanceolate in outline, and maturing in one year. . . . . ***Q. agrifolia***.

4b. Leaves flat or wavy (mostly not convex); the lower surfaces without tufts of hairs. Acorns oblong to broadly lanceolate in outline, and maturing in two years:

5a. Leaves mostly 3 to 9 cm. long, the lower surface a dull olive green. Acorns oblong in outline, abruptly tapering to the tip. . . . .

5b. Leaves mostly 2 to 5 cm. long, the lower surface usually a shiny yellowish green. Acorns lanceolate in outline:

6a. Trees ranging from about 10 to 22 m. (33-72') tall. Leaves mostly 2 to 5 cm. long. . . . . ***Q. wislizeni*** var. ***wislizeni***.

6b. Shrubs ranging from about 2 to 6 m. (6-20') tall. Leaves mostly 1.8 to 4 cm. long. . . . . ***Q. wislizeni*** var. ***frutescens***.

1b. Deciduous trees. Leaves limber to stiff, and deeply to shallowly lobed (or sometimes entire in *Q. douglasii*):

7a. Leaves blue green or bluish gray green; the margins are moderately to shallowly lobed or sometimes entire. . . . . ***Q. douglasii***.

7b. Leaves not bluish hued; the margins are deeply lobed:

8a. Leaf lobe margins terminated with limber spines. Bark dark colored. Inner surface of acorn shell hairy. . . . . ***Q. kelloggii***.

8b. Leaf lobe margins not terminated with spines. Bark with a whitish cast. Inner surface of acorn shell glabrous. . . . . ***Q. lobata***.

Acorn based key:

1a. Acorn cup scales thin, not tubercled, the shells hairy to woolly inside, at least at tip. Bark gray to very dark gray or gray-brown:

2a. Leaf blades lobed, the lobes terminating with 1 to 5 non spiny bristle like teeth. Plants deciduous. . . . . ***Q. kelloggii***.

2b. Leaf blades entire to toothed, the teeth abruptly pointed to spine-tipped. Plants evergreen:

3a. Leaf blades generally widely elliptic to round, mostly convex, the margins often rolled under and obscuring the marginal teeth. The lower surfaces of the blades usually have tufts of hair in the axils of the veins. The acorns mature in 1 year. . . . . ***Q. agrifolia***.

3b. Leaf blades generally lanceolate to oblong, and flat or wavy (but not usually convex). The lower surfaces of the blades without tufts of hairs in the axils of the veins. The acorns mature in 2 years:

4a. Leaf blades mostly 3 to 9 cm. long, the lower surface a dull olive green. Acorns oblong in outline, abruptly tapering to the tip. . ***Q. parvula*** var. ***shrevei***.

4b. Leaf blades mostly 2 to 5 cm. long, the lower surface usually a shiny yellowish green. Acorns lanceolate in outline:

5a. Shrubs ranging from about 2 to 6 m. (6-20') tall. Leaves mostly 1.8 to 4 cm. long. . . . . ***Q. wislizeni*** var. ***frutescens***.

5b. Trees ranging from about 10 to 22 m. (33-72') tall. Leaves mostly 2 to 5 cm. long. . . . . ***Q. wislizeni*** var. ***wislizeni***.

1b. Acorn cup scales thick, generally tubercled, the shells glabrous to woolly inside. Bark light gray to whitish:

6a. Plants evergreen. Acorns maturing in 2 years, the shells more or less woolly inside. . . . . ***Q. chrysolepis***.

6b, Plants evergreen or deciduous. Acorns maturing in 1 year, the shells glabrous inside:

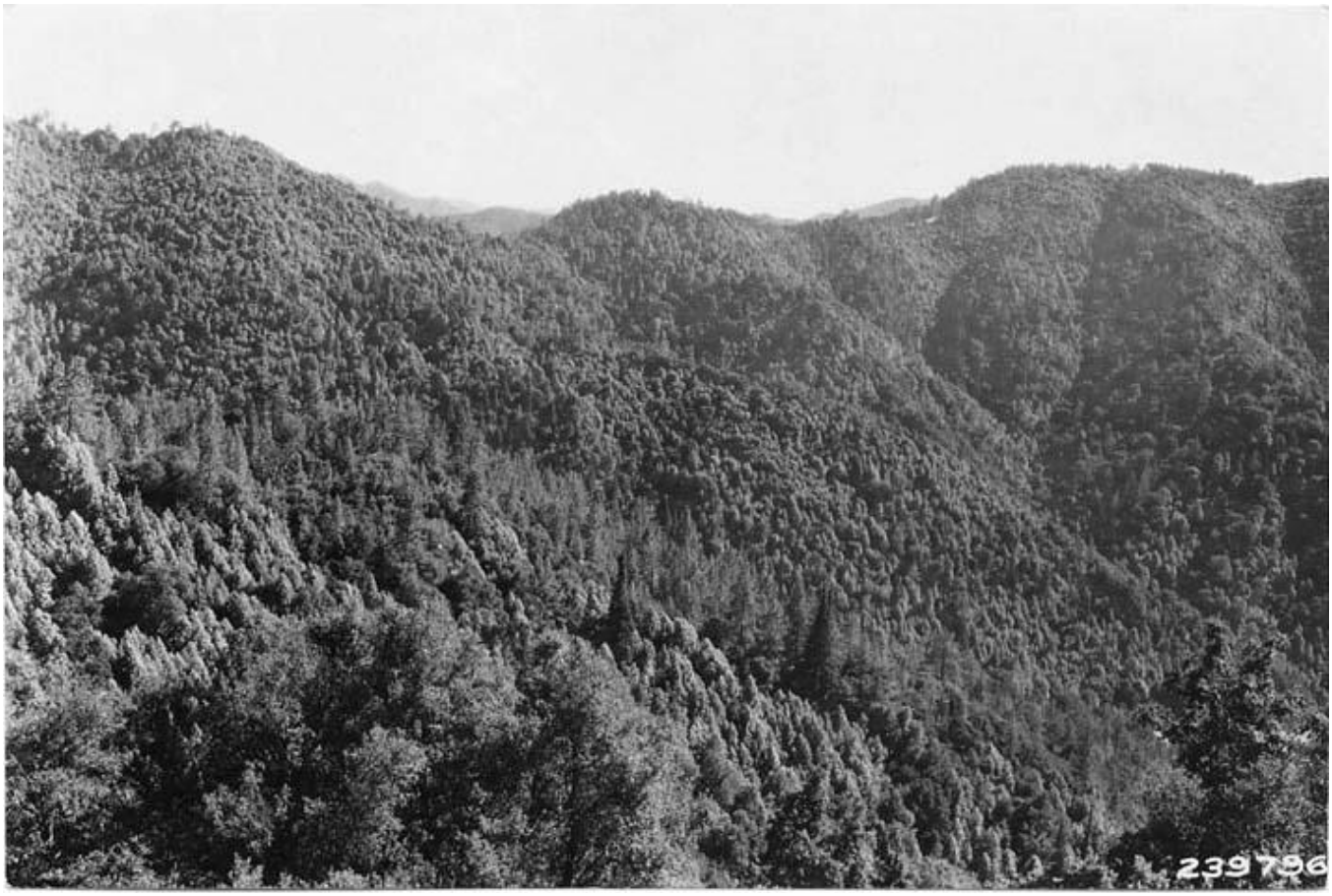
7a. Plants evergreen. Leaves sharply toothed but not lobed. . . . . ***Q. berberidifolia***.

7b. Plants deciduous. Leaves deeply lobed to entire, the margins not sharply toothed:

8a. Leaves shallowly lobed to entire, the upper surface generally a dull green or blue-green. . . . . ***Q. douglasii***.

8b. Leaves moderately to deeply lobed, the upper surface generally a shiny dark green. . . . . ***Q. lobata***.

Quercus agrifolia Nee. COAST LIVE OAK, CALIFORNIA LIVE OAK, ENCINA. This by far the most common oak species in the lower and intermediate elevations of the Tassajara region, but it becomes less common above 3,000 ft., and it is nearly absent above about 3,500 ft. This species manifests itself both as a tree in woodland areas and as a shrub in chaparral. A former landmark at Tassajara was the 'Gossip Oak' or 'Gossip Tree,' which was an impressive representative of this species that stood in the vicinity of the dinner bell



The mixed evergreen forest in upper Miller Canyon as viewed from Chew's Ridge in 1929. The majority of the broadleaf trees were *Notholithocarpus*. The trees with spire like crowns are Santa Lucia Firs (*Abies bracteata*). From the Wieslander Vegetation Type Maps and Photographs Collection of the Koshland Bioscience and Natural History Resources Library, University of California, Berkeley.

near the kitchen. I have been told that this tree was killed by having a planter box built around its base during the early years of Zen Center's ownership of Tassajara (this tree is shown in pictures that were taken in the central area of Tassajara in 1966, the year that the resort was purchased by Zen Center). Since then two other representatives of this species that stood in the central area of Tassajara have succumbed, one stood next to the guest dining room and the other by the bathrooms that are just west of the stone rooms. Both were blown down by the heavy winds of storms. *Quercus agrifolia*, along with *Quercus lobata*, rank among the earliest of the native California plants to be described in botanical literature. These species were named by Luis Nee in 1801, and his descriptions were based on specimens that had been collected in the vicinity of Monterey in 1791 by Thaddeus "Tadeo" Haenke, the botanist of the Spanish exploratory expedition that was commanded by Alessandro Malaspina. ●R: Coast, Transverse and Peninsular Ranges, from Mendocino and Lake counties to the western slopes of Mt. San Pedro Matir in northern Baja California, and it rarely occurs more than 50 miles from the coast. In spite of its limited range, it is the most abundant oak species of coastal California south of Mendocino County. ●H: evergreen trees or shrubs typically with broad and rounded crowns that range from about 2 to 23 m. (6-75') tall. The trunks tend to be rather stout ;the girth of unusually large trees can sometimes exceed 3 m. (10') in diameter), and the branches, which can be massive, often exhibit a tortuous habit of growth. The bark is thick, moist, and deeply fissured into broad plates. The leaf blades are about 2 to 7 cm. long, usually convex (like a spoon turned upside down), roundish to ovate or oblong (or sometimes elliptic), and the margins have spine like teeth terminating the major veins. The staminate flowers are produced in dangling catkins about 3 to 6 cm. long, while the pistillate flowers are borne in small axillary clusters. The acorns are about 2.5 to 3.5 cm. long, narrowly lanceolate in outline, and taper to a rather sharp point. ❁March-April.

+***Quercus berberidifolia*** Liebmann. CALIFORNIA SHRUB OAK. This species occurs in chaparral along Tassajara Road as it passes over the summit of Black Butte, and according to Vern Yadon's field notes (6/16/1979, 6/23-24/1979, 7/3/1980 & 7/4/1980), it also occurs on Never Again Ridge (the ridge between the watershed of Church Creek and that of upper Tassajara Creek), and along the Pine Ridge and Black Cone trails, from the vicinity of South Ventana Cone to the Elephant's Back. Yadon listed this species under the names *Quercus dumosa* and *Quercus turbinella*/*dumosa*, which were the acceptable names for such plants at that time, but it has since been demonstrated that the name *Q. dumosa* properly applies to a species that is endemic to the coast of southern California and northern Baja California, and the name *Q. turbinella* correctly applies to a species that occurs from the desert mountains of southern California to northern Baja California, and eastward to Colorado and Texas. Although *Q. berberidifolia* was named and described by the Danish botanist Frederic Liebmann in 1854, well over 100 years had passed before this taxon became familiar to North American botanists. ●R: Sierra Nevada foothills and the Cascade, Coast, Transverse and Peninsular ranges, from Shasta County to northern Baja California. ●H: evergreen shrubs or sometimes small trees that range from about 1 to 3 + m (40"-10'+) tall. The shortly petiolate leaves have blades that are oblong to ovate, elliptic or roundish, and about 1.5 to 3 cm. long. The blades are flat to wavy, more or less shiny green above and minutely appressed pubescent below (and thus pale green), and the margins sharply toothed. The staminate catkins are produced in dangling catkins and the pistillate flowers are produced in axillary clusters. The acorns are generally ovoid and about 1 to 3 cm. long. ❁February–April.

Quercus chrysolepis Liebmann. CANYON LIVE OAK, IRON OAK, VALPARAISO OAK, MAUL OAK, GOLDEN CUP OAK. This species is common to abundant at all elevations in the Tassajara region, both as a tree in woodlands or as a shrub in chaparral, and it sometimes forms nearly pure stands, especially at higher elevations. The wood of this species is very heavy, and newly cut wood sinks in water. ●R: Cascade, Sierra Nevada, Coast, Transverse and Peninsular ranges, from Lane County in western Oregon to the mountains of northern Baja California, and eastward to mountains of southern Nevada, Arizona and southwestern New Mexico. ●H: evergreen oaks that range from open crowned trees about 7.5 to 22 m. (25-70') tall in woodland habitats, to medium or large sized shrubs in chaparral. The trunks of exceptionally large trees can exceed 3 m. (10') in diameter, and the primary branches of such plants can be quite massive. The bark is relatively thin and roughly fissured. The petioles are about 3 to 10 mm. long, and the blades are about 2 to 6 cm. long. The blades are ovate to lanceolate or oblong, and have extremely variable margins, ranging from flat and entire to wavy and densely spiny toothed. The lower surfaces of the blades have a distinctive powdery or felt like coating that is at first yellowish but becomes dull and grayish with age. The staminate flowers are borne in dangling catkins, while the pistillate flowers are produced in small axillary clusters. The acorns range from broadly ovate or obovate to oblong in outline, and from 2 to 3.75 cm. long. ❀April-May.

Quercus douglasii Hooker & Arnott (*Q. ransomi* Kellogg). BLUE OAK. This distinctive species is locally common in open oak woodlands in the Arroyo Seco area, and its distribution extends westward along Tassajara Creek to about the confluence of the Willow Creek, and northwestward along the Horse Pasture Trail to Oak Knoll (at the pass between the watershed of Blackberry Creek, which flows into Tassajara Creek near the junction of the Horse Pasture and Marble Peak trails, and the watershed of Quail Spring Creek, which flows into Tassajara Creek a short distance below The Narrows). This species must also occur somewhere in the watershed of Church Creek, for I found a young tree growing along Tassajara Creek at the confluence of Oryoki Creek in the spring of 2009 (this tree was swept away by a high water event during the following winter). James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), listed this species as being uncommon on Pine Ridge below 1,200 m. (3,937'), and thus he probably found it somewhere in or near Pine Valley. Griffin also listed this species as being common on Chew's Ridge below 1,200 m; these trees were almost certainly found on the Jamesburg side of the mountain. ●R: Cascade and Coast ranges, the Sierra Nevada foothills, and the western Transverse Ranges, from Siskiyou County to northwestern Los Angeles County. This species also occurs on Santa Cruz and Santa Catalina islands. ●H: deciduous white oaks that range from about 6 to 19 m. (20-60') tall. The bark is fissured into a checker like pattern, with the outer most surfaces typically exhibiting a light gray cast. The leaves are shortly petiolate, and the generally oblong blades are bluish green or gray green, about 3 to 10 cm. long, and have entire to irregularly lobed margins. Staminate flowers are produced in dangling catkins, while the pistillate flowers are borne in small axillary clusters. The acorns vary from broadly ovate to oblong in outline, and range from about 2 to 3 cm. long. ❀April-May.

Quercus kelloggii Newberry (*Q. californica* Cooper; *Q. sonomensis* Bentham in DeCandolle]. CALIFORNIA BLACK OAK. This distinctive oak species is common along Tassajara Road between Jamesburg and White Oaks Camp, and it is also common in and around Pine Valley. Prior to the fires of 1999 and 2008, this species was also common southwestward from Pine Valley to Bear Basin, and southeastward from Pine Valley to the upper regions of Church Creek (to near The Caves). Trees are also scattered in the Strawberry Valley area. ●R: Cascade and Coast ranges, Sierra Nevada, and the Transverse and Peninsular ranges, from Lane County in western Oregon to the highest mountains of northern Baja California. It primarily occurs in mixed forests that are between 1,000 to 8,000 ft. in elevation. ●H: deciduous trees typically with open and rounded crowns that range from about 10 to 25 m. (33-82') tall. The bark is darkly hued and fissured into small plates. The leaves have petioles that are about 1 to 4 cm. long, and the blades, which are about 9 to 20 cm. long, are broadly obovate to ovate in outline, and deeply cleft into two or three pairs of lobes, the margins of which bear sharply acute teeth at the ends of the primary and secondary veins. The staminate flowers are produced in dangling catkins that are about 3.5 to 7.5 cm. long, and the pistillate flowers are borne in small axillary clusters. The acorns are generally broadly ovate in outline and about 2.5 to 3 cm. long. As the acorns take two years to mature, partially developed acorns are usually present on most trees. ❀April-May.

Quercus lobata Nee. VALLEY OAK, CALIFORNIA WHITE OAK, ROBLE. This species is locally common in the Tassajara region, but it is mostly restricted to deep soiled areas along fault zones. Along the Willow Creek Fault this species is common from the confluence of Tassajara Creek and the Arroyo Seco River to about a quarter of a linear mile west of Willow Springs Camp. Along the Church Creek Fault this species is common from the junction of Willow Creek Fault (in the vicinity of the junction of the Horse Pasture and Marble Peak trails) to the Horse Pasture (the Basin Complex Fire of 2008 killed nearly all of the trees in the Horse Pasture). After a gap that extends from The Pines to the Wind Caves, this species is once again common in the Church Creek area, from just north of the Wind Caves and extending northwestward towards the Church Creek Divide. The species is also common on Chew's Ridge, from China Camp northward (the Chew's Ridge population is notable for its exceptionally high elevation, and most of the larger plants exhibit the consequences of being subjected to heavy snowfalls: they have large trunks but few or no major branches). Near the developed area of Tassajara a small group of trees also occurred on the northeastern slope of the Overlook Ridge, but I failed to visit the location after the fire of 2008, so I at the present time I am unaware of their fate. The trees grew on the slope above the eastern end of the Overlook Trail. This species is said to be the largest of all North American oaks, and the crowns of exceptionally large trees can exceed both 37 m. (120') in height and width; the trunks can be up to 3.7 m. (12') in diameter. Fortunate trees can live for more than 1,000 years. Habitats in which this species is dominant tend to be open, grassy, and dotted with large and fairly evenly spaciously placed trees. ●R: Cascade Ranges, Sierra Nevada foothills, Coast Ranges and western Transverse Ranges, from Siskiyou and Mendocino counties to western Los Angeles County, and in the Sacramento and northern San Joaquin Valleys, where it is now mostly restricted to river banks. Also on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: deciduous white oaks typically with broad and rounded crowns that range from about 12 to 30+ m. (40-100+') tall. The trunks can be quite massive, and the branches frequently have a tortuous habit of growth. The bark is deeply fissured into a checker like pattern of thick segments, the outer surfaces of which have a whitish cast. The leaves have petioles that are about 5 to 12 mm. long; the blades are about 5 to 12 cm. long, oblong to obovate in outline, and pinnately divided (sometimes irregularly so) into 5 to 11 lobes that are rounded to irregularly undulate at the apex. Staminate flowers are produced in limber and dangling catkins, while the pistillate flowers are produced in axillary clusters. The large acorns are lanceolate in outline and about 3 to 5 cm. long. ❀March-April.

+***Quercus parvula*** E. Greene var. ***shrevei*** (C. H. Muller) K. Nixon [*Q. shrevei* Muller]. COAST RANGE OAK. This entry is based on a specimen that was collected "Beside Tassajara Road, east of China Camp, opposite hitching rail and mail box" by Alfred J. Stewart in October of 1942 (Stewart 204; UCD 47160). It is possible that the plants of this region that have been assumed to represent the tree variety of *Q. wislizeni* actually represent this taxon. *Quercus shrevei* was first named and described by Cornelius Muller in 1938,

THE THICH NHAT HANH OAK.

The *Quercus kelloggii* tree next to the railroad bell at Tassajara grew from a sprouting acorn that I collected along Tassajara Road during the winter of 1982. It was collected at Mary's Flats, a prominent bend in the road between Bruce Flats and White Oaks Camp. As the acorn was spouting on top of a very thick layer of fallen leaves, I thought the chances for its survival were slight, so I bought it back to Tassajara and planted it in a pot. The tree was planted at its current site in March of 1983, at which time the Buddhist Peace Fellowship was holding a retreat at Tassajara. The retreat was lead by Thich Nhat Hanh, who, as evidenced by the accompanying photograph, was present at the tree's ceremonious planting. This tree grew very slowly during its first 30 years, but it is now growing rapidly. This tree was planted at nearly the same site as where the landmark 'Gossip Oak' or 'Gossip Tree' once stood. This *Quercus agrifolia* tree, which is often mentioned in historical literature pertaining to Tassajara, was killed by having a planter box built around its base during the early years of Zen Center's ownership of Tassajara.

The planting of the Thick Nhat Hanh oak. Left to right: Arnie Kotler, Richard Baker, Thich Nhat Hanh, Brendan Kenney (?), Elan Kamesar and his mother, Dolores Kamesar. This photograph was taken by Rob Lee, and it is included in the Zen Center photographic archives.

and in 1994 Muller and Kevin Nixon reduced it to a variety of *Q. parvula*. Although *Q. parvula* and var. *shrevei* were recognized by John Tucker in his treatment of *Quercus* in *The Jepson Manual* (1993 & 2012), many authorities consider them to be a synonyms of *Q. wislizeni*. ●R: outer Coast Ranges and western Transverse Ranges, from Mendocino and Lake counties to the Santa Ynez Mountains of Santa Barbara County. The typical species is a shrub that occurs on Santa Cruz Island and along the coast of Santa Barbara County and southern San Luis Obispo County. ●H: evergreen trees that are usually less than 20 m. (65') tall. The short petiolate leaves are mostly about 3 to 9 cm. long; the blades range from nearly round to ovate, oblong or lanceolate. The margins vary from sharply toothed to entire. The staminate flowers are produced in dangling catkins, and the pistillate flowers are produced in axillary clusters. The acorns, which are about 2.5 to 4.5 cm. long, are oblong to ovoid and obtuse or rounded at the apex. ❀March-May.

+***Quercus wislizeni*** deCandolle var. ***wislizeni***. SIERRA LIVE OAK, INTERIOR LIVE OAK. Although I have not knowingly seen this species in this region, according to James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975), *Quercus wislizeni* is common above 600 m. (1968') on Pine Ridge and Chew's Ridge, and he noted that it was "Widely distributed as a dominant in the higher elevation mesic chaparral, less common as an understory tree in the forest." Of the six specimens of *Q. wislizeni* from the Tassajara region that are presently listed in the Consortium of California Herbaria database, only two are assigned to a variety. One of these is assigned to shrub variety *frutescens*, and the one that is assigned to tree variety *wislizeni* was collected at "White Oak Camp on the road from Jamesburg to Tassajara" by Reino Alava in August of 1958 (Alava 2325; RSA 293396). It is possible that the plants of this region that have been assumed to represent the tree variety of *Q. wislizeni* actually represent *Q. parvula* var. *shrevei*. ●R: Sierra Nevada foothills and the Coast, Transverse and Peninsular ranges, from Trinity, Shasta and Plumas counties to mountains of northern Baja California. ●H: evergreen trees that range from about 10 to 22 m. (24-72') tall. The bark is relatively smooth but becomes deeply fissured with age. The leaves are petiolate, and the blades, which are about 2 to 5 cm. long, are lanceolate to nearly roundish, shiny green on both surfaces, and have flat and spiny toothed margins (although the leaves of this species often have entire margins, this trait was not observed in any of the local plants). Staminate flowers are produced in limber dangling catkins, while pistillate flowers are produced in axillary clusters. The acorns are oblong to lanceolate in outline, about 2 to 4 cm. long, and are usually marked with lines. As the acorns take two years to mature, immature acorns are usually present on most plants. ❀March-May.

Quercus wislizeni deCandolle var. ***frutescens*** Englemann. This taxon is widespread and locally common in chaparral on the higher ridges of the Tassajara region, but it is uncommon below about 1,700 ft. in elevation. ●R: southern Cascade Ranges, Sierra Nevada foothills and the Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California. ●H: evergreen shrubs usually with rounded crowns that range from about 2 to 4 m. (6-12')

tall. This taxon also differs from the typical species in having smaller leaves. ❀March-May.

Quercus john-tuckeri, a shrubby evergreen oak, occurs at the Hastings Natural History Reservation, and it is common in the Paloma Creek Canyon. Several named hybrid oaks also occur in the upper Carmel Valley, Paloma Creek and lower Arroyo Seco areas.

GARRYACEAE. SILK TASSEL FAMILY.

Garryaceae is a very unique family that consists of only one genus.

GARRYA. SILK TASSEL.

The genus *Garrya* consists of fourteen species that are endemic to temperate western North America, Central America and the Caribbean Islands. The genus was named by the famous botanical explorer David Douglas for Nicholas Garry (1782-1856). According to John Lindley, the genus was "Named by Mr. Douglas in compliment to Nicholas Garry, Esq., Secretary of the Hudson's Bay Company, to whose kindness and assistance he was much indebted during his travels in Northwest America" (*Edwards*' *Botanical Register* 20: tab. 1686, 1835).

Garrya flavescens S. Watson [*G. pallida* Eastwood; *G. flavescens* var. *pallida* (Eastw.) Ewan; *G. f.* var. *p.* Bacigalupi]. ASHY or PALE SILK TASSEL. This distinctive species is locally common in chaparral along the Black Cone Trail between South Ventana Cone and the Elephant's Back (a. k. a, White Cone), and it is scattered in chaparral along the Marble Peak Trail between the Willow Creek Divide and Camp Creek. After the Basin Complex Fire of 2008 one plant was discovered within 15 feet west of the summit of Tony's Trail, and although it was resprouting from the roots, it was easy to identify due to the distinctive leaves of this species. James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), reported that this species was rare on Chew's Ridge. Although this species is not known to occur elsewhere in this region, it probably occurs in other areas that are not accessible by trails. ●R: Coast, Transverse and Peninsular ranges, from Humboldt and Tehama counties to northern Baja California, and the Sierra Nevada foothills, from Butte County to Mariposa County, and eastward to southwest Utah and New Mexico. This species generally occurs between 1,500 to 8,000'. ●H: evergreen shrubs that range from about 1.5 to 3 m. (5-10') tall. The opposite leaves have petioles about 3 and 10 mm. long; the grayish green blades are oval to elliptic, entire, and about 2 to 8 cm. long. The flowers are produced in dangling silky catkins; those of staminate plants are about 3 to 6 cm. long, while those of pistillate plants are about 3 to 7. cm. long. The fruits are broadly ovoid berries that are about 6 to 8 mm. long; they are covered with a dense layer of appressed silky hairs. ❀February-April.

GERANIACEAE. GERANIUM FAMILY.

Geraniaceae includes six genera and approximately 750 species that primarily occur in northern temperate and tropical regions. The showy flowered geraniums of ornamental horticulture belong to the genus *Pelargonium*.

1a. Leaves pinnately divided. Fertile stamens 5. . . . . ***Erodium***.
1b. Leaves palmately divided. Fertile stamens 10. . . . . ***Geranium***.

ERODIUM. FILAREE, STORK'S BILL.

This genus includes about 74 species of annual and perennial herbs of temperate Eurasia, North Africa, the Americas and Australia. The name is derived from the Greek word *erodios*, a heron, and alludes to the bill like styles of the carpels.

Erodium cicutarium (Linnaeus) L'Heritier [*Geranium c.* L.]. COMMON FILAREE, RED STEMMED FILAREE. This well known species is widely scattered and locally common in open and usually grassy areas in the Tassajara region, especially in areas where the soil is poor and/or sandy. ●R: a very common weed in North America; probably native to Eurasia. This species was present in California before large scale settlement by Europeans, for carpels have been found in some of the earliest adobe bricks made in the state, and the species was reported to have been common in the San Joaquin Valley before major settlement. These factors help to confuse the issue as to whether or not this species is alien or native to California. Most authors, however, believe this is a Eurasian species. The presence of carpels in adobe bricks suggests that this species was first established in and around mission communities, and it may have spread into the San Joaquin Valley via the fur and/or dung of large numbers of horses and cattle that had escaped from the mission communities. There is also a theory that the species may have first arrived in California (from Mexico) via the feathers of migrating birds. ●H: annual herbs varying in size depending on environment, from up to 5 dm (20") tall in richer and/or moister soils, to less than .5 dm. (2") tall in poor, dry, and highly exposed soils. The basal leaves are produced in loose rosettes and the cauline leaves are opposite. The lower leaves have petioles that are about as long to shorter than the blades, and the upper most leaves are sessile. The blades are about 3 to 10 cm. long, lanceolate to oblanceolate or oblong in outline, and pinnately divided into generally narrow and pinnately toothed or lobed leaflets. The flowers are produced singularly or in few flowered umbels that are terminal and axillary, and the corollas consist of five rose purple to lavender petals that are about 5 to 7 mm. long. The ovaries split into five carpels when mature, each of which retains a longitudinal section of the style. The styles become coiled when dry, and unwind when water is applied. This adaptation helps to drill the carpels into the ground at the start of the rainy season. ❀February-June.

GERANIUM. CRANE'S BILL.

Geranium includes about 400 species that are native to temperate regions and tropical mountains. The name is based on the Greek word *geranos*, a crane, on account of the bill like styles of the carpels.

Geranium dissectum Linnaeus. CUT LEAVED GERANIUM. The only areas in the Tassajara region where this species is known to occur are in Pine Valley, where it is weedy in the vicinity of Pine Valley Camp, and in and about the developed area of Tassajara. The Tassajara population has been established for more than 50 years, for Tassajara Springs was listed as a location for this species in Beatrice Howitt and John Thomas Howell's "The Vascular Plants of Monterey County" (1964). ●R: a common weed in North America;

native to Eurasia. ●H: annual herbs with erect or ascending stems that range from about 1 to 3 dm. (4-12") tall. The leaves are opposite and mostly long petiolate, and the blades are roundish to deltoid in outline, about 3 to 6 cm. wide, and deeply cleft into five major segments which are further divided. The terminal and axillary flowers are produced in one's or two's, and the corollas consist of five two lobed petals that are about 5 to 7 mm. long; the petals are pale pink to rose purple. The ovaries split into five carpels when mature, each of which retains a longitudinal section of the style. ❀March-June.

GROSSULARIACEAE. GOOSEBERRY AND CURRANT FAMILY.

Grossulariaceae is comprised of only one genus, *Ribes*. In many older texts this genus has been treated as a subfamily within *Saxifragaceae*, the Saxifrage Family.

RIBES. CURRANTS AND GOOSEBERRIES.

Ribes consists of about 120 species of shrubs or subshrubs that are widely distributed in the temperate regions of the northern hemisphere; the genus is also represented in the tropical mountains of Central and South America, and in temperate South America. *Ribes* is well represented in North America (53 species are listed in "Flora of North America"), and especially so in western North America. Thirty one species occur in California, and seventeen of these (plus nine lesser taxa) are endemic to the California Floristic Province. The genus has two wings, the gooseberries and the currants. Gooseberries have thorny and sometimes bristly branches and stems, bristly fruits, and inflorescences that are comprised of one to four axillary flowers, while the currants totally lack thorns or bristles, and the flowers are produced in many flowered terminal racemes. There are, however, a number of species that exhibit intermediate features, and thus the genus has not been divided. The name is derived from the Arabic name for rhubarb, *ribas*, which for some inexplicable reason became mistakenly applied to currants.

1a. Stems without thorns or spines. Flowers produced in terminal racemes. Fruits not bristly. . . . . ***R. malvaceum***.
1b. Stems with at least some thorns at the nodes, and sometimes with internodal spine like bristles, which can be dense. Flowers produced singularly or in groups of two's or three's from the axils of the leaves. Fruits bristly (except in *R. divaricatum*):
2a. Stems with bristly spines between the nodes. Free part of flower tube about as long as broad. . . . . ***R. sericeum***.
2b. Stems not bristly between the nodes. Free part of flower tube longer than broad:
3a. Fruits not bristly. . . . . ***R. divaricatum***.
3b. Fruits bristly:
4a. Leaf blades mostly 2 to 4 cm. long, the lower surface dotted with glandular pores. . . . . ***R. amarum***.
4b. Leaf blades mostly 1 to 2 cm. long, the lower surface not dotted without glandular pores. . . . . ***R. roezlii***.

Ribes amarum McClatchie [*Grossularia amara* (McClatchie) Coville & Britton]. BITTER GOOSEBERRY. This species is fairly common in the Church Creek area, and it has also been seen at a number of locations on the floodplains of Tassajara Creek between the confluence of Church Creek and the hot springs. Smaller leaved plants from the upper regions of Church Creek, Pine Valley, and along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge, probably represent plants that are intermediate with *R. roezlii*. ●R: Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Contra Coast and Butte counties to San Diego County. ●H: deciduous shrubs that range from about 1 to 2 m. (40-80") tall. Plants growing in open areas tend to be rather stoutly branched and with an erect and generally rounded crown, while plants growing in shady areas tend be lanky. The leaves are alternate or in alternate clusters; the petioles are about 1 to 2.5 cm. long, and the blades, which are about 2 to 3.5 cm. long, are ovate to roundish in outline, cordate at the base, and cleft into three to five primary lobes, the margins of which are crenately toothed. The pendulous flowers are produced singularly or in two's or three's from the axils of the leaves. The corollas consist of five white or pinkish white petals about 3 to 4 mm. long, and the more conspicuous sepals, which are reflexed, are tinged brownish or purplish red. The fruits are roundish and densely bristly berries about 1.5 to 2 cm. wide. ❀March-April.

+***Ribes divaricatum*** Douglas [*Grossularia divaricata* (Doug.) Coville & Britton] var. ***pubiflorum*** Koehne. STRAGGLY GOOSEBERRY. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3200; DS 40492). ●R: Coast Ranges, from Lane County in western Oregon to the western coast of Santa Barbara County (the typical species ranges from British Columbia to Oregon). ●H: widely branched deciduous shrubs the range from about 1 to 3 m. (40"-10') tall. The stems usually have one to three spines at the nodes. The petioles are about 1 to 3 cm. long, and the blades, which are roundish in outline and about 2 to 5 cm. wide, are three to five lobed, the margins of which are toothed. The flowers are produced in drooping racemes that are 2 to 6 flowered. The floral tubes, which are greenish or purplish, are about 3 to 4 mm. long, and the oblong sepals, which are reflexed and about 5 mm. long, are purple or purplish green. The white petals are about 2 mm. long. The fruits are dark round berries that are about 6 to 10 mm. in diameter; the berries lack prickles or spines. ❀March-May.

Ribes malvaceum J. E. Smith var. ***malvaceum***. CHAPARRAL CURRANT, WESTERN BLACK CURRANT. In the first edition of this text (1998) I stated that "This species is widely scattered in chaparral and sometimes in woodland habitats in the Tassajara region, but it is relatively uncommon." After the Basin Complex Fire of 2008 it was discovered that this species is more common in this region than previously thought, for plants that were resprouting from their roots were seen many more locations in what had been dense stands of chaparral. ●R: Coast, Transverse and Peninsular ranges, from Humboldt and Shasta counties to San Diego County, and in the Sierra Nevada foothills, from El Dorado County to Tuolumne County. Also on Santa Cruz and the Anacapa islands (var. *viridifolium* occurs from San Luis Obispo County to northern Baja California). ●H: generally erect deciduous shrubs with somewhat flexuous stems that range from about 1 to 2 m. (40-80") tall. The leaves are generally alternate or in alternate clusters; the petioles are about 1 to 4 cm. long, and the blades are about 1 to 5 cm. wide, broadly ovate to roundish in outline, and divided into 3 to 5 shallow lobes, the margins of which are serrately toothed. The flowers are produced in drooping terminal racemes that can have up to 25 flowers. The flowers emit a spicy, incense like scent. The corollas are comprise of five pale pink petals about 2 to 3 mm. long, and the more conspicuous calyces have pink tubes and lavender to rose lobes. The roundish berries are about 6 to 7 mm. wide; they are purplish black and covered with a whitish bloom. ❀October-March.

<>***Ribes roezlii*** Regel [*Grossularia r.* (Regel) Coville & Britton]. SIERRA GOOSEBERRY. This montane species is scattered in shady and sometimes moist habitats in the higher elevations of the Tassajara, such as on Chew's Ridge, the upper regions of Miller Canyon, along the first ¼ of a mile or so of the Pine Ridge Trail west of Tassajara Road, and on Pine Ridge. Plants in Pine Valley,

the upper regions of Church Creek, and along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge, may represent a population which is to some degree intermediate with *R. amarum*. Such plants generally resemble *R. roezlii*, but the lower surfaces of the leaves have a scattering of glandular pores. The populations of Ribes roezlii in the Santa Lucia Mountains are greatly disjunct, for the nearest populations to the north are on Mount St. Helena in Napa County, and the nearest populations to the south are in the Sierra Madre Mountains of Santa Barbara County. ●R: southern Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Curry and Jackson counties in southwestern Oregon to the mountains of San Diego County. ●H: Deciduous shrubs with erect to spreading branches; the plants range from about 5 to 12 dm. (20-48") tall. The leaves are alternate or in alternate clusters; the petioles are about .5 to 3 cm. long, and the blades are about .5 to 2.5 cm. long, ovate to roundish in outline, and cleft into three to five crenately margined lobes. The generally pendulous flowers are produced singularly or in two's or three's from the axils of the leaves. The corollas are comprised of five white petals about 3 to 5 mm. long, and the reflexed sepals are dull reddish purple. The fruit is a roundish and densely bristly berry about 14 to 16 mm. wide. ❀May-June.

Ribes sericeum Eastwood [*Grossularia sericea* (Eastwood) Coville & Britton]. SANTA LUCIA GOOSEBERRY. This Santa Lucia Mountains endemic is fairly common along Willow Creek, but at present it is not known to occur elsewhere in this region. For a number of years a plant was established on a bank of Tassajara Creek a short distance downstream from the confluence of Waterfall Creek, but this plant perished when the bank collapsed during a high water event during the mid 1990s. *Ribes seri*ceum also occurs along streams in the Jamesburg area and at the Hastings Natural History Reservation. ●R: Santa Lucia Mountains, from Rocky Creek on the Monterey County coast, and from the Hasting Natural History Reservation in the upper Carmel Valley, to Lopez Canyon in San Luis Obispo County; most of the herbarium specimens of this species are from the coastal slopes of these mountains. ●H: deciduous shrubs up to 2 m. (6.5') tall, with lanky and widely spreading branches that have bristles on the stems and spines at the nodes. The leaves are alternate or produced in alternate clusters; the petioles are about 1 to 3.5 cm. long, and the blades are about 1 to 3.5 cm. long, roundish to broadly ovate in outline, cordate to truncate at the base, and cleft into three to five crenately margined lobes. The pendulous flowers are produced singularly or in two's or three's from the axils of the leaves. The corollas consist of five white petals that are about 3 to 4 mm. long, and the more conspicuous sepals are dull red or reddish purple. The fruits are round and densely bristly berries about .8 to 2 cm. wide. ❀December-May.

Ribes species that occur in areas near to the Tassajara region include *R. aureum* and its variety *gracillimum* (in the Cachagua region, on the Hastings Natural History Reservation and in Lost Valley), *R. californicum* (in the Jamesburg, Hastings and lower Arroyo Seco Canyon areas), *R. menziesii* (Jamesburg and Hastings areas), *R. quercetorum* (Paloma Creek Canyon and lower Arroyo Seco Canyon), and *R. speciosum* (Hastings, upper Carmel Valley region).

Included in the Consortium of California Herbaria database is a specimen of *Ribes menziesii* that somehow got mislabeled as being from Monterey County. The specimen was collected by Joseph Burtt Davy in March of 1898, and the stated location collection was "Below the Caves (Wildcat Canyon)," and thus one might assume that this was in the vicinity of the Wildcat Creek in the Tassajara region. As numbered, this was Davy's specimen #4174, and both his #4173 and #4175 specimens were collected in the hills northeast of Berkeley, where Wildcat Canyon is located. In that canyon there is a large volcanic rock outcrop that is known Caves Rock, which was so named for its numerous caves which bobcats used as dens (and hence the name of the canyon).

HYDRANGEACEAE. HYDRANGEA FAMILY.

Hydrangeaceae consists of 18 genera and about 250 species of the temperate and subtropical regions of the northern hemisphere. The species range from perennial herbs to vines and small trees.

WHIPPLEA. MODESTY, YERBA DE SELVA.

This is monotypic (one species) genus that is endemic to the coast of temperate western North America. The genus was named for Lieutenant Amiel W. Whipple (1818-1863), the commanding officer of the Pacific Railroad Survey of 1853-1854 (this species was first named and described in the report of the survey).

∨***Whipplea modesta*** Torrey. This species is uncommon on moist and shady rock outcrops along Tassajara Creek above the confluence of Church Creek, and it may be present in Miller Canyon and along Church, Oryoki and Willow creeks, for suitable habitats exist in these areas. It also occurs in the upper watershed of the Carmel River. ●R: Coast Ranges, from the northern Olympic Peninsula in Washington to the Santa Lucia Mountains of southern Monterey County. ●H: deciduous perennials with slender, trailing and slightly woody branches that range from about 3 to 18 dm. (1-6') long. The branches root at the nodes. The opposite leaves are nearly sessile, and the blades, which are about 1 to 3 cm. long, are generally ovate; the margins are shallowly toothed. The small flowers are produced in terminal head like clusters, and the corolla consists of four to six white petals about 2 to 2.5 mm. long. The fruit is a four to five celled capsule about 2 to 2.5 mm. wide. ❀April-June.

HYPERICACEAE. ST. JOHN'S WORT FAMILY.

This is a widely distributed family that is comprised of 37 genera and about 1,610 species. The species range from annual and perennial herbs to shrubs and trees.

HYPERICUM. ST. JOHN'S WORT, TINKER'S PENNY.

Hypericum consists of about 450 widely distributed species of annual and perennial herbs and shrubs. The name is derived from an ancient Greek word, the meaning of which is unknown.

Hypericum scouleri Hooker [H. *formosum* Kunth var. *scouleri* (Hooker) Coulter]. This species is scattered in wet habitats in Pine Valley and on Pine Ridge, and it was once seen in a wet ditch along Tassajara Road a short distance below (northeast of) the Chew's Ridge summit. According to the note that is enclosed in an envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901 (Elmer 3202; DS 31386), he collected it "Near Pine Valley Camp, in gulch northwest." ●R: widely distributed in the mountains of western North America, from British Columbia and Alberta to the mountains of southern California and

New Mexico. In California this species occurs in the Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, as far south as the higher mountains of San Diego County. In the Coast Ranges this species occurs from Howell Mountain in Napa County northward, with disjunct populations on Mount Tamalpias, on Mount Diablo and on Loma Prieta, and at a number of locations in the Santa Lucia Mountains of Monterey County. The nearest populations to the south are in the San Rafael Mountains of Santa Barbara County. ●H: rhizomatic perennial herbs with erect stems that range from about 2 to 7 dm. (8-28") tall. The opposite leaves are sessile, oblong to ovate, and about 1 to 3 cm. long. The flowers are produced in terminal and axillary paniculate cymes, and the corollas consists of five obovate yellow petals about 7 to 10 mm. long. The fruit is a three lobed capsule about 6 to 7 mm. long. ❀June-September.

LAMIACEAE (*Labiatae* or *Menthaceae*). MINT FAMILY.

This is a widely distributed family that consists of about 230 genera and approximately 7,200 species; the species range from annual herbs to shrubs. *Lamiaceae* is particularly well represented in the Mediterranean Sea area. Due to the pleasantly aromatic nature of many of its species, *Lamiaceae* is a major source of culinary herbs, such as the various mints (*Mentha*), basil (*Ocimum*), sage (*Salvia*), thyme (*Thymus*), savory (*Clinopodium*), rosemary (*Rosmarinus*) and marjoram and oregano (*Origanum*). Other well known plants include lavender (*Lavandula*), *Coleus*, and catnip (*Nepeta cataria*). *Lamiaceae* is well represented in the Tassajara region, and includes some of the most common and/or conspicuous of the local plants.

1a. Stamens and style exserted beyond the corolla tube (and lobes) by at least twice the length of the tube. Nutlets attached wholly or partially by the side, and thus may appear as a unit before separation. . . . . ***Trichostema***.
1b. Stamens and/or style generally not exserted beyond the corolla tube for more than twice the length of the tube, and not or only slightly beyond the corolla lobes. Nutlets attached at the base, thus each nut let is distinct, even before full maturation:
  2a. Corollas weakly bilabiate, the five lobes nearly equal in length, the upper two lobes united for most of their length:
    3a. Plants prostrate, the stems slightly woody and trailing. . . . . ***Clinopodium douglasii***.
    3b. Plants erect or the stems ascending:
      4a. Inflorescens head like and terminal, and subtended by an involucre like whorl of bracts. . . . . ***Monardella***.
      4b. Inflorescens axillary and/or spike like, and subtended by two small leaf like bracts) . . . . . ***Mentha***.
  2b. Corollas strongly bilabiate, the two to five lobes not equal in size and/or shape in most species:
    5a. Calyces with ten hooked teeth that become hardened when dry, thus the calyces are bur like in maturity. Stems covered with a dense coat of white woolly hair. . . . . ***Marrubium***.
    5b. Calyces two or five lobed (or toothed), the calyces not becoming bur like in maturity. Stems not white woolly:
      6a. Flowers with two fertile (anther bearing) stamens. . . . . ***Salvia***.
      6b. Flowers with four fertile stamens:
        7a. Calyces with 2 entire lobes of nearly equal size and shape. Stamens concealed within a dome like upper lip. . . . . ***Scutellaria***.
        7b. Calyces with five lobes or teeth of equal or unequal length. Stamens exposed:
          8a. Shrubs or subshrubs. Corolla tube strongly inflated, the upper lips four lobed. . . . . ***Lepechinia***.
          8b. Herbaceous perennials (sometimes slightly woody at the base). Corolla tube slender, the upper lips two lobed:
            9a. Flowers produced singularly and opposite in the axils of the leaves. . . . . ***Clinopodium mimuloides***.
            9b. Flowers produced in whorls in a terminal spike or head like inflorescence (the lower most flowers may be present in the axils of the upper most leaves). . . . . ***Stachys***.

CLINOPODIUM. SAVORY.

Clinopodium consists of about 150 species of perennial herbs and shrubs that primarily occur in the Mediterranean region, but the genus is also represented in Eurasia, Australia and in North and South America. The culinary herb is *C. hortensis*. The genus name is the Latin word for savory, and it is derived from *klinopodion*, the Greek name for *Clinopodium vulgare*. The Greek word *klino* means a bed, and the Greek word *podion* means a little foot.

1a. Evergreen herbs with slender, trailing, and slightly woody stems. Leaves less than 3 cm. long and with sparse and minute hairs. Corollas white and about 3 to 8 mm. long. . . . . ***C. douglasii***.
1b. Winter deciduous herbs with relatively stout, generally erect, and non woody stems. Leaves up to 8 cm. long and covered with long appressed hairs. Corollas red to orangish red and about 15 to 40 mm. long. . . . . ***C. mimuloides***.

Clinopodium douglasii (Bentham) Kuntze [*Satureja douglasii* (Bentham) Briquet; *Micromeria chamissonis* (Bentham) E. Greene]. YERBA BUENA (Good Herb). This species is rare in the Tassajara region, for the only location at which it has been observed is on a shady bank above Tassajara Creek near the junction of the Horse Pasture and Marble Peak Trails. ●R: western North America, from Alaska to Montana and California. In California this species occurs in the Klamath, Coast and western Transverse ranges, as far south as the Santa Monica Mountains of western Los Angeles County. It also occurs on Santa Rosa, Santa Cruz and Santa Catalina islands, and in the northern Sierra Nevada in Butte County. ●H: aromatic perennial herbs with slender, slightly woody, and trailing branches that range from about 2 to 6 dm. (8-24") long. The opposite leaves are short petioled, and the blades are mostly round-ovate with slightly crenate margins, and about 1 to 2.5 cm. long. The leaves have a sweet minty flavor that is similar to spearmint. The small flowers are produced in the axils of the upper leaves, and the bilabiate corollas are white or sometimes tinged with pink, and about 6 to 8 mm. long. The fruits are four shiny brown nutlets that are about 1 mm. long. ❀May-September.

^***Clinopodium mimuloides*** (Bentham) Kuntze [*Calamintha m.* Bentham; *Satureja m.* (Bentham) Briquet]. MONKEY FLOWER MINT. This showy flowered species is scattered along perennial streams in this region, but it is uncommon. It occurs (or has occurred) at various points along Tassajara Creek, Church Creek, the Miller Fork of the Carmel River in Miller Canyon, and along Anastasia Creek. In 1901 A. D. E. Elmer reported seeing this species in several gulches along the Church Creek Trail between the Windcaves and the Church ranch. The type specimen was collected along the Carmel River by Theodore Hartweg during the summer of 1846. Elsewhere in Monterey County specimens of this species have been collected along the Big Sur River, at various locations in the watershed of the Arroyo Seco, at springs on Junipero Serra Peak, along the upper San Antonio and Nacimiento rivers, along Los Burros and Alder Creeks,

and at Buckeye Spring. ●R: this is an uncommon species of the Coast and Transverse ranges, from Monterey County to Los Angeles County. In San Luis Obispo County it occurs in the Santa Lucia Mountains in the vicinity of San Luis Obispo, and in Santa Barbara County it occurs in the vicinity of Tepusquet Peak and in the San Rafael Mountains. In Ventura County it occurs in the vicinity of Hooper Mountain, and in Los Angeles County it occurs in the San Gabriel Mountains. ●H: aromatic perennial herbs with erect stems that range from about 8 to 15 dm. (32-80") tall. The opposite leaves have petioles that are generally less than half as long as the blades, and the blades, which are about 4 to 8 cm. long, are ovate with serrately toothed margins, and are often reddish tinged below. The showy flowers are produced in the axils of the upper leaves. The bilabiate corollas, which are about 1.5 to 4 cm. long, range from scarlet to orangish red or salmon. ❀June-October.

LAMIUM.

Lamium consists of about 40 species of temperate Eurasia and North Africa. The name is derived from the Greek word *laimos*, throat, and refers to the gaping corollas.

Lamium amplexicaule Linnaeus. GIRAFFE HEADS. This species is lightly scattered in the developed area of Tassajara Hot Springs. Unlike many introduced species, this one is not invasive, and it has not spread from the developed area at Tassajara, where it has been established since at least the late 1970s. ●R: a common weed in North America; native to Eurasia. ●H: small annual herbs with simple or branched stems that are about 1 to 4 dm. long. The leaves are opposite and the lower are petiolate and the upper are sessile. The blades are ovate to roundish and the margins are coarsely crenate. The flowers axillary and terminal, and the bilabiate corollas are mostly light purplish red and about 10 to 18 mm. long. The corollas have arching upper lips and spreading lower lips. The brownish and mottled nutlets are about 2 mm. long. ❀March-June.

LEPECHINIA. PITCHER SAGE.

The genus *Lepechinia* consists of about 55 species of South America, Central America and western temperate North America (California). The genus was named for the Russian botanist Ivan. I. Lepechin (1737-1802).

Lepechinia calycina (Bentham) Epling ex Munz [*Sphacele calycina* Bentham]. This species is widely scattered in chaparral and as an understory in woodland habitats at all elevations in the Tassajara region. In the first edition of this text I stated that this species was generally uncommon, but after the Basin Complex Fire of 2008 it became apparent that this species is much more common than I thought, for plants that were resprouting from their roots were a common sight in areas of burnt out chaparral. ●R: Coast Ranges and western Transverse Ranges, from Humboldt County to the San Gabriel Mountains of Los Angeles County, and in the Sierra Nevada foothills, from Butte and Plumas counties to Mariposa County. Also on Santa Rosa and Santa Cruz islands. ●H: aromatic shrubs or subshrubs with somewhat lanky and distally herbaceous stems that range from about 6 to 22 dm. (2-7') tall. The opposite leaves have petioles that are mostly about .5 to 2.5 cm. long; the veiny blades, which are about 3 to 12 cm. long, are generally oblong-ovate, cuneate at base and obtuse at the apex, veiny, and the margins are entire or irregularly toothed. The flowers are produced in short terminal racemes, and the lower most are often in the axils of the upper leaves. The bilabiate corollas, which have inflated tubes and an extended lower lips, are pinkish white and about 2 to 3 cm. long. The fruits consist of four roundish nutlets that are about 3.5 mm. long. ❀April-June.

MARRUBIUM. HOREHOUND.

Marrubium consists of about 30 species of perennial herbs that are native to Eurasia. The name is derived from an ancient Hebrew word for bitter juice.

Marrubium vulgare Linnaeus. WHITE HOREHOUND. These distinctive plants are lightly scattered in areas of the Tassajara region that have had more contact with human activity, such as in The Flats, along Tassajara Road, etc. ●R: a common weed in North America; native to Eurasia. ●H: perennial herbs with erect or ascending white wooly stems that range from about 2 to 6 dm. (8-24") long. The leaves are opposite and petiolate, and the blades are ovate to roundish with crenately toothed margins, and about 1.5 to 5.5 cm. long. The flowers are produced in whorls that are positioned in the axils of the upper leaves, and the white corollas are about 5 to 6 mm. long. The ten lobed calyces become bur like when fully mature. The fruits consist of four nutlets. ❀June-September.

MENTHA. MINT.

The genus *Mentha* consists of 18 species that, as a whole, are widely distributed in the temperate regions of the northern hemisphere. *Mentha* is the Latin word for mint.

1a. Cauline leaves sessile or nearly so. Inflorescence spikes interrupted and usually less than 5 mm. wide. . . . . ***M. spicata***.
1b. Cauline leaves petiolate. Inflorescence spikes crowed and usually more than 10 mm. wide. . . . . ***M.*** x ***piperita***.

+*Mentha spicata* Linnaeus. SPEARMINT. This well known species has been established on the seepy rock bank adjacent to the main pool at The Narrows since at least the late 1970s. It is probably a waif from the gardens at Tassajara or the Church ranch. ●R: a common weed in North America, native to Europe. ●H: aromatic perennial herbs with erect stems that range from about 3 to 10 dm. (12-40") tall. The opposite leaves are sessile or nearly so, and the blades, which are about 1 to 6 cm. long, are lanceolate to oblong or ovate-lanceolate. The margins are finely serrate. The flowers are produced on slender axillary and terminal spikes. The slightly bilabiate corollas, which are about 3 to 4 mm. long, range from white to pale pink or lavender. The fruits consist of four nutlets. ❀July-October.

+*Mentha* x *piperita* [*M. piperita* Linnaeus]. PEPPERMINT. I am guessing that this the correct name for the plants of this region, for I have not seen them during their flowering and fruiting stages, but based on the appearance and flavor of the leaves, they are probably peppermint plants. Such plants are scattered along Tassajara Creek both upstream and downstream from the developed area of Tassajara, and are almost certainly waifs from the garden of the Church ranch. Peppermint plants are hybrids between *M. spicata* and *M. aquatica*. ●R: a common weed in North America; native to Europe. ●H: aromatic perennial herbs with erect or ascending stems that range from about 3 to 10 dm. (12-40") long. The opposite leaves are petiolate, and the ovate to lanceolate blades are about 3 to 8 cm. long. The margins are serrate. The flowers are produced in

axillary and terminal spikes that are about 2 to 12 cm. long. The slightly bilabiate corollas are about 3.5 to 6 mm. long, and vary from white to pale pink or violet. The fruits consist of four nutlets. ❀July-October.

MONARDELLA. COYOTE MINT.

The genus *Monardella* consists of about 35 species of annual and perennial herbs of temperate western North America. Twenty nine species occur in California, and 23 species, plus 17 lesser taxa, are endemic to the California Floristic Province. The name is diminutive of *Monarda*, a closely related genus that was named for the Spanish physician and botanist Nicolas Monardes (1493-1588).

1a. Corollas bright scarlet red, and 3.5 to 4.5 cm. long. . . . . ***M. macrantha***.
1b. Corollas blue to purplish lavender or sometimes quite pale, and about 1 to 2 cm. long:
2a. Some to nearly all hairs forked, especially on the under surface of leaves. . . . . ***M. villosa*** subsp. ***obispoensis***.
2b. All hairs simple, or plants glabrous or subglabrous. . . . . ***M. villosa*** subsp. ***villosa***.

∧<>***Monardella macrantha*** A. Gray subsp. ***macrantha***. LARGE FLOWERED COYOTE MINT. This species is common in chaparral along the Marble Peak Trail between Shovel Handle Creek and Strawberry Valley, and I collected a specimen from a small population that I discovered in May of 1992, which was in a brushy opening in woodlands along the Pine Ridge Trail about half of a mile east of Pine Ridge (in the vicinity of the Tassajara Canyon overlook). Although this species was not seen elsewhere in this region, it probably occurs in other areas that are not accessible by trails. This species is noteworthy for two reasons. One is that it reaches most northern limit of distribution in the Santa Lucia Mountains of Monterey County (the most northern known populations are in the immediate vicinities of Ventana Double Cone and South Ventana Cone). The other reason is that these populations are greatly disjunct from the nearest known populations, which are in the Santa Ynez Mountains of Santa Barbara County (these populations are also disjunct). Elsewhere in the Santa Lucia Mountains this species occurs in the vicinity of Big Sur State Park, on the North Coast Ridge (in the vicinities of Cold Spring and the former Pick homestead along Pick Creek), along the road to Cone Peak, on the South Coast Ridge in the vicinity of the summit of the Nacimiento-Fergusson Road, and in the upper watershed of Alder Creek. There are also two Calflora reports from the South Coast Ridge in the vicinity of Lion Peak. ●R: scattered in the Santa Lucia Mountains of Monterey County and the Santa Ynez Mountains of Santa Barbara County. The next populations are in the San Gabriel Mountains of Los Angeles County and the San Bernardino Mountains of San Bernardino County. This species also occurs in the higher Peninsular Ranges as far south as northern Baja California. In the southern part of its range (from Los Angeles and San Bernardino counties southward) it often occurs subsp. *hallii*. ●H: aromatic perennial herbs with decumbent to trailing stems that range from about 1 to 3 dm. (4-12") long. The opposite leaves have petioles that are about 2 to 15 mm. long, and the blades, which are about 5 to 30 mm. long, are generally ovate with an obtuse apex, entire, and are commonly tinged purplish, especially below. The showy flowers are produced in terminal head like clusters about 2 to 4 cm. wide. The bright scarlet corollas, which are about 3.5 to 4.5 cm. long, have narrowly funnel shaped tubes and five slender lobes. The fruits consist of four straw colored nutlets that are about 3 mm. long. ❀June-August.

∨***Monardella villosa*** Bentham [*M. v.* subsp. *subserrata* (E. Greene) Epling; *M. antonina* Hardham] subsp. ***villosa***. COYOTE MINT, YERBA POLES, POLEO. This species is widely scattered in the Tassajara region, and it mostly occurs in openings in woodland habitats or in transitional areas between major habitat types. Included in the first edition of this text was a taxon that Clare Hardham designated as *Monardella antonina*; this taxon was recognized in the first edition of *The Jepson Manual* (1993), but in the second edition (2012), it is reduced to a synonym of *M. villosa*. Plants that fit the description of *M. antonina*, especially in their glabrous and gland dotted leaves, are locally common in open or semi open woodland habitats in the central regions of the Tassajara Canyon, such as in The Pines, the Horse Pasture, in the vicinity of Tassajara Hot Springs. It is also possible that such plants represent a disjunct population of *M. sheltonii*, for they have glabrous leaves that have globular glands that are on the surface of the epidermis (*M. sheltonii* may be an intergradation between *M. villosa* and *M. odoratissima* subsp. *pallida*). ●R: Cascade and Coast ranges, from Douglas County in southwestern Oregon to the Diablo Range and the Santa Lucia Mountains of southern Monterey County, and in the Sierra Nevada foothills, from Butte and Plumas counties to Fresno County. Also on the Sutter Buttes. ●H: aromatic and often tufted evergreen perennial herbs or subshrubs with slender and erect or ascending stems that range from about 1 to 6 dm. (4-24") tall. The opposite have petioles that are about 2 to 15 mm. long, and the blades are ovate to lanceolate, entire or irregularly serrate, and about .5 to 3 cm. long. The flowers are produced in dense terminal glomerules that are about 1 to 3 cm. wide. The bilabiate corollas are about 8 to 18 mm. long; the upper lip is two lobed and the lower lip is three lobed. The corollas range from purplish blue or bluish purple to pinkish lavender, and sometimes they are nearly white. The fruits are four oblong nutlets that are about 1.5 to 2.2 mm. long. ❀May-July (-September).

∧***Monardella villosa*** subsp. ***obispoensis*** (Hoover ex Jepson) Jokerst [*M. v.* var. *obispoensis* H. ex J.]. SANTA LUCIA COYOTE MINT. This taxon is widely scattered and locally common in the Tassajara region, primarily in open or semi open woodlands, grassy openings in chaparral, or in transitional areas. ●R: Coast Ranges and western Transverse Ranges, from the at least Miller Canyon and Graves Creek on the Big Sur coast, to the western Santa Ynez Mountains of Santa Barbara County. ●H: similar to the typical species, except for the presence of forked hairs. The hairs of such plants also tend to be longer and more dense, and the odor is often pennyroyal like. The plants in this region vary from having almost exclusively forked hairs to having just a few forked hairs that are scattered among simple hairs. ❀May-July (-September).

SALVIA. SAGE.

The genus *Salvia* consists of approximately 900 species that range from annual herbs to shrubs. This genus is represented in tropical, subtropical and in warmer temperate regions nearly worldwide, and it is particularly well represented in the tropical and subtropical regions of the Americas. *Salvia officinalis* Linnaeus is the species that is most widely used as culinary and medicinal herb. The genus name is based on the Latin word *salveo*, to save, on account of the medicinal uses of a number of the species.

1a. Annual herbs with pinnately or bipinnately lobed or parted leaves. . . . . ***S. columbariae***.
1b. Perennial herbs or shrubs with simple and entire or toothed leaves:
2a. Shrubs with leafy branches. . . . . ***S. mellifera***.
2b. Perennial herbs with primarily basal leaves:

3a. Leaves ovate-hastate to oblong-hastate. Corollas red or reddish. . . . . ***S. spathacea***.
3b. Leaves oblong-elliptic to oblong-spatulate. Corollas blue to blue violet. . . . . ***S. sonomensis***.

!*Salvia columbariae* Bentham. WESTERN NORTH AMERICAN CHIA. This well known species is widely scattered at all elevations in the Tassajara region, and it is locally common on open slopes and in openings in chaparral, especially in areas with loose, poor or rocky soils. It was exceedingly abundant in this region during the first spring after the Basin Complex Fire of 2008, and the plants that year were often as much as six feet tall (they are usually less than 2 feet tall). The nutlets of this species, along with the closely related *Salvia hispanica*, which is native to central and southern Mexico and Guatemala, served as an important food source for Native Americans. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Trinity and Shasta counties to northern Baja California, and eastward to southwestern Utah, New Mexico and Sonora, Mexico. This species also occurs on many of the islands off the coast of southern California. ●H: aromatic annual herbs with one to several erect stems that range from about 1 to 5 dm. (4-20") tall. The leaves, which are produced in basal rosettes and sometimes at the lower nodes, are about 2 to 10 cm. long, and are mostly oblong-ovate in outline and pinnately or bipinnately parted into toothed or incised segments. The flowers are produced in roundish terminal glomerules or sometimes in two to three remote glomerules. The bilabiate corollas, which are about 8 to 14 mm. long, range from light to dark blue. The fruits are four dorsally flattened nutlets that are about 2 mm. long. ❀March-May.

Salvia mellifera E. Greene[*Audibertia stachyoides* Bentham]. BLACK SAGE, BEE SAGE, BALL SAGE. This is a common and conspicuous species in the chaparral habitats at the lower to intermediate elevations of the Tassajara region, and it is particularly abundant on south facing slopes. The nectar of this species is highly favored by bees. ●R: Coast, Transverse and Peninsular ranges, from Contra Costa and Marin counties to northern Baja California. Also on the islands off the coast of southern California (except for Santa Barbara and San Clemente islands). ●H: aromatic evergreen shrubs with rounded crowns that range from about 1 to 2 m. (40-80") tall, the branches of which are distally herbaceous. The opposite leaves are sub sessile or on petioles up to 12 mm. long, and the blades, which are about 2 to 6 cm. long, are narrowly oblong to elliptical; the margins are crenulately toothed. The terminal inflorescences are comprised of remotely spaced whorled glomerules that are about 2 to 4 cm. in diameter. The bilabiate corollas, which are about 8 to 12 mm. long, range from are pale blue lavender to nearly white. The fruits are four oblong nutlets that are about 2 mm. long. ❀May-July.

Salvia sonomensis E. Greene [*Audibertia humilis* Bentham]. CREEPING SAGE. This distinctive species is locally common in openings in chaparral along the Marble Peak Trail from the upper Willow Creek drainage (about half way between the last crossing of Willow Creek and the Willow Creek Divide) to Strawberry Valley. It also occurs on Flag Rock, where it was first discovered by David Basil in the mid 1990s. ●R: scattered in the Cascade and Coast ranges, from Siskiyou County to Santa Barbara County, and in the Sierra Nevada foothills, from Butte County to Mariposa County. Disjunct populations occur in the San Gabriel Mountains of Los Angeles County, and in the mountains of San Diego County. ●H: aromatic evergreen perennial herbs tending to form densely leafy mats via a system of creeping rhizomes. The leafless or nearly leafless flowering stems range from about 1 to 4 dm. (4-16") tall. The long petiolate leaves, which are clustered at or near the base of the plants, have oblong-elliptic to oblanceolate blades that are about 3 to 6 cm. long; the margins are minutely crenulate. The terminal spike like inflorescences consist of about 2 to 7 whorled glomerules that are usually remotely spaced. The corollas, which are light blue to lavender and about 7 to 15 mm. long, are bilabiate; the upper lip comprised of two very small lobes, while the much larger lower lip has two small lateral lobes and a broad terminal lobe. The fruits are four oblong nutlets that are about 2.5 mm. long. ❀May-June.

!*Salvia spathacea* E. Greene [*Audibertia grandiflora* Bentham]. HUMMINGBIRD SAGE, CRIMSON SAGE. This showy flowered species is widespread at lower to intermediate elevations of the Tassajara region (mostly below about 3,500'), and it is locally common to abundant in shady or semi shady woodlands and in openings in tall chaparral. During the first spring after the Basin Complex Fire of 2008 this species was even more common than usual. The plants also tended to be larger, and they showed no ill effects from being exposed to full sunlight. ●R: Coast, Transverse and Peninsular ranges, from Solano County to San Diego County. ●H: aromatic perennial herbs from spreading rhizomes; the annually produced stems are relatively stout and range from about 3 to 10 dm. (12-40") tall. The basal and lower cauline leaves have petioles that range from about 3 to 8 cm. long, and the ovate-hastate to oblong-hastate blades are rugose and about 8 to 20 cm. long; the margins are irregularly toothed. The smaller upper leaves are few, opposite, rounded to truncate at the base, and sessile or nearly so. The spike like terminal inflorescences consist of whorled glomerules that are closely to remotely spaced; the glomerules are up to 6 cm. wide. The bilabiate corollas, which are about 4 to 4.5 cm. long, vary from red to scarlet, purplish red, or sometimes pale rose. The fruits are four brown nutlets that are about 5 mm. long. ❀April-June.

SCUTELLARIA. SKULL CAP.

The genus *Scutellaria* consists of about 300 species of perennial herbs that primarily occur in temperate regions. The name is based on the Latin word *scutella*, a small dish or platter, and alludes to the shape of the fruiting calyx

!*Scutellaria tuberosa* Bentham [*S. t.* subsp. *australis* Epling]. BLUE SKULL CAP. This species is widely scattered and locally common at lower to intermediate elevations in the Tassajara region, mostly in grassy openings in woodland habitats or sometimes in openings in chaparral, but it is fairly inconspicuous and easily overlooked. It was much more common during the spring of 2009 (the first one after the Basin Complex Fire), and the plants were much larger than usual. In many places they formed clumps that were sever feet wide. ●R: Sierra Nevada foothills and the Cascade, Coast, Transverse and Peninsular ranges, from Curry and Jackson counties in southwestern Oregon to northern Baja California. Also on Santa Cruz Island. ●H: small perennial herbs from tuber bearing rhizomes that annually produce one to several stems that range from about .5 to 2.5 dm (2-10") tall. The leaves are opposite and petiolate; the blades are oval to ovate with crenately toothed margins, and about 1 to 2 cm. long The leaves are typically purplish tinged below. The flowers are produced in the axils of the upper leaves, and the bilabiate corollas are dark purplish blue with a white palate, and about 1.5 to 2 cm. long. The fruits are four black nutlets. ❀April-June.

STACHYS. HEDGE NETTLE.

The genus *Stachys* consists of more than 300 species of annual and perennial herbs that occur in temperate regions nearly worldwide (except for Australia). The name is derived from the Greek word *stachus*, ear or grain, presumably for the shape of the inflorescences of some species.

1b. Inflorescence usually less than 5 cm. long in maturity, the flowers produced in adjoining whorls, with the lower most flowers positioned above the upper most leaves. Plants strictly of wet habitats. . . . . ***S. pycnantha***.

1a. Inflorescence generally more than 5 cm. long in maturity, the flowers produced in relatively remote whorls, with the lower flowers commonly produced in the axils of the upper leaves. Plants of moist or dry habitats:

2a. Corolla tubes not pouched. Ring of hairs within corolla tube perpendicular to the axis of the tube. . . . . ***S. bullata***.

2b. Corolla tubes pouched toward base on lower side. Ring of hairs within corolla tube oblique to the axis of the tube. . . . . ***S. rigida***.

Stachys bullata Bentham. WESTERN HEDGE NETTLE, CALIFORNIA HEDGE NETTLE. This species is widespread and locally common at all elevations in the Tassajara region, and it mostly occurs in shady or semi shady and generally moist or seasonally moist habitats. During the first spring after the Basin Complex Fire of 2008 it manifested itself just about everywhere, including in burnt out stands of chaparral. ●R: outer Coast Ranges, Transverse Ranges, and coastal southern California, from Del Norte and Shasta counties to San Diego County. Also on Santa Rosa, Santa Cruz and the Anacapa islands. ●H: aromatic perennial herbs from creeping rhizomes; the stems are erect stems and range from about 4 to 8 dm. (16-32") tall. The leaves are opposite, and the lower are petiolate and the upper are often nearly sessile. The blades are about 3 to 18 cm. long, mostly ovate to oblong-ovate, truncate to sub cordate at the base and obtuse at the apex, and the margins are crenate-serrate. The flowers are produced in fairly remote whorls on an elongated spike, and the lower flowers are usually positioned in the axils of the upper leaves. The corollas are bilabiate, mostly rose violet or pinkish with a white palate, and about 1 to 2 cm. long. The fruits are four nutlets that are about 1.5 mm. long. ❀April-July.

Stachys pycnantha Bentham. SHORT SPIKED HEDGE NETTLE. This species is widely scattered along streams and at springs or seeps at all elevations of the Tassajara region. Although this is an uncommon species, it is frequently encountered in suitable habitats in this region. Bees are quite fond of the nectar of this species, and when colonies are at the zenith of their flowering period (mostly mid to late summer), they attract large swarms. ●R: Coast Ranges and western Transverse Ranges, from Contra Costa and Marin counties to Santa Barbara County, and in the Sierra Nevada, from Butte County to Sierra County. ●H: rhizomatic and strongly scented perennial herbs with erect or ascending stems that range from about 3 to 10 dm. (12-40") tall. The opposite leaves are mostly petiolate but the upper are sometimes nearly sessile; the blades are about 5 to 12 cm. long, glandular, ovate to oblong-lanceolate, rounded to sub cordate at the base and obtuse at the apex, and the margins are crenately to serrately toothed. The flowers are produced in compact whorls on head like terminal spikes. The bilabiate corollas are white or pinkish with purple or brown veins or markings; the tube is about 6.5 to 8.5 mm. long, the upper lip is about 3 to 4 mm. long, and the lower lip is about 5 to 7 mm. long. The fruits are four small ovoid to oblong nutlets. ❀June-October.

+***Stachys rigida*** Nuttall ex Bentham [*S. ajugoides* Benth. var. *r*. (Nutt. ex Benth.) Jepson & Hoover] var. ***quercetorum*** (A. Heller) G. A. Mulligan & D. B. Munro [*S. q.* Heller]. This late addition is based on specimens that were collected by Clare Hardham at "Tassajara Hot Springs, Santa Lucia Mountains," on June 21st of 1960 (Hardham 6240; SBBG 107326 & RSA 140003). The specimen at the Santa Barbara Botanical Garden is not assigned to a lesser taxon, but the one at the Rancho Santa Anna Botanical Garden is assigned to subsp. *quercetorum*. In the spring of 2009 I noticed a white flowed plant along the Horse Pasture that I assumed was just an usual manifestation S. bullata. I took a photograph of the plant, and when comparing it to the S. rigida var. quercetorum photographs that have been uploaded to the CalPhotos Plants website, it looks very similar. ●R: the typical variety of this species occurs in the Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Jefferson and Chelan counties in western Washington to San Diego County, while var. *quercetorum* occurs in the Coast, Transverse and Peninsular ranges, from Douglas County in southwestern Oregon to northern Baja California. ●H: perennial herbs with erect or decumbent stems that range from 6 to 10 dm. (24-40") long. The leaves are opposite and the lower are shortly petiolate while the upper are nearly sessile. The blades range from about 5 to 9 cm. long and their margins are crenate-serrate. The flowers are produced in remote whorls on terminal spikes that are usually about 1 to 2 dm. long. The strongly bilabiate corollas are about 12 to 16 mm. long, and range from pink to rose purple, or white with purple veins. The fruits consist of four nutlets. ❀March-August.

TRICHOSTEMA. BLUE CURS.

Trichostema is comprised of about 17 species of annual and perennial herbs and shrubs of North America. Ten species occur in California, and six are endemic to the California Floristic Province. The generic name is derived from the Greek words *trichos*, hair, and *stemon*, stamen, and alludes to the very long and slender filaments.

1a. Evergreen sub shrubs primarily of chaparral habitats. Leaves linear. Inflorescence densely woolly. . . . . ***T. lanatum***.

1b. Annual herbs of open and usually grassy habitats. Leaves lanceolate. Inflorescence not densely woolly. . . . . ***T. lanceolatum***.

^***Trichostema lanatum*** Bentham. WOOLLY BLUE CURLS, ROMERO, CALIFORNIA ROSEMARY. This showy species is widely scattered in chaparral habitats at lower to intermediate elevations of the Tassajara region, and it is locally common in some areas, such as along the Church Creek Trail below Lime Point, and along Tony's Trail on the southfacing decent towards Willow Creek. The Spanish name, Romero, is a generic term for rosemary or rosemary like plants. ●R: Coast, Transverse and Peninsular ranges, from the vicinity of Harlan Peak in San Benito County, and from the Ventana Ridge and the Hastings Natural History Reservation in Monterey County, to northern Baja California. ●H: aromatic subshrubs with erect or ascending stems that range from about 6 to 15 dm. (2-5') tall. The opposite leaves are sessile, bright green, narrowly lance-linear with revolute margins, and about 3 to 7 cm. long. The leaves below the inflorescence usually have smaller leaves (fascicles) in the upper axils. The inflorescence is long and spike like, with the flowers produced in small sub sessile cymes. The main stem is densely coated with reddish or purplish woolly hair. The bilabiate corollas are about 16 to 26 mm. long (inclusive of the lobes); the corollas are and are externally covered with woolly blue hair. The arcing and distally curling pale blue stamens (and style) are two to three times longer than the corolla tube. The fruits are four generally rectangular nutlets about 2 to 4 mm. long. ❀May-August.

Trichostema lanceolatum Bentham. CAMPHOR WEED, VINEGAR WEED. These pungently aromatic herbs are scattered in open grassland habitats in the Horse Pasture and on the savannas above (north) of Tassajara Creek and east of Blackberry Creek, but I have not seen (or smelled) them elsewhere in this region. ●R: Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from southwestern Washington to northern Baja California. ●H: xerophytic annual herbs with one to several stems that range from about 1 to 4 dm. (4-16") tall. The leaves are opposite, and the lower most are short petiolate and the rest are sessile or subsessile. The blades are lanceolate to lance-ovate, entire, glandular, and about 1 to 5 cm. long. The inflorescences are spike like with the flowers produced in small axillary racemes. The bilabiate corollas are light blue, about 10 to 18 mm. long (inclusive of the lobes), and the tube is abruptly bent upward near the throat. The arcing stamens and

An unusually large manifestation of *Scutellaria tuberosa* (Blue Skull Cap) on the Hog's Back in April of 2009, and thus during the first spring after the Basin Complex Fire.

style greatly exceed the corolla tube. The fruits are four nutlets about 1.5 to 3 mm. long; they are crested with minute peg like projections. ❀August-October.

LINACEAE. FLAX or LINEN FAMILY.

This is a widely distributed (but primarily temperate) family that consists of 14 genera and about 250 species of herbs and shrubs. *Linum usitatissimum*, Common Flax or Linseed, is the source of linen fiber and flax seed (linseed) oil.

HESPEROLINON. WESTERN FLAX OR LINEN.

The genus *Hesperolinon* consists of 13 species of annual herbs that have been segregated from *Linum*. All of the species occur in California, and 12 are endemic to the California Floristic Province. Seven of the species are rare, and six of these are restricted to serpentine outcrops. The genus name is derived from the Greek word *hesperos*, western, and *linum* (*linum* is the Latin word for linen).

Hesperolinon micranthum (A. Gray) Small [*Linum m.* Gray]. SMALL FLOWERED DWARF FLAX. This species is rare on Chew's Ridge, and it is uncommon on large serpentine outcrop on Pine Ridge. Although this species is often found on serpentine, it is not restricted to such habitats, and thus it may occur elsewhere in this region (the plants are very inconspicuous and thus easily overlooked). ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Sherman County in the northern central Oregon to northern Baja California. ●H: small and usually freely branched annual herbs that range from about .5 to 4 dm. (2-16") tall. The alternate leaves are sessile, narrowly linear, and about 1 to 2.5 cm. long. The flowers are produced in terminal cymes, and the filiform pedicels are about 5 to 15 mm. long. The inconspicuous flowers have five white to pinkish petals that are only about .5 to 3.5 mm. long. The fruit is an ovoid capsule about 1 to 2 mm. long. ❀May-July.

LOASACEAE. LOASA FAMILY.

According to the Angiosperm Phylogeny Website, *Loasaceae* consists of 14 genera and about 265 species. The species, which range from annual herbs to shrubs, primarily occur in the tropical, subtropical and warmer temperate regions of the Americas.

MENTZELIA. STICK LEAF, BLAZING STAR.

The genus *Mentzelia* consists of about 60 of annual and perennial herbs and shrubs of tropical regions of the Americas and warmer temperate regions of western temperate North America. The leaves of many species readily adhere to clothing or fur by being both

glandular and equipped with hooked hairs, and hence the name Stick Leaf. The genus was named for the German botanist Christian Mentzel (1622-1701).

1a. Floral bracts relatively small and not obscuring the flowers. Filaments not widened or forked at the apex. . . . . ***M. dispersa***.
1b. Floral bracts relatively large and obscuring the flowers when viewed from the side. Outer filaments widened and forked at the apex. . ***M. micrantha***.

Mentzelia dispersa S. Watson [*M. pinetorum* Heller; *M. d.* var. *p.* (Watson) Jepson]. NADA STICK LEAF. This species is uncommon on Chew's Ridge, Black Butte and in open areas along the first mile or so of the Pine Ridge Trail west of Tassajara Road. It was more common during the first spring after the Basin Complex Fire of 2008. ●R: widely distributed in temperate western North America, from British Columbia to the Dakotas, Colorado, New Mexico and southern California (San Diego County). ●H: glandular annual herbs with erect and upwardly branched stems that range from about 1 to 4 dm. (4-16") tall. The leaves are linear lanceolate to ovate, and the margins range from entire to remotely toothed. The larger basal leaves, which are about 3 to 10 cm. long, are petiolate and produced in rosettes (these leaves are often shed early). The mid cauline leaves are alternate, sessile, and about 1 to 3 cm. long. The flowers are small and produced singularly or in small groups at and near the ends of the branches. The corollas consist of 5 yellow petals about 2 to 5 mm. long, and the fruits are slender capsules that are about 7 to 25 mm. long. ❀May-August.

!***Mentzelia micrantha*** (Hooker & Arnott) Torrey & A. Gray [*Bartonia m.* H. & A.]. SMALL FLOWERED STICK LEAF. In the first edition of this text I stated that this species was apparently widely scattered in the Tassajara region, but it is rare and restricted to disturbed areas within chaparral, such as at landslides, in areas where the soil is loose and tends to regularly slip downward, or sometimes along recently cleared trails. As this is a well noted 'burn species,' it is likely to be locally common in chaparral habitats in this region during the first few years after a fire. During the first spring after the Basin Complex Fire of 2008 this species was very common in and near areas of burnt out chaparral, and most of the plants were much larger than usual. Unlike many of the other 'burn species' that spring, this one did not form large stands. ●R: Coast, Transverse and Peninsular ranges, from Trinity and Shasta counties to northern Baja California. Also on Santa Cruz, Santa Catalina and San Clemente islands. ●H: glandular sticky annual herbs with simple or freely branched stems that range from about 1 to 9 dm. (4-36") tall. The leaves are about 1 to 15 cm. long; the lower most are petiolate and produced in rosettes, while the cauline leaves are alternate and sessile. The blades are ovate to narrowly oblong with serrate or pinnately toothed margins, and the larger leaves often have two opposing basal lobes. The small flowers are produced in terminal cymes or singularly in the axils of the leaves or stems, and are obscured (at least when viewed from the side) by floral bracts about 1 to 8 cm. long (the bracts are lanceolate to roundish and with entire or toothed margins). The corollas consist of five yellow petals that are about 3 to 4 cm. long, and the fruit is a linear and sharply three angled capsule about 7 to 9 mm. long. ❀April-July.

Based on the large number of herbarium specimens that have been collected in the lower Arroyo Seco Canyon, *Mentzelia gracilenta* appears to be rather common in that region, and thus it may be present somewhere in the lower Tassajara Canyon.

LYTHRACEAE. LOOSESTRIFE FAMILY.

This family consists of about 28 genera and approximately 600 widespread species that generally occur in temperate and tropic regions, and most of the species occur in wet habitats.

LYTHRUM. LOOSESTRIFE.

Lythrum consists of about 35 species of annual and perennial herbs that primarily occur in temperate regions. Most of the species occur in wet or seasonally wet habitats. The name is derived from the Greek word *lytron*, clotted blood, on account of the use of the type species, *Lythrum salicaria*, to stop hemorrhaging.

Lythrum californicum Torrey & A. Gray. CALIFORNIA LOOSESTRIFE. Although I have seen this species only at scattered sites along the lowermost half mile or so of Tassajara Creek, and along the Arroyo Seco in the vicinity of the confluence of Tassajara Creek, according to Miriam Bobcoff's Tassajara wildflower list, she found this species growing in the vicinity of the confluence of Tassajara and Oryoki creeks. ●R: southern Cascade Ranges, Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California, and eastward and southward to Kansas, Texas and northern Mexico. Also on Santa Cruz Island. ●H: densely foliated riparian herbs or subshrubs (older plants are often woody at the base), with erect or ascending branches that range from about 3 to 12 dm. (1-4') tall. The sessile leaves, which are about 1 to 3 cm. long, are linear to linear lanceolate or oblong, and the margins are entire. The lower leaves are opposite while the upper are alternate. The small flowers are produced singularly in the axils of the upper leaves, and the corollas consist of four to six bright purple petals that are about 4 to 8 mm. long. The fruits are two celled membranous capsules that are about 4 to 7 mm. long. ❀April-October.

MALVACEAE. MALLOW FAMILY.

Malvaceae consist of about 266 genera and approximately 4,025 species that are especially well represented in warm regions. Well known genera include *Theobroma* (cocoa), *Abelmoschus* (okra), *Gossypium* (cotton) and *Hibiscus.*

SIDALCEA. CHECKERBLOOM.

Sidalcea includes about 27 species that are native to western North America. The name is a combination of the names of two *Malvaceae* genera: *Sida* and *Alcea*.

e *Sidalcea hickmanii* E. Greene subsp. ***hickmanii***. SANTA LUCIA CHECKERBLOOM. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer #3235; DS 31684). According to the note that is enclosed in the envelope that is pasted to the specimen sheet, Elmer collected it in "Lost Valley between mounds" (Lost Valley is about 5½ linear miles south Tassajara). This taxon also occurs in Hanging Valley, about 5½ linear miles southeast of Tassajara. ●R: endemic to the Santa Lucia Mountains of Monterey County and northwestern San Luis Obispo County. ●H: perennial herbs from woody root crowns, with erect

and ascending leafy stems that range from about 4 to 8 dm. (16-32") long. The petiolate leaves have reniform and crenately margined blades that are about 1 to 6 cm. wide. The flowers are produced in terminal spikes, and the corollas consist of five pale pink to pinkish lavender petals that are about 16 to 18 mm. long. The ovaries mature into 6 to 10 carpels that are about 2 to 2.5 mm. long. ❁May-July.

MONTIACEAE. MINER'S LETTUCE FAMILY.

Montiaceae consists of about 22 genera and approximately 230 species of annual and perennial herbs; the genera and species of this family have been segregated from *Portulacaceae*, the Purslane Family, due to the findings of phylogenetic research. The species primarily occur in the temperate regions of the Americas, Asia, Australia, New Zealand and South Africa. Many of the species have succulent or semi succulent foliage, and some are edible. The family name is based on that of the member genus *Montia*.

1a. Leaves primarily basal; the cauline leaves are opposite, or more commonly, partially to completely fused into a disk like formation. . . ***Claytonia***.

1b. Leaves basal and cauline; the cauline leaves are alternate, and are often much smaller than the basal leaves:

2a. Petals red to purplish red or rose pink, and about 3 to 10 (-15) mm. long. Styles 3 branched. Capsules 3 valved. . . . . ***Calandrinia***.

2b. Petals white to pink and about 1 to 3 mm. long. Styles unbranched or absent (the stigmas sessile). Capsules 2 valved. ***Calyptridium***.

CALANDRINIA. RED MAIDS.

Calandrinia consists of 14 species that are endemic to South America and North America. The genus is primarily South American, for only two species are native to North America. The genus was named for the Swiss botanist Jean Louis Calandrini (1703-1758).

1a. Capsules oblong and about twice as long as the calyx lobes. Leaf development is strongly accentuated towards the base of the plant. . ***C. breweri***.

1b. Capsules ovoid and barely exceeding the calyx lobes. Leaf development is not strongly accentuated towards the base of the plant. . . . ***C. menziesii***.

!*Calandrinia breweri* S. Watson. CHAPARRAL RED MAIDS. In the first edition of this text I stated that this species was: "Rare in the Tassajara region, and restricted to openings in chaparral where the soil is loose or disturbed, or sometimes in sandy soiled areas on floodplains or in washes. As this is a well noted 'burn species,' it likely to be much more common in this region during the first few years after a fire." This species was very common to abundant at lower and intermediate elevations in this region during the first spring after the Basin Complex Fire of 2008, and especially so in areas of burnt out chaparral. ●R: Coast, Transverse and Peninsular ranges, from Shasta County to northern Baja California. Also in the central Sierra Nevada foothills in Tuolumne and Mariposa counties, the southern Sierra Nevada foothills in Tulare County, and on Santa Rosa and Santa Cruz islands. ●H: annual herbs with several semi prostrate to ascending branches that range from about 1 to 4 dm. (4-16") long. The alternate leaves are semi succulent and about .5 to 6 cm. long. The lower leaves, which are about 2 to 8 cm. long, are fairly crowded and narrowly oblong-oblanceolate to spatulate, while the smaller upper leaves are fairly remote and linear to linear-oblanceolate. The margins are entire. The flowers are scattered in elongated terminal racemes, and the (usually) five red to purplish pink petals about 3 to 5 mm. long. The fruits are oblong and many seeded capsules that are about 6 to 12 mm. long. ❁March-June.

!*Calandrinia menziesii* (Hooker) Torrey & A. Gray [*C. ciliata* (Ruiz, Lopez & Pavon) deCandolle & *C. caulescens* Humboldt, Bonpland & Kunth misapplied; *Talinum m.* Hooker; *C. c.* var. *menziesii* (Hooker) Macbride]. RED MAIDS. This species is widely scattered and locally common in the Tassajara region, and it occurs mostly in open grasslands or grassy openings in woodlands. It was even more common during the first spring after the Basin Complex Fire of 2008. Most of the plants of this region have smaller and more pale corollas than do plants that occur in other regions. ●R: western North America, from British Columbia and Idaho to northern Baja California and New Mexico. ●H: annual herbs usually with several semi prostrate to ascending branches that range from about 1 to 4 dm. (4-16") long. The leaves are alternate, semi succulent, and entire. The larger lower leaves, which are about 1 to 10 cm. long, are mostly narrowly oblanceolate, while the upper leaves are mostly linear. The flowers are scattered in leafy terminal racemes, and the (usually) five petals are about 4 to 10 (-15) mm. long; the petals range from pale pinkish red to deep purplish red. The fruits are ovoid and many seeded capsules that are about 4 to 7 mm. long. ❁February-May.

CALYPTRIDIUM. PUSSYPAWS.

The genus *Calyptridium* consists of nine species of western North America. All of the species occur in California, and four species, plus three lesser taxa, are endemic to the California Floristic Province. The name is derived from the Greek word *kaluptra*, a cup or covering, because of the way the petals close over the capsules in age. *Calyptridium* is reduced to a subgenus of *Cistanthe* in the Flora of North America.

1a. Capsules more than twice as long as the sepals. . . . . ***C. monandrum***.

1b. Capsules less than twice as long as the sepals. . . . . ***C. parryi***.

!*Calyptridium monandrum* Nuttall in Torrey & A. Gray [*Cistanthe monandra* Hershkovitz]. COMMON PUSSYPAWS, SAND CRESS. In the first edition of this text I stated that this well noted 'burn species' is apparently widely scattered in the Tassajara region, but currently rare. Although I have seen only a few plants in openings in chaparral along the spine of Black Butte Ridge, Vern Yadon reported it be common on Black Butte, and scattered on the summit of his 'Never Again Ridge' [the ridge between the watershed of upper Tassajara Creek and Church Creek], in June of 1979, less than two years after the Marble Cone Fire of 1977. During the first spring after the Basin Complex Fire of 2008, this species was common in nearly all of the areas of the Tassajara region that I explored, and especially so in areas of burnt out chaparral. ●R: southern Sierra Nevada in Tulare and Kern counties, and the Coast, Transverse and Peninsular ranges, from San Joaquin and Santa Clara counties to northern Baja California, and eastward to southwest Utah and, New Mexico and northern Mexico. ●H: small and semi succulent annual herbs with several prostrate to ascending branches that range from about 5 to 18 cm. (2-7") long. The leaves are entire and about 1 to 5 cm. long. The generally larger basal leaves, which are produced in rosettes, are mostly narrowly oblanceolate to spatulate, while the generally few and fairly remote cauline leaves are mostly obovate. The small flowers are produced on one side of terminal and axillary racemes or

panicles that are about 1 to 4 cm. long. The corollas consist of three white to pink or reddish petals that are about 1 to 3 mm. long. The fruits are linear-oblong and 5 to 10 seeded capsules that are about 3 to 6 mm. long. ♔January-June.

Calyptridium parryi A. Gray [*Cistanthe p*. (Gray) Hershkovitz] var. ***hesseae*** J. H. Thomas [*Cistanthe p*. var. *h*. (Thomas) Kartesz & Gandhi]. SANTA CRUZ MOUNTAINS PUSSYPAWS. The only place that I have seen this taxon is at (and around) the junction of Tassajara Road and the road to the Chew's Ridge Lookout and the MIRA Observatory, where I collected a specimen of it in May of 1994. James Griffin collected a specimen of this taxon on "Summit of Chew's Ridge (near junction of spur road to lookout and Tassajara Road)" in July of 1973 (Griffin 3751; JEPS 73809), and C. Matt Guilliams, Michael Simpson and Kristen Hasenstab collected a specimen on "Chew's Ridge, ca. 50 m. north of lookout tower in cleared area between 2 large brush piles, off Tassajara Road" in May of 2007 (G. S. & H. 315; SDSU 17446). This taxon has a California Native Plant Society Rare Plant Rank of 1B.1, threatened or endangered, and the plants in the vicinity of the junction of Tassajara Road and the road to the Chew's Ridge Lookout and MIRA Observatory are threatened by motorized vehicles and road maintenance. ●R: a rare plant of the Santa Cruz Mountains, in both Santa Cruz and Santa Clara counties, the Mount Hamilton Range in Santa Clara County, the San Benito Mountain region in southern San Benito and western Fresno counties, and the Santa Lucia Mountains of Monterey and San Luis Obispo counties. ●H: small and semi succulent annual herbs with several prostrate to ascending stems that range from about 2 to 15 cm. (1-6") long. The leaves are oblanceolate to spatulate, entire, and about 1 to 3 cm. long; the lower most are produced in rosettes and the upper are alternate. The small flowers are small and produced on one sided terminal and axillary racemes or panicles that are about 1 to 3.5 cm. long. The corollas consist of three white petals that are about 1.5 to 3 mm. long. The fruits are ovate to oblong and 10 to 15 seeded capsules that are about 3 to 7 mm. long. ♔May-July.

CLAYTONIA. MINER'S LETTUCE, SPRING BEAUTY.

Claytonia consists of 27 species and 14 subspecies of annual and perennial herbs that are endemic to eastern and northern Asia, and North and Central America. The genus was named for the Virginian physician and plant collector John Clayton (1686-1773).

1a. Basal leaves linear to narrowly oblanceolate, the blades indistinctly or gradually narrowing to the petiole, and more than 3 times longer than wide:
  2a. Cauline leaves free or partially fused on one side, the sections narrowly ovate to narrowly linear. Seeds dull black. . . . . ***C. exigua***.
  2b. Cauline leaves fused on both sides, the sections forming a more or less disk like structure. Seeds shiny black. . . . . ***C. parviflora***.
1b. Blades of basal leaves elliptic to reniform, less than 3 times longer than wide to wider than long, and wedge shaped to cordate at the base:
  3a. Plants reddish or pinkish throughout. Cauline leaves fused only on one side of the stem. . . . . ***C. rubra***.
  3b. Plants green (or yellowish or reddish with age). Cauline leaves fused on both sides of the stem:
    4a. Blades of basal leaves generally longer than wide, the base wedge shaped, the apex obtuse to acute. ***C. perfoliata*** subsp. ***perfoliata***.
    4b. Blades of basal leaves commonly wider than long, the base truncate to cordate, the apex abruptly acute. . . . . ***C. perfoliata*** subsp. ***mexicana***.

Claytonia exiqua Torrey & A. Gray [*Montia spathulata* (Douglas ex Hooker) Howell var. *e*. (T. & G.) Robinson]. According to James Griffin (Plants of the Highest Santa Lucia and Diablo Range Peaks, 1975), this species is uncommon on Chew's Ridge and rare on Pine Ridge. In the spring of 2009 I found one plant on the floodplains of Tassajara Creek, a short distance upstream from the developed area of Tassajara. ●R: western North America, from British Columbia and Idaho southern California (San Diego County). ●H: small annual herbs with erect or spreading stems that range from about 1 to 15 cm. (.5-6") long. The basal leaves, which are produced in rosettes, are linear to linear-spatulate and about 3 to 9 (-12) cm. long, while the two cauline leaves are opposite, free or fused on one side, narrowly ovate to linear, and about 1 to 2 cm. long. The flowers are produced in terminal racemes, and the corollas consist of five white or pinkish petals that are about 2 to 5 mm. long. The fruits are three valved capsules that are about 1.5 to 2.5 mm. long. ♔February-May.

Claytonia parviflora Douglas ex Hooker [*Montia perfoliata* forma *parviflora* (Doug. ex Hook.) Howell]. DWARF MINER'S LETTUCE. This species is widely scattered and locally common to abundant in the Tassajara region, particularly in sandy or gravely soiled areas in the partial shade of shrubs. ●R: widely distributed in western North America, from British Columbia and Montana to northern Mexico. ●H: small annual herbs with erect or ascending stems that range from about .5 to 3 dm. (2-12") tall. The leaves are primarily basal and produced in rosettes; they are narrowly linear to narrowly oblanceolate, and about 1 to 18 cm. long (inclusive of the petiole). The two cauline leaves are opposite and fused into a disk like structure that subtends the inflorescence. The flowers are produced in terminal racemes that become elongated in age, and the corollas consist of five white or sometimes pinkish petals that are about 2 to 6 mm. long. The fruits are three valved capsules that are about 1.5 to 4 mm. long. ♔January-June.

!***Claytonia perfoliata*** Donn ex Willdenow [*Montia p*. (Donn ex. Willdenow) Howell]. COMMON MINER'S LETTUCE. This well known and edible species is widespread and locally common to abundant at all elevations in the Tassajara region. In normal years it primarily occurs in shady or generally shady habitats, but during the first spring after the Basin Complex Fire of 2008 it was abundant in open areas, and the plants showed no signs of adverse effects from being exposed to full sunlight. ●R: widely distributed in western North America, from British Columbia, Idaho, Montana and Utah to northern Baja California. It is also naturalized weed in much of Europe, Australia, New Zealand and probably other areas. ●H: distinctive annual herbs with erect or ascending stems that range from about 1 to 4 dm. (4-16") tall. The leaves are primarily basal and produced in rosettes. The leaves are about 1 to 25 cm. long (inclusive of the petiole), and the blades are elliptic to deltate. The two cauline leaves are fused into a roundish involucre like structure that subtends the inflorescence. The flowers are produced in terminal racemes that become elongated with age. The corollas consist of five white or sometimes pinkish petals that are about 2 to 6 mm. long. The fruits are three seeded capsules that are about 1.5 to 4 mm. long. ♔January-June.

Claytonia perfoliata subsp. ***mexicana*** (Rydberg) J. M. Miller & Chambers [*Limnia m*. Rydberg; *C. cubensis* Bonpland]. ROBUST MINER'S LETTUCE. This taxon is widely scattered in shady woodland habitats in the Tassajara region, but it is less common than the typical species, and it tends to occur in relatively flat areas with richer soils. ●R: Coast, Transverse and Peninsular Ranges, from Humboldt County to northern Baja California, and eastward to New Mexico, and then southward to Guatemala. ●H: similar to the typical species, except for the broadly deltoid to reniform and abruptly acute blades of the basal leaves. Such plants also tend to be more robust in all forms of growth. ♔February-May.

Claytonia rubra (Howell) Tidestrom [*Montia rubra* Howell] subsp. ***rubra***. RED MINER'S LETTUCE. This species is common in the mixed evergreen forest along the Pine Ridge Trail from the trail

head on Tassajara Road to the first summit to the west, and occasionally on Chew's Ridge. Larger and less succulent but often reddish tinged plants from Chew's Ridge, with small deltoid blades and deeply cleft cauline leaves, may represent hybrids between C. rubra and another element of the *C. perfoliata* complex. ●R: widespread in western North America, from British Columbia to South Dakota, Colorado and the mountains of San Diego County. ●H: small and distinctly succulent annual herbs with many erect or ascending flowering stems that range from about 1 to 15 cm. (.3-6") tall. The entire plant is reddish to rose pink. The basal leaves, which are about 1 to 8 cm. long and produced in rosettes, have broadly deltoid blades that are generally less than 2 cm. long. The two cauline leaves are fused on one side, and the outer corners are generally squarish. The flowers are produced in short terminal racemes; the racemes are 3 to 30 flowered. The corollas consist of five white to pink petals that are about 2 to 3.5 mm. long. The fruits are three valved capsules that are about 2 to 3 mm. long. ❀March-May.

MYRSINACEAE. MYRSINE FAMILY.

Myrsinaceae consists of about 40 genera and 800 species that primarily occur in tropical and subtropical regions.

LYSIMACHIA.

Lysimachia consists of about 170 species that primarily occur in the northern temperate regions. The genus was named for Lysimachus, an ancient king of Sicily, who is said to have calmed a mad ox by feeding it a member of the genus.

!*Lysimachia arvensis* (Linnaeus) U. Manns & Anderberg [*Anagallis arvensis* Linnaeus]. SCARLET PIMPERNEL, POOR MAN'S WEATHER GLASS. This distinctive species is scattered in grassy habitats in the Tassajara region, but mostly in areas that have been used as forage grounds, such as in the vicinity of The Caves and the Horse Pasture. Also scattered in and around the developed area of Tassajara, and occasionally along trails and at campsites. It was abundant in the Horse Pasture during the spring of 2009, the first growing season after the Basin Complex Fire. The corollas open when exposed to full sunlight, but close when its dark or cloudy. ●R: a common weed in North America; native to Eurasia. ●H: annual herbs usually with several decumbent to ascending branches that range from about 1 to 2.5 dm. (4-10") long. The opposite and sessile leaves, which are about 5 to 20 mm. long, are generally ovate; the margins are entire. The flowers are produced singularly in the axils of the leaves, and the slender pedicels are 1 to 3 cm. long. The corollas, which are about 8 to 10 mm. wide, are cleft into five broad lobes; they reddish orange to salmon. The fruits are roundish and many seeded capsules that are about 3 to 4 mm. wide. ❀March-July.

OLEACEAE. OLIVE FAMILY.

According to the Angiosperm Phylogeny website, *Oleaceae* consists of about 24 genera and 615 species of trees and shrubs that are primarily of temperate and tropical Asia. Well known genera include *Olea* (olive), *Syringa* (lilac), *Jasminum* (jasmine), and *Fraxinus* (ash).

FRAXINUS. ASH.

Fraxinus consists of about 45 to 65 species of trees and shrubs that are native to tropical and temperate Eurasia and temperate North America. *Fraxinus* is the Latin word for ash trees.

Fraxinus dipetala Hooker & Arnott. CALIFORNIA ASH, TWO PETALED ASH. The only area in the Tassajara region where I have seen this species is along the west bank of the Arroyo Seco a short distance south of the Horse Bridge. As this is a species of both chaparral and woodland habitats, it may also occur in other areas of this region that are not accessible by trails or major waterways The listing of Tassajara Springs as a locality for this species in Howitt & Howell's "The Vascular Plants of Monterey County" (1964) was based on a specimen that was collected by Mary Strong Clemens on October 3, 1921 (CAS 39723); the location stated on the label is simply "Tassajara Springs, Monterey County." This species occurs in the upper Cachagua Creek and Finch Creek area, and in a description of the route to Tassajara Hot Springs in Book B of the Minutes of the Monterey County Board of Supervisors (page 65, 1870), it was stated that this route commenced "At the Finch Rancho Los Fresno;" fresno is the Spanish word for ash. This species is fairly common in the lower Arroyo Seco Canyon and in the canyon of Paloma Creek, and the later is depicted as "Fresno Cañon" on Lou Hare's "Official Map of Monterey County," which was published in 1898. ●R: Coast Ranges (away from the coast), Cascade Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Siskiyou County to San Diego County ●H: large deciduous shrubs or small trees that range from about 2 to 7 m. (6.5-23') tall. The leaves are about 5 to 19 cm. long, and pinnately divided into three to nine ovate to obovate and serrate margined leaflets about 1 to 7 cm. long. The flowers are produced in axillary panicles which appear at about the same time as the new leaves. The corolla consists of two white petals about 2.5 to 4 mm long. The fruits are winged nutlets (samaras) that are about 2 to 3 cm. long. ❀March-April.

ONAGRACEAE. EVENING PRIMROSE FAMILY.

Onagraceae is a widely distributed family that consists of 22 genera and about 656 species of annual and perennial herbs, shrubs, and a few trees. This family is well represented in western North America, and especially so in California. Sixteen genera and about 132 species and 34 lesser taxa are native to the state, and many of these are endemic to the California Floristic Province.

1a. Sepals remaining erect after the flowers open. Seeds with commas (tufts of hairs at the apex), except in *E. densiflorum*. . . . ***Epilobium***.
1b. Sepals spreading or turning downward as the flowers open. Seeds without commas:
  2a. Stigmas 4 lobed and dry; anthers generally maturing before stigmas. . . . . ***Clarkia***.
  2b. Stigmas head like (roundish or hemispheric) and wet; anthers not maturing before stigmas:
    3a. Petals white, drying pink or red. Ovaries two celled. . . . . ***Gayophytum***.
    3b. Petals yellow, often with red spots, and often turning red or green with age. Ovaries four celled:
      4a. Plants acaulescent (without stems). Flowers have long and slender scape like tubes. . . . . ***Tetrapteron***.
      4b. Plants caulescent. Flowers without long tubes:

5a. Leaves narrowly linear to very narrowly elliptic. Flowers or fruits never present in the basal or lower nodes. Fruits round or roundish in cross section; seeds glossy. . . . . ***Camissonia***.

5b. Leaves of various shapes, but never narrowly linear or very narrowly elliptic. Flowers or fruits usually present in the basal nodes, and always present at the lower nodes. Fruits four angled, at least when fully mature; seeds dull. . . . ***Camissoniopsis***.

CAMISSONIA.

Due to the findings of phylogenetic research, the genus *Camissonia* has been greatly dismembered. The accepted circumscription of the genus in the first edition of *The Jepson Manual* (1993) included 62 species, but now it is limited to 12. One species occurs in temperate South America, and the remainder are endemic to temperate western North America. All of the species occur in California, and six are endemic to the California Floristic Province. The genus was named for the botanist and poet Adelburt Ludwig von Chamisso (1781-1838). Although it has often been stated that the genus was named by Johann Friedrich Eschscholtz (1793-1831), who, along with Chamisso, served as a naturalist on the round the world Russian exploratory voyage under the command of Otto von Kotzebue (which spent the month of October of 1816 at San Francisco), the genus was actually named by the German botanist Johann Link (1767-1851). It is true that Chamisso named the California Poppy (*Eschscholzia californica*) in honor of Eschscholtz, and that Eschscholtz named *Lupinus chamissonis* (Silver Beach Lupine) for Chamisso.

1a. Plant hairs strigose, or some hairs spreading and glandular, or occasionally coarsely spreading and non glandular toward base. Less than 10% of pollen grains 4-angled. . . . . ***C. strigulosa***.

1b. Plant hairs spreading, generally coarse, often glandular in inflorescence. More than 30% of pollen grains 4-angled. . . . . ***C. contorta***.

+***Camissonia contorta*** (Douglas ex Hooker) Kearney [*Oenothera c.* D. ex H.]. According to James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975) this species is common on Chews Ridge between 600 and 1200 m. (1,968-3,937 ft.), and uncommon on the same ridge between 1200 m. and the summit (the elevation of the lookout is 1,538 m. or 5,045 ft.). Griffin also collected a specimen of this species in a grassy area at 4,000 ft. in the upper Kincannon Creek canyon in April of 1973 (Griffin 3479, JEPS 73544). ●R: western North America, from British Columbia to Idaho, Nevada and California. In California this species occurs in the Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, as far south as the mountains of Riverside and Orange counties. ●H: annual herbs with slender and decumbent to erect stems that range from about 1 to 3.5 cm. long. The alternate leaves, which are about 1 to 3.5 cm. long, are linear to narrowly elliptic, and the margins are minutely serrate. The flowers are produced in the axils of the upper leaves, and the corollas consist of four petals that are about 3 to 5 mm. long. The petals are at first yellow but become red or reddish with age. The fruits are slender capsules that are about 25 to 35 mm. long. ❀May-June.

Camissonia strigulosa (Fischer & C. Meyer) Raven [*Sphaerostigma strigulosum* F. & M.; *Oenothera s.* (F. & M.) Torrey & A. Gray, *O. contorta* Douglas var. *s.* (F. & M.) Munz]. This inconspicuous species is scattered in open and usually sandy soiled areas at lower and intermediate elevations in the Tassajara region, such as on the floodplains of Tassajara Creek (where it can be abundant in depressed, and thus in water collecting sites), and occasionally on southfacing and more or less grassy slopes. A specimen of this species was collected in "Dry sand" in Pine Valley by A. D. E. Elmer in June of 1901 (Elmer 3187 DS), and another specimen was collected in the vicinity of the developed area of Tassajara by Roxana Ferris in April of 1933 (Ferris 8314, UC 524014). ●R: Coast Ranges, southern Sierra Nevada, and the Transverse and Peninsular ranges, from Sonoma and Mariposa counties to northern Baja California. Also on Santa Rosa Island. ●H: annual herbs with very slender and ascending or decumbent stems that range from about 1 to 3 dm. (4-12") long. The shortly petiolate to nearly sessile leaves, which are about 8 to 35 mm. long, are narrowly linear to very narrowly elliptic, and they usually have remote serrulate teeth on the margins. The lower leaves are generally opposite and the upper mostly alternate. The small flowers are produced in the axils of the upper leaves, and the corollas consist of four petals that range from about 2.1 to 4.2 mm. long; the petals are at first yellow, but turn red or reddish with age. The fruits are narrowly linear capsules that range from about 1.5 to 4.5 mm. long. ❀April-June.

CAMISSONIOPSIS.

Camissoniopsis consists of 14 species of southwestern temperate North America that have been segregated from the genus *Camissonia* due to the findings of phylogenetic research. Thirteen species occur in California, and 12 species (plus 3 lesser taxa) are endemic to the California Floristic Province. *Camissoniopis* means *Camissonia* like.

1a. Fruits coiled up to 5 times. Upper cauline leaves with petioles up to 2.5 mm. long. . . . . ***C. ignota***.

1b. Fruits straight or coiled up to 3 times. Upper cauline leaves sessile or subsessile:

2a. Inflorescence with at least an understory of gland tipped hairs:

3a. Plants most commonly with ascending to erect branches. Capsules .75 to .9 mm. wide at base. Upper most leaves about as long as wide and strongly clasping the stem. . . . . ***C. hirtella***.

3b. Plants most commonly with a single erect stem. Capsules .9 to 2.2 mm. wide at base. Upper most leaves longer than wide, and not or only scarcely clasping the stem. . . . . ***C. intermedia***.

2b. Inflorescence without gland tipped hairs or only with a few remotely scattered gland tipped hairs:

4a. Branches erect or ascending. Petals 4 to 7 mm. long, and frequently with lobes or notches at the apex . . . . . ***C. luciae***.

4b. Branches semi prostrate and sprawling (or rarely with a single erect stem). Petals 1.5 to 3.5 (-4) mm. long, and without lobes or notches at the apex. . . . . ***C. micrantha***.

!***Camissoniopis hirtella*** (E. Greene) W. L. Wagner & Hoch [*Oenothera h. E.* Greene; *Sphaerostigma arenicola* A. Nelson; *O. micrantha* var. *jonesii* (Leveille) Munz; *Camissonia h.* (E. Greene) Raven]. HIRSUTE SUN CUP. In the first edition of this text I stated that this species was widely scattered in chaparral openings in the Tassajara region, particularly in disturbed areas, such as in gullies or washes, on loose soiled slopes where the soil tends to regularly shift downward, at landslides, and sometimes along trails that have been recently cleared. During the first spring after the Basin Complex Fire of 2008, this species was abundant in this region, particularly in areas of burnt out chaparral. A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901 (Elmer 3192, DS 29172), served as the type specimen for A. Nelson's *Sphaerostigma arenicola*. ●R: Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Trinity and El Dorado counties to northern Baja California. Also on Santa Cruz Island. ●H: annual herbs with one to several ascending or erect

stems that range from about .5 to 6 dm. (2-24") long. The lower most leaves are commonly produced in loose rosettes and the cauline leaves are generally alternate. The leaves are about .5 to 8 cm. long and the margins are crisped. The larger lower leaves are petiolate, and the blades are oblong to oblanceolate, the mid cauline are sessile and typically have broadly lanceolate to narrowly ovate blades, and the upper most leaves are generally ovate to broadly ovate and have bases which clasp the stems. The flowers are produced singularly in the axils of the leaves, and the corollas consist of four petals that range from about 2 to 9 mm. long. The petals are at first yellow but turn red with age, and they often have a red dot near the base. The fruits are twisted capsules that are about 1 to 2 cm. long. ֍April-July.

+***Camissoniopis ignota*** (Jepson) W. L. Wagner & Hoch [*Camissonia ignota* (Jepson) Raven; *Oenothera micrantha* var. *ignota* Jepson]. IGNORED SUN CUP. Although I have not noticed this species in this region, four herbarium specimens were collected by James Griffin along Tassajara Road on the grade down to the hot springs in April of 1973 and in May of 1974. As the stated elevation was 4,000 ft., the specimens were collected about half way between the Suzuki Roshi ashes site and the bathtub spring; they were growing in rocky areas and small grassy openings in chaparral (Griffin: 3370, 3461, 3879 & 3880; JEPS: 73529, 73531, 74091 & 74092). ●R: Coast, Transverse and Peninsular ranges, from Colusa County to northern Baja California. Also on Santa Cruz Island, and it was once collected in the Sierra Nevada foothills in Madera County in 1906 (Heller 8166, UC 162452). ●H: annual herbs with one or more ascending branches from the base that are up to 5.5 dm (22 in.) tall. The petiolate leaves of the basal rosettes are narrowly elliptic to narrowly ovate and up to 6 cm. long. The much reduced and bract like leaves of the inflorescence are truncate at the base and lanceolate to narrowly lanceolate. The flowers are produced singularly in the axils of the leaves, and the corollas consist of four yellow petals that are about 4 to 8 mm. long; the petals are sometimes red dotted. The fruits are slender and coiling capsules that are about 2 to 3 cm. long. ֍April-July.

Camissoniopis intermedia (Raven) W. L. Wagner & Hoch [*Camissonia i*. Raven]. INTERMEDIATE SUN CUP. In late spring and early summer of most years this species is usually lightly scattered in the Tassajara region, mostly in openings or disturbed areas in chaparral, but it was much more common during the first spring after the Basin Complex Fire of 2008. It is probably derived from genetic interchange between *C. hirtella* and *C. micrantha*. ●R: Coast, Transverse and Peninsular ranges, from Lake and Colusa counties to the Sierra San Miguel in northern Baja California. ●H: annual herbs commonly with one (but sometimes two or several) erect stems that range from about 1 to 6 dm. (4-24") tall. The lower portions of the stems tend to develop a shiny and deciduous epidermis with age. The leaves are generally alternate and are mostly about 1 to 6 cm. long. The larger lower leaves are petiolate, and their blades are narrowly oblong to oblanceolate, while the sessile upper leaves generally have narrowly ovate to lanceolate blades. The flowers are produced singularly in the axils of the leaves, and the corollas consist of four petals that are about 1.5 to 3.5 mm. long. The petals are at first yellow with one or two red dots near the base, but they turn red or reddish with age. The fruits are curving to coiling capsules that are about 2 to 3 cm. long. ֍May-July.

Camissoniopis luciae (Raven) W. L. Wagner & Hoch [*Camissonia l.* Raven]. SANTA LUCIA SUN CUP. This species is widely scattered and locally common on grassland slopes and in openings in chaparral in the Tassajara region, especially on steep and clayey soiled areas along the Church Creek Fault (such as in the Horse Pasture). It was much more common than usual during the first spring after the Basin Complex Fire of 2008. This species was probably derived from genetic interchange between *C. hirtella* and *C. intermedia*. ●R: from the Monterey Peninsula and southern San Benito County to the Santa Ynez Mountains of Santa Barbara County. Of the 20 specimens that are presently included in the Consortium of California Herbaria database, 15 are from the Santa Lucia Mountains of Monterey County. ●H: annual herbs with one to several erect or ascending stems that range from about .8 to 6 dm. (3-24") tall. The petiolate basal leaves, which are up to 7 cm. or more long, are narrowly oblanceolate and produced in loose rosettes. The smaller cauline leaves range from narrowly elliptic to narrowly oblanceolate or lanceolate; the lower are petiolate and the upper are sessile. The flowers are produced singularly in the axils of the leaves. The corollas consist of four entire or notched petals about 4 to 7 mm. long. The petals are at first yellow but turn red with age, and they usually have one red dot near the base. The fruits are curving to coiling and four angled capsules that are about 1 to 2.5 cm. long. ֍March-June.

!***Camissoniopis micrantha*** (Hornemann ex Sprengel) W. L. Wagner & Hoch [*Oenothera m.* H. ex S.; *Camissonia m*. Raven]. SMALL FLOWERED SUN CUP. In the first edition of this text I stated that this species was apparently widely scattered in the Tassajara region, but rare and restricted to areas where the soil is loose and/or sandy, such as in washes or gullies, or in other generally disturbed areas. During the first spring after the Basin Complex Fire of 2008, this species was very common, particularly in areas of burned out chaparral. ●R: Coast, Transverse and Peninsular ranges and adjacent areas, from Colusa, Lake and Sonoma counties to San Diego County. This species also occurs in the southern Sierra Nevada in Tulare and Kern counties, and on Santa Miguel, Santa Rosa, Santa Cruz, and Santa Catalina islands. ●H: annual herbs with one or several decumbent, ascending or erect stems that range from about 1 to 6 dm. (4-24") long. The petiolate basal leaves, which are produced in loose rosettes, are linear-lanceolate to oblanceolate and about 2 to 10 cm. long. The smaller cauline leaves are narrowly elliptic to lanceolate or oblanceolate; the lower are short petiolate and the upper are nearly sessile. The flowers are produced singularly in the axils of the leaves, and the corollas consist of four yellow petals that are about 1.5 to 4.5 mm. long; the petals usually have one or two red dots near the base. The fruit is a narrow and curved or coiled capsule about 1.5 to 2.5 cm. long. ֍April-July.

CLARKIA. FAREWELL TO SPRING.

The genus *Clarkia* consists of about 41 species of annual herbs. One species is endemic to temperate South America (central Chile and adjacent areas of Argentina), and the rest are endemic to temperate western North America. This genus is primarily Californian, for 39 species (plus 19 lesser taxa) occur within the state, and 34 (plus 17 lesser taxa) are endemic to the California Floristic Province. The common name "Farewell to Spring" refers to the relatively late flowering season of most Clarkia species, typically from May to early July. The genus was named for Captain William Clark of the Lewis and Clark Expedition, who collected the genus' type specimen.

1a. Petals with claws (narrowed bases), and are thus spade like in shape:
  2a. Claw with two small opposing marginal lobes. Petals 6 to 12 mm. long. . . . . ***C. rhomboidea***.
  2b. Claw with entire margins. Petals 10 to 20 mm. long. . . . . ***C. unguiculata***.
1b. Petals without claws (or with very short, obscure claws), and thus are fan shaped or elliptic:
  3a. Axis of budding portion of inflorescence reflexed (turned downward); the buds are pendant:
    4a. Petals 10 to 35 mm. long and broadly fan shaped. Immature capsules four grooved. Stigma higher than anthers. . . . . ***C. lewisii***.
    4b. Petals 5 to 12 mm. long and elliptic to obovate, widest near or above the middle, and more or less tapering to the apex. Immature

capsules eight grooved or ribbed. Stigma not higher than anthers. . . . . ***C. modesta***.
3b. Axis of budding portion of inflorescence erect; the buds are erect or reflexed:
5a. Buds reflexed. Inner anthers shorter than the outer anthers. . . . . ***C. jolonensis***.
5b. Buds erect. Anthers alike:
6a. Petals mostly pale rose pink or lavender, with a distinct reddish to purplish spot, or a wedge shaped spot:
7a. Petals with a wedge shaped spot starting near the center, that widens (but fades) towards the upper margin. . . . . ***C. purpurea*** subsp. ***quadrivulnera***.
7b. Petals with a semi circular, uniform or streaked spot in lower center. . . . . ***C. speciosa***.
6b. Petals mostly or uniformly dark reddish purple, without a distinct spot:
8a. Petals mostly dark, although some gradation of pigment is evident. Capsules covered with upwardly appressed hairs. . . . . ***C. speciosa***.
8b. Petals uniformly dark reddish purple. Capsule covered with spreading hairs:
9a. Petals more than 1 cm. long. . . . . ***C. purpurea*** subsp. ***quadrivulnera***.
9b. Petals less than 1 cm. long. . . . . ***C. purpurea*** subsp. ***quadrivulnera***, local race.

+e ***Clarkia jolonensis*** D. Parnell [the following names were formerly misapplied to specimens of this taxon: *C. bottae* (Spach) H. & M. Lewis, *C. deflexa* (Jepson) H. M. Lewis, *C. cylindrica* (Jepson) H. & M. Lewis and *C. lewisii* P. Raven & D. Parnell]. SANTA LUCIA CLARKIA. This showy flowered species is scattered in open and usually grassy areas at all elevations in the Tassajara region, and it usually occurs in small groups. ●R: northern Salinas Valley and the Santa Lucia Mountains of Monterey County, from the vicinity of Castroville to the vicinity of Sand Dollar Beach on the Big Sur Coast, and to the eastern foothills of the Santa Lucia Mountains in vicinity of Lake San Antonio. ●H: annual herbs with erect or ascending stems that are usually less than 6 dm. (2') long. The leaves have petioles that are less than 5 mm. long, and the blades, which are about 3 to 5 cm. long, are narrowly linear to narrowly lanceolate. The flowers are produced in terminal racemes in which the upper most buds are reflexed. The bowl shaped corollas consist of four fan shaped petals that are about 1 to 2 cm. long. The petals of the local plants are mostly pink, but fade to white near the base, and the white area is purple spotted. Below the white area is a rose-purple band that it subtended by an area that is more pale, and thus the corollas have darker square shaped formation at the base. The fruits are narrow capsules. ❀April-June.

(nearly **e**) ***Clarkia lewisii*** P. Raven & D. Parnell [*Godetia bottae* Spach and *Clarkia bottae* (Spach) H. & M. Lewis misapplied]. GABILAN AND SANTA LUCIA MOUNTAINS CLARKIA, MONTEREY CLARKIA. This showy flowered species, which is nearly identical to *Clarkia jolonensis*, is widely scattered in at all elevations in the Tassajara region, and it primarily occurs in open and grassy habitats. *Clarkia lewisii* was first named and described in 1977, and prior to 1977 specimens of this species were assigned to *Clarkia bottae*. The type specimen of *C. bottae* was collected by Dr. Paolo Emilio Botta (1802-1870), who was the physician and naturalist of the French around the world voyage of the Heros, which was commanded by Auguste Bernard Duhaut-Cilly. Between January of 1827 and July of 1828 the Heros paid visits to the ports of Fort Ross, Bodega Bay, San Francisco, Santa Cruz, Monterey, Santa Barbara, San Pedro, San Luis Rey and San Diego. Somehow the type specimen of *C. bottae*, which was named for Botta by Edouard Spach in 1835, was mislabeled as being from Monterey, but it actually represents a species that was later named *Clarkia deflexa*, which occurs in southern California. Thus the name *C. deflexa* was reduced to a synonym of *C. bottae*, and *C. lewisii* was applied to this species. The species was named for Harlan Lewis (1919-2008), a long time professor of botany at UCLA and a leading authority on the genus *Clarkia*. ●R: Gabilan and Santa Lucia mountains of Monterey and San Benito counties. In the Gabilan Mountains this taxon occurs from the vicinity of Fremont Peak to the Pinnacles National Park, and in the Santa Lucia Mountains it extends from the vicinity of Fort Ord to the vicinity of Lake San Antonio, Lion Peak and the Cruikshank Trail on the southern Big Sur coast. ●H: annual herbs with erect stems that range from about 2 to 5 dm. (8-20") tall. The leaves are mostly alternate and are narrowed at the base into petioles that are as much as 7 mm. long. The blades, which are about 1 to 5 cm. long, are narrowly linear to narrowly lanceolate or oblanceolate, and they usually have remotely toothed margins. The flowers are produced in upwardly nodding racemes, and the bowl shaped corollas consist of four fan shaped petals that are about 1 to 3 cm. long. The petals of plants in this region are mostly purplish pink with a white area near the base that is spotted or streaked with purplish red. Below the white area is a dark purplish band that is lighter below, and thus the corollas have a square shaped formation at the inner base. The fruits are slender four angled capsules that are about 1.5 to 7 cm. long. ❀May-July.

!*Clarkia modesta* Jepson [*Godetia epilobioides* (Watson) var. *m.* Jepson]. MODEST CLARKIA. This species is scattered in grassy openings within woodlands and chaparral at all elevations in the Tassajara region, but its populations vary considerably from year to year. During the first spring after the Basin Complex Fire of 2008, it was very common along most of north slope of Tony's Trail, and also along the flood plains of Tassajara Creek and adjoining slopes in the outer Flats. It was again very common on the floodplains of Tassajara Creek upstream from the hot springs during the spring of 2015, which was in a drought year. ●R: Coast Ranges and western Transverse Ranges, from Trinity and Tehama counties to Ventura County. This species also occurs in the northern Sierra Nevada foothills in Butte County, and in the south-central Sierra Nevada foothills, from Merced and Mariposa counties to Tulare County. ●H: annual herbs with slender and erect or ascending stems that range from about 2 to 7 dm. (8-28") tall. The mostly alternate leaves have petioles that are about 2 to 15 mm. long, and the blades, which are about 2 to 4 cm. long, are narrowly linear to oblong-lanceolate or elliptic, and they usually have remotely toothed margins. The flowers are produced singularly in terminal racemes, the rachis of which is at first reflexed but it becomes erect as the buds mature. The corollas consist of four rhomboid-elliptical to obovate petals that are about 8 to 12 mm. long and 3 to 7 mm. wide; the petals are usually pink distally but fade to nearly white towards the base. The fruits are narrow and four sided capsules that are about 1.5 to 3 cm. long. ❀April-June (-July).

Clarkia purpurea (Curtis) Nelson & Macbride [*Oenothera p.* Curtis] subsp. ***quadrivulnera*** (Douglas ex Lindley) Lewis & Lewis [*Oenothera q.* D. ex L.]. FOUR SPOT CLARKIA. This taxon is widespread and locally common in grassy habitats at all elevations in the Tassajara region. It is by far the most common and most widespread member of the *Clarkia purpurea* complex. ●R: Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from British Columbia to northern Baja California. Also on Santa Rosa, Santa Cruz and Santa Catalina islands, and in the mountains of central Arizona. ●H: erect annual herbs with slender stems that range from about 1 to 5 dm. (4-20") tall. The leaves, which are about 1.5 to 5 cm. long, are linear to narrowly oblong-lanceolate, and the margins are entire. The flowers are produced in the axils of the upper leaves, and the corollas consist of four generally fan shaped petals that are more than 1 cm. long. The petals of most plants are basically light rose pink, but they have a darker wedge shaped spot in the upper center which fades towards the upper margin (hence the names 'four

spot' and *quadrivulnera*). In some plants the petals are uniformly dark reddish purple. The fruits are eight ribbed capsules that are about 1 to 3 cm. long. ֍May-June.

Clarkia purpurea subsp. ***quadrivulnera***, **local race**. Common in this region are plants that have uniformly dark reddish purple petals that are about 4 to 7 mm. long,. In general, such plants also differ from the typical subspecies in having capsules that are covered with dense, spreading hairs (those of the typical subspecies, as manifested in this region, are usually covered with short, upwardly appressed hairs). Such plants probably represent some of the localized races that were described by Harlan and Margaret Lewis, in their monograph of the genus *Clarkia* (*University of California Publications in Botany*: 20: 308; 1955), as follows::

> Included within this subspecies are the numerous self pollinating forms of *C. purpurea*. They may differ conspicuously from population to populations with respect to the color of the flowers, pubescence, and habit. But they all have small flowers with petals usually a centimeter or less in length. The stigma is receptive at the time the stamens mature, and the anthers usually adhere to the stigma and deposit their pollen directly upon it. Pollination usually occurs in the unopened bud. Different local races may vary with respect to the degree of self pollination, however, and no sharp distinction between self pollinating races and those that are normally outcrossed can be made… Self pollination has promoted the formation of a multitude of morphologically distinct local races, some of which may grow together at the same site. We have made no attempt to name them.

Clarkia rhomboidea Douglas ex Hooker. MOUNTAIN CLARKIA. This inconspicuous species is lightly scattered on Chew's Ridge, along the summit of Black Butte, along the Pine Ridge Trail between China Camp and the Church Creek Divide, and perhaps at other locations on the higher ridges of Tassajara region. Plants were abundant in the vicinity of the former Chew's Ridge Guard Station (between China Camp and the Chew's Ridge summit) in the first spring after the Basin Complex Fire of 2008. ●R: widespread in western North America, from British Columbia and Montana to northern Baja California and Arizona, and it mostly occurs in mountainous areas that are between 3,000 to 8,000 feet in elevation. In the central Coast Ranges this species occurs in the mountains of Napa and Sonoma counties, on Mount Hamilton in Santa Clara County, in the Santa Cruz Mountains in Santa Cruz County, and in the Santa Lucia Mountains of Monterey County. The next populations to the south are in the Sierra Madre and San Rafael mountains of Santa Barbara County. ●H: erect annual herbs with simple or branched stems that range from about 1 to 10 dm. (4-40") tall. The lower leaves are generally opposite and the upper leaves are generally alternate, and the petioles are about 5 to 20 mm. long. The blades, which are about 2 to 7 cm. long, are lance-ovate to ovate-oblong or elliptic, and the margins are entire or nearly so. The flowers are produced in terminal racemes, the axis of which is at first nodding, but it becomes erect as the buds mature. The corollas consist of four pinkish lavender and often darker flecked petals that are about 6 to 12 mm. long. The petals have short claws with two opposing lobes, and generally rhombic to deltoid limbs. The fruits are four angled and many seeded capsules that are about 1 to 2.5 cm. long. ֍May-July.

^***Clarkia speciosa*** Lewis & Lewis [*Godetia parviflora* Jepson] subsp. ***speciosa***. BEAUTIFUL CLARKIA. This showy flowered species occurs in grassy habitats in the lower Tassajara Canyon, from about the junction of the Horse Pasture and Marble Peak trails to the confluence of Tassajara Creek with the Arroyo Seco. Some of the local plants have rose pink petals that have a darker and semi circular spot in the lower center, the spot being comprised of streaks and flecks. Other plants have dark reddish purple petals that are usually streaked towards the base, but do not have an evident central spot. Some plants have exceptionally large petals that are mostly a brilliant deep blood red, but with slightly fading upper margins. ●R: Coast Ranges, from Monterey and San Benito counties to western Santa Barbara County, the western Transverse Ranges in Ventura County, and in the southern Sierra Nevada and Tehachapi Mountains, from Tulare County to Kern County. In 1902 a specimen was collected along Stevens Creek Road in Santa Clara County by William Russell Dudley. Of the 259 specimens that are presently listed on Consortium of California Herbaria database, 242 are from Monterey and San Luis Obispo counties. ●H: annual herbs with erect or ascending stems that range from about 1-6 dm. (4-24") tall. The alternate leaves are sessile or on petioles less than 5 mm. long, and the blades are narrowly linear to narrowly lanceolate, entire or nearly so, and about 1 to 6 cm. long. The flowers are produced singularly in the axils of the middle and upper leaves. The corollas consists of four generally fan shaped petals that range from about 1 to 3 cm. long. The fruits are narrow and four sided capsules that are about 1 to 2.5 cm. long. ֍May-July.

Clarkia unguiculata Lindley [*C. elegans* Douglas ex Lindley invalid]. ELEGANT CLARKIA. This well known species is widely scattered and locally common to abundant in open habitats at all elevations in the Tassajara region. Although it did not make a strong showing during the first spring after the Basin Complex Fire of 2008, it was extremely abundant during the late spring and early summer of 1998. That was an El Nino year in which Tassajara received over 72 inches of rain, and rainy periods continued until late June. I remember the multitudes of plants that were seen all along Tassajara Road on the Fourth of July of that year, which was the day that I delivered the first copies of the first edition of this text to Tassajara. This species also made a strong showing in the spring of 2015, which was a drought year. ●R: Coast Ranges, the Sierra Nevada foothills, and the Transverse and Peninsular ranges, from Mendocino, Tehama and Plumas counties to northern Baja California. Also on Santa Rosa and Santa Cruz islands, and on the Sutter Buttes. ●H: annual herbs with erect or decumbent stems that range from about 3 to 10 dm. (12-40") long. The leaves are alternate and have petioles about 3 to 10 mm. long; the blades are about 1 to 6 cm. long, lanceolate to elliptic (or ovate), often reddish tinged, and have entire or toothed margins. The flowers are produced singularly in terminal racemes, and the flowers are subtended by nearly sessile leaves. The flower buds, which are covered with bright purplish red hair, are at first deflexed, but turn outward or upward as the flowers open. The corollas consist of four lavender pink to dark reddish purple petals that are about 1 to 2.5 cm. long. The petals are quite distinctive, for they spread outward on long and relatively slender petiole like claws, then flare into broad and deltoid to rhombic blade like limbs. The fruits are many seeded capsules that are about 1.5 to 3 cm. long. ֍May-June (July).

EPILOBIUM. WILLOW HERBS, COTTON WEEDS, FIRE WEEDS, ZAUSCHNERIA, BOISDUVALIA.

Epilobium is a widely distributed genus that consists of about 165 species. The species range from annual herbs to subshrubs, and they primarily occur in temperate regions. The genus name is derived from the Greek words *epi*, upon, and *lobos*, a pod or capsule, alluding to the inferior ovaries.

1a. Tufted evergreen perennial herbs or subshrubs, sometimes becoming woody at the base with age. Flowers with elongated corolla like floral tubes that are about 2 to 4 cm. long. The petals and floral tubes are red:

2a. Leaves narrowly linear to narrowly lanceolate, and usually with fascicles (clusters of small leaves) in the axils. Plants becoming woody at the base with age. . . . . ***E. canum***.

2b. Leaves broadly lanceolate to ovate and more than 6 mm. wide, and usually without fascicles. Plants herbaceous throughout. . . . . ***E. canum*** subsp. ***latifolium***.

1b. Annual or perennial herbs that never become woody. Flowers without floral tubes or with tubes less than 3 mm. long. Petals pink to purplish or sometimes nearly white:

3a. Plants of wet or seasonally wet habitats. Leaves narrowly lanceolate to rather broadly oblong-lanceolate or elliptic:

4a. Plants perennial. Leaves opposite up to inflorescence. Epidermis not peeling. Seeds with tufts of hairs at the apex:

5a. Petals white to pink and 2 to 6 (-9) mm. long. Leaves lanceolate and reduced in size in the inflorescence, which is open. . . . . ***E. ciliatum*** subsp. ***ciliatum***.

5b. Petals pink to rose purple and 4 to 14 mm. long. Leaves lanceolate to ovate, and little reduced in size in the inflorescence, which is dense. . . . . ***E. ciliatum*** subsp. ***watsonii***.

4b. Plants annual. Leaves opposite only near base. Epidermis of lower stems peeling. Seeds without tufts of hairs. . . . . ***E. densiflorum***.

3b. Plants of dry habitats (or only incidentally occurring in wet or moist habitats). Leaves narrowly linear to narrowly lance-linear, elliptic or oblanceolate:

6a. Plants glandular and more to much more than 2 dm. tall. Hypanthium 1.5 to 16 mm. long, sepals 2 to 8 mm. long. . . . . ***E. brachycarpum***.

6b. Plants not glandular and mostly about 1 to 3 dm. tall. Hypanthium .4 to 1 mm. long, sepals 1.5 to 4 mm. long. . . . . ***E. minutum***.

Epilobium brachycarpum Presl [*E. paniculatum* Nuttall ex Torrey & Gray]. SUMMER COTTON WEED, WEEDY COTTON WEED. This species is widely scattered at all elevations in the Tassajara region, and it mostly occurs in open habitats, and often in disturbed areas, such as on landslides or in washes. Although this species has become an aggressive weed in and about developed areas of California, such as along roads or in vacant lots, and even in cracks in streets and sidewalks, the plants of this region behave as balanced members of the native flora. ●R: widespread in North America, from British Columbia and Quebec to Wisconsin, South Dakota Colorado, New Mexico and northern Baja California. ●H: xerophytic annual herbs with erect stems that range from about 2 to 12 dm. (8-48") tall. The shortly petiolate leaves are mostly alternate, and the blades, which are 2 to 5 cm. long, are linear to lance-linear; the margins are remotely toothed. Most of the leaves are usually absent by the time the plants reach full maturity. The flowers are produced on the slender branches of open panicles. The corollas consist of four pinkish lavender to nearly white petals that are about 3 to 6 cm. long; the petals are notched at the apex. The fruits are narrow capsules that are about 2 to 3 cm. long; they contain numerous comose seeds. ❁June-October.

Epilobium canum (E. Greene) P. H. Raven [*Zauschneria californica* Presl; *Zauschneria cana* E. Greene; etc.] subsp. ***canum***. ZAUSCHNERIA, CALIFORNIA FUCHSIA, HUMMINGBIRD'S TRUMPET. This well known subspecies occurs at all elevations in the Tassajara region, and it is locally common in open areas, and especially so in rocky places. A frequent sight in this region during the early months after the Basin Complex Fire of 2008 were the leafy shoots arising from the roots of this subspecies. ●R: Coast, Transverse and Peninsular ranges, from Lake and Sonoma counties to northern Baja California, and the Sierra Nevada foothills, from Tuolumne County to Kern County. Also on San Miguel, Santa Rosa, Santa Cruz, Santa Catalina, San Clemente and the Anacapa islands. ●H: extremely variable evergreen perennial herbs, usually tufted and often becoming woody at the base with age, with erect and/or ascending branches that range from about 3 to 9 dm. (1-3') long (and sometimes much longer). The lower leaves are often opposite and the upper are alternate. The leaves are sessile or nearly so, and the blades, which are about 5 to 40 mm. long, vary from lanceolate to narrowly linear (the later type sometimes have enrolled margins). Plants with lanceolate to linear or oblong leaves, and that are mostly 2 to 5 mm. wide, sparsely to moderately fasciculate (i. e., with clusters of small leaves in the axils of the primary leaves), and green, gray pilose or canescent (densely covered with minute gray or white hairs), have been given the name var. *angustifolium*. Plants with leaves that are narrowly linear to nearly filiform (sometimes with revolute margins), less than 2 mm. wide, very densely fasciculate, and very canescent, have been named var. *canum*.. The showy flowers are produced in terminal and lateral spikes, and the corollas consist of four notched petals that are about 8 to 16 mm. long. Both the petals and much more conspicuous corolla like floral tubes (which are about 2 to 4 cm. long) are scarlet red. The floral tubes have globose bases that contain a highly nutritious nectar, which is a reward for hummingbirds, the pollinators of this species. The fruits are slender capsules that are about 2 to 3.5 cm. long; they contain numerous comose seeds. ❁June-November (or to the first frosts or drenching rains).

+***Epilobium canum*** subsp. ***latifolium*** (Hooker) Raven [*Zauschneria californica* var. *latifolia* Hooker; *Z. l.* (Hooker) E. Greene]. BROAD LEAFED CALIFORNIA FUCHSIA. Plants with characteristics that clearly represent this taxon are occasionally encountered in the Tassajara region, as well as plants that are intermediate between this and the other manifestations of this species. ●R: southern Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Coos and Klamath counties in southwestern Oregon to northern Baja California. Also on Santa Cruz Island and in the mountains of Arizona and southwestern New Mexico. ●H: perennial herbs generally with ascending braches that range from about 1 to 5 dm. (4-20") long. The leaves, which are about 6 to 17 mm. wide, range from ovate to lance-ovate. The inflorescences and flowers are similar to the typical species. ❁June-December.

Epilobium ciliatum Rafinesque subsp. ***ciliatum*** [*E. adenocaulon* & *E. californicum* Hausskknecht]. COMMON WILLOW HERB. This distinctive species is widely scattered and fairly common along streams and in other moist or seasonally moist habitats in the Tassajara region. ●R: widespread throughout most of temperate and subarctic North America, and now a weed in many other regions, such as in Eurasia and Australia. ●H: perennial herbs with erect stems that range from about 3 to 10 dm. (12-40") tall. The larger lower leaves are opposite and usually have fascicles (small leaves) in the axils, and the upper leaves are alternate. The petioles are about 2 to 8 mm. long, and the blades, which are about 2 to 8 cm. long, are lanceolate to oblong-lanceolate; the margins are finely toothed. The leaves are clammy to the touch. The flowers are produced in the axils of the upper leaves, and the long and narrow ovaries resemble pedicels. The corollas consist of four notched petals that are about 2 to 6 mm. long; they range from white to lavender or rose or pink. The fruits are narrow capsules that are about 5 to 7 cm. long; they contain many comose seeds. ❁May-October.

+***Epilobium ciliatum*** subsp. ***watsonii*** (Barbey) P. Hoch & Raven [*E. watsonii* & *E. franciscanum* Barbey]. This taxon occurs in wet habitats on Chew's Ridge, and perhaps in other areas of the Tassajara region. ●R: temperate western North America, from British Columbia and Idaho to California. In California this taxon is restricted to the Coast Ranges, from Del Norte County to the coast of western Santa Barbara County. ●H: similar to the typical subspecies, except for the characteristics stated in the key. ❁May-October.

Epilobium densiflorum (Lindley) P. Hoch & Raven [*Oenothera densiflora* Lindley; *Boisduvalia densiflora* (Lindley) Watson]. FLORIFEROUS BOISDUVALIA. This distinctive species is known to occur in only two areas in the Tassajara region. One is in Pine Valley, where it occurs along brooks, and the other is along the Arroyo Seco in the vicinity of the confluence of Tassajara Creek, where it is lightly scattered in the stream bed. Higher up in the Arroyo Seco watershed this species also occurs in Hanging Valley and along Roosevelt Creek. The scientific name for this species a often a misnomer, for plants are commonly sparsely flowered. John Lindley certainly chose the name on account of a very floriferous plant that was raised in the garden of the Horticultural Society of London in 1832, which served as the study for the chromolithographic plate that accompanied his description of the species in volume 19 of the *Botanical Register* (tab. 1593, 1833). ●R: widely distributed in western North America, from British Columbia and Montana to the higher mountains of northern Baja California. ●H: erect annual herbs with simple or branched stems that range from about 3 to 10 dm. (12-40") tall. The nearly sessile leaves have blades that are lance-linear to lanceolate; they are about 2 to 5 cm. long and have entire to denticulate margins. The lower most leaves are opposite while the rest are alternate. The flowers are produced in the axils of leafy terminal spikes, and the corollas are comprised of four deeply two lobed petals about 4 to 10 mm. long. The petals vary from rose purple to nearly white. The fruit is a cylindric capsule about 6 to 10 mm. long. ❀May-August.

Epilobium minutum Douglas ex Lehmann in Hooker. MINUTE COTTON WEED. This inconspicuous species is scattered in open or shady habitats in Pine Valley, along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge, and on Chew's Ridge. ●R: from British Columbia, Alberta and Montana to California. In California this species occurs in the Sierra Nevada and the Coast and western Transverse ranges, to Fresno and Santa Barbara counties. Disjunct populations occur in the San Bernardino Mountains of San Bernardino County and in the mountains of San Diego County, and this species also occurs in the mountains of central Arizona. ●H: simple or branched annual herbs that range from about .5 to 3 dm. (2-12") tall. The leaves are mostly opposite and on petioles about 1 to 10 mm. long; the blades are oblong-linear to oblanceolate or lanceolate with entire or remotely toothed margins, and about 1 to 2 cm. long. The flowers are in the axils of the upper leaves, and the corollas consist of four two lobed petals about 2 to 4 mm. long. The petals vary from rose lavender to white. The fruit is a narrow capsule 1.5 to 2.5 cm. long. ❀April-August.

GAYOPHYTUM.

The genus *Gayophytum* consists of nine species of montane annual herbs. Seven species are endemic to temperate western North America, one species is endemic to temperate western South America, and one species occurs in both North and South America. The genus name is a combination of that of the French botanist/naturalist Claude Gay (1800-1873), and a Greek word for a plant.

<>***Gayophytum heterozygum*** Lewis & Szweykowski [*G. diffusum* var. *villosum* Munz]. This strictly montane species is lightly scattered at higher elevations in the Tassajara region, such as on Chew's Ridge, Black Butte, and along the Pine Ridge Trail from Tassajara Road to Pine Ridge. It occurs mostly in openings in woodlands and chaparral, and sometimes in disturbed areas, such as on the banks of recently graded sections of Tassajara Road. Elsewhere in the Santa Lucia Mountains this species is known to occur on Junipero Serra Peak and on Cone Peak. The nearest populations to the north are in the mountains of Lake and Mendocino counties, and the nearest populations to the south are in the San Rafael Mountains of Santa Barbara County. ●R: mountainous regions of temperate western North America, from northern Washington and western Idaho to California. In California the range of this species extends southward through the North Coast Rages to Mendocino and Lake counties, and to Tulare County in the Sierra Nevada. Disjunct populations occur in the Santa Lucia Mountains of Monterey County, the San Rafael Mountains of Santa Barbara County, the Mount Pinos region of southern Kern County and northern Ventura County, the San Gabriel and San Bernardino mountains of Los Angeles and San Bernardino counties, the San Jacinto Mountains of Riverside County, and the Palomar Mountains of San Diego County. This species mostly occurs in coniferous forests that are between 2,600 and 9,800 ft. in elevation. ●H: annual herbs with slender, erect and upwardly branched stems that range from about 1.5 to 8 dm. (6-32") tall. The alternate leaves are sessile or narrowed to short petioles; the blades are narrowly linear to linear-oblong with entire margins, about 1.5 to 6 cm. long. The leaves diminish in size upward on the stems. The flowers are produced in the axils of the upper leaves, and the corollas consist of four petals about 2 to 4 mm. long; the petals are at first white, but become pinkish or reddish with age. The fruit is a narrow capsule about 6 to 15 mm. long. ❀May-October.

TETRAPTERON.

Tetrapteron consists of two species of temperate western North America that have been segregated from *Camissonia*. Both species occur in California, and one is endemic to the California Floristic Province. The name is derived from Greek and means four winged, alluding to the four winged fruits.

Tetrapteron graciliflorum (Hooker & Arnott) W. L. Wagner & Hoch [*Camissonia graciliflora* (H. & A.) Raven; *Oenothera g.* H. & A]. HILL SUN CUP. The only place in the Tassajara region where I have seen this species was on a steep southfacing grassland slope along the Pine Ridge Trail (about a third of the distance from China Camp to the Church Creek Divide), where I observed three plants on May 10th of 1990. James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975) reported this species to be rare on Chew's Ridge between 1200 m. and 1400 m. (3937-4593'), and uncommon on Chew's Ridge between 600 and 1200 m. (1968-3937'). Griffin also collected a specimen of this species in April of 1973, but the information on its label is confusing: "Head of canyon near White Oaks Campground, Los Padres National Forest, Calaboose Creek Canyon, 4000 ft." (Griffin 3469; JEPS 73543). The head of the Calaboose Creek Canyon is in the immediate vicinity of China Camp, and the elevation is about 4330 feet. White Oaks Camp is situated between the upper most watersheds of James and Anastasia creeks. Herbarium specimens of this species have been collected in nearby areas (in the vicinity of Jamesburg, on the Hastings Natural History Reservation, and in the Paloma Creek Canyon). ●R: foothills of the Cascade Ranges, the Sierra Nevada foothills, and the Coast, Transverse and Peninsular ranges, from Josephine and Jackson counties in southwestern Oregon to northwestern San Diego County, with a disjunct population in northern Baja California (about 175 miles south of the border). ●H: small annual herbs without stems or branches (or rarely with short horizontal branches less than 3 cm. long). The leaves are strictly basal and produced in tufts, and the blades, which are about 2 to 10 cm. long, are linear to narrowly oblanceolate with entire or nearly entire margins. The flowers are produced in the axils of the leaves, and the ovaries have long and very slender floral tubes that are about 1.5 to 4 cm. long, which elevate the showy portion of the flowers above the leaves. The corollas consists of four petals about that are 8 to 14 (-18) mm. long; they are at first yellow, but turn reddish or greenish with age. The fruit is a four winged capsule about 4 to 8 mm. long. ❀March-May.

OROBANCHACEAE. BROOM RAPE FAMILY.

According to the Angiosperm Phylogeny website, *Orobanchaceae* consists of 99 genera and about 2,060 species. The species range from annual herbs to shrubs, and they are particularly well represented in warmer northern temperate regions and in Africa and Madagascar.

1a. Plants not green and totally parasitic (holoparasites). Leaves reduced to bract like structures. . . . . ***Aphyllon***.
1b. Plants green or mostly green, and only partially parasitic (hemiparasites). Leaves fully developed:
2a. Flowers mostly yellow (or yellow and white) and not subtended by bracts that are petal like in color and texture. . . . . ***Triphysaria***.
2b. Flowers not yellow (or only partially yellow) and, in some species, subtended by large bracts that are petal like in color and/or texture:
3a. Leaves pinnately divided into sharply toothed segments. . . . . ***Pedicularis***.
3b. Leaves simple, three lobed, or cleft into narrowly linear segments:
4a. Calyces united for about half of the length. Corolla narrow, the lower lip shorter than the upper lip. . . . . ***Castilleja***.
4b. Calyces divided to the base. Corolla laterally expanded, the lower lip about as long as the upper lip. . . . . ***Cordylanthus***.

APHYLLON. BROOM RAPE, CANCER ROOT.

Aphyllon includes 21 species (plus 10 lesser taxa) of parasitic plants that occur in North America and South America. The name is Greek and means without leaf.

1a. Flowers produced on elongated scape like pedicels, the pedicels without bractlets:
2a. Flowers (and plants) pale straw yellow. Flowers several (to many) on a caudex that is frequently partially emerged. ***A. fasciculatum***.
2b. Flowers purple or bluish purple (ours). Flowers mostly singular on long pedicels rising from a below ground caudex. ***A. purpureum***.
1b. Flowers sessile or with rather short pedicels, the flowers (or pedicels) subtended by bractlets:
3a. Corollas 10 to 18 mm. long; calyces 6 to 10 mm. long. . . . . ***A. tuberosum***
3b. Corollas 25 to 35 mm. long; calyces 12 to 20 mm. long. . . . . ***A. californicum***.

+∧***Aphyllon californicum*** (Chamisso & Schlechtendal) A. Gray (*Orobanche californica* Chamisso & Schlechtendal) subsp. ***condensum*** (Heckard) A. C. Schneider. CALIFORNIA BROOMRAPE. This entry is based on two herbarium specimens. One was collected by James Griffin "East of Tassajara Road near China Camp" in July of 1980 (Griffin 4201, JEPS 79736), and the other one is one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3240, DS), which Lawrence Heckard cited in his text "A Taxonomic Reinterpretation of the *Orobanche californica* Complex" (*Madrono* 22 (2): 41-104, 1973). According to the note that is enclosed in the envelope that is pasted to the specimen sheet, Elmer collected it in "Lost Valley, dry mounds." Lost Valley is about 5½ linear miles south of Tassajara Hot Springs. Although this taxon is not known to occur elsewhere in this region, its primary host, *Heterotheca sessiliflora* subsp. *echioides*, Golden Aster, is common in this region. ●R: Coast Ranges and western Transverse Ranges, from Pinnacles National Monument in San Benito County, and Lost Valley in the Santa Lucia Mountains of Monterey County, to the Santa Ynez Mountains of Santa Barbara County. ●H: parasitic herbs that are about 5 to 15 cm. long. The delicate stems are usually distally branched, and the flowers are produced in round topped inflorescences. The bilabiate corollas are about 25 to 35 mm. long, and have rather stout tubes that are abruptly expanded above the sinus. The corolla lips are buff to more or less yellowish, and are purple tinged and usually red veined. The fruit is a many seeded capsule. ♔May-July.

Aphyllon fasciculatum (Nuttall) Torrey & A. Gray (*Orobanche fasciculata* Nuttall, *O. f.* var. *franciscana* Achey]. CLUSTERED BROOM RAPE. Although this distinctive species is widely scattered at all elevations in the Tassajara region, its above ground manifestations are not often seen. The primary host species in California belong to the genera *Artemisia*, *Eriogonum* and *Eriodictyon*. ●R: western North America, from Alaska to Ontario, Michigan, Indiana, the Great Plains states, Texas and northern Mexico. In California this species occurs in the Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California, and on most of the islands off the coast of southern California and on the Sutter Buttes. ●H: pale yellow or straw colored parasitic herbs with few to many erect stems that are generally less than 12 cm. (4.75") long; the stems arise from a stout and often partially emerged caudex. The emergence of more robust plants, with numerous spreading offshoots, can create conspicuous ruptures in the ground. The flowers are produced on pedicels about 2 to 10 cm. long; the pedicels are both terminal and lateral on the stems. The bilabiate corollas, which are about 15 to 30 mm. long, are pale yellow with pale to dark purplish brown lines. The fruits are two valved capsules that are about 4 to 8 mm. long. ♔April-July.

Aphyllon purpureum (A. Heller) Holub (*Orobanche uniflora* Linnaeus misapplied, *O. uniflora* var. *purpurea* (Heller) Achey; var. *minuta* (Suksdorf) Achey; var. *sedi* (Suksdorf) Achey]. ONE FLOWERED BROOM RAPE, NAKED BROOM RAPE. These small plants occur on shady woodland slopes in the Tassajara region, and although they appear to be uncommon, this perception is likely due to the extreme inconspicuousness of these plants in combination with the short duration of their above ground manifestations. I have seen this species only at two localities: on the steep north facing slope section of the Horse Pasture Trail, between the trail head on Tassajara Road and the open meadows through which the trail passes before reaching the summit of Flag Rock Ridge, and along the trail over the Hog Back, at a point on the Tassajara side of the trail between the Suzuki Roshi memorial site and the switchback. In both instances it was by chance that I noticed one small bluish purple flower amongst the other plants that I was observing. At both localities the plants were growing in association with *Saxifraga californica*, which is often noted as being one of its primary hosts. ●R: widely distributed in North America, from Alaska to Newfoundland, Florida and northern Mexico. In California this species occurs in the Sierra Nevada and the Cascade, Coast and Transverse ranges, from Oregon to Los Angeles County, with disjunct populations in the San Bernardino Mountains (San Bernardino County), the Cuyamaca Mountains (San Diego County), and on Santa Cruz Island. ●H: small parasitic herbs that produce usually one (but sometime two or three) flowers which arise from the ground on erect pedicels that are no more than 12 cm. (4.75") tall. A substantial portion of the pedicel is usually below ground. The nearest equivalent to leaves are scattered scale like structures that are sometimes manifested above ground. The bilabiate corollas, which are about 1.5 to 2 cm. long, are dark purple to light bluish purple, and they often have a yellow strip or yellow area along the inside base of the throat. The fruits are two valved capsules that are less than 5 mm. long. ♔March-May.

Aphyllon tuberosum (A. Gray) A. Gray. [*Orobanche bulbosa* Beck, *O. tuberosa* (A. Gray) A. Heller; *Phelipaca turbrosum* Gray]. CHAPARRAL BROOM RAPE. This very exotic looking species is widely scattered in chaparral at all elevations in the Tassajara region, and it mostly

occurs on southfacing chaparral slopes that are dominated by *Adenostoma fasciculatum* (Chamise), its primary host. Although the above ground manifestations of this species are an uncommon sight, it is probably fairly common in this region, for its primary host species is a common member of chaparral habitats in this region. ●R: Coast Ranges, Sierra Nevada foothills, and the Transverse and Peninsular ranges, from Mendocino and El Dorado Counties to northern Baja California. Also on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: dark purplish brown to black herbs with a thick stem that is about 8 to 30 cm. long. The exposed portion of the stem is usually only about 25 to 50 percent of the length. The plants lack leaves, although the floral bracts may be mistaken for leaves. The flowers are sessile or nearly sessile, and they are congested on the branches of a dense and more or less conically shaped panicle. The bilabiate corollas, which are about 12 to 15 cm. long, have spreading and acute lobes; they are dark purplish brown to black externally and purplish to yellowish internally. The fruits are two valved capsules that are about 3 to 5 mm. long. ❀April-July.

CASTILLEJA. PAINTBRUSH, OWL'S CLOVER.

Castilleja includes somewhere between 160 to 200 species that are particularly well represented in western North America. The genus was named for the Spanish botanist Domingo Castillejo (1744-1793.

1b. Perennial herbs, sometimes slightly woody at the base:
2a. Plants dark green and glandular. . . . . ***C. applegatei***.
2b. Plants densely whitish to grayish woolly and not glandular. . . . . ***C. foliolosa***.
1a. Annual herbs:
3a. Plants of wet or seasonally wet habitats. Leaves entire. Floral bracts entire and distally red. Lower corolla lip less than ¼ the length of the upper lip. . . . . ***C. minor***.
3b. Plants mainly of open grassland habitats. Leaves or some leaves divided into narrow segments. Floral bracts divided into narrow segments that are tipped white or rose lavender. Lower corolla lip at least ½ the length of the upper lip:
4a. Inflorescence narrow and mostly pale green to white. . . . . ***C. attenuata***.
4b. Inflorescence broad and colorful:
5a. Upper corolla lip hooked and densely shaggy hairy at the apex. Filaments puberulent. . . . . ***C. exserta***.
5b. Upper corolla lip straight and puberulent at the apex. Filaments glabrous. . . . . ***C. densiflora***.

Castilleja applegatei Fernald subsp. ***martinii*** (Abrams) Chuang & Heckard [*C. martinii* Abrams, *C. roseana* Eastwood]. INDIAN PAINT BRUSH. This showy species is widely scattered and locally common at all elevations in the Tassajara region, and it usually occurs in open areas, especially in rocky places. ●R: Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California. Also in the southern Sierra Nevada in Tulare and Kern counties, and in the mountains of Inyo County and Nevada. The typical species occurs in southwestern Oregon. ●H: evergreen perennial herbs with erect or ascending stems that range from about 2 to 8 dm. (8-32") long. The leaves are alternate and sessile, and the blades are about 1 to 7 cm. long. The lower leaves are narrowly oblong to lanceolate and the upper are generally oblanceolate in outline and three lobed at the apex. The margins are usually wavy. The flowers are produced in very showy terminal racemes; the flowers are subtended by three lobed bracts that are distally deep red to scarlet. The calyx lobes and the corollas are of the same color. The narrowly bilabiate corollas, which are about 2.5 to 4 cm. long, have upper lips that are about as long to longer than the tube, while the much reduced lower lip is dark green and about 1 to 3 mm. long. The fruits are many seeded capsules that are about 8 to 15 mm. long. ❀April-August.

Castilleja attenuata (A. Gray) Chuang & Heckard [*Orthocarpus attenuatus* Gray]. VALLEY TASSELS. This rather inconspicuous species is scattered in small colonies in open grassland habitats along the Horse Pasture Trail and in Pine Valley. Although this species was not seen elsewhere in this region, I suspect that it occurs in grassland habitats along the entire length of the Church Creek Fault. ●R: western North America, from British Columbia to northern Baja California and the mountains of Arizona. This species is also native to Chile. ●H: small and fairly inconspicuous annual herbs with erect stems that range from about 1 to 3 dm. (4-12") tall. The leaves are alternate and sessile, and the blades, which are about 1 to 6 cm. long, are linear to linear-lanceolate; the upper leaves usually have two lateral lobes. The flowers are produced in narrow terminal racemes; the flowers are subtended by bracts that are divided into three white tipped lobes. The narrowly bilabiate corollas, which are about 10 to 25 mm. long, are whitish to yellowish. The erect upper lip is narrowly linear and about 4 or 5 mm. long, while the shorter lower lip is broad, three lobed, and has purple spots. The fruits are elliptic capsules that are about 6 to 10 mm. long. ❀March-May.

+∧***Castilleja densiflora*** (Bentham) Chuang & Heckard [*Orthocarpus densiflorus* Benth.] subsp. ***gracilis*** (Bentham) Chuang & Heckard [*Orthocarpus gracilis* Bentham; *O. densiflorus* var. *gracilis* (Benth.) Keck. This entry is based on a specimen that was collected "Along Tassajara Road at first summit, 1.3 miles north of White Oaks Campground," and thus in Bruce Flats (Reveal & Broome 6445; RSA 491744). Although this taxon is not known to occur elsewhere in this region, it strongly resembles *C. exserta*, and thus it may have been overlooked According to the note that is enclosed in the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of *C. densiflora* subsp. *gracilis* (Elmer 3352, June, 1901. DS), he collected it in Lost Valley. Lost Valley is about 5.5 linear miles south of Tassajara Hot Springs. The typical species occurs in Anastasia Canyon (PGM 6946 & 4968). ●R: Coast, Transverse and Peninsular ranges, from the Monterey Peninsula to northern Baja California. Also on Santa Cruz and Santa Catalina islands. The typical species occurs in the Sierra Nevada foothills and in the Coast and western Transverse ranges, from Shasta and Humboldt counties to Kern and Ventura counties. ●H: simple or upwardly branched annual herbs that range from about 10 to 40 cm. tall. The alternate leaves are lance linear and about 2 to 8 cm. long; they are entire of three lobed toward the apex. The flowers are produced in dense terminal racemes that are about 3 to 25 cm. long. The bracts are rose-purple, and the corollas, which are about 10 to 25 mm. long, vary from white to yellow or pink or rose purple. The fruits are ovoid capsules that are about 7 to 10 mm. long. ❀March-May.

Castilleja exserta (Heller) T. I. Chuang & Heckard [*Orthocarpus exsertus* A. Heller; *O. purpurascens* Bentham]. OWL'S CLOVER, PINK PAINTBRUSH, ESCOBITA. This showy flowered species is widely scattered at all elevations in the Tassajara region, and it is locally common, usually in colonies, in open grassland habitats. ●R: Sierra Nevada foothills and the Coast, Transverse and Peninsular ranges, from Humboldt and Shasta counties to northern Baja California. Also on San Miguel, Santa Rosa, Santa Cruz and Santa Catalina islands, and in the mountains of Arizona and Sonora, Mexico. ●H: erect annual herbs with simple or branched stems that range from about 1 to 4 dm. (4-16") tall. The alternate and sessile leaves, which are about 1 to 5 cm. long, are divided into five to nine narrowly linear segments. The flowers, which are crowded in head like terminal racemes, are subtended by bracts that are cleft into five to seven lobes. The lobes of the bracts and calyces are tipped with rose or rose lavender. The bilabiate corollas, which are about 12 to 30

mm. long, are mostly rose or rose lavender. The upper lip is narrow, hooked, and has a dense pubescence of the same color; the lower lip is broad, swollen, three lobed, and distally white to yellowish with dark rose lavender spots. The fruits are ovoid capsules that are about 1 to 1.5 cm. long. ֍April-May.

Castilleja foliolosa Hooker & Arnott. WOOLLY PAINT BRUSH. This distinctive species is widely scattered and locally common in openings in chaparral and in transitional areas at lower and intermediate elevations in the Tassajara region, especially in rocky places. ●R: Coast, Transverse and Peninsular ranges, from Humboldt and Tehama counties to northern Baja California. Also in the Sierra Nevada foothills, from Placer County to Mariposa County, and on Santa Catalina Island. ●H: semi shrubby and densely white to grayish woolly evergreen perennial herbs with erect or ascending stems that range from about 2 to 6 dm. (8-24") tall. The alternate leaves are sessile, and they often have small roundish to linear fascicles in the axils. The blades, which are about 1 to 4 cm. long, are linear to narrowly oblong, and the upper usually have two lateral lobes. The flowers, which are subtended by three to five lobed bracts, are crowded in terminal racemes. The lobes of the upper bracts and calyces are bright red to orangish red, or sometimes yellow. The narrowly bilabiate corollas, which are 18 to 25 mm. long, are red to orangish red or sometimes yellow. The upper lip is about as long as the tube, while the dark green lower lip is only about 2 mm. long. The fruits are many seeded capsules that are about 10 to 15 mm. long. ֍April-June.

Castilleja minor (A. Gray) A. Gray subsp. ***spiralis*** (Jepson) T. I. Chuang & Heckard [*C. stenantha* A. Gray; *C. spiralis* Jepson; *C. stenantha* subsp. *spiralis* (Jepson) Munz]. LITTLE PAINTBRUSH. This species is widely scattered in wet or seasonally wet habitats in the Tassajara region, mostly in rocky areas along streams, but it is not common. ●R: Coast Ranges, Central Valley, Sierra Nevada foothills, Transverse and Peninsular ranges, from Lake, Colusa and Tuolumne counties to northern Baja California. ●H: annual herbs with simple or sometimes branched stems that range from about 3 to 15 dm. (1-5') tall. The alternate leaves are narrowly lanceolate to linear, entire, and about 2 to 10 cm. long. The flowers are produced spike like terminal racemes that are about 1 to 4 dm. long; the lower flowers are often produced in the axils of the upper leaves, while the upper are subtended by red tipped bracts. The narrowly bilabiate corollas, which are 25 to 35 mm. long, are yellowish to dull reddish. The upper lip is nearly as long as the tube, while the lower lip is only about 2 to 3 mm. long. The fruits are ovoid capsules that are about 10 to 15 mm. long. ֍May-September.

CORDYLANTHUS. BIRD'S BEAK.

The genus *Cordylanthus* consists of 13 species of western North America. Twelve species occur in California, and six species, plus 11 lesser taxa, are endemic to the California Floristic Province. The name is derived from the Greek words *cordule*, club, and *anthos*, flower, on account of the shape of the corollas.

Cordylanthus rigidus (A. Gray) Jepson. BIRD'S BEAK, TRAIL WEED. This species is widely scattered and locally common at all elevations in the Tassajara region, primarily in grassy or rocky openings in chaparral. It is frequently seen along the margins of trails. ●R: Coast Ranges, Sierra Nevada foothills, and the Transverse and Peninsular ranges, from San Mateo and Tuolumne counties to northern Baja California. ●H: annual herbs with branching stems that range from about 3 to 10 dm. (12-40") tall. The leaves are alternate, sessile, about 1 to 3 cm. long, and the blades are narrowly linear with the larger divided into three linear segments. The flowers are produced few to many flowered head like terminal clusters, and subtended by three lobed bracts that are commonly tinged purplish. The bilabiate corollas are about 12 to 20 mm. long (they are largely obscured by the two sepals which are about equal length), laterally expanded and with lips of about equal length (and thus resembling a bird beak), pale green to yellowish, purplish tinged distally, and with a U shaped spot on the lower side. ֍July-September.

PEDICULARIS. LOUSEWORT, ELEPHANT HEADS.

This genus consists of about 500 species that are primarily of northern temperate and boreal regions and also of South America; most species occur in cool and wet habitats. The name is derived from the Latin word *pediculus*, pertaining to lice, which was due a belief that such plants promoted the infestation of lice when eaten by stock animals.

!*Pedicularis densiflora* Bentham ex Hooker. INDIAN WARRIOR. These distinctive perennial herbs are widely scattered at lower and intermediate elevations in the Tassajara region, and they mostly occur in the shade of tall *Ceanothus* dominated chaparral. The plants are usually found in small colonies, and such colonies were much more frequently encountered during the first spring after the Basin Complex Fire of 2008. The plants seemed to be unaffected by being exposed to full sunlight. ●R: Cascade Ranges, Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Josephine and Klamath counties in southwestern Oregon to northern Baja California. ●H: partly to mostly reddish tinged (and dry season deciduous) perennial herbs have one to several erect or ascending stems that range from about 1 to 5 dm. (4-20") tall. The alternate leaves are petiolate, and the blades, which are about 5 to 20 cm. long, are broadly lanceolate to elliptic or oblanceolate in outline, and pinnately divided into sharply toothed segments. The flowers are produced in crowded terminal racemes that are about 4 to 12 cm. long, and they are subtended by serrately margined bracts. The deep red bilabiate corollas are about 25 to 35 mm. long. The hood like upper lip is about 8 to 17 mm. long, while the much reduced and three lobed lower lip is only about 2 to 4 mm long. The fruit is an ovate capsule about 7 to 13 mm. long. ֍March-June.

TRIPHYSARIA.

Triphysaria consists of six species of temperate western North America and China. Five species plus two lesser taxa occur in California, and four species (plus the lesser taxa) are endemic to the California Floristic Province. The name is derived from Greek and means three bladders, on account of the three pouched lower lip of the corollas.

+*Triphysaria eriantha* (Bentham) T. I. Chuang & Heckard [*Orthocarpus erianthus* Benth.]. JOHNNY TUCK, BUTTER AND EGGS. This species was first discovered in the Tassajara region by Diane Renshaw in April of 2009, and thus during the spring after the Basin Complex Fire of 2008. She found it above Tassajara Road near the bathtub spring. ●R: locally common in open areas, especially in grasslands, from Del Norte and Shasta counties to western Santa Barbara County, and to Kern County in the Sierra Nevada. Disjunct populations occur on the Palo Verde Peninsula in Los Angeles County and in San Diego County. ●H: annual herbs with corymbosely branched (or sometimes simple) stems that range from about 10 to 35 cm. tall. The purplish leaves, which are about 1 to 5 cm. long, are pinnately divided into linear segments. The floral bracts are divided into four to ten linear divisions. The floral spikes are generally lax below and more congested and relatively flat topped at the summit. The corollas, which are about 1 to 2.5 cm. long, have long slender tubes

that are much exserted from the calyces. The small beak is dark purple, while the lower lip is much inflated into three pouches; the lower lip is typically yellow with areas of white. The fruit is a many seeded oblong capsule about 5 to 8 mm. long. ❁March-May.

OXALIDACEAE. OXALIS FAMILY.

According to the Angiosperm Phylogeny Website, *Oxalidaceae* consists of 6 genera and approximately 770 species that primarily occur in tropical and subtropical regions. The species range from annual herbs to trees.

OXALIS.

The genus *Oxalis* is comprised of approximately 700 species that are especially well represented in the tropical regions of the Americas and southern Africa. Although two *Oxalis* species are native to the Santa Lucia Mountains (*O. albicans* and *O. oregana*), both are restricted to coastal facing slopes and canyons. The name is based on the Greek word *oxus*, sour, on account of the sour taste that is produced by oxalic acid.

1a. Plants with trailing stems and cauline leaves. Flowers axillary; petals less than 1 cm. long. . . . . ***O. corniculata***.
1b. Plants with erect flowering stems and basal leaves. Flowers terminal; petals more than 1 cm. long. . . . . ***O. pes-caprae***.

Oxalis corniculata Linnaeus. WEEDY SORREL. This species is weedy in and about the developed area of Tassajara, and occasionally along Tassajara Creek, downstream from the hot springs. ●R: a common weed in North America; native to Europe. ●H: small perennial herbs with decumbent or trailing stems that range from about .5 to 3 dm. (2-12") long. The stems frequently root at the nodes. The alternate leaves have petioles that are about 1 to 5 cm. long; the blades are divided into three generally obcordate leaflets about 5 to 10 mm. long. The flowers are produced mostly in 2's or 3's on axillary peduncles that are about 2 to 5 cm. long. The corollas consist of five yellow petals that are about 4 to 8 mm. long. The fruit is a linear capsule about 1 cm. long. ❁mostly April-October.

Oxalis pes-caprae Linnaeus. BERMUDA BUTTERCUP, SOUR GRASS. This distinctive species has been present in the developed area of Tassajara since at least the late 1970s. Tassajara gardeners should keep an eye on it, for it has the potential to spread into the surrounding wilderness, and once it is established, due to its bulbous root system, it is hard to eradicate. ●R: a common weed in California, Europe, Australia and elsewhere; native to southern Africa (not Bermuda). ●H: bulbous perennial herbs with leafless peduncles that are about 1.5 to 3 dm. (6-12") tall. The leaves are basal and have petioles that are 1 to 2 dm. long; the blades are divided into three obcordate leaflets that are about 1 to 2.5 cm. long. The corollas consist of five yellow petals that are about 15 to 25 mm. long, and the capsules are about 5 to 7 mm. long. ❁December-May.

PAPAVERACEAE. POPPY FAMILY.

Papaveraceae includes about 25 to 30 genera and about 400 species; the species range from annual herbs to shrubs and small trees, and they primarily occur in the temperate and subtropical regions of the Northern Hemisphere. This family is the source of many ornamental plants, as well as the narcotic opium poppy, *Papaver somniferum*.

1a. Corollas asymmetrical. Petals 4, the inner 2 connected at the apex, the outer 2 connected at the base. . . . . ***Ehrendorferia***.
1b. Corollas symmetrical. Petals 4 or 6 and totally distinct:
  2a. Petals six, white, and less than 5 mm. long. Leaves opposite or whorled, and simple. . . . . ***Meconella***.
  2b. Petals four, yellow to orange or sometimes red, and more than 5 mm. long. Leaves alternate or strictly basal, and simple or divided into lobes or narrow segments:
    3a. Shrubs or shrubby plants of chaparral habitats. Leaves simple. . . . . ***Dendromecon***.
    3b. Herbaceous plants primarily of open grassy habitats or on recent burns. Leaves lobed or dissected into narrow segments:
      4a. Ovaries y and fruits more than 3 times longer than wide. . . . . ***Eschscholzia***.
      4b. Ovaries and fruits less than 3 time longer than wide. . . . . ***Papaver***.

DENDROMECON. BUSH POPPY.

The genus *Dendromecon* consists of two species that are endemic to the California Floristic Province. The name is derived from the Greek words *dendron*, tree, and *mekon*, poppy.

Dendromecon rigida Bentham. BUSH POPPY, TREE POPPY. This well known species is widely scattered in chaparral habitats at lower and intermediate elevations in the Tassajara region, and it is fairly common in some areas. ●R: Coast, Transverse and Peninsular ranges, from Mendocino and Glenn counties to northern Baja California, and the Sierra Nevada foothills, from Shasta County to Kern County. Also on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: lanky evergreen shrubs that range from about 1 to 2.5 m. (3.3-8.2') tall. The alternate leaves have petioles that are about 2 to 8 mm. long, and the blades, which are about 2 to 10 cm. long, are linear-lanceolate to lance-oblong, and the margins have minute teeth. The blades, which are relatively stiff, are yellowish to grayish green. The showy flowers are produced singularly on pedicels that are about 3 to 9 cm. long, and the corollas consist of four bright yellow petals that are about 2 to 3 cm. long. The fruits are narrow and upwardly curving capsules that are about 5 to 10 cm. long. ❁May-July.

EHRENDORFERIA. EAR DROPS.

Ehrendorferia is comprised of two species that are endemic to the California Floristic Province. This genus, which has been segregated from *Dicentra*, was named for the Austrian evolutionary and taxonomical botanist Frederich Ehrendorf (1927-).

Ehrendorferia chrysantha (Hooker & Arnott) Rylander [*Dielytra c*. H. & A.; *Dicentra c*. (H. & A.) Walpers]. GOLDEN EAR DROPS. This distinctive species is widely scattered in the Tassajara region, mostly in chaparral or in rocky areas in woodlands, and it is locally common on some of the higher ridges. ●R: Coast, Transverse and Peninsular ranges, from Mendocino and Glenn counties to northern Baja California, and the Sierra Nevada foothills, from Amador County to Kern County. ●H: perennial herbs from stout roots that annually

produce one to several erect or ascending branches that range from about 6 to 18 dm. (2-6') tall. The alternate leaves, which are about 10 to 30 cm. long, are irregularly bipinnately divided into narrow segments or lobes. The flowers are produced in loosely to densely flowered terminal panicles that are about 2 to 5 dm. long. The corollas are comprised of four yellow petals that are about 12 to 16 mm. long; they are produced in two dissimilar series. The two outer petals are united at the base and flare outward at the apex, while the two inner petals converge and unite at the apex. The fruits are one celled and two valved capsules that are about 15 to 25 mm. long. ♔April-September.

ESCHSCHOLZIA. GOLDEN POPPY.

The genus *Eschscholzia* includes 12 species that are endemic to western North America. The genus is especially well represented in California, for ten species occur within boundaries of the state, and six are endemic to the California Floristic Province. The genus was named by the naturalist and poet Adelbert Ludwig von Chamisso (1781-1838), for the physician and naturalist Johann Friederich von Eschscholtz (1793-1831). Both men served as naturalists on the Russian ship Rurik, which made a round the world exploratory expedition under the command of Otto von Kotzebue from 1815 to 1818, and Chamisso collected the type specimen at San Francisco in October of 1816. In his original description of the type species, *Eschscholzia californica*, Chamisso failed to include the t in Eschscholtz's name, and thus we have *Eschscholzia* instead of *Eschscholtzia*.

1a. Petals and capsules subtended by a rim about .5 to 5 mm. wide. . . . . ***E. californica***.
1b. Petals and capsules not subtended by a rim, or subtended with a rim less than .3 mm. wide:
2a. Flower buds glabrous and erect. Petioles generally glabrous. . . . . ***E. caespitosa***.
2b. Flower buds hairy and nodding. Petioles generally hairy. . . . . ***E. hypecoides***.

!*Eschscholzia caespitosa* Bentham [*E. tenuifolia* Bentham; *E. flaccida* Fedde; *E. elmeri* E. Greene, etc.]. SLENDER CALIFORNIA POPPY. In normal years this highly variable species is lightly scattered in open and usually grassy habitats at lower and intermediate elevations in the Tassajara region, but during the first spring after the Basin Complex Fire of 2008 it was locally abundant. In many places it occurred in large colonies, and those that occurred on mountain slopes produced large yellow patches that could be seen from many miles away. Densely tufted plants, which correspond to George Bentham's *E. tenuifolia*, occur along the Arroyo Seco-Indians Road between the Marble Peak Trail head and the Arroyo Seco Campgrounds. A. D. E. Elmer's "Tassajara Hot Springs" specimen of this species (Elmer 3268; DS 42984) is noteworthy for several reasons. Elmer assigned this specimen to *E. caespitosa*, but in 1905 Edward Greene designnated it as the type specimen of his *E. elmeri* (*Pittonia* 5: 286). In the typescript "Plants collected by A. D. E. Elmer from Tassajara Hot Springs and Vicinity, Monterey County, June, 1901," which on file in the type specimen room of the herbarium of the California Academy of Sciences, this species is listed as *E. hypecoides*. Someone handwrote "*E. flaccida* Fedde" above the specimen's label, and for some unknown reason it is presently listed under this name in the Consortium of California Herbaria database, even though this name has long been considered to be a synonym of *E. caespitosa*. According to the note that is enclosed in an envelope that is pasted to the specimen sheet, Elmer collected it between The Caves and Pine Valley. ●R: Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Douglas County in southwestern Oregon to San Diego County. Also on San Miguel and Santa Rosa islands. ●H: annual herbs with erect or ascending stems that range from about 1 to 3 dm. (4-16") tall. The leaves are mostly basal and have petioles that are about 1 to 7 cm. long. The blades, which are about 1 to 3 cm. long, are ternately divided into sections that are further dissected into small linear segments. The flowers are singular and terminal on the branches, and the corollas consist of four yellow and generally fan shaped petals that are about 1 to 2.5 cm. long. The fruits are narrow capsules that are about 4 to 8 cm. long. ♔March-July.

Eschscholzia californica Chamisso. CALIFORNIA POPPY. This very well known species is conspicuous in its absence in most of the Tassajara Creek Canyon, although it is common some areas, such as in the open meadows in the Church Creek area, along the Pine Ridge Trail between China Camp and the Church Creek Divide, in the Horse Pasture (on the very steep grassy slopes to the east of trail), and on the alluvial benches that are above (and north of) Tassajara Creek between the Horse Pasture Trail and the Arroyo Seco. Plants that exist in the developed area of the hot springs are of garden origin. ●R: Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from southern Washington to northern Baja California. Also on San Miguel, Santa Rosa, Santa Cruz, San Nicolas, Santa Catalina and San Clemente islands. This species has become naturalized in many other regions of the world. ●H: showy flowered annual or short lived perennial herbs with erect or ascending stems that range from about 2 to 6 dm. (8-24") long. The leaves are basal and cauline, and the cauline leaves are alternate. The petioles are about 2 to 12 cm. long, and the blades, which are about 2 to 8 cm. long, are ternately divided into major divisions that are dissected into narrow segments. The upper most leaves are much reduced in size. The showy flowers are singular and terminal on the stems and branches. The corollas consist of four silky textured petals that are about 2 to 6 cm. long. Flowers blooming in the spring months tend to have larger and deep orangish yellow petals, while flowers blooming during the summer months tend to have smaller petals that are generally yellow. The fruits are narrow capsules that are about 3 to 9 cm. long. ♔January-November.

Eschscholzia hypecoides Bentham [*E. caespitosa* var. *h.* A. Gray]. SAN BENITO POPPY. Although there are two herbarium specimens from the Tassajara region that are presently assigned to this species, based on my observation of them they actually represent *E. caespitosa*, for the flower buds are glabrous and erect. These specimens represent *E. caespitosa* plants that are in the late stages of their flowering period, during which they develop longer and more leafy stems and have pale yellow petals that are only about 5 to 10 mm. long. One of these specimens was collected by William Russell Dudley at "Tassajara, Santa Lucia Mountains" on June 11th of 1901 (DS 43067), and the other was collected by Jens Clausen on "Chew's Ridge, 6 miles from Jamesburg P. O., near lookout" in July of 1934 (Clausen 888; DS 679731). It is quite possible, however, that *E. hypecoides* occurs somewhere in this region, for there are many herbarium specimens in the Consortium of California Herbaria database that were collected in the lower Arroyo Seco Canyon and in the canyon of Paloma Creek. I have thus included this species in the preceding key.

MECONELLA. LITTLE POPPY.

The genus *Meconella* is small, for it includes only three species that are endemic to western North America. The name is a combination of the Greek word *mekon*, poppy, and the Latin diminutive suffix *ella*, and thus means little poppy.

^***Meconella denticulata*** E. Greene [*M. oregana* Nuttall var. *d.* (Greene) Jepson]. SMALL FLOWERED MECONELLA. This species is scattered on shady woodland slopes at lower and intermediate elevations in the Tassajara region, but it is inconspicuous and thus easily overlooked. It was abundant in the Outer Flats and the adjacent mountain slopes during the first spring after the Basin Complex Fire of 2008.

Above: distant fields of *Eschscholzia caespitosa* as viewed from Tassajara Road in the vicinity of Lime Point in April of 2009; the Elephant's Back is in the far distance. Below: *Eschscholzia caespitosa* in the Outer Flats in April of 2009. Photographs by the author.

●R: Coast, Transverse and Peninsular ranges, from Fort Ord in northern Monterey County to northern Baja California. Also on Santa Cruz Island. ●H: small annual herbs with slender stems that range from about 1 to 2 dm. (4-8") tall. The leaves, which are about 1 to 4 cm. long, vary in size and shape depending on the location on the plant. Basal leaves, which are produced in rosettes, typically have long petioles and ovate to obovate blades, the leaves at the lower and middle nodes vary from linear to oblong-oblanceolate or spatulate and are generally whorled in four's, while the upper most leaves are opposite, sessile, and narrowly linear to oblanceolate. The margins are remotely toothed or entire. The flowers are terminal and axillary on filiform pedicels that are about 1 to 5 cm. long. The corollas consist of six white petals that are about 2 to 4 mm. long. The fruits are narrowly linear and twisted capsules that are about 2 to 3 cm. long ❀March-May.

PAPAVER. POPPY.

This well known genus includes more than 70 species of annual and perennial herbs, most of which are native to Eurasia. The botanical name of the infamous Opium Poppy is *Papaver somniferum*. *Papaver* is the Latin word for poppy.

+***Papaver californicum*** A. Gray. CALIFORNIA FIRE POPPY. On my first visit to Tassajara in early April of 2009, and thus during the first spring after the Basin Complex Fire of 2008, I found a small population of these elusive plants at the highest point on the Hog's Back, and shortly afterwards along Tony's Trail, where it was rather common from about a quarter of the way up and continuing to near the summit on the Tassajara side of the ridge. It was also scattered on the flood plains of Tassajara Creek, from the Outer Flats to near the confluence of Church Creek. Diane Renshaw and others found a few plants on the Tassajara Cut-Off Trail, but I failed to notice these plants. During the spring of 2010 I saw only one very small and sickly looking plant along a section of Tony's Trail, where this species had been very common in the previous spring. ●R: Coast, Transverse and Peninsular ranges, from Marin and Contra Costa counties to San Diego County. Also in the southern Sierra Nevada, from Tulare County to Kern County, and on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: annual herbs with erect stems that range from about 3 to 6 dm. (12-24") tall. The leaves, which are primarily basal, range from about 3 to 9 cm. long, are pinnately divided into lobes that are further (and variously) lobed or toothed. The long pedunculate flowers are solitary, and the four petals, which are about 1 to 2 cm. long, range from medium orange (ours) to brick red. The fruits are flat topped capsules that range from about 10 to 16 mm. long; the capsules contain hundreds of minute black seeds. ❀April-May.

This species eluded detection by botanists until 1886, when it was first named and described by Asa Gray in December of that year in volume 22 of *The Proceedings of the American Academy of Arts and Sciences* (pages 313-14). According to Gray:

> One is naturally slow to believe in an indigenous Californian Corn Poppy. In the spring of 1886 that excellent florist and acute observer, Mr. Spence, of Santa Barbara, sent me some flowers of this plant which he had picked up in the Santa Ynez Mountains, at an elevation of 1,500 or 2,000 feet, far away from any cultivation, on ground which had been covered by Manzanita, but had been burned over the year before. These flowers and forming pods, so far as could be told by inspection, might have belonged to *Papaver dubium* or *P. rhroeas*, species which might be expected to abound in old Californian wheat fields, although they had not there been met with to my knowledge. At this moment I receive from Mr. Spence a supply of mature capsules and seeds gathered last summer at the same station, or partly at another similar station, about forty miles further west, "Far away from any trail," on ground which had similarly been burned over; and with these some flowering materials raised from their seed in his conservatory. These capsules are so like those of *P. dubium* that, apart from their history, they might pass for such. But they all (nearly one hundred in number) have the peculiarity described in the character… I conclude, therefore, that Mr. Spence's plant is an indigenous species.

In the following year this species was collected by J. G. Lemmon in a "Hilly and mountainous region of San Luis Obispo County." Lemmon's specimen served as the type specimen of Edward Greene's *Papaver lemmonii* (*Pittonia* 1: 168).

PARNASSIACEAE. GRASS OF PARNASSUS FAMILY.

As presently treated in the Jepson eFlora (as of 4/5/2015), the genus *Parnassia* and the monotypic genus *Lepuropetalon* are placed in *Parnassiaceae*, but according to the Angiosperm Phylogeny website (and other sources) these genera are included in *Celastraceae*, which consists of 94 genera and about 1400 species. *Parnassia* was formerly placed in *Saxifragaceae*.

PARNASSIA. GRASS OF PARNASSUS.

According to the Jepson eFlora website, *Parnassia* includes about 70 species, while according to the Angiosperm Phylogeny website this genus consists of about 50 species. In any case, this genus is comprised of perennial herbs that are endemic to temperate and boreal regions of the northern hemisphere. The genus was named from Mount Parnassus in Greece.

Parnassia palustris Linnaeus [*P. californica* (A. Gray) E. Greene; *P. palustris* L. var. *c*. Gray]. COMMON GRASS OF PARNASSUS. This entry is based on the following citation in Beatrice Howitt and John Thomas Howell's "Supplement to Vascular Plants of Monterey County" (1973): "Near Horsebridge Camp on Arroyo Seco River, [Jeff] Norman in 1970." Elsewhere in the Santa Lucia Mountains of Monterey County specimens of this species have been collected along the Big Sur River in the vicinity of Ventana Camp, along Ventana Creek (which enters the Big Sur River in the vicinity of Ventana Camp), on Junipero Serra Peak, and along Salmon Creek. ●R: widely distributed in the temperate and boreal regions of the northern hemisphere. In California this species occurs in the southern Cascade Ranges and southward, through the Coast Ranges, to the Santa Lucia Mountains of San Luis Obispo County, and in the Sierra Nevada, from Butte and Plumas counties to Tulare and Inyo counties. Disjunct populations occur in the mountains of Santa Barbara, Los Angeles and San Bernardino counties. ●H: perennial herbs with strictly basal leaves and long and slender scapes that are about 2.5 to 5 dm. (19-20") tall. The leaves are produced in rosettes, and the petioles are about 2 to 10 cm. long. The blades, which are about 2.5 to 4 cm. long, are broadly to narrowly ovate and have cuneate bases and entire margins. The flowers are singular and terminal on the scapes, and are usually closely subtended by an ovate bract less than 1 cm. long. The corollas consist of five round-ovate petals about 8 to 20 mm. long, which are pale white with yellowish or greenish veins. The fruit is a four valved capsule about 8 to 12 mm. long. ❀July-October.

Papaver californicum along Tony's Trail in early May of 2009.

PHRYMACEAE. MONKEY FLOWER OR LOP SEED FAMILY.

Due to the findings of phylogenetic research, the genus *Mimulus* has been transferred from *Scrophulariaceae* to *Phrymaceae*, a family that consists of 13 genera and about 188 species. Most of the species are endemic to temperate North America, but the family is also represented in Central and South America, South and Southeast Asia, Australia and New Zealand, Madagascar and south east Africa. In the first edition of this text all of the following plants were included in the Monkey Flower genus *Mimulus*, but due to findings of more recent phylogenetic research, this genus has been greatly dismembered (*Phytoneuron* 2012-39: 1-60; 2012). The common name Monkey Flower is a misnomer that was based on an assumption by English botanists that Linnaeus (Carl von Linne, 1707-1778) had based the name on the Greek word for a monkey. On page 182 of Linnaeus's *Philosophia Botanica* (1755), he defined *Mimulus* as "*Mimus personatus*;" *Mimus* is a Latin word for a mimic actor, and *personatus* is a Latin word for a mask. As *ringens* is a Latin word for gaping, Linnaeus obviously thought that the flowers of the type species, *Mimulus ringens*, resembled gaping masked mimics.

1a. Pedicels shorter than the calyces. Plants of dry habitats (except *D. douglasii*). Shrubs, subshrubs and annual herbs. . . . . ***Diplacus***.
1b. Pedicles longer than the calyces. Plants restricted to wet habitats (except sometimes *E. nasuta*). Annual and perennial herbs:
2a. Calyx tube longer than the calyx lobes; calyx midribs strongly angled. . . . . ***Erythranthe***.
3b. Calyx tube about as long as the calyx lobes; calyx midribs faint and not raised. . . . . ***Mimetanthe***.

DIPLACUS. SHORT PEDICELED MONKEY FLOWERS.

The genus *Diplacus* consists of about 47 species that are endemic to temperate western North America. The name is based on the Greek words *dis*, two, and *plakos*, placenta, on account of the two separating placentas of the fully ripened seed capsules.

1a. Evergreen shrubs or subshrubs. Flowers yellow to orange or saffron. . . . . ***D. linearis***.
1b. Annual herbs. Flowers primarily purplish pink:
2a. Lower corolla lips nearly absent. Fruits hard, asymmetrical-ovate in outline, and indehiscent while stems are alive. . . ***D. douglasii***.
2b. Lower corolla lips fully developed. Fruits fragile, narrowly lanceolate in outline, and promptly dehiscent:
3a. Flowers produced singularly at the nodes. . . . . ***D. fremontii***.
3b. Flowers (or at least some flowers) produced in opposite pairs at the nodes. . . . . ***D. bolanderii***.

Diplacus bolanderi (A. Gray) G. L. Nesom [*Mimulus b*. A. Gray]. TOBACCO SCENTED MONKEY FLOWER. The only area in the Tassajara region where I have seen this species is in chaparral along the Carmel River Trail on its ascent out of Pine Valley and before its descent into Hiding Canyon. According the note that is enclosed the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara

Hot Springs" specimen of this species (Elmer 3356 DS, June 1901), he collected it in "Dry soil by trail to summit north of Little Valley." As Elmer specifically stated Pine Valley, Lost Valley and Indian Valley as locations at which he collected specimens on that expedition, I have a hunch that his "Little Valley" is what is now known as Strawberry Valley. As this species primarily occurs in disturbed chaparral habitats, especially after fires, it is possible that it is more widely scattered in the Tassajara region. ●R: Coast Ranges and the western Transverse Ranges, from Trinity and Shasta counties to the Rose Lake area in Ventura County, and the Sierra Nevada (especially the foothills), from Plumas County to Tulare County. ●H: annual herbs with erect or ascending stems varying from just a few cm. tall to up to 9 dm. tall (1-36"). The plants emit a tobacco like odor. The opposite leaves are short petiolate, and the blades are obovate to oblanceolate or narrowly oblong, entire or remotely toothed towards the apex, and about .5 to 6 cm. long. The flowers are produced in the axils of the leaves; the lower flowers are often singular, but the upper are usually in opposite pairs. The bilabiate corollas, which are about 12 to 30 mm. long, are pale pink to dark reddish purple, and two white lines crest the folds on the lower side. The fruit is a slender and upwardly tapering capsule that is about 7 to 13 mm. long. ♔May-October.

+∨***Diplacus douglasii*** (Bentham) G. L. Nesom [*Eunanus d*. Bentham, *Mimulus d*. (Bentham) A. Gray]. CHINLESS MOUSE EARS, MAGENTA MOUSE EARS. In the first edition of this text I noted that "Nearly acaulescent plants growing on gentile sandy soiled slopes in openings in chaparral in the northwestern area of Pine Valley probably represent *M. douglasii*, or perhaps *M. congdonii*. None of the plants had flowers at the time of observation, but the capsules were hard, indehiscent, and oblique-ovoid." I revisited this site in late May of 2009, but it was also too late in the season to find any plants that still had corollas. The identity of these plants remained a mystery to me until I discovered a record in the Consortium of California Herbaria database of a specimen of *M. douglasii* that was collected by Dieter Wilken and Al Flinck "5 miles west of summit of road to Tassajara Hot Springs," in April of 1968 (UCSB 26160). The area in Pine Valley where I found the plants is 4 ½ miles due west of the Chew's Ridge Lookout. For the record, this specimen is cited in David Thompson's "Systematics of *Mimulus* Subgenus *Schizoplacus*" (*Systematic Botany Monographs* 75, 2005), but in this text the stated location of its collection is "1/4 mi. W. of summit of road to Tassajara Hot Springs." ●R: from Benton County in western Oregon to Kern County in the Sierra Nevada, and to the Santa Lucia Mountains of northwestern San Luis Obispo County in the Coast Ranges. This species also occurs in the Warner Mountains of Modoc County. ●H: small and often nearly acaulescent annual herbs that range from about 3 to 40 mm. tall. The nearly sessile leaves have ovate to obovate blades that are about 5 to 28 mm. long. The flowers are produced in the axils of the leaves on pedicels that are about 2 to 4 mm. long. The showy corollas are about 3 to 4 cm. long, and are more than twice as long as the calyx. The lower lip is nearly absent, while the upper lip consists of two large magenta lobes. The inner tube is very dark purple and marked with yellow. The fruit is an asymmetrical capsule about 3 to 6.5 mm. long. ♔February-April.

!∧***Diplacus fremontii*** (Bentham) G. L. Nesom [*Eunanus f*. Benth.; *Mimulus subsecundus* A. Gray; *Mimulus f*. (Bentham) A. Gray]. ONE SIDED MONKEY FLOWER. This species is widely scattered, but generally uncommon, at all elevations in the Tassajara region, and it mostly occurs in open grasslands or in grassy openings in chaparral. It was much more common during the first spring after the Basin Complex Fire of 2008, and the plants were much larger than they normally are. The small plants that are sometimes seen in this region during normal years, which have darker hued corollas with yellow ridges on the throat, represent what Asa Gray recognized as *Mimulus subsecundus*. ●R: Coast, Transverse and Peninsular ranges, from Carmel Valley in Monterey County, and the vicinity of Pinnacles National Monument in San Benito County, to northern Baja California. Also in desert regions of Inyo, San Bernardino, Riverside and Imperial counties. ●H: small and highly variable annual herbs with erect or ascending stems that range from about .4 to 2 dm. (1-8") tall, and depauperate plants often have only two leaves and one flower. The leaves are opposite, sessile, and entire, and the blades, which are about 1 to 3 cm. long, are oblong to broadly oblanceolate; the blades are commonly reddish to purplish tinged, especially below. The flowers are produced in the axils of the leaves on short pedicels. The bilabiate corollas, which are about 1.5 to 2.5 cm. long, varying from rose violet to dark reddish purple, and they often have two yellow ridges on the throat. The fruits are many seeded capsules that are about 7 to 13 mm. long ♔April-July.

Diplacus linearis (Bentham) E. Greene [*Mimulus l*. Benth; *Diplacus fasciculatus* (Pennell) McMinn; *Mimulus bifidus* subsp. *fasciculatus* Pennell; *D. longiflorus* var. *linearis* (Benth.) McMinn; M. *glutinosus* var. *linearis* (Benth.) A. Gray; *M. longiflorus* var. *linearis* (Benth.) A. L. Grant, etc. *M. aurantiacus* (Curtis) var. *grandiflorus* (Lindley) D. M. Thompson mis-applied]. SANTA LUCIA STICKY MONKEY FLOWER. This showy flowered species is widespread and locally common to abundant at all elevations in the Tassajara region, and it primarily occurs in transitional habitats and in openings in chaparral, especially in rocky areas. ●R: mostly in the Santa Lucia Mountains of Monterey and northwestern San Luis Obispo counties, but also in the Gabilan Range (in both Monterey and San Benito counties). ●H: evergreen shrubs or sub shrubs typically with rounded crowns that range from about 4 to 10 dm. (16-40") tall. The glandular (sticky) leaves are opposite, mostly linear-oblong or elliptic with revolute or sometimes outwardly toothed margins, and about 2 to 6 cm. long. The larger leaves, which are elliptic, are shed at the onset of the dry season, and thus dry season plants usually have only linear and linear-oblong leaves. Smaller leaves are clustered in the axils of the primary leaves. The flowers are produced in the axils of leafy terminal racemes. The bilabiate corollas, which are about 4 to 5 cm. long, range from yellow to pale orange or sometimes pale peach, saffron or white, and the five primary lobes are deeply two lobed. The fruit is a many seeded capsule. ♔May-July

In the future it is possible that the accepted name for this taxon will become *D. aurantiacus* (Curtis) Jepson var. *linearis* (Bentham) D. J. Keil, for David Keil has proposed new varietal combinations for the *D. aurantiacus* complex (*Phytoneuron* 2019-3: 1-8, 2019). The *Diplacus aurantiacus* complex as treated by Keil includes ten taxa and several named hybrids that, as a whole, range from southwestern Oregon to northwestern Baja California (thus they are endemic to the California Floristic Provence), and genetically (and thus morphologically) intermediate plants occur where the distribution boundaries border or overlap. *Diplacus linearis* plants are readily discernible from the typical variety (*D. aurantiacus*) in this part of California, due to their larger and deeply lobed corollas. If one closely observes plants along the route between Tassajara and the Monterey Peninsula, the gradual transition from *linearis* characteristics to *aurantiacus* characteristics will be seen.

The type specimen of *D. linearis* was collected by David Douglas in the early 1830s, and because its stated location was only "California," subsequent botanists misapplied the name to plants that occur in regions of California where Douglas did not explore. The lectotype specimen at Kew (K001079320), an image of which is online, appears to be a hybrid between *linearis* and *aurantiacus* plants.

In 1890 Edward Greene applied the name *D. grandiflorus* to the large flowered plants of the Santa Lucia Mountains and the northern Sierra Nevada, and noted that "What I now find to be of a species hitherto unrecognized, comes from Monterey County (Hickman) and from the foothills of the Sierra Nevada in Yuba Co., California. In pubescence, and also in respect to the pattern of the large and Salpiglossis-like corolla, it is exceedingly unlike any of the plants described by Nuttall or by anyone else" (*Pittonia* 2: 156-157, 1890; in the same text Greene stated that *D. linearis* was "Common in

southern California and on the [Baja] peninsula"). Greene's name for this taxon was redundant, for it had already been applied to the plants of the northern Sierra Nevada. In 1857 the German botanist Johannes Groenland described this taxon from horticulturally grown plants (*Revue Horticole* s. 4 v. 6: 402), and the accompanying illustration clearly depicts *D. grandiflorus* of the northern Sierra Nevada, for it has broader leaves and broader corollas lobes than those of the Coast Range plants.

The next botanist to address the plants of the Santa Lucia Mountains was Francis Pennell, who in 1947 described them under the name *Mimulus bifidus* subsp. *fasciculatus* (*Proceedings of the Academy of Natural Sciences of Philadelphia* 99: 168). *Mimulus bifidus* is the name that Pennell applied to the large flowered taxon of the northern Sierra Nevada that is now known as *Diplacus grandiflorus*.

In 1951 Howard McMinn recognized the Santa Lucia Mountains plants as distinct under the name *Diplacus fasciculatus* (Pennell) McMinn, and listed *Diplacus linearis* as a hybrid under the name *D. aurantiacus* x *D. fasciculatus* [x *D. linearis* (Benth.) McMinn] (*Madrono* 11: 70-73 & 87-88). In this excellent paper McMinn noted that "I have chosen to treat all these field entities (taxa) simply as binomials. Inasmuch as binomials to most botanists indicate species, I have endeavored not to use the word species when writing of these various entities. I must point out, however, that if sterility and geographical distribution tests were the main criteria applied in delimiting species and subspecies, then the field entities of the genus *Diplacus* probably would be classified as two taxonomic species [*D. aurantiacus* and *D. clevelandii*], eleven subspecies, and numerous hybrids."

In 1993 David Thompson, in the first edition of *The Jepson Manual, Higher Plants of California*, reduced all the members of the *Diplacus* (*Mimulus*) *aurantiacus* complex to forms of *Mimulus aurantiacus*, and in 2005 he elevated them to varietal level in his *Systematics of Mimulus Subgenus Schizoplacus* (*Systematic Botany Monographs* 75). In this text Thompson grouped the plants of this region with the northern Sierra Nevada plants under the name *Mimulus aurantiacus* var. *grandiflorus* (Lindley) D. M. Thomson.

Due to the findings of phylogenetic research, in 2012 Bill Barker, Guy Nesom, Paul Beardsley and Naomi Fraga split *Mimulus* into a number of genera (*Phytoneuron* 2012-39: 1-60), and placed the woody stemmed monkey flowers in the genus *Diplacus* section *Diplacus* (*Diplacus* was first applied to them by Thomas Nuttall in 1838). In this paper 13 taxa were recognized within *Diplacus* section *Diplacus*, three of which were considered to be hybrids that "Appear to behave essentially as species." *D. linearis* was listed as one of these hybrid taxa (as *D.* x *linearis*), and it was speculated that it was a cross between *D. aurantiacus* and *D. calycinus* ("= *D. aurantiacus* x *D. calycinus?*").

In the same year (2012) Melisa Tulig and Guy Nesom, in their paper "Taxonomic Overview of *Diplacus* sect. *Diplacus*" (*Phytoneuron* 2012-45: 1-20), also listed *D. linearis* as a hybrid, and noted that "*Diplacus grandiflorus* and *D.* x *linearis* appear to be distinct as a pair, particularly in the notching of the upper corolla lobes, but morphology and geography suggest that the parents of *Diplacus* x *linearis* are *D. calycinus* and *D. aurantiacus*, thus *D. grandiflorus* and *D.* x *linearis* are not each other's closest relatives."

In 2013, in his paper "Taxonomic Notes on *Diplacus*" (*Phytoneuron* 2013-66: 1-8), Guy Nesom noted that the "Treatment of *D. linearis* as a nothospecies [hybrid] is speculative."

The results of a phylogenetic analysis that was published in 2017 showed that *D. linearis* was not a hybrid, being a monophyletic (descending from a common ancestor) sister group of *D. grandiflorus*, and that the *Diplacus aurantiacus* complex consisted of infraspecific subspecies or varieties of *D. aurantiacus* (Chase, M.A., S. Stankowski, and M.A. Streisfeld. "Genomewide Variation Provides Insight into Evolutionary Relationships in a Monkeyflower Species Complex," *American Journal of Botany* 104: 1510–1521).

Thus in 2019, David Keil, in his paper "New Varietal Combinations in *Diplacus* for the Shrubby Monkeyflowers, the *Diplacus aurantiacus* Complex" (*Phytoneuron* 2019-3: 1-8), treated the *D. aurantiacus* complex as consisting of nine varieties and numerous hybrids. Keil states that: "I want to treat the shrubby monkeyflowers with nomenclature that is both up to date and practical… Therefore I propose new combinations at the varietal level in *Diplacus aurantiacus* to accommodate the taxa that form this wonderful example of evolution in progress. I use the varietal rank rather than subspecies because this is the rank that has been applied in most past studies in this group that recognized infraspecific taxa."

ERYTHRANTHE. LONG PEDICELED MONKEY FLOWERS.

The genus *Erythranthe* includes about 122 species, most of which are endemic to temperate North America (especially western North America; the genus is also represented in Central and South America and Asia). The name is derived from the Greek words *erythros*, red, and *anthe*, flower, due to the color of the flowers of the type species, *E. cardinalis*.

1a. Corollas red to reddish orange (very rarely yellow or brown); the lateral lobes are reflexed. . . . . ***E. cardinalis***.
1b. Corollas yellow (often with red spots or markings); the lateral lobes are spreading:
  2b. Corollas weakly bilabiate; the throat is open. . . . . ***E. floribunda***.
  2a. Corollas strongly bilabiate; the throat is nearly closed by an upwardly swollen palate:
    3a. Rhizomatic perennial herbs. The lower corolla lips usually have small reddish dots. . . . . ***E. guttata***.
    3b. Fibrous rooted annual herbs. The lower corolla lips usually have a large diamond or triangular shaped red spot. . . . . ***E. nasuta***.

Erythranthe cardinalis (Douglas ex Bentham) Spach [*Mimulus cardinalis* Douglas ex Bentham]. SCARLET MONKEY FLOWER. This showy flowered species is widely scattered and fairly common along perennial streams in the Tassajara region, and it is sometimes found at springs and seeps. Plants that occur in sunny or mostly sunny places are much more robust than those that occur in shady areas. This species was a hit among European gardeners after its introduction from seeds that were collected in California by David Douglas in the early 1830s, and it was a frequent topic in European botanical and horticultural journals from the mid 1830s to the early 1840s (nine illustrations from this period are listed in *Iconum Botanicarum Index Londinensis*, all of which are full page chromolithographic plates). ●R: Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Lane County in western Oregon to the Sierra de San Pedro Matir in northern Baja California. Also on some of the islands off the coast of southern California and northern Baja California, and in mountainous regions of Arizona, southwestern Utah and northwestern New Mexico. ●H: rhizomatic perennial herbs with erect to decumbent stems that range from about 2.5 to 8 dm. (10-32") long. The leaves are opposite, and the lower are shortly petiolate while the upper are sessile. The blades, which are about 2 to 8 cm. long, are broadly elliptic to obovate, and they have irregularly serrate margins. The showy flowers are produced in opposite pairs in the axils of the upper leaves; the pedicels are about 5 to 8 cm. long. The bilabiate corollas, which are about 4 to 5 cm. long, have strongly reflexed lobes. The corollas are usually scarlet red, but can vary towards orange or yellow, and sometimes even brown. The fruits are many seeded capsules that are about 16 to 18 mm. long. ❁May-October.

!*Erythranthe floribunda* (Douglas ex Lindley) G. L. Nesom [*Mimulus floribundus* Douglas ex Lindley]. FLORIFEROUS MONKEY FLOWER. In the first edition of this text I stated that this species was widely

scattered along perennial streams and sometimes at springs or seeps in the Tassajara region, but uncommon. During the first spring after the Basin Complex Fire of 2008 this species was very common, and not just along the banks of streams, but also high up on floodplains, and up to the highest conceivable high water levels. This made me wonder if some of the seeds from which these plants sprouted were deposited during the flood of late January, 1914. Based on my historical research, it appears that both Tassajara and Cabarga reached their highest known levels in the developed area of hot springs during this event. The suspension bridge to the bath house and the bridge over Cabarga Creek were swept away, the basements of the kitchen and club house (now the guest dining room) "Vanished downstream," the camping grounds in The Flats were made "A wreck," and the vegetable garden, which was located in the vicinity the present bath house, was "Washed away" ("Jamesburg Notes," *Monterey Daily Cypress*, 2/4/1914; "Notes From Jamesburg," *Salinas Weekly Journal*, 2/7/1914). The full exposure to sunlight that most of the plants of the spring of 2009 had to endure appeared not to have had a detrimental effect on them. ●R: western North America, from British Columbia and South Dakota to northern Mexico. ●H: annual herbs with erect to decumbent and usually much branched stems that range from about 1 to 5 dm. (4-20") long. The opposite leaves have petioles that are 1 to 20 mm. long, and the blades, which are about .5 to 4.5 cm. long, are ovate to slightly lance-ovate with toothed margins; the blades are rounded to sub cordate at the base, and they are clammy and somewhat sticky to the touch. The flowers are produced in the axils of the leaves; they have slender pedicels that are about 5 to 30 mm. long. The yellow and weakly bilabiate corollas are about 6 to 15 mm. long; they usually have red spots on the throat. The fruits are many seeded capsules that are about 4 to 7 mm. long. ❀April-August.

Erythranthe guttata (Fischer ex deCandolle) G. L. Nesom [*Mimulus guttatus* Fischer ex deCandolle; *M. langsdorffii* J. Donn ex Sims; *M. lyratus* Bentham; *M. hirsutus* Howell, etc.]. COMMON MONKEY FLOWER. This well known species is widely scattered and locally common along perennial streams at all elevations in the Tassajara region, and it also occurs at springs and seeps. ●R: widespread in western North America, from Alaska to the Northwest Territories, Saskatchewan, the northern Great Plains, Colorado, New Mexico and northern Mexico. It has become naturalized in Europe. ●H: highly variable rhizomatic perennial herbs with generally weak and often hollow stems that range from about .5 to 10+ dm. (2-40+") long; the stems are often decumbent for a considerable length and root at the nodes. The leaves are opposite and have serrately toothed margins. The lower leaves have petioles that are up to 9 cm. long, and the petioles of larger leaves are sometimes pinnately lobed or toothed. The blades of the lower leaves, which are up to 12 cm. long, are roundish to broadly ovate. The smaller upper leaves, which are sessile and often fused at the base, have broadly to narrowly ovate blades. The showy flowers are produced in opposite pairs at the nodes of terminal racemes; the pedicels are about .5 to 6+ cm. long. The strongly bilabiate corollas, which are about 1 to 4 cm. long, are bright yellow, and the upwardly swollen palate usually has red spots or marking. The capsules are about 5 to 10 mm. long; they are concealed within the persistent calyces. ❀April-October.

!+***Erythranthe nasuta*** (E. Greene) G. L. Nesom [*Mimulus nasuta* Greene; *M. bakeri* Gandoger; *M. cuspidatus* Greene; *M. erosus* Greene; *M. guttatus* var. *gracilis* (A. Gray) G. R. Campbell; *M. guttatus* var. *nasutus* (Greene) Jepson; *M. langsdorffii* var. *nasutus* (Greene) Jepson; *M. luteus* var. *gracilis* A. Gray, etc.]. In the first edition of this text, in the discussion of *Mimulus guttatus*, I noted that occasionally plants are encountered in this region, mostly in intermittently wet areas, that are fairly depauperate and with smaller corollas. Such plants are what was recognized by E. Greene as *M. nasutus*. At that time this taxon was generally considered to be synonymous with what is now *E. guttata*. During the first spring after the Basin Complex Fire of 2008 this species was abundant, and not just along the banks of streams, but also high up on floodplains, and up to the highest conceivable flood levels. This made me wonder if the seeds from which these plants sprouted had been deposited during the great flood of late January, 1914, at which time it appears that Tassajara and Cabarga creeks reached their highest reported levels. According to the "Jamesburg Notes" column in the February 4, 1914 edition of the *Monterey Daily Cypress*:

> At Tassajara Springs the creek washed away portions of the basements of the kitchen and clubhouse [now the guest dining room]. It also carried away the suspension bridge [to the bath house] and badly damaged the camp grounds. The bridges between this place and Tassajara were carried away, and a gigantic landslide filled the road with immense sandstones. The road is impassable even on horseback. Mr. Hall, keeper at the springs, made the journey on foot. No records of the rainfall were kept at Tassajara, but it must have been even greater than at this place, where 3.70 fell in ten hours.

According to the "Notes from Jamesburg" column in the February 7, 1914 edition of the *Salinas Weekly Journal*, the flood also washed away the bridge over Cabarga Creek, and the huge landslide on the road was "Below Grace's Cabin;" Grace McPhail's cabin was located in The Pines.

Erythranthe nasuta as photographed by the author on the high floodplains of Tassajara Creek in early May of 2009. This photograph depicts members of a large population that grew in the vicinity of the swing set in the Outer Flats.

MIMETANTHE.

The genus *Mimetanthe* is comprised of one species that is endemic to western temperate North America. The name is derived from the Greek words *mimos*, imitator, and *anthe*, flower, on account of the *Mimulus* like flowers.

+***Mimetanthe pilosa*** (Bentham) E. Greene [*Herpestis pilosa* Bentham; *Mimulus pilosus* (Bentham) S. Watson]. DOWNY MONKEY FLOWER. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer #3355, DS). According to the note that is enclosed in the envelope that is pasted to the specimen sheet, Elmer collected it in a "Gulch east of Higgin's Camp." Higgin's Camp, the site of the cabin on the former Higgin's homestead, was also a former Forest Service campground that was located to the

south of the Marble Peak Trail about 4.75 linear miles southwest of the developed area of Tassajara. This species also occurs in Hanging Valley, several miles south of the confluence of Tassajara Creek and the Arroyo Seco. ●R: temperate western North America, from Douglas County in central Washington to the mountains of southwestern Utah, Arizona and northern Baja California. ●H: hairy annual herbs with erect or ascending stems that range from about 2 to 35 cm. tall. The leaves, which are opposite and sessile, are lanceolate to oblong and about 1 to 3 cm. long. The flowers are produced singularly or in opposing pairs in the axils of the leaves. The weakly bilabiate corollas are yellow and about 7 to 8 mm. long. The fruits are capsules that are about 7 to 8 mm. long. ❁April-August.

PLANTAGINACEAE. PLANTAIN FAMILY.

Until the early 1990s the accepted circumscription of this family was small (three genera and about 270 species), but due to the findings of phylogenetic research, the current circumscription has been greatly expanded. According to the Jepson eFlora website it consists of 110 genera and approximately 2,000 species, while according to the Angiosperm Phylogeny website it includes 90 genera and about 1900 species. Most of the species are endemic to temperate regions.

1a. Leaves strictly basal. Corollas dry, scarious, translucent, and persistent in fruit. . . . . ***Plantago***.
1b. Leaves basal and cauline. Corollas petal like in color and texture, and deciduous:
2a. Cauline leaves alternate, or only the upper cauline leaves are alternate:
3a. Cauline leaves ovate-deltate to roundish in outline, and shallowly 5 to 7 lobed or toothed:
4a. Small perennial vines that are restricted to rock walls. Corollas spurred. . . . . ***Cymbalaria***.
4b. Small annual herbs that are weedy in and about the developed area of Tassajara. Corollas not spurred. . . . . ***Veronica***.
3b. Cauline leaves narrowly linear to narrowly elliptic, lanceolate or oblong, and entire:
5a. Corolla tubes with narrowly linear spurs. Basal leaves whorled; the lower most cauline leaves are often opposite or produced in 3's. . . . . ***Nuttallanthus***.
5b. Corolla tubes with a swollen pouch or sac like formations at the base. Basal leaves not whorled; the basal and lower cauline leaves are sometimes opposite. . . . . ***Antirrhinum***.
2b. Cauline leaves opposite:
6a. Sterile filament absent or just a small rudiment. Bases of corollas upwardly swollen. . . . . ***Collinsia***.
6b. Sterile filament well developed. Bases of corollas not upwardly swollen:
7a. Fertile filament bases glabrous and attached to corolla at different levels. Upper corolla lip turned upward. . . . . ***Penstemon***.
7b. Fertile filament bases densely hairy and attached to corolla at one level. Upper corolla lip nearly straight or turned downward. . ***Keckiella***.

ANTIRRHINUM. SNAPDRAGON.

The genus *Antirrhinum* consists of 35 species that are endemic to two greatly divergent parts of the northern hemisphere. One group occurs in western North America, and the other in southwestern Europe (in Spain, Portugal, northwestern Italy and on the island of Sicily). The common snapdragon of gardens is *Antirrhinum majus*, which belongs to the later group. The name of the genus is derived from the Greek words *anti*, like, and *rhinon*, nose, and alludes to the snout like flowers of some of the species.

1a. Plants glabrous. Upper stems weak, twining, and often supported by their coiling capillary pedicels. Capsules symmetrical. . . . . ***A. kelloggii***.
1b. Plants glandular hairy. Upper stems not weak or twining. Capsules asymmetrical due to a displacement of the upper and lower halves. ***A. multiflorum***.

!***Antirrhinum kelloggii*** E. Greene [*A. strictum* A. Gray invalid, *Asarina stricta* (Hooker & Arnott) Pennell; *Maurandya s.* H. & A.]. CLIMBING SNAPDRAGON, LAX SNAPDRAGON. In the first edition of this text I stated that this is an ephemeral 'burn species' that has rarely been collected anywhere within its range except during the first few years after a fire. Although I have not seen this species in this region, Miriam Bobcoff reported it from the vicinity of Tassajara Hot Springs during the first few years after the Marble-Cone Fire of 1977. During the first spring after the Basin Complex Fire of 2008 this species was common at two locations. One was along the lower Horse Pasture Cutoff Trail in the vicinity of the switchback between the base and top of the waterfall on Horse Pasture Creek, and this population extended along the base of Flag Rock to the vicinity of the swimming pool at Tassajara. The other location was on the steep southfacing slope of Hawk Peak immediately above the Suzuki Roshi memorial site on the Hogs Back. A few plants occurred on the Hogs Back proper, and at points along the Horse Pasture Trail. ●R: Coast, Transverse and Peninsular ranges, from Napa and Sonoma counties to northern Baja California. Also on Santa Cruz and Santa Catalina islands. ●H: annual herbs with at first erect but upwardly weak and vine like stems that range from about 1 to 8 dm. (4-32") long. The alternate are short petiolate to nearly sessile, and the blades, which are about 1 to 5 cm. long, are mostly lanceolate, the upper most becoming narrowly linear bracts. The flowers are produced in the axils of the leaves for most of the length of the plant; they are on slender pedicels about 3 to 9 cm. long, which are often tendril like and coil around the stems of other plants. The bilabiate corollas, which are about 10 to 14 mm. long, are mostly lavender to deep bluish purple, but the palate is white with purple veins. The fruits are roundish capsules that are about 5 to 7 mm. long. ❁April-June.

!***Antirrhinum multiflorum*** Pennell [*A. glandulosum* Lindley invalid]. STICKY SNAPDRAGON. In the first edition of this text I stated that this species was scattered in open and often rocky or disturbed habitats in the Tassajara region, but currently very rare. During the middle to late 1980s this species was fairly uncommon but widely scattered in suitable habitats, but in the current decade (the 1990s) I have not seen any plants. In contrast, Vern Yadon reported this species to be common to abundant on some of the higher ridges of this region two to three years after the Marble Cone Fire of 1977. This showy flowered species was once again abundant in this region during the first few years after the Basin Complex Fire of 2008, but by 2015 it was again fairly rare. ●R: Coast, Transverse and northern Peninsular ranges, from Alameda and Santa Cruz counties to Orange and Riverside counties. Also in the central Sierra Nevada foothills in Calaveras and Tuolumne counties, and on Santa Rosa and Santa Cruz islands. ●H: annual or short lived perennial herbs with erect or ascending and laterally branched stems that range from about 6 to 15 dm. (2-5') long. The sessile leaves are generally alternate, and the blades are narrowly lanceolate to oblong or linear, entire, and about

1 to 6 cm. long. The flowers are produced in elongated terminal racemes, and sometimes in few flowered racemes terminating the lateral branches. The bilabiate corollas, which are about 13 to 18 mm. long, are mostly pale pink to carmine; the lobes tend to be darker hued, and the upwardly inflated palate is white. The fruits are oblique-ovoid capsules that are about 7 to 11 mm. long. ֍May-August.

COLLINSIA. CHINESE HOUSES, BLUE EYED MARY.

Collinsia consists of about 20 species that are endemic to North America, and especially to western North America. Seventeen species occur in California, and 12 (plus 4 lesser taxa) are endemic to the California Floristic Province. The genus was named for the Philadelphia botanist Zaccheus Collins (1764-1831).

1a. Corollas 10 to 20 mm. long. Pedicels shorter than the calyces. . . . . ***C. heterophylla***.
1b. Corollas 4 to 8 mm. long. Pedicels of at least the lower flowers longer than the calyces. . . . . ***C. childii***.

^<>***Collinsia childii*** Parry ex Gray. LITTLE BLUE EYED MARY. This inconspicuous species is widely scattered in semi shady but generally grassy areas within mixed evergreen forests at higher elevations in the Tassajara region, and it was more common than usual during the first spring after the Basin Complex Fire of 2008. Elsewhere in the Santa Lucia Mountains this species occurs along the trail to the Ventana Double Cone, on and in the vicinity of Cone Peak, on Junipero Serra Peak, and in the vicinity of the summit of the Nacimiento Fergusson Road. The populations in the Santa Lucia Mountains are disjunct; the nearest populations are in the Sierra Madre and San Rafael Mountains of Santa Barbara County. ●R: Coast Ranges, Sierra Nevada, Transverse and Peninsular ranges, from Monterey and Mariposa counties to the higher mountains or northern Baja California, mostly between 3,000 and 9,000 ft. ●H: annual herbs with erect and usually simple stems that range from about 1 to 4 dm. (4-16") tall. The opposite leaves are short petiolate to nearly sessile, and the blades, which are about 1 to 4 cm. long, are narrowly oblong to oblong-lanceolate or oblanceolate, and the margins are remotely serrulate to nearly entire. The flowers are produced in terminal racemes, and the lower flowers are usually opposite in the axils of the upper leaves, while the upper flowers are in loose whorls at the nodes. The bilabiate corollas, which are about 4 to 8 mm. long, range from pale violet to white. The fruit is a roundish capsule about 3 to 4 mm. long. ֍April-June.

!*Collinsia heterophylla* Buist [*C. bicolor* Bentham]. CHINESE HOUSES, INNOCENCE. This showy flowered species is widely scattered and locally common to abundant at all elevations in the Tassajara region, and it usually occurs in semi shady grassy areas in woodlands. It was exceedingly abundant during the first spring after the Basin Complex Fire of 2008. ●R: Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from Humboldt and Butte counties to northern Baja California. ●H: showy flowered annual herbs with erect or ascending stems that range from about 1 to 5 dm. (4-20") tall. The leaves are opposite, and the lower leaves are short petiolate and the upper are sessile. The blades are about 1 to 7 cm. long, lanceolate to lance-oblong or linear, and the margins are remotely serrulate or sometimes entire. The flowers are produced at the nodes of terminal and generally conically shaped racemes, and the lower most flowers are commonly singular or opposite in the axils of the upper leaves, while the upper flowers congested in whorls. The bilabiate corollas are about 10 to 20 mm. long, and are extremely variable in coloration, ranging from (rarely) pure white to uniformly dark reddish purple. In most plants the lobes are darker than the tube, with the lower lobes are darker than the upper lobes, but plants in which the upper lobes are the darkest are fairly common. The fruit is a roundish capsule about 5 mm. long. ֍April-June.

CYMBALARIA.

The genus *Cymbalaria* includes about 8 to 10 species that are native southern and central Europe. The name is based on either the Greek word *kymbalon*, or perhaps the Latin word *cymbalum*, both of which mean cymbal; the name alludes to the round or roundish leaves of the species.

Cymbalaria muralis Gaertner, B. Meyer & Scherbius [*Antirrhinum m.* Linnaeus; *Linaria cymbalaria* Miller]. KENILWORTH IVY. This distinctive species has been established on the rock retaining walls in the developed area of Tassajara since at least the late 1970s. This species is well adapted for this kind of habitat, for the long pedicels are at first positively phototropic, and thus direct the flowers toward sunlight, but after fertilization they become negatively phototropic, and thus direct the flowers toward shade. The purpose is to find a nearby crevice where the mature capsules can deposit their seeds. ●R: this species has escaped from gardens at many locations in temperate North America; it is native to south-central Europe. ●H: vine like perennial herbs with trailing or hanging stems that are up to 60 cm. long. The long petiolate leaves, which are about 1 to 3 cm. wide, are roundish to reniform and have 5 to 7 shallow marginal lobes. The flowers are produced singularly in the axils of the leaves, and the corollas, which are about 9 to 15 mm. long, are strongly bilabiate and are spurred at the base. The corollas range from pale lilac to violet, and the palate is yellow (or sometimes white). The fruit is a roundish and two chambered capsule that is about 4 mm. wide. ֍May–September.

KECKIELLA.

Keckiella consists of 7 species of southwestern temperate North America. All of the species occur in California, and five (plus four lesser taxa) are endemic to the California Floristic Province. The genus was named for the Californian botanist David D. Keck (1903-1995), but the name had to modified, for the name *Keckia* had already been applied to a genus of fossil algae.

1a. Corollas white to pale pink with pinkish to purplish lines, 12 to 18 mm. long, the tube mostly included within the calyx. Leaves narrowly lanceolate to narrowly oblanceolate. Widely distributed in this region. . . . . ***K. breviflora***.
1b. Corollas red, 22 to 40 mm. long, the tube well exserted from the calyx. Leaves ovate to oblong-elliptic. Restricted to cliffs and major rock outcrops. . . . . ***K. corymbosa***.

Keckiella breviflora (Lindley) Straw [*Penstemon breviflorus* Lindley] var. ***breviflora***. GAPING PENSTEMON, BUSH BEARD TONGUE. This lanky species is widely scattered and locally common to abundant at all elevations in the Tassajara region, and it primarily occurs in areas that are transitional between major habitat types; it sometimes forms thickets. ●R: Sierra Nevada, Coast and Transverse ranges, from Humboldt and Shasta counties to the San Gabriel Mountains in San Bernardino County. ●H: lanky subshrubs with sprawling and outwardly herbaceous branches that range from about 5 to 20 dm. (20-80") long. The opposite leaves are nearly sessile, and the blades,

which are about 1 to 5 cm. long, are mostly narrowly lanceolate to narrowly oblanceolate; the margins are entire to serrulate. The flowers are produced in leafy and generally pyramidal shaped terminal panicles. The bilabiate corollas, which are about 12 to 18 mm. long, are mostly white and tinged with rose, and they have pinkish to purplish markings and lines. The upper lip arches outward, while the lower lip is reflexed downward and backward, giving the flowers a gaping or yawning appearance. The fruits are ovoid capsules. ֍May-July.

∨***Keckiella corymbosa*** (Bentham) Straw [*Penstemon corymbosus* Bentham]. REDWOOD PENSTEMON. This showy flowered species is widely scattered on cliffs and major rock outcrops at lower and intermediate elevations in the Tassajara region, and it is fairly common in some areas, such as at The Narrows and around the waterfalls of Waterfall Creek. ●R: Coast Ranges, from Del Norte and Siskiyou counties to the Santa Lucia Mountains of northwestern San Luis Obispo County. Also in the northern Sierra Nevada foothills in Butte County and on the Sutter Buttes. ●H: small shrubs with spreading to ascending branches that range from about 3 to 5 dm. (12-20") long. The opposite leaves are short petiolate or sessile, and the blades, which are about 1 to 3.5 cm. long, are mostly ovate to oblong-elliptic; the margins are remotely toothed. The showy flowers are produced in corymbose panicles. The bilabiate corollas are deep red and about 2 to 4 cm. long. The tubes, which are generally longer than the lips, are well exserted from the calyx. The upper lip is relatively straight, but the lower lip is strongly deflexed. The fruits are ovoid and many seeded capsules. ֍June-October.

NUTTALLANTHUS. AMERICAN TOAD FLAX.

Nuttallanthus consists of four species that are endemic to North and South America; these species were formerly placed in the genus *Linaria*. This genus was name for the famous North American botanist and zoologist Thomas Nuttall (1786-1859).

Nuttallanthus texanus (Scheele) D. A. Sutton [*Linaria texana* Scheele; *L. canadensis* var. *texana* (Scheele) Pennell; *L. canadensis* misapplied]. BLUE TOAD FLAX. In the first edition of this text I stated that this species was scattered in open and grassy habitats below about 3,000 ft. in the Tassajara region, but uncommon. I had seen only a few plants in the Horse Pasture and on the south slope of the Overlook Ridge immediately south of the developed area of Tassajara Hot Springs. I was expecting that this species would be more common during the first spring after the Basin Complex Fire of 2008, but I saw only one plant during that season, which was growing in the small U shaped valley just beyond The Narrows. ●R: widely distributed in temperate North America and temperate South America. ●H: annual herbs with slender and erect stems that range from about 1 to 6 dm. (4-24") tall. Produced at the base of the plants are whorls of offshoots that are about 1 to 5 cm. long; these have small oblanceolate to narrowly linear leaves that are opposite or whorled in 3s at the nodes. The cauline leaves are sessile, narrowly linear, and about 5 to 25 mm. long; the lower most are commonly opposite or in 3s, while the upper are alternate. The flowers are produced in terminal spike like racemes. The strongly bilabiate corollas, which are about 10 to 24 mm. long, have narrow and downwardly curved spurs at the lower base. The corollas are mostly blue or blue violet. The fruits are roundish capsules that are about 3 mm. long; they contain numerous minute seeds. ֍April-May.

PENSTEMON. PENSTEMON, BEARD TONGUE FLOWERS.

Penstemon consists of about 250 species that are endemic to North America, and especially to western North America. The name is derived from the Greek words *pente*, five, and *stemon*, stamen, on account of the well developed sterile filaments (the 'fifth stamen'). The common name Beard Tongue refers to the densely hairy sterile filament of some species; the only species of this region that exhibits this characteristic is *P. grinnellii*.

1a. Corollas red to orangish red, the tubes narrowly cylindrical, the lips short and faintly bilabiate. . . . . ***P. centranthifolius***.
1b. Corollas blue to purple or magenta, the tubes expanded, the lips spreading and strongly bilabiate:
  2a. Leaves broadly lanceolate and with toothed margins. Corolla throats abruptly expanding from the tube. Sterile filament densely hairy. . . . . ***P. grinnellii***.
  2b. Leaves narrowly linear, narrowly elliptic or narrowly oblanceolate, and with entire margins. Corolla throats more gradually expanding from the tube. Sterile filament not hairy:
    3a. Plants mostly glabrous. Largest leaves 2 to 4 mm. wide. . . . . ***P. heterophyllus*** var. ***heterophyllus***.
    3b. Plants minutely pubescent. Largest leaves generally less than 2 mm. wide. . . . . ***P. heterophyllus*** var. ***australis***.

Penstemon centranthifolius (Bentham) Bentham [*Chelone centranthifolia* Bentham]. SCARLET BUGLER. This highly distinctive species is widely scattered and locally common in open habitats at all elevations in the Tassajara region, and especially so in open areas within chaparral. ●R: Coast, Transverse and Peninsular ranges, from Monterey and San Benito counties to northern Baja California. Disjunct populations occur in the inner North Coast Ranges, from Glenn County to Solano County, and in the Black Diamond Mines region of Contra Costa County. ●H: evergreen perennial herbs with erect stems that range from about 3 to 12 dm. (1-4') tall. The leaves are opposite, entire, and about 3 to 10 cm. long. The lower most leaves are petiolate and oblanceolate to spatulate, while the cauline leaves are sessile and narrowly ovate to oblong-lanceolate. The uppermost leaves clasp the stem at the base. The showy flowers are opposite or in opposing groups of 2s or 3s that occur at the nodes of a spike like terminal raceme. The narrowly tubular corollas, which are bright red to scarlet and about 2 to 3 cm. long, have small and faintly bilabiate lips. The fruits are many seeded capsules that are about 8 to 12 mm. long. ֍May-August.

Penstemon grinnellii Eastwood var. ***scrophularioides*** (Jones) Holmgren [*P. g.* subsp. *s.* (Jones) Munz; *P. palmeri* A. Gray var. *g.* Munz & Johnston]. BIG MOUTH PENSTEMON. This showy flowered species is scattered in chaparral on the higher ridges the Tassajara region (above about 3,000 ft.), such as on Black Butte (where it is locally abundant) and along the Black Cone Trail between Pine Ridge and the Elephant's Back. ●R: Coast and Transverse ranges, and the southern Sierra Nevada, from Santa Clara, Tulare and Inyo counties to San Bernardino County. The typical variety occurs southern Sierra Nevada, Transverse and northern Peninsular ranges, from Inyo and Tulare counties to Santa Barbara, Orange and Riverside counties. ●H: glaucous evergreen perennial herbs with rather thick and erect or ascending stems that range from about 3 to 10 dm. (12-40") tall. The leaves are opposite, and the lower are short petiolate while the upper sessile. The blades, which are about 4 to 9 cm. long, are broadly lanceolate to oblong-elliptic; the lower have coarsely serrate margins, while the upper have finely serrate margins. The flowers are produced in elongated panicles that occupy the upper half of the stems; the opposing panicle branches, which are up to 7 cm. long, are one to several flowered. The bilabiate corollas, which are about 25 to 35 mm. long, are purplish blue to reddish purple; the lips are more darkly hued, and the throat is abruptly expanded beyond the calyx. The fruits are many seeded capsules

that are about 5 to 10 mm. long. ֍May-August.

!***Penstemon heterophyllus*** Lindley. FOOTHILL PENSTEMON, CHAPARRAL PENSTEMON. This showy flowered species is widespread and locally common in open habitats at all elevations in the Tassajara region, particularly in openings in chaparral or in areas that are transitional between major habitat types. During the first spring after the Basin Complex Fire of 2008, the habit of growth of this species (and var. *australis*) was radically different than usual, so much so that I was unable to recognize the plants until I was close enough to clearly see the flowers. Such plants were often more than six feet tall, and for some reason the corollas were uniformly magenta. ●R: Coast, Transverse and Peninsular ranges, from Del Norte and Siskiyou counties to San Diego County, and the northern Sierra Nevada foothills, from Butte County to El Dorado County. ●H: evergreen perennial herbs, sometimes slightly woody at the base, with slender and erect or ascending stems that range from about 3 to 5 dm. (12-20") tall. The leaves, which are about 1 to 7 cm. long, are opposite, sessile, and narrowly linear; smaller leaves are usually clustered in the axils. The showy flowers are opposite or singular at the nodes of elongated spike like terminal racemes. The bilabiate corollas, which are about 2.3 to 4 cm. long, and are highly variable in their colorizations, for they range from magenta to cyan, bluish purple or bluish lavender. The fruits are many seeded capsules that are about 4 to 6 mm. long. ֍May-July.

Penstemon heterophyllus var. ***australis*** Munz & Johnston [subsp. *a.* (M. & J.) Keck]. This taxon is about as common as the typical species in the Tassajara region, and it occurs in the same kind of habitats. ●R: Coast, Transverse and Peninsular ranges, from Colusa and Sonoma counties to San Diego County. ●H: similar to the typical species, except for the minutely pubescent stems, leaves and calyces, and the more narrowly linear leaves. ֍May-July.

PLANTAGO. PLANTAIN.

Plantago is a widely distributed but primarily temperate genus that includes about 250 species of annual and perennial herbs. The name is based on the Latin word for plantain, *planta*, and means footprint.

1a. Annual herbs. Leaves narrowly linear and grass like, light green, delicate, and inconspicuously veined. Outer sepals completely separate. Stamens not exserted. . . . . ***P. erecta***.

1b. Perennial herbs. Leaves oblong-lanceolate, dark green, rather coarse, and strongly ribbed. Outer sepals united. Stamens exserted. . . ***P. lanceolata***.

Plantago erecta Morris [*P. hookeriana* Fischer & C. Meyer var. *californica* (E. Greene) Poe]. CALIFORNIA PLANTAIN. This species is scattered in grasslands at lower to intermediate elevations in the Tassajara region, and it is locally abundant in areas where the soil is poor or compacted, such as on the summit of knolls or in trail beds. ●R: from Coos and Douglas counties in southwestern Oregon to northern Baja California, and on most of the islands off the coast of southern California. ●H: small annual herbs with flowering stems that range from about .5 to 2.5 dm. (2-10") tall. The leaves are strictly basal and are produced in erect or ascending rosettes The blades, which are about 3 to 12 cm. long, are linear to narrowly linear-lanceolate, and the margins are entire or remotely toothed. The small flowers are produced in head like terminal spikes that are about .5 to 3 cm. long. The dry and white translucent corollas, which are salverform and about 3 to 5 mm. wide, have four spreading or reflexed lobes. The fruit is a two seeded capsule that is about 3 mm. long. ֍March-May.

Plantago lanceolata Linnaeus. RIB GRASS, ENGLISH PLANTAIN, BUCKHORN, RIBWORT. This species is scattered at pull outs along Tassajara Road, at some campsites, and sometimes along trails. ●R: a common weed in North America, particularly in lawns, in and around gardens, and in agricultural lands; native to Europe. ●H: perennial herbs with flowering stems that range from about 2 to 8 dm. (8-32") tall. The leaves, which are strictly basal and produced in rosettes, have blades that are mostly oblong-lanceolate and that gradually taper to the petiole; the blades are about 5 to 20 cm. long, and have pronounced longitudinal ribs. The flowers are produced in terminal head like spikes that are about 2 to 8 cm. long. The corollas, which are dry, translucent, and four lobed, are about 2 to 2.5 mm. long. The fruits are oblong-ovoid capsules that are about 2 to 3 mm. long. ֍April-August.

VERONICA. SPEEDWELL, BROOKLIME.

The genus *Veronica* is comprised of about 250 species of annual and perennial herbs that are endemic to the temperate regions of the northern hemisphere, and especially those of Eurasia. The genus was named for Saint Veronica, the woman who, according to Christian tradition, offered Jesus her veil while he was carrying his cross, so that he could wipe his face, and on the veil an image of his face was miraculously impressed. The genus was so named on account of the corolla markings of some species, which were thought to resemble those of the sacred veil.

Veronica persica Poiret. WINTER or PERSIAN SPEEDWELL. These small and inconspicuous annual herbs have been established in and about the developed area of Tassajara since at least the 1980s. ●R: widely naturalized in North America; native to Asia Minor. ●H: small annual herbs with one or more procumbent-ascending stems that range from about 4 to 40 cm. long. The lower leaves are opposite and the upper leaves are alternate, and the crenately margined blades are ovate to roundish, and about 5 to 20 mm. long. The inflorescence is a terminal raceme in which the flowers are produced singularly in the axils of the upper leaves, on pedicels that are about 10 to 30 mm. long. The asymmetrically four lobed corollas, which are about 5 to 11 mm. wide, are centrally white to light blue, and the lobes are blue and marked with darker blue or purplish blue lines. The fruits are two lobed capsules that are about 2.5 to 3 mm. long. ֍February-May.

PLATANACEAE. SYCAMORE or PLANE TREE FAMILY.

Platanaceae consists of one genus and ten species. The name is based on *platanos*, which is the Greek word for the Eurasian Sycamore, *Platanus orientalis*.

PLATANUS. SYCAMORE OR PLANE TREES.

Platanus consists of ten species that are endemic to North America and Eurasia. Two species occur in Eurasia, one ranging from southeastern Europe to the southern slopes of the Himalayan Mountains in Nepal, the other in southeast Asia (Laos, Vietnam and probably southern China). Six species occur in Mexico, and four of these are endemic to Mexico. One species occurs in northern Mexico and

Arizona, and another species occurs in southern Mexico and Guatemala. Of the remaining two species, one is widely distributed in the eastern United States, while the other is endemic to the California Floristic Province.

Platanus racemosa Nuttall. CALIFORNIA SYCAMORE. This highly conspicuous tree species is common along the perennial or mostly perennial streams at lower to intermediate elevations in the Tassajara region. Occasionally trees are found away from riparian habitats, but only in places where the water table is near the surface. Most of the trees that existed along Tassajara Creek upstream from the hot springs were killed during the Basin Complex Fire of 2008. The sycamore trees of the Tassajara region are infected with a canker, *Gnomonia veneta* (or *Apiognomonia veneta*, sycamore anthracnose). The canker is active only during the rainy season, and causes budding leaves to wither and die. In dry years the local trees start to develop their leaves by late April or early May, but in years in which rains continue into May, the trees may not develop their leaves until mid June. During spring months I have observed branchlets of trees that extended under the eaves of buildings at Tassajara with fully developed leaves, while the rest of the plant was still barren of leaves. ●R: scattered in riparian habitats along the Sacramento River and its tributaries from southern Shasta County to the Sacramento River Delta, and in the southern Sierra Nevada, from Stanislaus County to Kern County. The distribution of this species fairly regular in the Coast, Transverse and Peninsular ranges, from Contra Costa County to northern Baja California. Populations that were not documented in Griffin & Critchfield's " The Distribution of Forest Trees in California" (1976) include a population along the Russian River in southern Mendocino County, and populations that occur on Santa Cruz and Santa Catalina islands. ●H: broadleaf deciduous trees of riparian habitats that vary from erect and up to 30 meters (98'+) tall in densely wooded areas where there is competition for light, to spreading and with an often tortuous manner of growth in open habitats. The bark is smooth and at first ash white, but it becomes gray green with age, and it eventually flakes away in thin scales, thus exposing a new layer of ash white bark. The bark on the trunks and primary branches of old trees is persistent, and becomes thick and fissured into grayish plates. The alternate leaves have petioles that are about 3 to 12 cm. long, and the blades, which are up to 4.5 dm. (18") wide, are generally deltate in outline and palmately parted into five acute lobes. The margins are toothed at the ends of the lateral veins. The inflorescens are pendulous racemes with three to five ball like clusters about 1 to 3 cm. wide. The clusters are usually either staminate or pistillate. The fruits are bristled achenes that are about 5 mm. long. ⊛February-April.

In the developed area of Tassajara there are a number of trees representing *Platanus* x *acerifolia*, the London Plane Tree of ornamental horticulture. This taxon is a hybrid between *P. occidentalis*, which is native to eastern temperate North America, and *P. orientalis*, which is native to southeast Europe and southwest Asia. The trees were probably planted during the 1920s, when the adjacent cabins were built.

POLEMONIACEAE. PHLOX FAMILY.

Polemoniaceae consists of 26 genera and 314 species that range from small annual herbs to shrubs and vines. As a whole, the species range from northern Europe and eastward across northern Asia to North America, and then southward to temperate South America. This family is especially well represented in California, for plants representing 17 genera and 169 species (plus numerous lesser taxa) are present within the boundaries of the state, and about 75 species (plus about 37 lesser taxa) are endemic to the California Floristic Province. The scientific name for the family is based on that of the member genus *Polemonium*, and the common name is based on the name for an also inclusive genus, *Phlox*.

1a. Short evergreen perennials herbs that become densely tufted and woody at the base with age (ours) . . . . . ***Eriastrum***.
1b. Annual herbs of various heights (ours):
2a. Leaves opposite, or at least some of the leaves are opposite:
3a. Leaves entire. The occurrence of opposite leaves varies from almost all to only a few. . . . . ***Microsteris***.
3b. Leaves divided to the base into linear segments; and because they are sessile, they resemble whorls of linear leaves:
4a. Stamens exserted beyond the corolla tubes. Flowers open during the day. . . . . ***Leptosiphon***.
4b. Stamens hidden within the corolla tubes. Flowers opening in the evening and closing in the morning. . . . . ***Linanthus***.
2b. Leaves alternate (the basal leaves of some species are produced in rosettes):
5a. Mature inflorescens closely subtended by bracts or bract like leaves:
6a. Inflorescence bracts spiny or at least sharply toothed. Calyx lobes not equal in size. . . . . ***Navarretia***.
6b. Inflorescence bracts not spiny and resemble the leaves. Calyx lobes equal in size. . . . . ***Collomia***.
5b. Mature inflorescens not closely subtended by bracts or bract like leaves:
7a. Larger leaves ranging from pinnately lobed, mostly entire, or divided into three leaflets. . . . . ***Allophyllum***.
7b. Larger leaves bipinnately divided into segments or lobes:
8a. Leaf segments linear or nearly so. Corollas white to blue or lavender. . . . . ***Gilia***.
8b. Leaf segments not linear. Corollas bright pink with cyan blue throats. . . . . ***Saltugilia***.

ALLOPHYLLUM.

The genus *Allophyllum* consists of four species and one subspecies, all of which are endemic to southwestern temperate North America. All of the taxa occur in California, and four are endemic to the California Floristic Province. The name is derived from the Greek words *allos*, other, and *phullon*, leaf, in contrast to the leaves of the species of the genus *Gilia*, to which the taxa of *Allophyllum* were originally assigned.

1a. Widest leaves, or leaf lobes, no more than 4 mm. wide. Corollas dark blue, purplish blue, violet, or sometimes pale:
2a. Flowers produced in fairly dense clusters of 4 to 8. Plants up to 40 cm. tall; pinnate leaves many. . . . . ***A. gilioides*** subsp. ***gilioides***.
2b. Flowers produced singularly or in loose groups of 2 or 3. Plants less than less than 16 cm. tall; pinnate leaves few. . . . . ***A. gilioides*** subsp. ***violaceum***.
1b. Widest leaves or leaflets 3 to 15 mm. wide:
3a. Lower and cauline leaves 3 to 13 lobed. Corollas 8 to 22 mm. long and with dark red or purplish red tubes and pink to bluish lavender lobes. . . . . ***A. divaricatum***.

3b. Lower and middle cauline leaves entire, coarsely toothed, or with an irregular lobe here or there. Corollas 6 to 11 mm. long and white to pale blue or pale lavender. . . . . ***A. integrifolium***

Allophyllum divaricatum (Nuttall) A. & V. Grant [*Gilia divaricata* Nuttall). RED TUBE ALLOPHYLLUM. This species is widely scattered and moderately common in open and grassy areas at lower and intermediate elevations in the Tassajara region; it was more common than usual during the first spring after the Basin Complex Fire of 2008. ●R: Coast Ranges, from Humboldt and Trinity counties to the Santa Lucia Mountains of northwestern San Luis Obispo County, and on the western slope of the Sierra Nevada, from Shasta County to Kern County. This species also occurs in the Transverse Ranges of southern California, from Ventura County to San Bernardino County. ●H: annual herbs with simple or branched stems that range from about 1 to 6 dm. (4-24") tall. The alternate leaves are about 1-8 cm. long (inclusive of the petiole); the lower most are sometimes clustered and generally oblanceolate in outline and regularly or irregularly pinnately lobed, the middle leaves are usually simple and narrowly oblong to broadly linear, and the reduced upper most leaves are generally sessile, mostly oblong-lanceolate or oblanceolate, and commonly have a pair of small lobes or leaflets at the base. The flowers are produced in relatively loose terminal clusters, and the narrowly funnelform corollas, which are about 8 to 22 mm. long, have red or dark reddish purple tubes and five pink or pinkish violet (or sometimes lavender or bluish lavender) lobes. The fruit is a roundish and three celled capsule about 2 to 4 mm. long. ❀April-July.

+***Allophyllum gilioides*** (Bentham) A. & V. Grant [*Collomia g*. Bentham, *Gilia g*. E. Greene] subsp. ***gilioides***. GILIA LIKE ALLOPHYLLUM. The only locality in the Tassajara region where this taxon is known to occur is on Pine Ridge, where James Griffin collected a specimen of it at "The edge of Pine Ridge Camp," on May 27th of 1973 (Griffin 3504, JEPS 73555). It is likely that this taxon is present at many other localities in this region. In his "Plants of the Highest Santa Lucia and Diablo Range Peaks, California" (1975), Griffin listed *Allophyllum gilioides* as being uncommon on Chew's Ridge and as rare on Pine Ridge, but he failed to state the subspecies. The California Native Plant Society's vascular plants list for Chew's Ridge includes *Allophyllum gilioides*, and there is a specimen of *Allophyllum gilioides* listed in the Consortium of California Herbaria data base that was collected by Clare Hardham on Chew's Ridge in June of 1960 (Hardham 6797, RSA 140912), but these sources of information also fail to state the subspecies. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from southwestern Oregon to San Diego County. ●H: annual herbs with one to several stems up to 40 cm. tall. The lower most leaves are crowded and pinnately divided into 5 to 11 lobes; the cauline leaves become gradually shorter and divided into fewer lobes, and the upper most leaves are often three foliate or entire. The flowers are produced fairly crowed clusters of four to eight. The funnelform corollas, which are about six to ten mm. long, generally range from dark blue to blue purple. The fruit is roundish capsule containing one black seed per chamber. ❀April-June.

Allophyllum gilioides subsp. ***violaceum*** (Heller) A. Day [*A. v.* (Heller) A. & V. Grant]. This taxon is widely scattered and locally common in grassy openings in woodlands and chaparral in the Tassajara region, but is fairly inconspicuous and easily overlooked. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Shasta County to northern Baja California, and eastward to the mountains of western Nevada and Arizona. ●H: Annual herbs with simple or branched stems that are usually less than 16 cm. (6 ½ ") tall. The alternate leaves are .5 to 5 cm. long (inclusive of the petiole), the lower most, which are generally clustered and tending to be shed rather early, are mostly oblong-oblanceolate in outline and pinnately lobed, while the middle leaves are usually simple and linear to narrowly oblanceolate, while the upper most leaves are generally sessile and commonly three parted or lobed, with the central segment the largest. The flowers are produced singularly or in open cymes of two to three. The five lobed narrowly funnelform corollas, which are about 5 to 8 mm. long, are deep blue or purplish blue to sometimes quite pale. The fruit is a roundish and three seeded capsule about 2 to 4 mm. long. ❀April-July.

+<>***Allophyllum integrifolium*** (Brand) A. D. Grant & V. Grant [*Gilia gilioides* var. *integrifolia* Brand]. ENTIRE LEAVED ALLOPHYLLUM. On the tenth day of June, 2010, while botanizing along Tassajara Road along the summit of Black Butte Ridge, I came across a clump of plants that I did not recognize. I was very surprised to find an unknown species at this particular site, for it is very well known to me, having used it as an overnight stop on countless occasions while en route to Tassajara or to other points in the Ventana Wilderness. The site is an opening in chaparral that is accessible by an automobile via a remnant of the fire break that was cut along the summit of Black Butte Ridge during the Marble Cone Fire of 1977; it is located a short distance south of where the road to The Caves (Church ranch) intersects with Tassajara Road. Due to the characteristics of the flowers and fruits of this species, my hunch was that it was a member of *Polemoniaceae*, and my first effort to indentify it using the first edition of *The Jepson Manual* (1993) indicated that I was correct. From there I was quickly lead to the genus *Allophyllum*, and then to the species *integrifolium*. I then reviewed Alva Day Grant and Vern Grant's monograph of the genus (El Aliso 3 [2]: 93-110, 1955), and I was again lead to the same conclusion. As this species had never before been reported to occur in Monterey County, I went to the Consortium of California Herbaria website, where I discovered that the only specimen listed that was collected outside of the Sierra Nevada and the Transverse Ranges of southern California was in the Santa Lucia Mountains of San Luis Obispo County. It was collected in July of 1876 by the botanist-archaeologist Edward Palmer (1829-1911), in the mountains near San Luis Obispo (Palmer 394; UC 106703). I then photographed my specimen and emailed the image to my long time friend and fellow Tassajara botanist Diane Renshaw, who did not recognize the species. Diane suggested that I bring the specimen to her place so that we could put it under the microscope (literally), and after several hours of careful analysis, Diane also concluded that it was *A. integrifolium*, and gave me a high five. ●R: southern Cascade Range, the Sierra Nevada and the San Rafael, San Gabriel and San Bernardino mountains of southern California, from Shasta County to Santa Barbara, Los Angeles and San Bernardino counties, with disjunct populations the Santa Lucia Mountains of Monterey and San Luis Obispo counties. ●H: annual herbs with a single lower stem that usually becomes alternately branched upwards. The plants are usually less than 25 cm. (10") tall. The leaves are generally entire, but the lower most leaves can be coarsely toothed and the middle leaves can have an irregular lobe or two. The lower leaves are generally smaller and narrower than the oblong middle cauline leaves, and the sessile inflorescence leaves are usually divided to the base into three leaflets, the terminal one being the largest. The flowers are produced loose groups of two to four that are subtended by a leaf, and the salverform corollas, which are about six to eleven mm. long, range from white to pale blue. The fruit is a three to six seeded capsule. ❀May-August (September).

COLLOMIA. GLUE SEED.

Collomia consists of fifteen species that are primarily of North America, but some species also occur in temperate South America. The name is derived from the Greek word *kolla*, glue, for the seeds become gluey when wet.

A specimen of *Allophyllum integrifolium* and photographs of flowers of the plants that were found on Black Butte in June of 2010.

The site on Black Butte at which *Allophyllum integrifolium* was discovered in June of 2010.

1a. Leaves sessile and entire. Flowers showy. . . . . ***C. grandiflora***.
1b. Leaves petiolate and pinnately divided into leaflets. Flowers inconspicuous. . . . . ***C. heterophylla***.

Collomia grandiflora Douglas ex Lindley. LARGE FLOWERED COLLOMIA. This distinctive species is widely scattered in open and usually grassy areas in the Tassajara region, but it is usually uncommon, although it can be abundant at some localities in some years (such as along the fire break trail between the Pine Ridge Trail and the junction of Tassajara Road and the road to the Church Homestead. Prior to the Basin Complex Fire of 2008 the only other locations were this species was known to occur were as follows: along the Pine Ridge Trail between the first summit west of China Camp and the Church Creek Divide, in a meadow about half way up the Horse Pasture-Tassajara Cutoff Trail, in open areas on Chew's Ridge, along the lower portion of the Horse Pasture Trail, and on the floodplains of Tassajara Creek between The Narrows and the Arroyo Seco. During the spring of 2009 this species was seen at a number of other localities, such as on the floodplains of Tassajara Creek upstream from the hot springs. ●R: widespread in the mountains of western North America, from British Columbia and Colorado to Arizona and southern California. ●H: annual herbs that usually have a single erect stem that range from about 1 to 6 dm. (4-24") tall. The alternate leaves are sessile, linear to linear lanceolate with entire margins, and about 3 to 5 cm. long. The flowers are produced in terminal clusters that are subtended by ovate leaf like bracts. The narrowly funnelform and five lobed corollas are about 1.5 to 3 cm. long, and range from nearly white to peach, yellowish salmon, yellow or sometimes even light blue. The fruit is an obovoid capsule about 5 mm. long. ♔April-July.

!∨***Collomia heterophylla*** Douglas ex Hooker. VARIABLE LEAFED COLLOMIA. In the first edition of this text I stated that this species was "Widely scattered and locally common above about 3,000 ft. in the Tassajara region, such as on Black Butte, along the Pine Ridge Trail, the upper regions of Church Creek, etc., and occurring mostly semi shady areas in woodlands and chaparral." During the first spring after the Basin Complex Fire of 2008, this species was very common, and it was frequently seen at much lower elevations, such as in and around the developed area of Tassajara Hot Springs. ●R: widely distributed in western North America, from British Columbia and Idaho southward, to Tulare County in the Sierra Nevada, and to the Santa Lucia Mountains of northwestern San Luis Obispo County in the Coast Ranges. ●H: small and usually diffusely branched annual herbs that range from about .5 to 2.5 dm. (2-10") tall. The plants are glandular and often emit a somewhat skunk like odor. The alternate are about .5 to 4 cm. long, and are highly variable in shape, with the blades of the larger lower leaves being mostly oblanceolate in outline and pinnately parted into irregularly toothed leaflets or lobes, while the blades of the upper leaves are mostly obovate and irregularly lobed or toothed towards the apex (or sometimes entire). The small flowers are produced in terminal and axillary clusters. The narrowly funnelform and five lobed corollas, which are about 1 to 1.4 cm. long, range from pinkish lavender to nearly white. The fruit is an oblong capsule about 4 to 6 mm. long. ♔April-June.

ERIASTRUM. WOOL FLOWER.

Eriastrum is comprised of sixteen species of western North America. All of the species occur in California, and six are endemic to the California Floristic Province. The name is derived from the Greek words *erion*, wool, and *astrum*, star, on account of the woolly pubescence of the calyces and the star shaped corollas.

∧***Eriastrum densifolium*** (Bentham) H. Mason subsp. ***elongatum*** (Bentham) H. Mason [*Hugelia elongata* Bentham]. LEAFY WOOL FLOWER. This showy flowered species is scattered at higher elevations on Black Butte Ridge, and also at points along the Pine Ridge Trail between China Camp and the Church Creek Divide. It also occurs on Chew's Ridge in the vicinity of the lookout. According to the note that is enclosed in the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901(Elmer 3259 DS), he collected it "Near Pine Valley." The large blue patches that could be seen above Tassajara Road (between the Bathtub Spring and the Suzuki Roshi ashes site) during the first spring after the Basin Complex Fires of 2008 probably represented this species. This would be fine addition to the gardens at Tassajara, especially as a ground cover for more or less barren places. ●R: scattered in suitable habitats in the South Coast Ranges, the southern Sierra Nevada, and the Transverse and Peninsular ranges of southern California, from Monterey and Inyo Counties to northern Baja California. ●H: densely tufted evergreen herbs that become woody at the base with age. They have decumbent primary branches and numerous slender and erect or ascending secondary branches that range from about 1 to 5 dm. (4-20") tall. The alternate and crowded leaves are white woolly, about .5 to 4 cm. long, and variously cleft into narrow and sharply acute lobes; the lower leaves irregularly so, while the upper leaves typically have one to several pairs of remote and opposing lobes. The flowers are produced in head like terminal clusters in which the calyces are conspicuously embedded in white woolly hair. The salverform corollas are bright blue and about 14 to 18 mm. long. The fruit is an ellipsoid capsule about 3 to 4 mm. long. ♔May-Sept.

Eriastrum densifolium (Bentham) Mason subsp. *austromontanum* (Craig) H. Mason. It is possible that this taxon also occurs in this region, for there is a specimen at the University of California Herbarium that is labeled as such. This specimen was collected by Harvey Monroe Hall in July of 1915, at "5,000 ft." on "Tassajara Road, South Coast Ranges" (Hall 10077, UC 186,144), and thus probably at the summit of Chew's Ridge. Subspecies *austromontanum* differs from subsp. *elongatum* in being less woolly, in having floral bracts that are five to nine lobed (instead of 1 to 5 lobed), and in having 15 to 20 flowers per cluster (instead of fewer than 15). There are also herbarium specimens from the Tassajara region that are labeled as *E. densiflorum* subsp. *densiflorum*, but this taxon is said to be restricted to coastal sand dunes.

GILIA.

Gilia consists of about forty species of western temperate North America and temperate South America. Twenty nine species plus twenty seven lesser taxa occur in California. The genus was named by Ruiz Lopez & Pavon, in their "Florae Peruvianae et Chilensis" (1794), for the Italian naturalist Filippo Luigi Gilii (1756-1821).

1a. Flowers produced in fan shaped to roundish clusters. Corollas 1 to 2 cm. long. . . . . ***G. achilleaefolia*** subsp. ***achilleaefolia***.
1b. Flowers produced in loosely flowered groups of seven or fewer flowers. Corollas less than 1 cm. long:
2a. Corollas evenly colored. . . . . ***G. achilleaefolia*** subsp. ***multicaulis***.
2b. Corolla tubes purple or dark purplish, the color usually manifesting as five spots or five pairs of spots. . . . . ***G. clivorum***.

Gilia achilleaefolia Bentham. CALIFORNIA GILIA. Although this species is widely scattered and locally common in open grasslands at all elevations in the Tassajara region, its populations vary considerably from year to year. In places where it occurs plants can be abundant in some years, while in other years they can be rare or totally absent. It was common at many localities during the first

spring after the Basin Complex Fire of 2008. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges of California, from Solano and El Dorado counties to San Diego County. ●H: erect annual herbs that range from about 2 to 7 dm. (6-28") tall. The alternate leaves are about 1 to 10 cm. long; they are primarily basal in some plants but well developed upwards in others. The lower most leaves are generally clustered. The blades are ovate to oblong oblanceolate in outline and are bipinnately dissected into linear lobes; the lower are petiolate and the upper are sessile and become reduced in size and in complexity. The flowers are produced in several to many flowered terminal clusters that range from fan shaped to nearly round. The broadly funnelform corollas are about 1 to 2 cm long, and range from white to blue or dark blue violet (all the plants that I have seen in this region had white or light blue flowers). The fruit is an ovoid and 10 to 18 seeded capsule about 3 to 6 mm. long. ❁April-June.

At some point after the publication of Philip Munz's *A California Flora* in 1959, the commonly used spelling of the name for this species transformed into "a*chilleifolia*." As *achilleaefolia* is how the name was spelled in George Bentham's original description of the species in 1833 (in volume 20 of *Edwards Botanical Register*, under tab. 1622), and as this is how it was also spelled in all known botanical texts that were published prior to the first edition of *The Jepson Manual* in 1993, I have retained the former spelling in this text.

Gilia achilleaefolia subsp. ***multicaulis*** (Bentham) A. & V. Grant [*G. multicaulis* Bentham, *G. m.* var. *peduncularis* (Eastwood) Jepson]. This taxon is widely scattered and locally common in the Tassajara region, primarily in grasslands or in grassy openings in woodlands, often in association with the typical species. Although this taxon is fully compatible with the typical species (Grant 1954 a), the morphological characteristics are so radically distinct that the retention of a sub specific classification is still quite useful. The flowers of the typical species tend to be bee pollinated, while those of *multicaulis* are mostly self pollinating. ●R: Coast, Transverse and Peninsular ranges, from Solano County to San Diego County. ●H: highly variable annual herbs that range from about 1.5 to 6 dm. (6-24") tall, with plants growing in densely grassy areas tending to be simple or upwardly few branched and often with primarily basal foliage, while plants growing in more open habitats tend to be diffusely branched and leafy throughout. The leaves are about 1 to 6 cm. long; the lower are petiolate, broadly ovate to oblong in outline, and pinnately or bipinnately divided into narrow and usually toothed lobes or segments, while the upper are sessile and pinnately or irregularly divided into linear and entire segments, the axis of which are often falcate. The flowers are usually produced in loose terminal groups of two's or three's, or sometimes singularly or in groups of up to 7; they are on slender and elongating pedicels that are up to 6 cm. long in fruit. The funnelform corollas are about 5 to 7 mm. long, and the throat is often yellowish tinged. The five lobes range from white to blue or purplish blue. ❁April-June.

Gilia clivorum (Jepson) V. Grant [*G. multicaulis* Bentham var. *clivorum* Jepson]. HILLSIDE GILIA. This species is widely scattered and locally common in open and grassy habitats in the Tassajara region, but it is inconspicuous and easily overlooked. ●R: Coast, Transverse and Peninsular ranges, from Siskiyou County to San Diego County, and also on the northern Channel Islands and in Arizona. ●H**:** delicate annual herbs with slender stems that range from about 1.5 to 4 dm. (6-16") tall. Plants growing in densely grassy habitats tend to have an erect and simple (or few branched) primary stem, while plants growing in more open areas tend to have many diffuse branches. The alternate leaves are about 1.5 to 9 cm. long, and tend to be primarily basal in simple plants and well developed upwards in diffuse plants. They are oblong to oblanceolate (or sometimes ovate) in outline and pinnately or bipinnately parted into narrow, simple or variously lobed segments. The flowers are usually produced in few flowered terminal glomerules, on pedicels that are up to 3 cm. long in fruit. The funnelform corollas are about 6 to 8 mm. long; the throats are yellowish tinged and have five pairs of dark purplish spots, while the five lobes are blue or blue violet towards the apex. The fruit is an ovoid and many seeded capsule about 5 mm. long. ❁March-May.

LEPTOSIPHON.

Leptosiphon consists of thirty species of western North America and the temperate regions of Chile. The name is derived from Greek words and means narrow tube, on account of the narrow corolla tubes of some of the species.

1a. Flowers pediceled and not produced in clusters. Corollas broadly funnelform. . . . . ***L. liniflorus***.
1b. Flowers sessile and produced in densely bracted clusters. Corollas narrowly salverform:
  2a. Corolla tubes less than two and a half times longer than the calyx, the limbs mostly less than 6 mm. wide and rose lavender. Floral bracts conspicuously ciliate. . . . . ***L. ciliatus***.
  2b. Corolla tubes two to four times longer than the calyx, the limbs about 6 to 12 mm. wide, white or (rarely) yellow, and often tinged rose, lavender, or yellow. Floral bracts inconspicuously ciliate. . . . . ***L. parviflorus***.

Leptosiphon ciliatus (Bentham) Jepson [*Gilia ciliata* Bentham; *Linanthus ciliatus* (Bentham) E. Greene]. WHISKER BRUSH. *L. ciliatus* is lightly scattered in open and grassy habitats in the Tassajara region, and it often occurs in small colonies. ●R: endemic to much of the California Floristic Province, where it occurs in the Coast Ranges, Sierra Nevada foothills, Transverse and Peninsular ranges, from southern Oregon to San Diego County. ●H: erect annual herbs with simple or branched stems that range from about 1 to 3 dm. (4-12") tall. The opposite leaves are sessile and divided to the base into five to eleven narrowly linear segments about 5 to 20 mm. long. The flowers are produced in densely bracted head like terminal clusters which, in more robust plants, resemble soap brushes, and hence the common name. The narrowly salverform corollas range from about 10 to 25 mm long; the inner throat is usually yellow and surrounded by a white rim. The five lobed limbs are about 3 to 6 mm. wide, and range from nearly white to lavender or dark pink. There is often a dark spot in the lower center of each lobe. The fruit is an oblong capsule about 6 mm. long. ❁April-June.

Leptosiphon liniflorus (Bentham) J. M. Porter & L. A. Johnson [*Gilia liniflora* Bentham; *Linanthus liniflorus* (Bentham) E. Greene; *Gilia pharnaceoides* Bentham]. FLAX FLOWERED LEPTOSIPHON. These small but very distinctive annual herbs are widely scattered and locally common in open areas in the Tassajara region, particularly in very exposed places where the soil is poor or sandy. ●R: widely distributed in temperate western North America, from Washington and Idaho to southern California. ●H: annual herbs with slender and upwardly branched stems; the plants range from about 1 to 5 dm. (4-20") tall. The remote leaves are opposite and sessile, and divided to the base into three to nine narrowly linear segments about .5 to 3 cm. long (they thus resemble whorls of linear leaves). The inflorescence is cymose-paniculate, and the flowers are axillary and terminal on filiform pedicels about 1 to 2.5 cm. long. The five lobed corollas are broadly funnelform and about 1 to 3 cm. long; the lobes are white or lavender tinged, and there are usually many purplish veins radiating outward from the center of the tube. The fruit is an oval and several seeded capsule about 2 mm. long. ❁April-September.

Leptosiphon parviflorus Bentham [*Linanthus p.* (Bentham) E. Greene, *Linanthus androsaceus* (Bentham) Greene subsp. *luteolus* (E. Greene) Mason, *Linanthus l.* E. Greene, *Linanthus p*. var. *l.* (E. Greene) Milliken,

Linanthus plaskettii Eastwood, *Linanthus a.* subsp. *p.* (Eastwood) Mason, *Gilia tassajarae* Brand, *L. a.* subsp. *luteus* (Bentham) Mason, *L. a.* subsp. *croceus* (Milliken) Mason; etc., etc., etc.]. VARIABLE LEPTOSIPHON, SHOWER GILIA. This highly variable species is widespread and locally common to abundant at all elevations in the Tassajara region; it primarily occurs in open grasslands and in grassy openings in woodlands and chaparral (the most radical manifestation of this species that I have seen in this region are small and light yellow flowered plants that are lightly scattered in open grasslands along the Pine Ridge Trail, between China Camp and the Church Creek Divide). *L. parviflorus* was very common during the first spring after the fire of 2008, but not as extremely so as were many other annual herbs. ●R: Coast, Transverse and Peninsular ranges, from Lake and Mendocino counties to northern Baja California, and in the Sierra Nevada foothills, from Butte County to Fresno County. ●H: small but showy flowered annual herbs that range from about .5 to 3 dm. (2-12") tall. The leaves are opposite, remote, sessile, and divided at the base into five to nine narrowly linear lobes about 4 to 12 mm. long (they thus resemble whorls of linear leaves). The sessile flowers are produce in densely bracted head like terminal clusters. The narrowly salverform corollas range from about 2 to 3.5 cm. long, and the limbs range from about .6 to 1.5 cm. wide. The tubes, which are no more than 1 mm. wide, range from yellow to maroon and pink. The throats are yellow and the lobes range from white to yellow, pink, blue or purple. The corolla lobes often have red marks at the base. The fruit is an ellipsoid capsule about 4 to 5 mm. long. ❀April-June.

Leptosiphon parviflorus is highly polymorphic, and as a consequence many botanical names have been applied to it over the years, as evidenced by the partial list of synonyms that I have given above. Willis Linn Jepson, in volume three of his "Flora of California" (1943), listed seventeen synonyms under the name *L. parviflorus*. Herbert Mason, in volume three of Leroy Abrams's "Illustrated Flora of the Pacific States" (1951), reduced the *L. parviflorus* complex to six subspecies of *Linanthus* (*Leptosiphon*) *androsaceus*, and the total number of synonyms given under the names of these subspecies was thirty. Philip Munz, in his "A California Flora" (1959), also treated the *L. parviflorus* complex as a series of subspecies *of L. androsaceus*; in this text there were five subspecies and a total of eighteen synonyms. Robert Paterson, in the first edition of *The Jepson Manual* (1993), made no attempt to segregate the manifestations, but he noted that "Detailed study needed before infraspecific taxa can be recognized" (the treatment in the second edition of *The Jepson Manual* (2012) is unchanged). A noteworthy synonym of *L. parviflorus* is *Linanthus plaskettii* Eastwood, the type of which was collected in the Santa Lucia Mountains by Alpha Reason Plaskett in April of 1898. The majority of the local plants more or less fit the description of this taxon. Another noteworthy synonym is *Gilia jassajarae* Brand, which August Brand named and described in his treatment of *Polemoniaceae* in *Das Pflanzenreich* in 1907 (IV, 250; Heft 27). This taxon was named for the locality of the type specimen, which was collected by A. D. E. Elmer in June of 1901 (Elmer #3255), which, due to the stylized T of the printed labels of Elmer's "Tassajara Hot Springs" specimens, Mr. Brand misread as "Jassajara Hot Springs."

LINANTHUS.

As presently circumscribed, *Linanthus* consists of twenty four species of temperate western North America and temperate western South America (Chile). The name is derived from the Greek words *linon*, flax, and *anthos*, flower, on account of the resemblance of the flowers to those of the genus *Linum* (*Linaceae*).

Linanthus dichotomus Bentham. EVENING SNOW. This distinctive species is fairly common in open areas in the vicinity of the Hog's Back and on adjacent flood plains of Tassajara Creek, but it is not known to occur elsewhere in this region. It is often abundant on the flood plain on the far side of the Hog's Back, near to where the trails to the waterfall and upstream diverge. It is possible that this species occurs in other areas in the Tassajara region, for the corollas open towards dusk and close with the rising of the sun, and thus other populations may have been overlooked. ●R: from Shasta County southward, through the Sierra Nevada foothills and the Coast, Transverse and Peninsular ranges, to San Diego County, and eastward, across the deserts, to Nevada and Arizona. ●H: annual herbs with slender and erect stems that range from about 5 to 25 cm. (2-10") tall, which are usually simple at the base but dichotomously branched above (and hence the name for the species). The remote leaves are opposite and sessile, and divided to the base into 3 to 7 narrowly linear segments about 1 to 2 cm. long (and thus they resemble whorls of linear leaves). The showy flowers are terminal and axillary in open cymes, and the five lobed salverform corollas are about 2 to 3 cm. long (in the process of opening and closing the corollas temporarily appear to be broadly funnelform). The interior and exterior surfaces of the corolla throats are usually yellow, and the broad limbs are mostly white, but they have distinctive pale brownish red or pale brownish purple bands along the outside margins of the lobes. The fruit is an oblong and several seeded capsule about 3 to 4 mm. long. ❀April-June.

MICROSTERIS. ANNUAL PHLOX.

This genus consists of one extremely variable species that is native to both western temperate North America and temperate South America. In botanical literature this species has often been placed in the closely related genus *Phlox*, in which it radically stands out for being the only annual herb within that complex. According to one etymology, the name is derived from Greek words *mikros*, small, and *aster*, star, while another states that mean small and to support.

Microsteris gracilis (Hooker) E. Greene [*Gilia g.* Hooker; *Phlox g.* (Hooker) E. Greene; *M. g.* subsp. *humilis* (E. Greene) Grant]. This unique and highly variable species is lightly scattered in open and usually grassy habitats at all elevations in the Tassajara region; it was more common than usual during the first spring after the Basin Complex Fire of 2008. ●R: widely distributed in temperate western North America, from British Columbia and Nebraska to northern Baja California, and it also occurs in temperate South America (in Bolivia, Chile and Argentina). ●H: the growth forms of *M. gracilis* are extreme, ranging from plants that have decumbent branches from the base and that are wider than they are tall (this form has been named subsp. *humilis*), to plants with a single, very erect and unbranched stem. Plants range from about 2 to 20 cm. (1-8") tall. The position of the leaves is also highly variable, for in some plants nearly all of the leaves are opposite, while in others nearly all of the leaves are alternate. In plants with only a few opposite leaves, the location on where they occur on the plant is also variable. The sessile leaves, which have entire margins, are about 1 to 4 cm. long, and range from oblanceolate or oblong to lanceolate; the lower mid cauline leaves are usually the largest. The small flowers are produced singularly or in terminal cymes. The salverform corollas are about 8 to 12 mm. long; the tube is yellowish and the five lobed limbs range from pale to dark rose. The corolla lobes are another highly variable feature of this species, for the margins range from entire to shallowly or deeply notched at the apex. The fruit is an ovoid capsule about 4 to 7 mm. long. ❀March-June.

NAVARRETIA.

Navarretia consists of about 30 species of temperate western North America and temperate South America (Chile and Argentina). The genus is primarily Californian, for 27 species occur in California, and 20 are endemic to the California Floristic Province. The genus was named by Ruiz Lopez & Pavon, in their "Florae Peruvianae et Chilensis" (1794), for the Spanish physician F. F. Navarrete (?-1742).

1a. Plants not glandular. Corollas white. . . . . ***N. intertexta***.
1b. Plants glandular. Corollas light blue to dark purplish blue:
2a. Plants sparsely glandular pubescent, the glandular hairs are mostly restricted to the stems and inflorescence. Axis of upper leaves oblong elliptic to oblong linear. . . . . ***N. atractyloides***.
2b. Plants densely glandular pubescent throughout. Axis of upper leaves narrowly linear to narrowly lance linear. . . . . ***N. mellita***.

Navarretia atractyloides (Bentham) Hooker & Arnott [*Aegochloa a.* Bentham]. HOLLY LEAFED NAVARRETIA. This species is lightly scattered in grassy openings in woodlands and chaparral along the Horse Pasture and Church Creek Trails (i.e., in clayey soils along the Church Creek Fault Zone); it also occurs areas with similar soils along the Miller Canyon Fault in Miller Canyon. ●R: Coast, Transverse and Peninsular ranges, from southwestern Oregon to northern Baja California. ●H: small and thistle like annual herbs with erect simple or branched stems that range from about 5 to 30 cm. (2-12") tall. The leaves are alternate and about 1 to 4 cm. long; the lower have a narrowly linear axis and short, sharply acute and irregularly pinnate lobes, while the upper have an oblong elliptic to oblong linear axis and spiny toothed margins. The flowers are produced in dense and spiny bracted terminal and lateral clusters. The five lobed corollas are narrowly funnelform, dark purplish blue, and about 8 to 10 mm. long. The fruit is an ovoid capsule about 3 to 4 mm. long. ❀May-July.

Navarretia intertexta (Bentham) Hooker [*Aegochloa i.* Bentham]. The only place in the Tassajara region where this species is known to occur is in Pine Valley, where it was found at vernal seeps on the massive sandstone outcrop a short distance northeast of Jack English's cabin. ●R: this species, along with its subspecies *propinqua*, is widely distributed in temperate western North America, from British Columbia, Montana and Colorado to Arizona and northern Baja California. ●H: annual herbs with simple or branched stems that range from about 2 to 20 cm. (1-8") tall. The leaves are alternate and about 1 to 5 cm. long, and are pinnately or bipinnately divided into narrowly linear lobes. The flowers are produced in head like terminal clusters which are subtended by pinnately lobed bracts that strongly resemble the leaves. The five lobed white corollas are narrowly funnelform and about 5 to 9 mm. long. The fruit is a one or two celled capsule less than 3 mm. long. ❀May-July.

∨***Navarretia mellita*** E. Greene. HONEY SCENTED NAVARRETIA. These small annual herbs are scattered in open areas on Chew's Ridge and in Miller Canyon, but are not known to occur elsewhere in this region. ●R: Coast Ranges, from Humboldt County to the Santa Lucia Mountains of northwestern San Luis Obispo County, and also in the Sierra Nevada foothills in Tuolumne and Calaveras counties. ●H: densely glandular-pubescent annual herbs with simple or branching stems that range from about 5 to 20 cm. (2-8") tall. The leaves are alternate and about .5 to 3 cm. long; the leaf axis is narrowly linear and pinnately or irregularly divided into sharply acute lobes. The flowers are produced in dense and spiny bracted head like terminal clusters. The funnelform corollas are about 5 to 7 mm. long; the throat is white and the five lobes are light blue. The fruit is an ovoid capsule about 3 to 4 mm. long. ❀May-July.

SALTUGILIA. WOODLAND GILIA.

Saltugilia consists of four species of central and southern California and northern Baja California. The name *Saltugilia* was originally designated as a section of the genus *Gilia* in 1954 (El Aliso 3 [1]: 59-91), but due to the findings of phylogenetic research, this section was elevated to the genus level in 2000 (Aliso 19 [1]: 69). The name *Saltugilia* is a combination of the Latin word *saltu*, woodland, with that of the genus *Gilia*.

!∧***Saltugilia splendens*** (Douglas ex H. Mason & A. D. Grant) L. A. Johnson [*Gilia splendens* Douglas ex H. Mason & A. D. Grant; *G. tenuiflora* Bentham var. *altissima* Parish; *Gilia grinnellii* Brand in part]. SPLENDID GILIA, TASSAJARA GILIA. In the first edition of this text I stated that this species was widespread and locally common in the Tassajara region, primarily in grassy openings in woodlands and chaparral. During the first spring after the Basin Complex Fire of 2008 this species was exceedingly abundant, and in many places on the higher mountains dense colonies produced huge patches of pink that were visible from many miles away. The plants of that season were also much larger than usual. Normally the tallest plants are about 8 dm. (32") tall, but in the spring of 2009 most of the plants were more than 12 dm. (48") tall, and some were as much as 18 dm. (72") tall. I recall passing along sections of Tony's Trail where the flowers were at, and sometimes above, the level of my eyes. The leaves and flowers that season were also much larger than usual. ●R: Coast, Transverse and Peninsular ranges, from Carmel Valley in Monterey County to the San Jacinto Mountains of Riverside County. ●H: annual herbs typically a with a single lower stem that branches into one or more cymose inflorescences. The plants usually range from about 1.5 to 8 dm. (6-32") tall. The basal leaves, with can be as much as 9 cm. long, are produced in more or less dome shaped rosettes. Their blades are typically oblong-oblanceolate in outline and bipinnately divided into many segments and lobes. The much more remote cauline leaves quickly begin to become reduced in size and complexity upwards, and those of the inflorescence are generally entire and linear. The flowers are produced in terminal cymes in which the flowers are usually produced in two's on pedicels of unequal length. The tubes of the funnel form corollas are about 10 to 23 mm. long, and the five lobed limbs are about 12 to 23 mm. in diameter. The throats (and anthers) are cyan or purplish blue, and the broadly ovate and acute lobes are usually bright rose pink, but can have a hint of cyan or violet. The fruit is an oblong capsule about 4 to 6 mm. long ❀April-July.

TASSAJARA WOODLAND GILIA

On April 26th of 1933, Roxana Ferris, a botanist at Stanford University, spent a part of that day collecting plant specimens in and around the developed area of Tassajara Hot Springs. Ferris identified one of these specimens as *Gilia tenuiflora* var. *altissima* (Ferris #8317), which at that time was the accepted name for what is now *Saltugilia splendens*. In 2004 this specimen was chosen for the conserved type of the species, and in 2005 the name *Saltugilia splendens* Douglas ex H. Mason & A. D. Grant was officially accepted as the valid name for this taxon by the General Committee of the International Code of Nomenclature for algae, fungi and plants. These actions were part of long series of events that eventually lead to the valid reestablishment of this taxon under the specific name that David Douglas had given it: *splendens*.

Saltugilia splendens was one of the multitudes of the new (to science) species that were encountered by David Douglas during the period he spent in California from December of 1830 to August of 1832. Douglas named this species *Gilia splendens*, and although he

must have collected a specimen of it, it was probably in one of his bundles that were lost while in shipment to London. Included in one of Douglas' successful shipments were *Gilia splendens* seeds, for a plant was raised in the garden of the Horticultural Society of London in 1834. This plant served as a study for the gifted botanical illustrator Sarah Ann Drake, and the resulting chromolithographic plate was published in volume nine (complete series vol. 22) of *Edward's Botanical Register* in 1836 (tab. 1888). One can only guess as to how John Lindley, the editor of the *Botanical Register*, got *Gilia splendens* confused with the smaller flowered and quite distinct *Gilia tenuiflora* Bentham, but the text that accompanied the illustration was under the name of the later species. It also appears that Mr. Lindley never saw the plant that was illustrated), for he stated that:

> Mr. Douglas sent it home under the name *Gilia splendens*, a somewhat singular appellation, seeing that it is one of the least showy of the genus. In fact it is not worth cultivating for the sake of the flower garden; but it is very pretty in nosegays as an ornament to rooms.

And thus the name "*Gilia splendens*" remained a synonym of *Gilia tenuiflora* until 1898. The subsequent history of this taxon is as follows:

1898: Samuel Parish, a student of the flora in the vicinity of San Bernardino, who knew nothing about the taxonomical history of David Douglas' *G. splendens*, named and described *Gilia tenuiflora* var. *altissima* (*Erythea* 6: 90), and this became the accepted name for this entity for the next 50 years.

1907: August Brand, in his treatment of *Polemoniaceae* in section 4, part 250 of *Das Pflanzenreich*, (heft 27, p. 101), named and described *Gilia grinnellii*, which apparently applied to the same entity as *G. splendens*, but he failed to designate a type specimen, and the specimen that was assumed to be the type was destroyed when herbarium of the Berlin Botanical Garden was bombed during World War II.

1943: In volume three of his *Flora of California*,, Willis Linn Jepson listed *Gilia splendens* as a synonym of *G. tenuiflora*, and he also stated the authorship of it as "Douglas; Paxton Mag. Bot. 3: 260 (1837)." It is unknown as to how Mr. Jepson thought that this was so, for in that volume of *Paxton's Magazine of Botany and Register of Flowering Plants*, *Gilia splendens* was only mentioned as a synonym of *G. tenuiflora*, and this was in a "New and Rare Plants" section of the magazine that discussed species that had been recently illustrated and described in other periodicals (in this instance it was tab. 1888 in the *Botanical Register*).

1948: Herbert Mason and Alva Day Grant, students of Willis Jepson, unknowingly became the coauthors of *Gilia splendens* when, in a paper titled "Some Problems in the Genus *Gilia*," they provided the first published description of the taxon (*Madrono* 9 [6]: 169-220). The following excerpt from this text begins on page 212:

> GILIA SPLENDENS Douglas ex Paxton, Mag. Bot. 3: 260. 1837. This is the species that has been regarded in the literature as *G. tenuiflora* var. *altissima* Parish. The name *G. splendens* as applying to this seems to been overlooked in spite of the excellent illustration in Lindley's Botanical Register (1836, t. 1888), under the caption "*G. tenuiflora* Benth." This illustration was made from living plants grown in England from seeds collected by David Douglas and labeled by him "*Gilia splendens,*" and is a faithful reproduction of the species. The range of *G. splendens* barley overlaps into the range of *G. tenuiflora,* but we have seen no evidence of integration between them. *Gilia splendens* is readily distinguished from that species by its pubescence of coarse translucent hairs on the basal leaves, the bi- and tri-pinnate basal leaves with finely toothed lobes and the rose or bright pink color of the corolla as opposed to the purple and yellow of *G. tenuiflora*. It is a typically a montane species occurring from the mountains of southern Monterey County to those of Santa Barbara and Ventura counties and in the San Gabriel, San Bernardino and San Jacinto mountains, California.

And thus the formal authorship of *Gilia splenden*s became Douglas ex H. Mason & A. D. Grant. In the same text Mason & Grant also reduced Brand's *Gilia grinnellii* to a lesser taxa of *Gilia splendens*.

1951. As seen in the preceding excerpt from Mason & Grant's text, they repeated Jepson's erroneous authorship of the species (they did ad "ex" between the names of Douglas and Paxton), and they made the same mistake in their treatment of the genus *Gilia* in volume three of Leroy Abram's "Illustrated Flora of the Pacific States," 1951.

1954. By 1954 Alva Day Grant became aware of the fact that Paxton had nothing to do with the authorship of *Gilia splendens*, for in her and her husband's treatment of the *Saltugilia* section of *Gilia* (*El Aliso* 3 [1]: 59-91), they stated the authorship as "Douglas ex Lindley, in *Edward's Botanical Register*, n. s. 9: t. 1888, 1836." This was only a bit more accurate, for as stated above, Lindley only mentioned *G. splendens* in his text for *G. tenuiflora*.

1993. By at least 1993 Alva Day (formerly Alva Day Grant) became aware of the fact that she was one of the coauthors of *Gilia splendens*, as evidenced in her treatment of the genus *Gilia* in the first edition of *The Jepson Manual* (in this text the authorship of *Gilia splendens* is abbreviated to H. Mason & A. D. Grant).

2000. With the publication of J. Mark Porter's and Leigh A. Johnson's "A Phylogenetic Classification of Polemoniaceae" (Aliso 19 [1]: 55-91), *Gilia* section *Saltugilia* was elevated to the genus level. In this text *Saltugilia grinnellii* Brand was given priority over *G. splendens*, on account of its earlier date of its publication (1907, as opposed to 1948).

2003. Verne Grant (the former husband of Alva Day) and Tom Wendt provide a taxonomical history of *Saltugilia splendens*, and made a formal proposal for the rejection of the name *Gilia grinnellii* (*Taxon* 52 (1): 145-146). Grant & Wendt's argument was based on the following factors: *G. grinnellii* had no designated type specimen, the specimen that had been considered to be the type was destroyed when the herbarium of the Berlin Botanical Garden was bombed during World War II, the neotype specimen was designated in a text in which *G. grinnellii* was listed as a synonym of *G. splendens*, and that the neotype of *G. grinnellii* was actually a specimen of a different species (*Gilia cana*).

2004. Verne Grant and Wendt make a formal proposal to conserve the name *Gilia splendens* (Taxon 53 (3): 842-843), and in this text they stated that:

> The type of *Gilia splendens* should probably be a figure published by Lindley (Bot. Reg. 22: t. 1888. 1836), this being the only element cited in the protologue of Mason & Grant. To circumvent the uncertainty of interpretation of Art. 7.5, and since it seems wise to base the name on a specimen to avoid potential problems that may arise from the use of an illustration, we propose the Ferris specimen listed above as the conserved type.

The "Ferris specimen listed above" was cited in this text as follows:

> Typus: [U.S.A.], California, Monterey Co., Santa Lucia Mts., Tassajara Hot Springs, alt. 1530 ft., 26 April 1933, Roxana S. Ferris 8317 UC no. 524203; isotype: DS, GH), typ. cons. prop.

2005. Both of Grant & Wendt's proposals are unanimously accepted by the General Committee of the International Code of Nomenclature for algae, fungi and plants (*Taxon* 54 [2]: 530, & 54 [4]: 1100).

2007. Leigh Johnson, the coauthor of the above mentioned phylogenetic revision of *Polemoniaceae*, acknowledged the de-

Saltugilia splendens as illustrated in volume nine of *Edward's Botanical Register*, 1836.

cisions of the International Code of Nomenclature (*Novon* 17: 193-197), and made the needed changes to the circumscription of *Saltugilia*. Leigh also designated *Saltugilia splendens* as the type species of the genus, and added to it subsp. *grantii*, a longer flowered taxon of the mountains of southern California.

POLYGALACEAE. MILKWORT FAMILY.

Polygalaceae consists of about 20 genera and approximately 1,000 species of primarily tropical and subtropical herbs, vines, shrubs and small trees. About half of the species belong to the namesake genus, *Polygala*.

POLYGALA. MILKWORT.

The genus *Polygala* consists of approximately 500 species of tropical, subtropical and temperate regions; the species range from annual and perennial herbs to shrubs and small trees. The name is derived from the Greek words *polus*, much, and *gala*, milk, for it was believed that cattle that feed upon some species produced more milk.

∨***Polygala californica*** Nuttall. CALIFORNIA MILKWORT. The only area in the Tassajara region where I have seen this species is along the Pine Ridge Trail between Divide Camp and Pine Ridge. I counted twenty one plants in and around a small patch of chaparral a few hundred feet from the Tassajara Canyon overlook in June of 1972. James Griffin collected a specimen of this species "On Pine Ridge Trail near junction with trail down to Bear Basin" in June of 1992 (Griffin 3222; JEPS 74290). As this species occurs primarily in chaparral and woodlands, it is probably more widely distributed in this region. ●R: Coast Ranges, from Linn County in west-central Oregon to the Santa Lucia Mountains of northwestern San Luis Obispo County, with disjunct populations in southwestern Ventura County and on Santa Cruz Island. ●H: more or less woody based perennial herbs with several decumbent to ascending stems that range from about 3 to 35 cm. (1.25-14") long. The alternate and entire leaves are mostly lance-oblong to elliptic, and about 1 to 3 cm. long. The flowers are produced in both terminal and basal racemes. The flowers of the basal racemes have three sepals and no petals, while the flowers of the terminal racemes have five sepals, the inner two of which are enlarged and petal like, and three petals. The upper two petals are narrow, while the much larger lower petal is sack like, and engulfs the stamens, pistil and ovary. The flowers range from purple to deep or pale rose pink. The fruit is a disk like and outwardly two lobed capsule about 7 mm. long. ❁March-July.

POLYGONACEAE. BUCKWHEAT FAMILY.

Polygonaceae is a highly diverse family of primarily northern temperate herbs and shrubs, comprised of 48 genera and about 1200 species worldwide. The family includes a few edible plants, such as the achenes (seeds) of *Fagopyrum* (buckwheat), the petioles of *Rheum rhaponticum* (rhubarb), and the leaves of *Oxyria digyna* (winter or mountain sorrel), as well as a few ornamentals, such as *Antigonon* (mountain rose vine), *Muehlenbeckia* (tapeworm plant), and some species of *Eriogonum* (North American False Buckwheat). *Polygonaceae* is represented in the Tassajara region by 21 currently accepted taxa that are placed in six genera, with most of the native taxa belonging to the chiefly western North American subfamily *Eriogonoideae*. *Eriogonoideae* is particularly well represented in the California Floristic Province, were a large number of the taxa are endemic, including a number of more or less rare and restricted monotypic genera, such as *Systenotheca*, *Mucronea*, *Hollisteria*, *Lastarriaea*, *Aristocapsa*, and *Dodecahema*.

1a. Leaves subtended by sheath like stipules:
  2a. Calyces four or five parted. . . . . ***Persicaria***.
  2b. Calyces six parted. . . . . ***Rumex***.
1b. Leaves not subtended by stipules:
  3a. Delicate vine like annual herbs with weak and trailing stems. Leaves opposite, remote, roundish to obovate and frequently obcordate. Flowers inconspicuous; the involucres two winged in maturity and loosely enclosing the achene. . . . . ***Pterostegia***.
  3b. Erect or ascending herbs, subshrubs or shrubs. Leaves opposite, alternate, whorled or produced in basal rosettes, narrowly linear to roundish, but never obcordate. Flowers readily evident; involucres cylindric to campanulate or funnelform:
    4a. Involucres many flowered, the ribs not spine tipped. Annual and perennial herbs, subshrubs and shrubs. . . . . ***Eriogonum***.
    4b. Involucres one or two flowered, the ribs terminating in more or less stiff and often hooked spine like teeth. Annual herbs:
      5a. Involucres cylindrical to urn shaped or top shaped, 3 lobed, 3, 5 or 6 awned, and 1 or rarely 2 flowered. . . . . ***Chorizanthe***.
      5b Involucres 4 angled, 4 lobed, 4 awned and 2 flowered. . . . . ***Systenotheca***.

CHORIZANTHE. SPINE FLOWER.

Chorizanthe includes about fifty species of temperate western North America and temperate western South America. The genus is primarily Californian, for 33 species occur within the state of California, and 27 are endemic to the California Floristic Province. The name is derived from Greek words *chorizo*, to divide, and *anthos*, flower, and alludes to the divided calyx.

1a. Leaves narrowly linear to very narrowly oblanceolate, mostly alternate, and produced along most of the length of the stems. Membranes between involucre spines white translucent. . . . . ***C. membranacea***.
1b. Leaves oblong-ovate to oblanceolate or narrowly oblanceolate, and produced in basal rosettes or in whorls at the nodes. Membranes between involucre spines, if present, are rose to purplish pink:
  2a. Involucre with membranous margins between the spines. . . . . ***C. douglasii***.
  2b. Involucre without membranous margins between the spines:
    3a. Leaves strictly basal. Involucre spines nearly the same length. . . . . ***C. staticoides***.
    3b. Leaves basal and cauline. Involucre spines unequal, the longest one twice as long as the others. . . . . ***C. clevelandii***.

+***Chorizanthe clevelandii*** C. Parry. CLEAR LAKE AND SANTA LUCIA MOUNTAINS SPINE FLOWER. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3245; DS 48121). ●R: Coast and western Transverse ranges, from Mendocino and Lake counties to Ventura County, and the southern Sierra Nevada, from Tulare County to Kern County. Of the 122 specimens that are presently listed on the Consortium of California Herbaria data base, 93 are from Lake County and the Santa Lucia

Mountains. Forty four are from the vicinity of Clear Lake in Lake County, and 49 are from the Santa Lucia Mountains; forty two of these specimens are from Monterey County, and remaining 7 are from San Luis Obispo County. ●H: annual herbs with several or many decumbent stems from the base that range from about 5 to 25 cm. (2-10") long. The basal leaves, which are produced in rosettes, are petiolate, oblanceolate, and about .5 to 3 cm. long, while the usually much smaller cauline leaves, which are similar in shape, are opposite at the nodes. The flowers are produced in terminal and axillary clusters, and the three angled involucres are about 3 to 3.5 mm. long. The involucres have six hooked spines that are of unequal length, the outer one usually being two or more times longer than the others. The flowers, which are about 2.5 to 3 mm. long, have perianths that have greenish white tubes and white lobes. The fruits are grayish achenes that are about 2.5 to 3 mm. long. ❀May-September.

Chorizanthe douglasii Bentham [*C. nortonii* E. Greene]. SANTA LUCIA SPINE FLOWER. Although this is an uncommon species, it is the most common of the *Chorizanthe* species that occur in the Tassajara region, for it is widespread and locally common in open and usually grassy areas at all elevations. ●R: South Coast Ranges, from Monterey and San Benito counties to San Luis Obispo County. This species occurs in the Gabilan, Santa Lucia and La Panza ranges, from Fremont Peak and Fort Ord to Martinez Canyon, which is on the eastern slope of the La Panza Range about five miles east of Machesna Mountain. Most of the records that are presently included in the Consortium of California Herbaria database are from the Santa Lucia Mountains of Monterey County. ●H: gray green annual herbs usually with simple, erect and upwardly branched stems that range from about 1 to 3 dm. (4-12") tall. The leaves of the basal rosettes have petioles that are about .5 to 2.5 cm. long, and the blades are oblanceolate to linear-oblanceolate and about 1 to 4 cm. long. The smaller cauline leaves are opposite or whorled at the lower nodes. The flowers are produced in head like terminal clusters, and sometimes singularly in the upper axils. The flowers lack corollas, but the corolla like involucres, which are about 3 to 5 mm. long, have rose violet to reddish purple membranes between the six spreading spines, and the six parted calyces, which are about 3.5 to 4.5 mm. long, are mostly rose pink. The fruits are narrow and three angled achenes that are about 3.5 mm. long. ❀April-July.

Chorizanthe membranacea Bentham. PINK SPINE FLOWER. This species is widespread and locally common in open and generally grassy habitats at all elevations in the Tassajara region, especially on steep southfacing slopes. ●R: southern Cascade Range foothills, Sierra Nevada foothills, and the Coast and western Transverse ranges, from Jackson County in southwestern Oregon to Kern and Ventura counties. ●H: annual herbs with erect and simple or few branched stems that range from about 1 to 4.5 dm. (4-18") tall. The leaves, which are mostly alternate and well distributed on the stems, are narrowly linear to very narrowly oblanceolate, and about 1 to 6 cm. long. The flowers are produced in terminal and lateral clusters, or sometimes singularly in the axils of the leaves. Corollas are absent, although the involucres, which are about 4 to 7 mm. wide, have six deep red and widely spreading spines that are connected by white translucent membranes, which collectively make the flowers appear pink from a distance. The six parted calyces are white to rose, densely woolly, and about 1.5 to 3 mm. long. The fruits are shiny beaked achenes that are about 2 mm. long. ❀April-July.

^***Chorizanthe staticoides*** Bentham [*C. s.* var. *nudicaulis* (Nuttall) Jepson]. TURKISH RUGGING. In the first edition of this text I stated that this species was:

> Widely scattered in the Tassajara region, but uncommon and restricted to open areas with disturbed soils, particularly in openings in chaparral. While I have seen this species only along a recently cleared section of Tony's Trail, in a loosely soiled area in chaparral about half way down on the Willow Creek side of the grade, Roxana Ferris collected it in disturbed soil along Tassajara Road about seven tenths of a mile north of the hot springs in 1956 (Ferris 13018; DS 381094), Vern Yadon reported it from Pine Ridge in 1980 (Yadon 1980 d), and Miriam Bobcoff found it the vicinity of the hot springs during the early years after the Marble-Cone Fire of 1977.

This species was much more common in this region during the first spring after the Basin Complex Fire of 2008, and although it did not manifest itself on such a grand scale as did other 'burn species,' where it did occur the plants were much more robust than usual, and their densely floriferous branches were wide spreading. ●R: Coast, Transverse and Peninsular ranges, from the vicinities of Carmel Highlands, San Clemente Reservoir and the Hastings Natural History Reservation in the Santa Lucia Mountains of Monterey County, to San Diego County. Also on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: annual herbs with one to several erect or ascending stems that are upwardly branched; the plants range from about 1 to 2 dm. (4-8") tall. The leaves, which are basal and produced in rosettes, have petioles that are about .5 to 3 cm. long, and blades that are mostly oblong to oblong-ovate, green above and woolly below, and about .5 to 6 cm. long. The inflorescences are generally flat topped, and the flowers are produced in terminal clusters; solitary flowers are usually present in the axils. The flowers lack corollas, but the spiny toothed involucres, which are about 3 to 5 mm. long, are dark reddish or purplish, while the six parted calyces are deep to light rose pink, and the lobes are usually white. The calyces are about 3 to 5 mm. long. The fruits are narrow achenes that are about 3 mm. long ❀April-July.

ERIOGONUM. NORTH AMERICAN BUCKWHEAT, FALSE BUCKWHEAT.

The genus *Eriogonum* consists of approximately 250 species of herbs and shrubs that are endemic to North America. This genus is well represented in California, for 117 species occur within the state, and 44 are endemic to the California Floristic Province. The name is derived from the Greek words *erion*, wool, and *gonu*, knee or joint, and alludes to the hairy nodes of the type species, *E. tomentosum* Michaux.

1a. Woody branched shrubs or subshrubs. Leaves narrowly linear, sessile, and densely foliating the branches. . . . . ***E. fasciculatum***.
1b. Plants herbaceous or woody only at the base. Leaves not narrowly linear:
  2a. Annual herbs:
    3a. Involucres pedunculate, campanulate to broadly turbinate, and not angled or ribbed. Calyces covered with hooked hairs. . . . . ***E. inerme***:
    3b. Involucres sessile, cylindric to cylindric-turbinate, and angled and/or ribbed. Calyces glabrous or nearly so:
      4a. Leaves basal and usually cauline, the blades oblong obovate to oblanceolate or elliptic. . . . . ***E. gracile***.
      4b. Leaves strictly basal, the blades roundish to deltoid. . . . . ***E. davidsonii***.
  2b. Evergreen perennial herbs or sometimes subshrubs:
    5a. Stems glabrous and commonly fistulous (hollow):
      6a. Leaves strictly produced in basal rosettes. The blades are mostly 1 to 5 cm. long, and the margins are flat or slightly crisped. . . ***E. nudum*** var. ***nudum***.

6b. Leaves not or not strictly produced in basal rosettes, for some are usually scattered along the woody caudex. The blades are mostly about 3 to 7 cm. long, and the margins strongly crisped. . . . . ***E. nudum*** var. ***auriculatum***.

5b. Stems densely to sparsely woolly and not fistulous:

7a. Plants with often lanky stems up to 18 dm. (6') long. Widely scattered and locally common, especially at lower to intermediate elevations. . . . . ***E. elongatum***.

7b. Plants less than 6 dm. (24") tall. Restricted to rock outcrops, cliffs and talus at intermediate to higher elevations:

8a. Leaves strictly basal (the small bracts of the inflorescence scarcely leaf like), the blades roundish to broadly obovate or elliptic. Inflorescence paniculate, with the flowers produced in terminal, lateral and axillary clusters. . . . . ***E. saxatile***.

8b. Leaves basal as well as in whorls at the nodes, the blades obovate-spatulate to elliptic. Inflorescence umbellate, with the flowers produced in terminal clusters. . . . . ***E. umbellatum***.

+^***Eriogonum davidsonii*** E. Greene. Plants that best fit the description of this species are widely scattered, but uncommon, at higher elevations in the Tassajara region, such as on Pine Ridge, along the Black Cone Trail between Pine Ridge and the Elephant's Back, along the Pine Ridge Trail between Tassajara Road and the Church Creek Divide, and on Chew's Ridge. Elsewhere in the Santa Lucia Mountains of Monterey County this species occurs on and in the vicinity of Cone Peak and on Junipero Serra Peak, and also in Hanging Valley. ●R: Coast, Transverse and Peninsular ranges, from Monterey and San Benito counties to northern Baja California, and the Sierra Nevada, from Mono County to Kern County, and eastward to the mountains of southern Nevada, southwestern Utah and Arizona. ●H: annual herbs with upwardly branched stems that range from about 1 to 5 dm. (4-20") tall. The leaves are strictly basal and the roundish blades range from about .5 to 4 cm. long. The lower surface of the leaves densely tomentose, and the margins are usually crisped. The flowers are produced in clusters from sessile involucres that are scattered along the upper stems. The six lobed corolla like calyces, which are about 1.5 to 4 mm. long, are generally white with a red mid vein. The fruit is a shiny brown achene about 2 mm. long. ♔May-September.

^***Eriogonum elongatum*** Bentham. SILVER BUCKWHEAT, LONG STEMMED BUCKWHEAT. This species is widely scattered and locally common at all elevations in the Tassajara region, and it occurs mostly in open habitats, especially in rocky areas. ●R: Coast, Transverse and Peninsular ranges, from the coastal hills of northern Monterey County to northern Baja California. ●H: white woolly perennial herbs with long and erect or ascending and somewhat lanky stems that range from about 6 to 18 dm. (2-6') long. The leaves are generally produced on the lower half of the stems, the lowermost often in rosettes. The lower leaves are petiolate and the upper are nearly sessile, and the upper leaves vary from alternate to opposite or whorled at the nodes. The blades, which are about 1 to 3 cm. long, are generally elliptic, and the lower surface is covered with a dense coast of short white woolly hair. The small flowers are produced in clusters from involucres that are remotely positioned on the elongated upper branches. Although the flowers lack corollas, the calyces, which are about 2.5 to 3 mm. long, are generally white with a pink tinge. The fruits are dark brown achenes that are about 2 to 3 mm. long. ♔July-November.

Eriogonum fasciculatum Bentham var. ***foliolosum*** (Nuttall) Stokes. CALIFORNIA BUCKWHEAT, FLAT TOP. This showy flowered species is widely scattered and locally common at all elevations in the Tassajara region, and it occurs mostly in open areas that are transitional between major habitat types, and also on southfacing chaparral slopes that are dominated by smaller shrubs and sub shrubs. ●R: Coast, Transverse and Peninsular ranges, from Trinity and Glenn counties to northern Baja California. Also on San Nicolas Island. ●H: evergreen shrubs typically with rounded crowns that consist of many erect or ascending and densely foliated branches that are up to 15 dm. (52") long. The crowded leaves are sessile, linear oblong to linear oblanceolate with generally inrolled margins, and about 6 to 12 mm. long. The flowers are produced in dense and often flat topped umbels that terminate the upper branches. The six lobed corolla like calyces, which are about 2.5 to 3 mm. long, are at first white or pinkish white, but turn rusty red when dry. The fruits are lance ovoid achenes that are about 2 mm. long. ♔May-July.

Eriogonum gracile Bentham. SLENDER WOOLLY BUCKWHEAT. Plants that best fit the description of this species are scattered in open areas at all elevations in the Tassajara region, but they are generally uncommon, except for in the grasslands to the northeast of the junction of the Horse Pasture and Marble Peak trails (to the east of Blackberry Creek and to the north of Tassajara Creek). Plants that occur on the west and south slope of the Overlook Ridge, and along the Tony's Trail, often have whorls petiolate leaves at the first node that have generally roundish blades; other than that these plants seem to best fit the description of E. gracile (but I am not sure). ●R: Coast Ranges, Sierra Nevada, Transverse and Peninsular Ranges, from Tehama and Plumas counties to northern Baja California. ●H: annual herbs with one or several erect and upwardly branching stems that range from about 1.5 to 6 dm. (6-24") tall. The leaves are mostly or strictly basal (upper leaves are much reduced and sessile, except for the plants that occur on the Overlook ridge and along Tony's Trail), and the blades of the long petiolate basal leaves are oblanceolate to oblong or elliptic, and about 1 to 4 cm. long. The small flowers are produced in clusters from sessile involucres that are lateral and terminal on virgate branches. The petal like calyces, which are six parted and about 1 to 3 mm. long, range from white to pinkish (often aging yellowish), and the individual segments are with a red midvein. The fruit is a beaked achene about 1 to 2 mm. long. ♔May-August (-October).

Eriogonum hirtiflorum S. Watson. Chew's Ridge was listed as a location for this taxon in Beatrice Howitt and John Thomas Howell's "The Vascular Plants of Monterey County" (1964), and the probably basis was specimen that Clare Hardham collected near the lookout in June of 1960 (Hardham 6196; CAS 501335, SBBG 17222, & RSA 143294). This specimen was originally assigned to *E. hirtiflorum*, but it was later determined to represent the very similar *E. inerme*. In James Griffin's "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), the presence of *E. hirtiflorum* on Chew's Ridge is designated with a plus symbol, meaning that it was recorded from the literature or a herbarium specimen (and thus probably referring to Howitt and Howell's text). *E. hirtiflorum* is also included the California Native Plant Society's list of the vascular plants of Chew's Ridge. In *E. hirtiflorum* the involucres have 2 flowers, while in *E. inerme* the involucres have 4 to 6 flowers.

Eriogonum inerme (S. Watson) Jepson. This species is scattered on or near the summits of Black Butte and Chew's Ridge, along the Carmel River Trail in Hiding Canyon (aka, 'Spanish Canyon,' were William Dudley collected a specimen of it in June of 1901 [DS 47870]), and, according to Vern Yadon, it also occurs in gravely areas within the massive sandstone outcrops in the Church Creek area. ●R: Coast and Transverse ranges, from Lake County to Los Angeles County, and the Sierra Nevada, from Tuolumne County to Kern County. ●H: small annual herbs that range from about .5 to 3 dm. (2-12") tall, with generally spreading stems which are usually two to three branched near the base and repeatedly two branched above. The lower leaves are about 1 to 2.5 cm. long, and the generally spatulate blades taper to an indistinct petiole. The sessile upper leaves, which are generally lanceolate and usually less than 1 cm. long, are produced in two's or three's at the nodes. The margins are ciliate. The flowers are produced in clusters of four to six from sharply four lobed involucres that are terminal and axillary in a generally diffuse panicle. The six parted calyces, which are between 1

and 2 mm. long, are pink to red and covered with hooked white hairs. The fruits are brownish achenes that are about 1.5 to 1.9 mm. long. ֍June-October.

Eriogonum nudum Douglas ex Bentham var. ***auriculatum*** (Bentham) J. P. Tracy ex Jepson [*E. latifolium* subsp. *a*. (Bentham) Stokes]. This taxon is widespread and locally common at all elevations in the Tassajara region, and it occurs mostly in open or semi open and often rocky places in areas that are more or less transitional between major habitat types. The morphological characteristics of many of the plants of this region, especially those from open grasslands and sometimes rocky areas in the Horse Pasture and The Pines, suggest var. *indictum* (Jepson) Reveal of the inner south Coast Ranges. Such plants have very strongly fistulous stems (up to 2 cm. wide), tend to be more densely tufted, and often have a prominent woody base. As the flowers are white to pinkish (not yellow or yellowish), the plants may simply represent a growth form of older and/or more hardy var. *auriculatum* plants, but it is also possible that the plants are to some degree genetically intermediate with var. *indictum*. The possibility of genetic interchange in this region is also indicated by the fact that many (if not most) of the local plants produce fistulous stems (the stems of var. *auriculatum* like plants usually are not fistulous). ●R: Coast and Transverse ranges, from Lake and Colusa counties to the coast of Ventura County. ●H: sometimes woody based evergreen perennial herbs with stout and commonly fistulous (hollow) stems that range from about 3 to 15 dm. (1-5') tall. The leaves are produced at or near the base of the stems in loose rosettes; the petioles are about 2 to 10 cm. long, and the blades are oblong to elliptic, about 3 to 7 cm. long, obtuse at the apex and often truncate to sub cordate at the base. The blades are glabrous or nearly so on the upper surface, and woolly on the lower surface, and the margins are usually crisped. The small flowers are produced in clusters from involucres that are solitary or in two's or three's; the involucres are terminal, axillary and occasionally lateral on the branches of an open cymose panicle. The six parted corolla like calyces, which are about 2.5 to 3 mm. long, are creamy white with a pinkish tinge, and often become yellowish with age. The fruits are achenes that are about 1.5 to 3.5 mm. long. ֍May-September.

+∨***Eriogonum nudum*** var. ***nudum***. NAKED STEMMED BUCKWHEAT, TIBINAGUA. This entry is based on a specimen that was collected along the "Pine Ridge Trail to Big Sur" by Beatrice Howitt in September of 1955 (Howitt 746; PGM 6580). The only other specimen from the Santa Lucia Mountains that is presently listed in the Consortium of California Herbaria database was also collected by Beatrice Howitt; it was collected along the Carmel River Trail in the vicinity Los Padres Reservoir in May of 1956 (Howitt 9939; PGM 6581). ●R: Cascade and Coast ranges, from Lewis and Yakima counties in western Washington to the Santa Lucia Mountains of Monterey County, and in the Sierra Nevada, from Plumas County to Kern County. ●H: perennial herbs that are similar to var. *auriculatum*, except for the strictly basal leaves that have flat or only slightly crisped blades. ֍June-September.

Eriogonum saxatile S. Watson. ROCK BUCKWHEAT. This distinctive species is restricted to rock outcrops, talus and sometimes scree covered slopes at intermediate to higher elevations of the Tassajara region, such as on Black Butte Ridge and the massive sandstone outcrops in the Church Creek and Pine Valley areas. According to Vern Yadon's field notes, it is also present on the summit of 'Never Again Ridge' (the ridge between the watersheds of Church Creek and upper Tassajara Creek), and on the Elephant's Back (the prominence to the northwest of the Oryoki Creek canyon). ●R: Coast, Transverse and Peninsular ranges, from the Santa Cruz Mountains and the Diablo Range in Santa Clara County to the mountains of San Diego County, and in the southern Sierra Nevada, from Fresno and Mono counties to Kern County. ●H: white woolly evergreen perennial herbs with one to several erect or ascending and often woody based stems that range from about 1 to 3 dm. (4-12") tall. The leaves are basal and produced in rosettes, and in older plants the living leaves are subtended by a congestion of persistent dead leaves, and thus give the leaves are stacked. The petioles are about 1 to 4 cm. long, and the roundish to broadly obovate or elliptic blades are about 1 to 2 cm. long. The inflorescence is a shortly branched and cymose terminal panicle; the small flowers are produced in clusters from terminal, lateral and axillary involucres that are about 3 to 4 mm. long. The corolla like six lobed calyces, which are about 3 to 7 mm. long inclusive of the stipe like base, vary from pinkish to white or yellowish. The fruits are sharply three angled achenes that are about 3 to 4 mm. long. ֍May-July.

Eriogonum umbellatum Torrey var. ***bahiiforme*** (Torrey & A. Gray) Jepson [*E. polyanthum* var. *b*. T. & G.]. SULPHUR FLOWERED WILD BUCKWHEAT. This taxon is uncommon on the serpentine outcrop on Pine Ridge, where it was first discovered by Steven Talley in 1972. It is possible that it also occurs elsewhere in this region, especially on talus or scree slopes, for it is sometimes found on non serpentine rock outcrops. ●R: inner North Coast Ranges, from Tehama County to Napa County, and in the South Coast Ranges it occurs on Mount Diablo in Contra Costa County, on Mount Hamilton in Santa Clara County, on San Benito Mountain in San Benito County, and on Pine Ridge in Monterey County. It also occurs in the southern Sierra Nevada and the Tehachapi and Transverse ranges, from Tulare County to Ventura and Los Angeles counties, and in the central Sierra Nevada foothills in Calaveras County. *E. umbellatum* is comprised of 41 named varieties that, as a whole, are widely distributed in western North America (25 varieties occur in California). ●H: densely tomentose perennial herbs or subshrubs with decumbent to ascending lower branches and generally erect flowering stems less than 6 dm. (24") tall. The petiolate leaves are clustered on the lower branches, and the blades are obovate-spatulate to elliptic and about 1 to 1.5 cm. long. The inflorescence is umbel like, and the flowers are produced in terminal clusters. The six parted corolla like calyces, which are about 5 to 8 mm. long, are bright yellow, and often become reddish tinged with age. The fruits are sharply three angled achenes that are about 2 to 5 mm. long. ֍July-September.

The following *Eriogonum* species occur in areas near the Tassajara region: *E. angulosum* (Hastings Natural History Reservation), *E. covilleanum* (Hanging Valley), *E. elegans* (upper Cachagua Creek & Lambert's Flats), *E. hirtiflorum* (Hanging Valley), *E. nortonii* (Hastings Natural History Reservation), *E. roseum* ("Trail from Miller Creek to Carmel River," Hardham 6247), and *E. vimineum* (Hanging Valley).

PERSICARIA. SMARTWEED.

The genus *Persicaria* consists of about 100 widely distributed species that have been segregated from the genus *Polygonum*. The name is derived from the Latin words *persica*, peach, and *aria*, pertaining to, alluding to the shape of the leaves of some species to those of peach trees.

Persicaria lapathifolia (Linnaeus) Delarbre [*Polygonum lapathifolium* L.]. WILLOW SMARTWEED, WILLOW WEED. In the first edition of this text I stated that this species was rare in the Tassajara region, for only a few plants were seen in the bed of Tassajara Creek near Adobe Camp (and thus in the vicinity of the junction of the Marble Peak and Horse Pasture trails). Many more plants were observed along Tassajara Creek below the hot springs during the first spring after the Basin Complex Fire of 2008, and they were obviously benefiting from the increased sunlight. At one site, a short distance beyond the Narrows, I saw a plant that was far beyond its natural size as described in botanical literature, for its primary stem was at least 6 inches wide, and some of its branches were at least 7 feet

long. ●R: widely distributed wet habitats in North and South America, Eurasia and Africa. ●H: annual herbs with erect or ascending stems that (usually) range from about 5 to 15 dm. (20-60") long. The alternate and shortly petiolate leaves, which are about 5 to 20 cm. long, have blades that are linear lanceolate to oblong lanceolate, and about 5 to 20 cm. long. The margins are entire. The small flowers, which lack corollas, are crowded on the spike like and often nodding branches of an open panicle, and the four parted calyces vary from rose pink to purplish or whitish. The fruits are lenticular achenes that are about 1.8 to 2.2 mm. long; they are enveloped within the calyces. ♔June-October.

PTEROSTEGIA.

The genus *Pterostegia* consists of one species that is endemic to south western temperate North America. The name is derived from the Greek words *pteron*, a wing, and *stege*, covering, alluding to the two winged bracts that cover the flowers.

!*Pterostegia drymarioides* Fischer & C. Meyer. THREAD STEM. In the first edition of this text I stated that this species was widely scattered in the Tassajara region, and locally common on shady slopes (especially in rocky areas), but it is inconspicuous and easily overlooked. During the first spring after the Basin Complex Fire of 2008, this species was common almost everywhere in this region, and it was not restricted to shady or rocky habitats. ●R: from Humboldt and Shasta counties to northern Baja California, and eastward to southwestern Utah and Arizona. It also occurs on most of the islands off the coast of southern California and northern Baja California. ●H: delicate vine like annual herbs with several prostrate and dichotomously branching stems that range from about 1 to 5 dm. (4-20") long. The petiolate leaves are produced in opposing pairs that are remotely positioned along the slender stems. The often reddish tinged blades are broadly obovate to roundish or reniform, deeply notched to entire at the apex, and about .5 to 2 cm. long. The monoecious flowers are less than 2 mm. long, and are produced singularly or in two's or three's in the axils of the leaves. The fruits are beaked achenes that are about 1.5 mm. long; they are loosely enclosed by the enlarging scarious bracts of the pistillate flowers. ♔March-July.

RUMEX. SORREL, DOCK.

Rumex consists of about 190 to 200 species of annual and perennial herbs that are primarily native to temperate regions, and many of the species have become widely naturalized in other regions. *Rumex* is the Latin word for sorrel.

1a. Rhizomatic(and thus outwardly spreading) plants. Lower leaves mostly hastate. Flowers mostly dioecious (with either stamens or pistils, but not both) . . . . . ***R. acetosella***.
1b. Taprooted (and thus not outwardly spreading) plants. Lower leaves never hastate. Flowers mostly perfect:
2a. Leaves all cauline and linear to linear-lanceolate. Stems decumbent to ascending. . . . . ***R. salicifolius***.
2b. Leaves basal and cauline, the lower oblong, oblong-lanceolate, lance-ovate or elliptic. Stems generally erect:
3a. Lower leaves upwardly v shaped, the blades gradually narrowing to the base, and with margins that are strongly crisped and undulating. . . . . ***R. crispus***.
3b. Lower leaves flattish, the blades rather abruptly narrowing to the base, and with margins that are entire to slightly undulating. . . . ***R. conglomeratus***.

Rumex acetosella Linnaeus. SHEEP SORREL. This introduced species occurs in areas that have had much exposure to human activities, such as around the developed area of Tassajara Hot Springs, at turnouts along Tassajara Road, and sometimes at campsites. ●R: a common weed in temperate North America; native to Eurasia. ●H: rhizomatic perennial herbs with erect or decumbent stems that range from about 1 to 4 dm. (4-16") long. The leaves are alternate, and the lower leaves are crowded. The blades of the long petiolate lower leaves, which are about 2 to 6 cm. long, are hastate or basally two lobed, while the reduced upper most leaves are short petiolate to sessile, and generally linear-lanceolate. The small and petalless flowers are produced in whorls on the branches of an open panicle. The often reddish tinged perianth segments are about 1 to 2 mm. long. The fruits are achenes that are about as long as the adherent perianth.. ♔March-August.

Rumex crispus Linnaeus. CURLY DOCK. This conspicuous species is scattered on the floodplains of Tassajara Creek in the vicinity of the developed are of Tassajara, both upstream and downstream, and occasionally it occurs at turnouts along Tassajara Road. ●R: a common weed in temperate North America; native to Eurasia. ●H: taprooted perennial herbs with erect stems that range from about 5 to 12 dm. (20-48") tall. The petiolate leaves are alternate, and the blades, which are about 10 to 25 cm. long, are oblong to oblong-lanceolate or oblong elliptic, and the margins are strongly crisped (hence the botanical name). The petalless flowers, which are about 4 to 6 mm. long, are produced in closely spaced whorls on the branches of an open panicle; the panicles turns reddish brown with the maturation of the fruits. The fruit is an achene that is about 2 mm. long; it is surrounded by the three inner perianth segments. ♔May-July.

+*Rumex conglomeratus* Murray. According to James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975), this species is uncommon in disturbed spots on Chew's Ridge; it is also included in the California Native Plant Society's list of the vascular plants of Chew's Ridge. ●R: a common weed in North America; native to the western temperate regions of the eastern hemisphere. ●H: taprooted perennial herbs with erect stems that range from about 3 to 15 dm. (1-5') tall. The alternate leaves are petiolate, and the blades of the larger lower leaves, which are up to 20 or 30 cm. long, are oblong to lance ovate, and the bases are more or less cordate. The blades of the upper leaves are generally lanceolate. The flowers are produced in remote whorls that are at the nodes of the upper branches, and the perianth lobes are about 2 to 3 mm. long. The dark reddish brown nutlets are about 1.5 to 2 mm. long. ♔May-August.

Rumex salicifolius Weinmann. WILLOW DOCK. This species is rare in the Tassajara region, for it is only known to occur in generally wet habitats in Pine Valley and on Chew's Ridge. ●R: from northern California and western Nevada to northern Baja California. Inclusive of the many subspecies, this taxon is widely distributed in western North America, from Alaska to Mexico. ●H: perennial herbs with decumbent to ascending stems that range from about 3 to 9 dm. (12-36") long. The leaves, which are alternate and short petiolate, have linear to linear-lanceolate blades that are about 3 to 12 cm. long. The flowers, which are about 2 to 3 mm. long, are clustered on the branches of open panicles that are about 15 to 30 cm. long; the flowers lack petals. The fruits are three angled achenes that are about 2 to 3 mm. long; the achenes are surrounded by the persistent inner perianth segments. ♔May-September.

SYSTENOTHECA. SANTA LUCIA SPINE FLOWER.

The genus *Systenotheca* consists of one species that has a very limited range of distribution. The name is derived from the Greek words *systenos*, tapering to a point, and *theke*, case, and alludes to the tips of the elongated lobes of the box shaped involucre.

e ***Systenotheca vortriedei*** (Brandegee) Reveal & Hardham [*Chorizanthe v*. Brandegee]. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer #3244, DS 48200). ●R: Santa Lucia Mountains, from the canyon of the Arroyo Seco in Monterey County to the vicinities of Rocky Butte and Adelaida in San Luis Obispo County. ●H: annual herbs with several branches from the base that range from about 6 to 15 cm. (2.5-6") long. The quickly deciduous leaves are basal and produced in rosettes; the blades are spatulate and about 1 to 3 cm. long. The margins are entire. The sessile flowers are produced singularly in the axils, at the node and at the ends of the stems. The four angled involucres, which are about 3 mm. long, contain two flowers. The shorter distal one is perfect and proximal one is pistillate. The perianths, which are about 1 to 2.5 mm. long, have yellow tubes and white to pink lobes. The fruits are obconic achenes that are 2 to 2.5 mm. long. ❁May-July.

PRIMULACEAE. PRIMROSE FAMILY.

As currently circumscribed in the Jepson eFlora (as of 12/31/14), *Primulaceae* consists of about eight genera and approximately 600 species that primarily occur in northern temperate regions.

PRIMULA*, SECTION *DODECATHEON. SHOOTING STARS, PRAIRIE POINTERS, MOSQUITO BILLS, SAILOR CAPS, INDIAN CHIEFS, MAD VIOLETS, ROOSTER HEADS, AMERICAN COWSLIP.

As currently circumscribed in the Jepson eFlora, *Primula* consists of about 470 species. This includes the 17 species that were formerly placed in the North American genus *Dodecatheon*, which now represents section *Dodecatheon* of the *Primula* subgenus of *Auriculastrum*. *Dodecatheon* was derived from the Greek words *dodeca*, twelve, and *theos*, gods, and it was applied by the Roman naturalist Pliny the Elder to some kind of a plant was said to be under the protection of the twelve Olympian gods. Linnaeus, who applied the name to North American plants, failed to state his reasoning, but according to Sir William Jackson Hooker: "the *Dodecatheon* of modern authors has, however, nothing to do with the individual to which Pliny applied so grand a designation, as it is native of the New World, and receives its name in allusion to the number of flowers, frequently twelve, which it bears in each umbel." (*Curtis's Botanical Magazine* 64, Tab. 3622, 1837). *Primula* is an adaption of the Latin words *primus* or *primulus*, and refers to the early flowering season of the species.

1a. Leaf blades generally more than two times longer than wide. Filament tubes generally 3 to 4 mm. wide. Root bulbs absent. . . . . ***P. clevelandii***.

1b. Leaf blades generally less than two times longer than wide. Filaments tubes less than 3 mm. wide. Root bulbs present. . . . . ***P. hendersonii***.

!***Primula clevelandii*** (E. Greene) A. R. Mast & Reveal var. ***gracilis*** (E. Greene) A. R. Mast & Reveal [*Dodecatheon c*. Greene subsp. *sanctarum* (Greene) Abrams; *D. patulum* Greene var. *gracile* Greene]. HOLY or GRACEFUL SHOOTING STARS. This very conspicuous taxon is widely scattered and locally common to abundant on open grassland slopes at lower to intermediate elevations in the Tassajara region. It was exceedingly abundant during the first spring after the Basin Complex Fire of 2008. ●R: Coast Ranges and western Transverse Ranges, from Año Nuevo in Santa Cruz County, and from the vicinity of the Coyote Reservoir in Santa Clara County, to the Santa Susana and Santa Monica mountains of western Los Angeles County. ●H: small perennial herbs which annually send up flowering scapes that range from about 10 to 40 cm. (4-16") tall. The petiolate leaves, which are produced in basal rosettes, range from about 2 to 6 cm. long; the blades are broadly oblanceolate to spatulate, and usually have crisped and/or irregularly crenate margins. The flowers are produced in terminal umbels that are comprised of about 3 to 7 flowers; the flowers face downward or downwardly on deflexed pedicels that are about 2 to 5 cm. long (the pedicels turn upward with the maturation of the fruits). The reflexed corollas have five generally oblong-acute lobes that are about 1 to 2 cm. long. The lobes are generally rose lavender, while the tubes have three bands of color: the upper one is white, the central one is yellow, and the lower one is blackish purple. There is a light spot at the base of each anther. The stamens are united around the longer pistil, the 'mosquito bill.' The fruits are many seeded capsules that range from about 8 to 13 mm. long ❁January-April (-May).

+***Primula hendersonii*** (A. Gray) Mast & Reveal [*Dodecatheon hendersonii* Gray]. This entry is based on two herbarium specimens. One was collected by D. L. Parker about "3 mi. s. of Jamesburg on road to China Camp" in April of 1973 (Parker 8; CHSC 23455), and the other one was collected in "Anastasia Canyon-in Canyon" by Beatrice Howitt in March of 1955 (Howitt 59; PGM 6646). ●R: from British Columbia and Idaho to California. In California the range of this species extends southward through the Sierra Nevada to Kern County, and in the Coast Ranges it extends to the Santa Ynez Mountains of western Santa Barbara County. A disjunct population occurs in the San Bernardino Mountains of San Bernardino County. ●H: acaulescent perennial herbs from root bulblets. The leaves, which are strictly basal and produced in rosettes, are elliptic to ovate or obovate, and range from about 2 to 16 cm. long. The margins are entire, or sometimes toothed. The flowers are produced in umbels that are on scapes that range from about 12 to 48 cm. (5-19") tall; the umbels are 3 to 17 flowered. The flowers, the parts of which are produced in 4s or 5s, even on the same plant, are upside down and inside out. The corolla lobes, which are 6 to 23 mm. long, are magenta to deep lavender (or sometimes white). The fruits are capsules that range from about 8 to 15 mm. long. ❁March-May.

RANUNCULACEAE. BUTTERCUP FAMILY.

Ranunculaceae is a highly diverse family that consists of about 60 genera and approximately 1,700 species worldwide, with most of the species occurring in temperate and boreal Eurasia and North America and in tropical mountains. Many of the species are cultivated for their ornamental qualities.

1a. Climbing or trailing vines, sometimes semi woody. Petals absent, but the sepals are white, and are petal like in texture. . . . ***Clematis***.
1b. Plants not vine like and never woody. Petals present or absent:
  2a. Petals absent; the sepals are greenish white to purplish. . . . . ***Thalictrum***.
  2b. Petals present (or often absent in *Ranunculus hebecarpus*):
    3a. Flowers yellow; the nectar glands are exposed. Achenes exposed. . . . . ***Ranunculus***.

3b. Flowers not yellow or only partially yellow (in *Aquilegia*); the nectar glands are concealed in spur like formations. Achenes enclosed in follicles:

4a. Leaves lobed or deeply cleft into linear segments, but not divided into distinct (petioled) leaflets. Flowers asymmetrical; the sepals are more conspicuous than the petals. Flowers with one exposed spur. . . . . ***Delphinium***.

4b. Leaves divided into distinct petioled leaflets. Flowers symmetrical; the petals are more conspicuous than the sepals. Flowers with five exposed spurs. . . . . ***Aquilegia***.

AQUILEGIA. COLUMBINE.

The genus *Aquilegia* consists of about 70 species that are native to temperate and boreal regions of the northern hemisphere. The derivation of the name is uncertain. It could be from the Latin word for an eagle, *aquila*, on account of the claw like spurs of the flowers, and another possibility is that is from the Latin word *aquilegus*, water drawer, on account of the wet habitats in which the species occur.

Aquilegia formosa Fischer [*A. truncata* Fischer & C. Meyer; *A. f.* var. *truncata* (F & M.) Baker]. CRIMSON COLUMBINE. This showy flowered species occurs along perennial streams or in other kinds of wet habitats in the Tassajara region, but it is rare. I have seen these perennial herbs at several places along the upper section of Church Creek, at one site along Oryoki Creek, and at a seep along the Pine Ridge Trail between Divide Camp and Pine Ridge. James Griffin collected a specimen of this species in early July of 1973 at the spring "Just west [of] Pine Ridge Camp" (Griffin 3755; JEPS 73559), and in his text "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), he listed this species as local in wet habitats on Pine and Chew's ridges. It is likely that this species also occurs along the Miller fork of the Carmel River in Miller Canyon. ●R: widespread in the mountains of western North America, from Alaska and Alberta to Montana, Wyoming, Utah and northern Baja California. ●H: perennial herbs from a thick caudex that annually produces erect and ascending stems that range from about 5 to 10 dm. (20-40") tall. The basal and lower cauline leaves are borne on petioles up to 3 dm. long; the blades are biternately divided into cuneate-obovate and irregularly lobed leaflets about 2 to 4 cm. long. Upper leaves are much reduced, sessile, simple or divided into three generally lanceolate segments. The flowers generally face downward on long axillary and terminal pedicels. The five petal like sepals are scarlet and spread outward, while the five petals, which are about 1 to 2 cm. long, are yellow at the opening, but the tubular spur that protrudes backward between the sepals is scarlet. The fruit is a follicle about 15 to 25 mm. long that contains many shiny black seeds that are about 2 mm. long. ❀April-August.

CLEMATIS. VIRGIN'S BOWER.

Clematis is a widely distributed genus that consists of about 300 species. According to some authors the name is derived from an ancient Greek word for a twig, while other state that it means "long, lithe branches," and refers to some kind of a climbing plant.

1a. Leaves divided into 3 (or rarely 5) leaflets. Flowers usually singular on long axillary peduncles. Sepals 1.5-2.5 cm. long. Plants mostly of chaparral habitats. . . . . ***C. lasiantha***.

1b. Leaves divided into 5 to 7 leaflets. Flowers several to many in cymose axillary panicles. Sepals no more than 1 cm. long. Plants of wet and shady habitats (or sometimes dwarfed in deeply shady but not wet habitats) . . . . . ***C. ligusticifolia***.

Clematis lasiantha Nuttall. CHAPARRAL VIRGIN'S BOWER, PIPE STEM. These showy flowered vines are widely scattered in chaparral habitats in the Tassajara region, and although they are fairly uncommon, plants can be numerous in some localities. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Humboldt and Shasta counties to northern Baja California. ●H: semi shrubby vines with climbing branches as much as 5 m. (16') long. The opposite leaves have usually twining petioles about 2 to 5 cm. long; the blades are divided into three (or sometimes five) generally ovate and variously toothed or lobed leaflets about 2 to 5 cm. long. The flowers are produced singularly or in two's or three's on long axillary peduncles about 4 to 12 cm. long. The flowers lack petals, although the four sepals, which are up to 2.5 cm. long, are white and petal like in texture. The numerous stamens range from bright yellow to yellowish green or nearly white. The numerous fruits are achenes that have persistent plumose styles about 2.5 to 4 cm. long; collectively the styles form spherical head like clusters in maturity. ❀February-June.

Clematis ligusticifolia Nuttall. WESTERN VIRGIN'S BOWER, YERBA DE CHIVATO. These often very long branched vines are widely scattered along perennial streams in the Tassajara region, and in some areas they form thickets. They are also sometimes found in deeply shady but not wet habitats, such as under dense stands of arborescent *Ceanothus* chaparral, but such plants are much smaller than those that occur in perpetually wet habitats. ●R: widely distributed in western North America, from British Columbia and Manitoba to northern Baja California and Oklahoma. ●H: perennial vines sometimes with trailing branches just a few decimeters long, but more commonly with semi woody branches that range to as much as 15 m. (50') long, which can climb high into the branches of trees. The opposite leaves have usually twining petioles about 3 to 7 cm. long; the blades are divided into 5 to 7 lance-ovate, irregularly toothed and often three lobed leaflets about 2 to 8 cm. long. The flowers are produced in cymose panicles on axillary peduncles about 3 to 10 cm. long. Although the flowers lack petals, the sepals, which are about 6 to 10 cm. long, are white and petal like in texture. The very numerous stamens can be bright yellow, but they also range from greenish yellow to nearly white. The fruits are small achenes with persistent feather like styles about 2 to 4 cm. long. ❀May-August.

DELPHINIUM. LARKSPURS, DOLPHIN FLOWERS.

The genus *Delphinium* consists of approximately 300 species that occur in arctic, northern temperate and northern subtropical regions worldwide; this genus is also represented in the mountains of tropical Africa. *Delphinium* is well represented in California, for 28 species occur within the state, and 20 species, plus 17 lesser taxa, are endemic to the California Floristic Province. I have found three etymologies for the name of this genus. One is that the name is based on the Latin word for a dolphin, *delphinus*, on account of the shape of the flower buds. Another is that it is derived from the Greek name *delphinion*, "Derived from *delphinos* or *delphis* for 'dolphin' because of the flower shape in some species," and the third is that it is based on the Greek word "*Delphinion*, derived from *delphin*, possibly for fancied resemblance of flowers of some species to classical sculptures of dolphins."

1a. Sepals and petals red, scarlet or orangish. . . . . ***D. nudicaule***.

1b. Sepals blue or purplish blue, petals blue, or white with blue or purplish blue veins or markings:

2a. Basal and lower cauline leaves divided into curving linear segments, rarely more than 4 mm. wide, and often less than 1 mm. wide.

Primary stem not narrowed at the base, and strongly attached to the root. . . . . ***D. parryi***.

2b. Basal and lower cauline leaves divided into broader and comparatively straight segments, mostly about 5 to 20 mm. wide. Primary stem narrowed at the base and weakly attached to the root:

3a. Lobes of basal and lower cauline leaves divided more than 80% to petiole; the lobes are generally less than 15 mm. wide. . . . . ***D. patens*** subsp. ***patens***.

3b. Lobes of basal and lower cauline leaves divided less than 80% to petiole; the lobes are generally more than 15 mm. wide. . . . . ***D. patens*** subsp. ***hepaticoideum***.

∨***Delphinium nudicaule*** Torrey & A. Gray. RED or SCARLETT LARKSPUR. Although this showy flowered species is widely scattered in the Tassajara region, it is uncommon, and it usually occurs on deeply shady (and often rocky) woodland slopes. I once found it in an unusual situation: a shady depression in chaparral along the crest of Black Butte Ridge, between Tassajara Road and the highest point of the ridge. In April of 2015 Diane Renshaw discovered one plant "On the Tassajara side of the creek, down by the old Tony Trail crossing." ●R: from Josephine and Jackson counties in southwestern Oregon to the Santa Lucia Mountains of San Luis Obispo County in the Coast Ranges. This species also occurs in the northern Sierra Nevada, from Butte and Plumas counties northward, and disjunct populations occur in the central Sierra Nevada, in Tuolumne and Mariposa counties. ●H: perennial herbs from elongated rootstocks that annually produce erect or ascending (and often branching) stems that range from about 2 to 6 dm. (8-24") tall. The leaves are and mostly produced on the lower third of the stems, the petioles of the basal leaves are up to 15 cm. long while those of the upper leaves become increasingly reduced in length. The blades are semi succulent, generally deltoid to reniform in outline and about 3 to 10 cm. wide, those of the lower leaves larger and deeply divided into three major sections, the central section is three lobed at the apex while the lateral sections are usually cleft into two major lobes which are two to four lobed at the apex. The blades of the upper leaves become increasingly reduced in size and complexity, with the upper most typically divided into three broadly to narrowly lanceolate and segments. The showy flowers are produced on slender pedicels in open spike like racemes. Both the calyx (which is about 2 to 2.5 cm. long inclusive of the spur) and the four smaller petals are bright red to crimson (or sometimes orangish). The fruit is a many seeded follicle about 12 to 25 mm. long. ❁March-June.

!*Delphinium parryi* A. Gray [*D. p.* subsp. *seditiosum* (Jepson) Ewan]. WOODLAND LARKSPUR. This species is widely scattered at all elevations in the Tassajara region, and it is locally common at lower and intermediate elevations, where it most often occurs in semi open woodland habitats. It abundantly manifested itself in many areas of this region during the first spring after the Basin Complex Fire of 2008. ●R: Coast, Transverse and Peninsular ranges, from Contra Costa County to northern Baja California. Also on all of the Channel Islands and Santa Catalina Island. ●H: perennial herbs from woody roots that annually produce erect or ascending stems that range from about 3 to 9 dm. (12-36") tall. The leaves are mostly restricted to the lower half of the plant. The basal and lower cauline leaves are larger and on petioles up to 15 cm. long; the blades are reniform to deltoid in outline, about 3 to 12 cm. wide, and deeply divided into three to five narrowly linear and simple or (usually) irregularly lobed segments. The flowers are produced in elongated terminal racemes on pedicels about .5 to 3 cm. long. The calyces, which are about 1 to 2 cm. long (inclusive of the spur) and two lower petals are blue or slightly purplish blue, while the two upper petals are generally white, but purplish blue veined at the apex. The fruit is a many seeded follicle about 10 to 15 mm. long. ❁April-June.

!∨***Delphinium patens*** Bentham [*D. decorum* Fischer & C. Meyer var. *p.* (Bentham) A. Gray] subsp. ***patens***. ZIGZAG LARKSPUR, SPREADING LARKSPUR. This species is widespread and locally common at all elevations of the Tassajara region, and it occurs mostly in shadier areas of semi open woodland habitats at lower and intermediate elevations. It was very abundant in many areas of the Tassajara region during the first spring after the Basin Complex Fire of 2008. ●R: Coast Ranges, from Humboldt and Tehama counties to southern Monterey County, where it occurs in both the Diablo and Santa Lucia mountain ranges. ●H: perennial herbs from tuber like rootstocks that annually produce erect or ascending stems that range from about 2 to 5 dm. (8-20") tall. The leaves are mostly produced on the lower third of the stems. The basal and lower cauline leaves are the largest, and are on petioles up to 16 cm. long; the blades are deltoid to more or less roundish in outline, about 4 to 9 cm. wide, and deeply parted into (usually) five major divisions that are mostly two to four lobed or cleft at the apex. The blades of the smaller upper most leaves are usually divided into simple segments. The flowers are produced on elongated and spike like terminal racemes on pedicels about 1 to 4 cm. long. The calyces, which are about 1 to 2 cm. long (inclusive of the spur), are mostly a bright medium blue, while the four small petals are basically white or whitish and with blue veins. The fruit is an oblong and many seeded follicle about 1 to 2 cm. long. ❁March-June.

+∧***Delphinium patens*** subsp. ***hepaticoideum*** Ewan. SOUTHERN ZIGZAG LARKSPUR. This entry is based on a specimen that was collected on the "Hogback ½ mile upstream from hotel, Tassajara Hot Springs" by Rimo Bacigalupi on April 10th of 1925 (Bacigalupi 1121; DS 146268). It is possible that this taxon occurs in other areas in the Tassajara region, particularly on the floodplains of Tassajara Creek, for riparian woodlands are its principal habitat. ●R: Coast, Transverse and Peninsular ranges, from Monterey and San Benito counties to northern Baja California. ●H: similar to the typical subspecies, except for the characteristics stated in the preceding key. ❁April-June.

Included in the Consortium of California Herbaria database is a specimen of *Delphinium californicum* that was collected along "Tassajara Road" by Leroy Abrams in 1916 (Abrams 5656; DS 68628). This was one of a number specimens that Mr. Abrams collected on June 1st, 1916, and although most state the location as Tassajara Road, others state that they were collected along Tassajara Road between Carmel Valley and Monterey-Salinas Road, and along Tassajara Road at junction of Corral de Tierra Road. Thus Mr. Abrams falsely assumed that Tassajara Road began at what is now highway 68.

RANUNCULUS. BUTTERCUP.

Ranunculus consists of about 300 species of perennial and annual herbs that primarily occur in temperate and montane tropical regions, but, with the exception of lowland tropical regions, the genus is represented nearly worldwide. The name is derived from the Latin word for a frog, *rana*, along with the suffix *unculus*, little, in allusion to the wet habitats in which some species grow.

1a. Showy flowered perennial herbs; the flowers have 7 to 22 petals that range from 5 to 15 mm. long and from 2 to 6 mm. wide. . . . . ***R. californicus***.

1b. Minutely flowered annual herbs; the flowers often lack petals, but if they have petals, they number from 3 to 5 and they are only 1 to 2 mm. long and less than 1 mm. wide. . . . . ***R. hebecarpus***.

Ranunculus californicus Bentham. CALIFORNIA BUTTERCUP. This species is widely scattered and locally common in grassy woodlands

and in seasonally wet grassland habitats in a number of localities in the Tassajara region. It is common in such habitats in the lower most elevations of the Tassajara Creek watershed, and it also occurs in the watershed of Church Creek, in Pine Valley and on Chew's Ridge. This species is conspicuous by its apparent absence in the central region of the Tassajara Creek watershed, for I have not seen any plants in the vicinity of the developed area of Tassajara, the Horse Pasture and The Pines. ●R: Cascade Ranges, Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from British Columbia to northern Baja California. ●H: perennial herbs with clustered roots which annually produce erect or ascending (and usually branching) stems that range from about 3 to 7 dm. (12-28") tall. The lower leaves are long petiolate and have blades that are ovate to orbicular in outline, up to 8 cm. long, and divided into three to five major leaflets or lobes which are further lobed or toothed. The middle cauline leaves have shorter petioles and blades which vary from palmately to pinnately divided into narrow and irregularly lobed segments, while the upper most leaves are sessile and have blades that are divided into three or four narrow and entire segments. The flowers are singular or several in loose terminal cymes. The corolla consists of about 7 to 22 yellow petals about 5 to 15 mm. long; sometimes the petals outwardly fade to nearly white. The petals have a distinctive glossy sheen on the upper surface, and nectar bearing glands near the base. The ovaries mature into about 5 to 35 beaked achenes that are about 2 to 2.5 mm. long ❀February-June (August).

Ranunculus hebecarpus Hooker & Arnott. DOWNY BUTTERCUP. These inconspicuous annual herbs are widespread in shady or semi shady habitats in the Tassajara region. The plants commonly occur in groups in small moisture retaining depressions. ●R: from southern Washington, and northern central Idaho to northern Baja California. ●H: annual herbs with slender and erect or ascending stems that range from about .5 to 3 dm. (2-12") tall. The lower leaves are long petiolate, and the blades are deltoid to orbicular in outline, about .5 to 2.5 cm. long, and palmately (or sometimes irregularly) divided or lobed (the lobes are generally three lobed at the apex). The upper most leaves are short petiolate and simple or cleft into three oblong-lanceolate segments up to 3 cm. long. The small flowers are produced singularly on very slender axillary and terminal pedicels up to 2.5 cm. long. Petals are often absent, for they tend to fall before the flowers are mature, but if present, they number from 3 to 5; they are yellow and less than 2 mm. long. The fruits consist of about 3 to 11 gibbous achenes that are about 2 mm. long. ❀March-May.

THALICTRUM. MEADOW RUE.

Thalictrum consists of about 120 to 200 species of the temperate regions of the northern hemisphere. The name comes from the Greek word *thalictron*, which pharmacologist and botanist Pedanius Dioscorides (c. 40-90 A.D.) applied to meadow rues.

Thalictrum fendleri A. Gray var. ***polycarpum*** Torrey [*T. p.* (Torrey) S. Watson]. This distinctive species is scattered in moist and usually shady habitats in Pine Valley, in Strawberry Valley and in Miller Canyon, but it is not known to occur elsewhere in this region. ●R: Cascade Ranges, Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from southern Washington to the mountains of northern Baja California. ●H: perennial herbs from a short caudex which annually produces erect and hollow stems that range from about 6 to 20 dm. (2-6') tall. The larger lower leaves are long petiolate and the upper often sub sessile; the blades are three to four times ternately divided into ovate to cuneate and variously toothed or lobed leaflets about .5 to 2 cm. long. The flowers are produced in panicles terminating the main stem and lateral branches. The flowers lack petals; the sepals range from green to white, and they sometimes have a tinge of purple. The ovaries mature into 7 to 20 achenes about 4 to 8 mm. long. ❀April-July.

RHAMNACEAE. BUCKTHORN FAMILY.

Rhamnaceae includes about 52 genera and approximately 950 species that are primarily trees, shrubs and vines. This family, which is particularly well represented in tropical and subtropical regions, includes the genus *Ziziphus*, the jujubes.

1a. Flowers produced in showy terminal and axillary clusters. The petals are small, slender clawed, and longer than the sepals. The fruits are dry capsules. . . . . ***Ceanothus***.
1b. Flowers produced in inconspicuous clusters that are axillary or scattered along the stems. Petals are present or absent, and if present, they are not clawed, and they are shorter than the sepals. The fruits are juicy berries:
  2a. Petals absent. Leaves broadly ovate to roundish, less than 4 cm. long, and with spiny toothed margins. Winter bud scales present. The fruits are red. . . . . ***Rhamnus***.
  2b. Petals present. Leaves oblong-elliptic to lance-oblong, up to 10 cm. long, and with finely serrate or entire margins. Winter bud scales absent. The fruits are purplish black. . . . . ***Frangula***.

CEANOTHUS. CALIFORNIA LILAC, BLUE BLOSSOM.

The genus *Ceanothus* consists of about 55 species that are endemic to North America, especially western North America. Forty six species occur in California, and 40 species, plus 14 lesser taxa, are endemic to the California Floristic Province. The name is based on the Greek word *keanothus*, which was used by Dioscorides for some kind of spiny plant.

1a. Leaves opposite, the blades cuneate-obovate to oblong, entire, and obtuse to truncate or emarginate at the apex. Stipules thick, corky, and persistent. Capsule lobes crested with prominent horn like appendages. . . . . ***C. cuneatus***.
1b. Leaves alternate, the blades variously shaped, the margins ranging from entire to serrate, toothed, revolute and/or crisped, and acute to obtuse at the apex (if apparently truncate or emarginate at the apex, it is due to the revolute margins). Stipules thin and readily deciduous. Capsule lobes rounded or with low ridges or crests at the apex:
  2a. Leaves with three prominent veins from (or near to) the base:
    3a. Leaf margins finely serrate. Flowers are usually light blue, but are sometimes darker blue or purely white. Calyx lobes are spreading in mature flowers. . . . . ***C. oliganthus*** var. ***sorediatus***.
    3b. Leaf margins almost always entire. Flowers are usually white, but are sometimes light blue. Calyx lobes are inwardly curving in mature flowers. . . . . ***C. integerrimus*** var. ***macrothrysus***.
  2b. Leaves with one prominent central vein, or sometimes obscurely three veined from the base:
    4a. Leaves narrowly lanceolate to elliptic, acute to rounded at the apex, and with flat or only slightly revolute margins:
      5a. Flowers blue. Leaf margins generally gland toothed, the glands generally dark and persistent. . . . . ***C. foliosus*** var. ***medius***.

5b. Flowers white. Leaf margins entire or sometimes toothed. . . . . ***C. integerrimus*** var. ***integerrimus***.

4b. Leaves narrowly oblong-linear to oblong elliptic, mostly obtuse to truncate at the apex, and with strongly revolute and/or crisped margins:

6a. Largest leaves usually more than 1.5 cm. long, mostly oblong to elliptic, the upper surface very glandular and with prominent wart like formations. . . . . ***C. papillosus***.

6b. Largest leaves usually less than 1.5 cm. long, mostly oblong to linear, the upper surface commonly not glandular, and if with wart like formations, they are small and fairly inconspicuous. . . . . ***C. dentatus***.

Ceanothus cuneatus (Hooker) Nuttall [*Rhamnus c*. Hooker]. BUCK BRUSH. This distinctive species is locally common in chaparral at lower to intermediate elevations in the Tassajara region, and it forms nearly pure stands in some areas. ●R: Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Clackamas County in northwestern Oregon to northern Baja California. This is the most widespread and abundant *Ceanothus* species in California. ●H: evergreen shrubs that range from about 1.2 to 3.5 m. (4-12') tall, with a fairly rigid habit of growth and smooth whitish to greenish gray bark. The opposite leaves are short petiolate to nearly sessile, and the blades are cuneate-obovate to spatulate, obtuse to truncate and often notched at the apex, and about .5 to 1.5 cm. long. The small and very fragrant flowers are produced in terminal and axillary clusters. The corollas are comprised of five small and slender clawed petals that are white (var. *ramulosus*, the blue to lavender flowered variety of this species, occurs on, and in the vicinity of, the Hastings Natural History Reservation, and thus it may occur somewhere in this region). The fruits are roundish three lobed capsules that are about 4 to 6 mm. long. ❁March-May.

Ceanothus dentatus Torrey & A. Gray (*C. floribundus* Hooker). CROP LEAFED CEANOTHUS, TOOTHED LEAVED CEANOTHUS. This very showy flowered species is scattered along the summit of Black Butte, on Chew's Ridge in the vicinity of the lookout tower, along the Pine Ridge Trail between China Camp and the Church Creek Divide, and in the vicinity of Lime Point. Although this species is not known to occur elsewhere in this region, it may be more widely distributed, for the plants are relatively short and are often obscured by larger shrubs. ●R: Coast Ranges, mostly in the Santa Cruz Mountains (in both Santa Cruz and Santa Clara counties), and the Santa Lucia Mountains (in Monterey and San Luis Obispo counties). Herbarium specimens that have assigned to this species have been collected in Mendocino, Napa, Marin, San Francisco, Alameda, Santa Barbara and Ventura counties. Of the 244 records that are presently listed in the Consortium of California Herbaria database, 196 are from Santa Cruz, Santa Clara, Monterey and San Luis Obispo counties (153 are from Monterey County). ●H: fairly rigidly branched evergreen shrubs that range from about .5 to 1.5 m. (20-60") tall. The alternate leaves, which are short petiolate to nearly sessile, are often clustered, and the oblong to linear blades are mostly about 5 to 12 mm. long. They are typically truncate to notched at the apex due to strongly revolute and gland toothed margins. The collectively very showy flowers are produced roundish terminal and lateral clusters that are about 1 to 2 cm. long. The corollas consist of five small and narrowly clawed petals, which are brilliantly deep blue. The fruit is a subglobose capsule that is about 4 mm. wide. ❁March-June.

+***Ceanothus foliosus*** C. Parry var. ***medius*** McMinn. WAVY LEAVED CEANOTHUS. While hiking along the Pine Ridge Trail in late May of 2009, and at point about a third to a half mile east of the Church Creek Divide, a dark blue flowered *Ceanothus* plant caught my eye, for it was the only shrub within of a patch of chaparral that had survived the fire of 2008. From a distance it appeared to represent either *Ceanothus dentatus* or *Ceanothus papillosus*, but when I got close enough to observe the leaves, I instantly knew that it represented an entity that I had never before observed in this region. The listings of Chew's Ridge as a location for this taxon in botanical literature (McMinn 1939 & 1942; Howitt & Howell 1964) are based on a specimen that was collected near the lookout by Rimo Bacigalupi in October of 1935 (Bacigalupi 2363, UC 1070605); this specimen is presently assigned to *Ceanothus dentatus*. ●R: Coast Ranges, from Lake and Sonoma counties to the mountains of south central San Luis Obispo County. Of the 90 specimens of *C. foliosus* var. *medius* that are presently included in the Consortium of California Herbaria database, 72 are from San Luis Obispo County. ●H: densely foliated evergreen shrubs that are up to 2 m. (80") tall. The alternate leaves have petioles that are about 1 to 3 mm. long, and the elliptic blades, which are about 5 to 20 mm. long, have wavy and gland toothed margins. The flowers are produced in terminal and lateral clusters, and the corollas consist of five small and slender clawed petals that are dark blue. The fruits are distally three ridged capsules that range from about 3 to 4 mm. wide. ❁March-June.

Ceanothus integerrimus Hooker & Arnott var. ***integerrimus***. DEER BRUSH, WHITE CEANOTHUS. Plants with pinnately veined leaves, and thus corresponding to those of this taxon, were discovered along Tassajara Road a short distance south of the junction of the road to The Caves in early May of 2015. Some of the leaves of these plants were also obscurely three veined from the base, and some had small serrate teeth on the margins, which is unusual for this species. Many plants in this region have leaves that are weakly three veined from the base, and thus represent plants that are genetically intermediate between this taxon and variety *macrothrysus*. ●R: south central Coast Ranges, from the southern Santa Cruz Mountains of Santa Cruz and Santa Clara counties to the northern Santa Lucia Mountains of Monterey County. ●H: evergreen or semi deciduous shrubs that range from about 1 to 4 m. (3.3-13') tall in chaparral habitats, and to as much as 7 m. (23') or more in woodlands or arborescent chaparral habitats. The trunks and branches are greenish or yellowish gray. The alternate leaves have petioles that are about 6 to 12 mm. long, and the blades, which are about 1 to 7 cm. long, are elliptic to oblong, and the margins are entire or sometimes finely toothed. The flowers are produced in clusters that are racemosely produced at the ends of the branches; the inflorescences are generally conically shaped and about 4 to 15 cm. long. The corollas consist of five small and narrowly clawed white petals. The fruits are roundish three lobed capsules that are about 4 to 5 mm. wide. ❁May-July.

+***Ceanothus integerrimus*** var. ***macrothrysus*** (Torrey) G. T. Benson [*C. thyrsiflorus* var. *m*. Torrey; *C. integerrimus* var. *californicus* Benson, *C. i*. var. *puberulus* (E. Greene) Abrams]. COMMON DEER BRUSH. This taxon is widely distributed at all elevations in the Tassajara region, and it is common to abundant both as an understory in woodlands and as an often dominate member of chaparral habitats (except on south facing slopes). On north facing slopes it can form dense stands, which can be nearly pure or mixed with the equally abundant *C. oliganthus* var. *sorediatus*; such stands can have canopies averaging more than 6 m. (20') in height. ●R: Cascades Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from southern Washington to the mountains of San Diego County. ●H: Similar to the typical species, except for the vein structure of the leaves. The leaves also tend to be lanceolate to widely ovate or oblong (as opposed to elliptic to oblong). ❁May-July.

Ceanothus oliganthus Nuttall var. ***sorediatus*** (Hooker & Arnott) Hoover [*C. sorediatus* H. & A.]. LIGHT BLUE CEANOTHUS, JIM BRUSH. This species is widespread and locally common to abundant in the Tassajara region, and it occurs as an understory in woodlands and in chaparral. It is particularly abundant on north or generally north facing slopes, and it can form dense and nearly pure stands of arborescent shrubs that often exceed 6 m. (20') in height. Trails that transect such areas require frequent maintenance while a post fire generation of plants are growing, but once the plants are fully ma

ture, almost no maintenance is required, for by that time the trails are under the canopy, where only a few shade tolerant plant species can grow. This taxon is also common, although in a less robust form, in chaparral habitats and in transitional areas. Some of the plants of this region, with more densely pubescent twigs and upper leaf surfaces, approach the description of the typical species. ●R: Coast, Transverse and northwestern Peninsular ranges, from Humboldt and Shasta counties to northwestern San Diego County (the typical variety occurs in the Coast, Transverse and Peninsular ranges, from Monterey County to northern Baja California). ●H: evergreen shrubs that range from about 1.5 to 7 m. (5-23') tall. The trunks and branches are relatively smooth and generally grayish green. The alternate leaves have petioles that are about 2 to 5 mm. long, and the blades, which are about 1 to 4 cm. long, are mostly ovate to broadly elliptic or sometimes nearly roundish; the margins are finely serrate margins. The blades are dark green and semi glossy above and paler below. The small flowers are produced in showy terminal and lateral clusters that are about 1 to 4 cm. long. The corollas consist of five small and narrowly clawed petals that range medium blue to (usually) light blue, but sometimes they are nearly white. The fruits are three lobed capsules that are about 4 mm. wide. ❀March-May.

Ceanothus papillosus Torrey & A. Gray [*C. p.* var. *roweanus* McMinn]. WART LEAF CEANOTHUS. This distinctive species is widely scattered and locally common to abundant at intermediate and higher elevations of the Tassajara region, and it is particularly common on ridge tops and south facing slopes, where it often forms nearly pure stands. Plants growing on ridge tops are often less than 5 dm. tall and have spreading to semi prostrate branches, perhaps in response to higher winds and/or the weight of winter snows (such plants correspond to what McMinn recognized as var. *roweanus*), while plants occurring in shady canyon bottoms are often quite tall and have larger leaves. ●R: the outer (coastal) South Coast Ranges and coastal western Transverse ranges, from the Santa Cruz Mountains of San Mateo County to the Santa Ynez Mountains of Ventura County. Disjunct populations occur in the Santa Ana Mountains in Orange and Riverside counties. ●H: densely foliated evergreen shrubs with rounded to semi prostrate crowns that range from about .3 to 2.5 m. (1-8') tall. The alternate leaves have petioles that are about 2 to 6 mm. long, and the blades, which are about 1 to 5 cm. long, are mostly narrowly oblong-elliptic; the margins are revolute, contorted, and glandular toothed. The upper surfaces are very glandular and are dotted with prominent wart like formations. The small flowers are produced in dense and showy terminal and lateral clusters that are about 2 to 5 cm. long. The corollas consist of five small and narrowly clawed petals that are an intense deep blue. The fruits are three lobed capsules that are about 3 to 4 mm. wide. ❀February-June.

Occasionally plants are encountered in the Tassajara region that have wavy and/or toothed margined leaves that also have three prominent veins from the base. Such plants probably represent hybrids between *C. oliganthus* and/or *C. integerrimus*, and *C. papillosus* and/or *C. dentatus*.

FRANGULA. COFFEE BERRY.

Frangula consists of about 50 species that occur in temperate regions of the northern hemisphere; they were formerly placed in the genus *Rhamnus*. The name is based on *frangendo*, frangible, capable of being broken, on account of the brittleness of the wood of the type species, *Frangula alnus*.

1a. Lower leaf surface glabrous and shiny (or puberulent when young), and about the same color as the upper surface. . . . ***F. californica*** subsp. ***californica***.

1b. Lower leaf surface a dull pale gray green due a dense layer of minute woolly hair (magnification is necessary to see the individual hairs). . . . . ***F. californica*** subsp. ***tomentella***.

Frangula californica (Eschscholtz) A. Gray [*Rhamnus c.* Eschscholtz]. CALIFORNIA COFFEE BERRY. This species is widely scattered and locally common in the Tassajara region, especially at lower and intermediate elevations, and it occurs as an understory in mixed evergreen and riparian woodland habitats. It also occurs in transitional areas and occasionally in chaparral. ●R: Coast, Transverse and Peninsular ranges, from Del Norte and Siskiyou counties to the mountains of San Diego County. Also on Santa Cruz Island, and in the Sierra Nevada, where it is rare. ●H: evergreen shrubs or sometimes small trees with generally open and rounded crowns that range from about 2 to 6 m. (6.5-20') tall. The alternate leaves have petioles that are about 3 to 10 mm. long, and the blades, which are about 3 to 10 cm. long and 1.5 to 4.5 cm. wide, are broadly oblong to elliptic. The margins are entire or finely serrate, and are usually slightly revolute. The small flowers are produced in axillary umbellate clusters of 6 to 50 flowers. The corollas are comprised of five white and obcordate petals that are less than 2 mm. long. The fruits are roundish and deep purplish black drupes that are about 1 to 1.5 cm. wide. The fruits mature in late summer to early fall. ❀May-July.

Frangula californica subsp. ***tomentella*** (Bentham) Kartesz & Gandhi [*Rhamnus t.* Bentham; *R. californica* subsp. *t.* (Benth.) C. B. Wolf]. HOARY COFFEE BERRY. This taxon is widespread and locally common in the Tassajara region, especially at higher elevations, and it occurs mostly in chaparral or in transitional areas. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Trinity and Shasta counties to northern Baja California. ●H: evergreen shrubs typically with rounded crowns that range from about 1.2 to 4 m. (4 to 13') tall. The alternate leaves have petioles that are about 3 to 10 mm. long, and the blades are olive green above and pale gray green below, which is due to a coat of minute woolly hairs that are discernible only under magnification. The blades, which are mostly oblong-lanceolate to elliptic, are about 3 to 7 cm. long and .5 to 2 cm. wide, and the margins are entire and slightly thickened. The flowers are small and produced in axillary clusters. The white corollas consist of five obcordate petals that are less than 2 mm. long. The fruits are roundish and dark purplish black drupes that are about 10 to 12 mm. wide. ❀May-July.

RHAMNUS. BUCKTHORN.

Rhamnus includes about 110 species of shrubs and small trees; most of the species occur in temperate regions. The name is the ancient Greek word for members of this genus.

Rhamnus ilicifolia Kellogg [*R. crocea* Nuttall subsp. *i.* (Kellogg) C. B. Wolf]. HOLLY LEAVED BUCKTHORN, RED BERRIED BUCKTHORN. This species is widespread and locally common at all elevations in the Tassajara region, and although it primarily occurs in chaparral, it also occurs in open woodlands, and in areas that are transitional between woodlands, chaparral and grasslands. ●R: southern Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Josephine and Jackson counties in southwestern Oregon to northern Baja California. Also in the mountains of Arizona and southern Nevada. ●H: evergreen shrubs that range from about 1.2 to 4 m. (4-13') tall. The leaves are alternate and the petioles are about 2 to 10 mm. long. The fairly stiff blades, which

are about 1 to 3 (-4) cm. long, are ovate to roundish and have spiny toothed margins. The small and reddish tinged flowers are produced in axillary clusters; the flowers lack corollas. The fruits are two seeded and more or less roundish drupes that are about 4 to 8 mm. long; the drupes are covered with a thin and semi transparent red skin. ❀March-June.

ROSACEAE. ROSE FAMILY.

Rosaceae is a large and very diversified family of trees, shrubs and herbs that is especially well represented in the northern hemisphere. According to the Jepson eFlora website, this family is comprised of about 110 genera and approximately 3,000 species, while according to the Angiosperm Phylogeny website it includes about 90 genera and approximately 2520 species. In any case, this family is the source of many common fruits, such as apples, pears, plums, prunes, cherries, peaches, nectarines, apricots, strawberries, raspberries and blackberries. *Rosaceae* also includes many plants that are cultivated for their ornamental appeal, which include those of the type genus, *Rosa*.

1a. Plants with thorns and/or sharp bristles on the branches or stems:
2a. Most leaves palmately divided into 3 or 5 leaflets. The fruits are coalescent drupelets (blackberries). Petals white. . . . . ***Rubus***.
2b. Leaves pinnately divided into 5 to 7 leaflets. The fruits are fleshy floral tubes (rose hips). Petals rose pink or darker. . . . . ***Rosa***.
1b. Plants without thorns or sharp bristles on the branches or stems:
3a. Non woody perennial herbs less than 8 dm. (32") tall:
4a. Leaves palmately divided into 3 leaflets. The fruits are small strawberries. . . . . ***Fragaria***.
4b. Leaves pinnately divided into 5 to 32 leaflets. The fruits are dry achenes:
5a. Basal leaves narrowly oblong in outline and divided into 7 to 16 pairs of leaflets that are about .4 to 1.5 cm. long. . . . ***Horkelia***.
5b. Basal leaves oblanceolate in outline and divided into 3 to 4 pairs of leaflets that are 1 to 4 cm. long. . . . . ***Drymocallis***.
3b. Shrubs or subshrubs usually much more than 8 dm. tall:
6a. Leaves narrowly linear to linear-oblanceolate and rarely more than 1 cm. long. . . . . ***Adenostoma***.
6b. Leaves not narrowly linear and more than 1 cm. long:
7a. Leaves 10 to 15 cm. wide, roundish in outline, and palmately cleft into five major lobes. . . . . ***Rubus parviflorus***.
7b. Leaves usually less than 5 cm. wide, of various shapes, entire or toothed, and if lobed, then the lobes pinnate:
8a. Ovaries inferior, the fruit is a pome (i.e., an apple like in structure):
9a. Leaves evergreen, elliptic to oblong-lanceolate, and the margins sharply toothed throughout. Pome red, rather dry, and waxy. Common in this region. . . . . ***Heteromeles***.
9b. Leaves deciduous, elliptic or oval to roundish or broadly obovate, and entire or toothed in the outer half. Pome purplish black and moist. Rare in this region. . . . . ***Amelanchier***.
8b. Ovaries superior, the fruit is not a pome:
10a. Fruit a fleshy drupe with one stone like seed:
11a. Plants monoecious. Fruits round or roundish and red. . . . . ***Prunus***.
11b. Plants dioecious. Fruits more or less bean shaped and nearly black (appearing to be dark blue due to a glaucus coating). . ***Oemleria***.
10b. Fruit not a drupe:
12a. Flowers produced singularly or in small groups. Petals absent. Styles very long, plume like, and very conspicuous. . . . ***Cercocarpus***.
12b. Flowers produced in abundance in terminal panicles. Petals present. Styles small and inconspicuous. . . . . ***Holodiscus***.

ADENOSTOMA. CHAMISE AND RED SHANK.

The genus *Adenostoma* consists of two species that are endemic to the California Floristic Province. The name is derived from the Greek words *aden*, gland, and *stoma*, mouth, on account of the ring of glands in the hypanthium.

Adenostoma fasciculatum Hooker & Arnott. CHAMISE, GREASE WOOD. This well known species is widespread in chaparral habitats at all elevations in the Tassajara region, and it is most abundant on steep southfacing slopes, where it is often the dominate species. This species is noted for its allelopathic properties, for the plants inhibit the growth of nearby plants via the emission of toxic chemicals. ●R: southern Cascade foothills, the Sierra Nevada foothills, and the Coast, Transverse and Peninsular ranges, from Humboldt and Shasta counties to northern Baja California. Also on Santa Rosa, Santa Cruz, Santa Catalina and San Clemente islands, and in the mountains of southern Nevada. ●H: densely foliated evergreen shrubs with erect or ascending branches that range from about .6 to 3 m. (2-10') tall. The plants develop fire resistant burls with age, and the branches are covered with a shredding reddish brown bark. The nearly sessile leaves are mostly produced in clusters, and the blades, which are linear to linear-oblanceolate, are about 4 to 10 mm. long. The small flowers are produced on the racemose branches of terminal panicles, and the corollas consist of five white petals that are roundish and about 1.5 mm. long. The fruit is a hardened capsule like floral tube that encloses the achenes. ❀May-June.

AMELANCHIER. SERVICE BERRY.

Amelanchier consists of about 25 species of the temperate regions of North America, Eurasia and North Africa. The name is derived from an old French word for members of this genus.

Amelanchier utahensis Koehne [*A. pallida* E. Greene]. The only area in the Tassajara region where this species is known to occur is on Chew's Ridge, where it is rare in shady ravines and stream bottoms. ●R: widely distributed in the mountains of western North America, from north central Washington and Montana to northern Baja California and Texas. ●H: deciduous shrubs that range from about 1 to 4 m. (1.3-13') tall. The alternate leaves have petioles that are about 6 to 12 mm. long, and the blades, which are 1.3 to 4.5 cm. long, vary from elliptic to roundish; the margins are entire or toothed in the outer half. The inflorescences are corymbose racemes that are about 1 to 4 cm. long; the racemes are three to eight flowered. The corollas consist of five white petals that are elliptic to

wedge shaped and about 5 to 11 mm. long. The fruits are purplish black and berry like pomes that are about 4 to 10 mm. in diameter. ❀April-June.

CERCOCARPUS. MOUNTAIN MAHOGANY, HARD TACK.

The genus *Cercocarpus* consists 11 species that are endemic to western North America and Mexico. The name is derived from the Greek words *kerkos*, tail, and *karpos*, fruit, on account of the persistent plume like styles of the achenes.

Cercocarpus betuloides Nuttall ex Torrey & A. Gray. BIRCH LEAF HARD TACK, MOUNTAIN MAHOGANY. This species is widespread and locally common at all elevations in the Tassajara region, and it primarily occurs in chaparral and in transitional areas. ●R: Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from southwestern Oregon to northern Baja California. Also on Santa Cruz and Santa Catalina islands. ●H: evergreen shrubs that range from about 1.2 to 3+ m. (4-10'+) tall; the branches are covered with a smooth and grayish bark. The leaves, which are alternate or produced in small groups, have petioles that are about 1 to 10 mm. long. The blades are obovate to oval or broadly elliptic, cuneate and entire below and serrate towards the apex, dark green above and paler below, and about 1 to 2.5 cm. long. The flowers, which are terminal and axillary, are produced singularly or in small clusters; the flowers lack corollas. The fruits are floral tubes that are about 8 to 14 mm. long; they contain cylindric achenes that are about 8 to 12 mm. long. The achenes have persistent, plume like, and generally twisting styles that are about 5 to 9 cm. long. ❀March-May.

DRYMOCALLIS

The genus *Drymocallis* consists of 30 species that occur in the temperate regions of the northern hemisphere. The genus has been segregated from *Potentilla* based on morphological and molecular evidence. The name is derived from Greek words and means wood beauty, presumably because the plants often occur in woodland habits.

Drymocallis glandulosa (Lindley) Rydberg [*Potentilla g.* Lindley]. STICKY CINQUEFOIL. This species is widely scattered at all elevations in the Tassajara region, and it usually occurs on shady woodland slopes or in moist or seasonally moist habitats. ●R: Pacific Slope, from British Columbia and Idaho southward, through the Coast Ranges, Sierra Nevada and the Transverse and Peninsular ranges, to northern Baja California. ●H: perennial herbs from a woody caudex, with one to several erect or ascending stems that range from about 3 to 8 dm. (12-32") tall. The basal and lower cauline leaves, which are up to 25 cm. long, are generally oblanceolate in outline, and are pinnately divided into three or four pairs of lateral leaflets plus a larger terminal leaflet. The obovate to roundish leaflets are about 1 to 4 cm. long, and the margins are coarsely toothed. The upper most leaves are reduced, short petiolate to sessile, and divided into three to five generally lanceolate to elliptic leaflets. The flowers are produced in terminal cymes that contain 2 to 30 flowers, and the corollas consist of five pale yellow to creamy white petals that are about 4 to 7 mm. long. The fruits consist of numerous achenes that are about 1 mm. long. ❀May-July.

FRAGARIA. STRAWBERRY.

The genus *Fragaria* consists of about 20 species, most of which occur in the temperate regions of the northern hemisphere. The name is derived from the Latin word *fragum*, fragrant.

Fragaria vesca Linnaeus [*F. v.* subsp. *californica* (Chamisso & Schlechtendal) Staudt, *F. c.* C. & S.]. COMMON WILD STRAWBERRY. This species is common in shady and/or moist habitats in its namesake Strawberry Valley, and it is also occurs in similar habitats in Pine Valley. It also occurs on shady woodland slopes along the Marble Peak Trail in the upper region of the Willow Creek watershed (between Willow Springs Camp and the Willow Creek Divide). ●R: widely distributed in temperate regions of the northern hemisphere. In California its range extends southward in the outer Coast Ranges to the Santa Ynez Mountains of Santa Barbara County, and to Tulare County in the Sierra Nevada. Disjunct populations occur in the San Bernardino Mountains of San Bernardino County, the San Jacinto and Santa Rosa mountains in Riverside County, and in the higher mountains of San Diego County and northern Baja California. ●H: perennial herbs with short rhizomes and more or less prostrate stolons. The flowering stems range from about 1 to 2.5 dm. (4-10") tall. The leaves are basal and have petioles that are about 3 to 12 cm. long; the blades are divided into three roundish-obovate and coarsely serrate leaflets that are about 2 to 5 cm. long. The flowers are produced singularly or in few flowered terminal cymes, and the corollas consist of five white petals that are roundish-obovate and about 5 to 8 mm. long. The red fruits are enlarged, fleshy and generally conical shaped receptacles (strawberries) that are about 1 cm. long; the small achenes are produced on the surface. ❀March-June.

HETEROMELES. TOYON, CALIFORNIA CHRISTMAS BERRY.

The genus *Heteromeles* is comprised of one species that is endemic to the California Floristic Province. The name is derived from the Greek words *hetero*, different, and *malus*, apple, on account of the fruits that somewhat resemble apples.

Heteromeles arbutifolia (Aiton) Roemer [*Crataegus a.* Aiton; *Photinia a.* Lindley]. These distinctive shrubs are widespread and locally common at all elevations in the Tassajara region, and they occur in chaparral, in transitional areas between chaparral and woodland habitats, and as an understory in woodlands. In woodland habitats this species sometimes manifests itself as a tree. This species is most conspicuous from late fall to early winter, when the panicles are adorned with numerous red fruits. ●R: southern Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Del Norte and Siskiyou counties to northern Baja California. Also on San Miguel, Santa Rosa, Santa Cruz, San Nicolas, Santa Catalina, San Clemente and the Anacapa islands, and on the Sutter Buttes. ●H: evergreen shrubs with gray bark that range from about 2 to 5 m. (6.5-16') tall, or rarely small trees up to 10 m. (33') tall. The alternate leaves have petioles that are about 1 to 2 cm. long, and the blades are elliptic to oblong-lanceolate with serrate margins, dark green above and paler below, and about 4 to 10 cm. long. The flowers are produced in crowded terminal corymbose panicles, and the corollas consist of five white petals that are about 2 to 4 mm. long. The fruits are ovoid, waxy, and red skinned pomes that are about 5 to 10 mm. in diameter. ❀May-June.

HOLODISCUS.

Holodiscus consists of five species of western North America, Central America and northern South America. The name is derived from the Greek words *holo*, whole, *diskos*, disk, perhaps for the saucer like disk lining the hypanthium.

Holodiscus discolor (Pursh) Maximowicz [*Spiraea* d. Pursh; *Holodiscus d.* var. *franciscanus* (Rydberg) Jepson]. OCEAN SPRAY, CREAM BUSH. This distinctive species is widely scattered at all elevations in the Tassajara region, and it mostly occurs in and along the borders of woodland habitats. Small shrubs are frequently seen growing from cracks on cliffs and rock outcrops along Tassajara Creek as it passes through the deep gorge downstream from the hot springs. ●R: western North America, from British Columbia and Montana to southern California, northern Mexico and western Texas. In California this species occurs in the Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, as far south as the mountains of San Diego County. It also occurs on Santa Cruz and Santa Catalina islands, and on the Sutter Buttes. ●H: deciduous shrubs with somewhat lanky branches that range from about 1 to 2.5 m. (3.3-8') tall, or rarely up to 6 m. (20') tall. The leaves are alternate or clustered on short lateral stems, and the petioles are about .5 to 2 cm. long. The blades, which are about 1 to 8 (-12) cm. long, are ovate to elliptic or obovate, and sub truncate to cuneate at the base. The margins are variously shallowly lobed and coarsely toothed. The flowers are crowded in terminal panicles that are about 4 to 25 cm. long, and the corollas consist of five oval and creamy off white petals that are about 2 mm. long. The fruits consist of five achenes that are about 1 to 1.5 mm. long. ❀May-July.

HORKELIA.

Horkelia consists of 20 species of herbaceous perennial herbs that are endemic to western North America. All of the species are represented in California, and 16, plus six lesser taxa, are endemic to the California Floristic Province. The genus is named for the German plant physiologist Johann Horkel, 1769-1846.

∧***Horkelia yadonii*** B. Ertter [*H. bolanderi* A. Gray subsp. *parryi* (S. Watson) Keck, in part]. SANTA LUCIA HORKELIA, VERN YADON'S HORKELIA. The only area in the Tassajara region where this species is known to occur is in Pine Valley, where it is found along brooks in the vicinity of Pine Valley Camp and Jack English's cabin. It also occurs in Hanging Valley, a few miles south-southeast of the Tassajara Creek watershed in Hanging Valley. This species was named for Vern Yadon, the former director of the Pacific Grove Museum of Natural History and the preeminent student of the flora of Monterey County. ●R: an uncommon plant of the Coast Ranges and far western Transverse Ranges, from Monterey County to Santa Barbara County. In the Santa Lucia Mountains of Monterey County this species is known to occur at a point along the Ventana Double Cone Trail (Hardham 10151), in Pine Valley, in Hanging Valley, and at a number of locations in the upper watershed of the Nacimiento River. In south central San Luis Obispo County this species occurs in a number of locations in, and in the vicinity of, the La Panza Range, and in Santa Barbara County it occurs in the San Rafael Mountains. In 1994 a specimen that was assigned to this taxon was collected in the vicinity of Prunedale in northern Monterey County (Dean Kelch, UCD 113464) ●H: tufted perennial herbs with decumbent but ultimately ascending stems that range from about 1 to 6 dm. (4-24") long. Plants can form mats up to a meter wide. The leaves are gray green due to dense coat of short woolly hairs. The basal leaves, which are mostly about 6 to 20 cm. long, are pinnately divided into 7 to 16 pairs of wedge shaped to roundish leaflets about 4 to 15 mm. long. The outer margins of the leaflets are toothed to deeply lobed, and are frequently notched toward the middle. Cauline leaves are much reduced and bract like. The flowers are produced in terminal racemes, and the corollas consist of five yellowish white and oblanceolate to elliptic petals about 3 to 5 mm. long. The fruits are two or more achenes about 1.5 mm. long. ❀June-September.

OEMLERIA.

The genus *Oemleria* consists of one species that is endemic to temperate western North America. *Oemleria* was named for Augustus Gottlieb Oemler (1773-1852), a German-American pharmacist and naturalist.

+***Oemleria cerasiformis*** (Hooker & Arnott) J. W. Landon [*Nuttallia c.* H. & A.; *Osmaronia c.* (H. & A.) E. Greene]. OSO BERRY, INDIAN PLUM. According to James Griffin (Plants of the Highest Santa Lucia and Diablo Range Peaks, 1975), this species is "Scattered in shady canyons at lower elevations" on Chew's Ridge, and "Rare above 1200 m." Griffin also collected a specimen of this species in Kincannon Canyon in April of 1973 (Griffin 3480; JEPS 74253); the specimen was collected at a location that was about 4,000 feet in elevation. A specimen was also collected in Miller Canyon "One mile below China Camp" by Delzie Demaree in April of 1933 (Demaree 10311; GH 346948). ●R: Pacific Slope of western North America, from British Columbia to California. In California it extends though the Coast Ranges to the Santa Ynez Mountains of Santa Barbara County, and to Tulare County in the Sierra Nevada. ●H: deciduous shrubs or small trees with smooth bark that range from about 1 to 5 m. [3-16'] tall. The alternate and short petioled leaves are oblong to oblanceolate, and about 5 to 13 cm. long. The five petaled flowers are produced in nodding racemes that are terminal on leafy stems. The flowers are either perfect (staminate and pistillate) or imperfect; staminate flowers have spreading obovate petals that are about 5 to 6 mm. long, while pistillate flowers have smaller and narrower petals that are erect. The petals are white, and the alternating sepals are also white, or at least greenish white. The fruits are more or less bean shaped drupes about 5 to 15 mm. long; when they are fully mature they are nearly black, but they appear to be dark blue due to their glaucus coating. ❀February-April.

PRUNUS. STONE FRUITS.

Estimates about the number of *Prunus* species range from over 200 to about 430; most of the species occur in the temperate regions of the northern hemisphere. *Prunus* includes many common fruits, such as the various plums, prunes, cherries, apricots and peaches, and the horticulturally derived nectarines and plucots; the genus also includes almond trees. The name is the ancient Latin word for prunes and plums.

1a. Plants evergreen. Leaves roundish to ovate, the margins sharply toothed. . . . . ***P. ilicifolia***.
1b. Plants deciduous. Leaves oblong to oblanceolate, the margins finely serrate:
2a. Leaves alternate, the tips sharply acute. Flowers 12 or more in elongated racemes. . . . . ***P. virginiana***.
2b. Leaves mostly clustered on short lateral stems, the tips slightly acute to rounded. Flowers 3 to 10 in short racemes. . ***P. emarginata***.

Prunus emarginata (Douglas ex Hooker) Eaton [*Cerasus e*. Douglas ex Hooker]. BITTER CHERRY. This species is apparently widely scattered in the Tassajara region, but rare. A few plants were found above the three waterfalls of Waterfall Creek, and perhaps one more was seen in The Pines (the plant had neither flowers or fruits, but the leaf shape suggested this species). Vern Yadon (Field Notes 7/3/1980) reported this species to be present at the Tassajara Canyon overlook along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge, and James Griffin ("The Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975) reported it to be rare on Pine Ridge. The listing of Tassajara Springs as a site for this species by Howitt and Howell ("The Vascular Plants of Monterey County," 1964) was based on a specimen collected by Junea Kelly in July of 1916 (CAS 69510). ●R: from British Columbia and Montana to New Mexico and California. In California the species occurs in the Coast Ranges, Sierra Nevada, Transverse and Peninsular ranges, as far south as the mountains of San Diego County. ●H: deciduous shrubs or small trees that range from about 1 to 6 m. (3.3-20') tall. The leaves are short petiolate and produced mostly in small groups on short lateral stems; the blades are oblong-obovate to elliptic with finely serrate margins, and about 2 to 5 cm. long. The flowers are produced in short 3 to 10 flowered lateral racemes, and the corollas consist of five white petals about 4 to 8 mm. long. The fruits are bright red, bitter sweet, and ovoid to roundish drupes about 7 to 14 mm. long; they contain one ellipsoid stone like seed. ❁April-May.

Prunus ilicifolia (Nuttall ex Hooker & Arnott) D. Dietrich [*Cerasus i*. Nuttall ex Hooker & Arnott]. ISLAY, HOLLY LEAVED CHERRY. This distinctive species is widely scattered in chaparral or in transitional areas at lower to intermediate elevations of the Tassajara region. Although it is uncommon at intermediate elevations, it is rather common at lower elevations, and especially so towards the Arroyo Seco River. In describing plants of the Santa Lucia Mountains that he observed in the vicinity of Mission San Antonio in September of 1847, the botanical explorer Karl Theodor Hartweg noted that:

> An evergreen shrubby *Prunus*, called Islay, with a holly-like leaf, bearing a red fruit resembling the cherry-plum, grows so abundantly here. The thin pulp which surrounds the proportionate large seed is sweet and pleasant to eat. The kernel, after being roasted and made into a gruel, is a favorite dish among the Indians (*Journal of the Horticultural Society of London* 3: 225, 1848).

●R: Coast, Transverse and Peninsular ranges, from Napa and Solano counties to northern Baja California. ●H: evergreen shrubs or small trees typically with rounded crowns that range from about 2 to 8 m. (6.5 to 26') tall. The alternate leaves have petioles about 4 to 10 mm. long; the dark green and shiny blades are roundish to ovate with sharply toothed margins, and about 2 to 5 cm. long. The flowers are produced in axillary racemes about 3 to 6 cm. long, and the corollas consist of five white petals about 2 to 3 mm. long. The fruits are ovoid to spherical drupes about 12 to 18 mm. wide. The red skinned drupes have a thin pulp and a large stone like seed. ❁April-May.

Prunus virginiana Linnaeus var. ***demissa*** (Nuttall ex Torrey & A. Gray) Torrey [*Cerasus d*. Nutt. ex T. & G.]. WESTERN CHOKE CHERRY. This species is fairly common on, and in the vicinity of, the section of the Black Butte-Miller Ridge between the road to The Caves and the Pine Ridge Trail, and it forms a thicket along a section of the fire break that runs along the summit of this ridge. It also occurs in rocky areas on Chew's Ridge, and in Pine Valley and Strawberry Valley. This is almost certainly the species for which Cherry Thicket, on northern portion of Chew's Ridge, and in the northern part of section 25, T18S R3E, is named. ●R: widely distributed in western North America, from British Columbia and Alberta to northern Mexico. It is also reported to occur in Nebraska, Iowa, Illinois and Indiana. The typical species is widespread in eastern North America. ●H: deciduous shrubs or small trees that range from about 1 to 6 m. (3-20') tall. The alternate leaves have petioles that are about 10 to 25 mm. long, and the blades, which are about 5 to 10 cm. long, are oblong-obovate to oblong-ovate with an abruptly tapered apex; the margins are finely serrate. The flowers are produced in lateral racemes about 5 to 10 cm. long, and the corollas consist of five white petals about 4 to 7 mm. long. The dark red and bitter sweet fruits are ovoid to spherical drupes about 6 to 14 mm. long; the stone like seed is roundish to slightly ellipsoid. ❁May-June.

ROSA. ROSE.

This well known genus consists of about 100 natural species that are primarily native to northern temperate regions, and it also includes many hundreds, if not thousands, of horticulturally derived hybrids. *Rosa* is the Latin name for rose plants.

1a. Leaflets puberulent to pubescent, the terminal one usually 2 to 6 cm. long. Thorns stout and hooked at the tip. Hypanthium 3 to 5 mm. wide in flower, and 8 to 20 mm. wide in fruit. Sepal tips usually about as long or longer than sepals; the sepals are persistent in fruit. Pistils more than 10. Petals 1 to 2 cm. long. . . . . ***R. californica***.

1b. Leaflets glabrous, the terminal one usually 1 to 3 cm. long. Thorns slender and straight. Hypanthium 1.5 to 2.5 mm. wide in flower, and 5 to 12 mm. wide in fruit. Sepal tips usually much shorter than sepals; the sepals are deciduous in fruit. Pistils fewer than 10. Petals about 1 cm. long. . . . . ***R. gymnocarpa***.

Rosa californica Chamisso & Schlechtendal. CALIFORNIA ROSE. This species is widely scattered in wet or seasonally wet habitats at all elevations in the Tassajara region, but it is generally uncommon, except in some areas. A thicket occurs in a marshy area along Waterfall Creek above the series of falls. It also occurs in the vicinity of The Caves. ●R: Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Yamhill and Clackamas counties in northwestern Oregon to northern Baja California. Also on the Sutter Buttes and on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: evergreen shrubs or subshrubs with relatively slender and thorny branches that range from about 1 to 3 m. (3.3-10') long. The petiolate leaves are alternate, about 4 to 8 cm. long, and pinnately divided into five to seven oval to oblong-ovate and serrately margined leaflets that are about 1 to 3.5 cm. long. The aromatic flowers are produced in few to many flowered terminal corymbs. And the corollas consists of five rose pink petals that are about 1 to 2 cm. long. The achenes are produced in an enlarged globose to ovoid floral tube (rose hip) that is about 8 to 20 mm. wide; the fruits become fleshy and sweet when mature. ❁May-August.

+***Rosa gymnocarpa*** Nuttall. WOOD ROSE. The first time I noticed this species in this region was on May 24th of 2009, while I was performing a post Basin Complex Fire botanical survey along the Pine Ridge Trail, from Tassajara Road to the Church Creek Divide, and from there to Pine Valley. While passing along the section of the trail to Pine Valley where it starts to become comparatively flat, I noticed rose plants that caught my attention, for their petals where smaller and more darkly hued than those of *Rosa californica*. I then looked around and saw other similar plants at that site, and many more of these plants were regularly encountered along this trail up to point where it enters the first grassy meadow in Pine Valley. The specimen that I collected was then in its early flowering stage, but

the overwhelming bulk of the information that it has provided me has lead me to conclusion that it certainly represents *R. gymnocarpa*. Although this species has not been reported to occur elsewhere in the Tassajara region, it is quite possible that other populations have been overlooked. ●R: from British Columbia and Montana to California. In California this species ranges southward in the Coast Ranges to the Santa Lucia Mountains of San Luis Obispo County, and to Tulare County in the Sierra Nevada. Disjunct populations occur in the Santa Ynez Mountains of Santa Barbara County, the San Gabriel Mountains of Los Angeles County, and in the mountains of San Diego County. ●H: lanky shrubs with very slender and upwardly spreading stems that range from about 5 to 20 dm. (20-80") long. The stems are beset with slender and straight prickles. The leaves are divided into 5 to 9 elliptic to ovate and serrately margined leaflets that range from about 5 to 30 mm. long. The flowers are produced from the axils of the upper leaves on pedicles that range from about 15 to 30 mm. long, and the corollas consist of 5 petals that are about 1 cm. long. The petals are usually dark rose pink. The fruits is are ellipsoid to roundish rose hips that are 5 to 12 mm. wide. ❀April-July.

RUBUS. BLACKBERRIES AND RASPBERRIES.

Recent estimates about the number of *Rubus* species vary greatly, from about 400 to 750 species, while the Angiosperm Phylogeny website places the number at about 250. In any case, the species, as a whole, are represented on all major land masses except for Antarctica, and they are especially well represented in northern temperate regions. The genus name is Latin and means both bramble and red, perhaps in reference to a red flowered or a red fruited member of this genus.

1a. Plants with erect and thornless branches. Leaves deciduous, not divided into leaflets, more or less roundish in outline, and palmately five lobed. . . . . ***R. parviflorus***.

1b. Plants with sprawling and thorny or bristly branches. Leaves evergreen and mostly divided into 3 to 5 leaflets:

2a. Primary stems roundish and with slender bristles. The majority of the leaves are divided into 3 leaflets. . . . . ***R. ursinus***.

2b. Primary stems five angled and with stout thorns. The majority of the leaves are divided into 5 leaflets. . . . . ***R. armeniacus***.

Rubus armeniacus Focke [*R. discolor* Weihe & Nees and *R. procerus* Mueller misapplied]. ARMENIAN BLACKBERRY, LUTHER BURBANK'S "HIMALAYA GIANT" BLACKBERRY. This species has been a weed at Tassajara since at least 1962, when Clare Hardham collected a specimen of it in June of that year (Hardham 10310; CAS 540083). It was probably planted at Tassajara at a much earlier date for its fruits, which are produced in abundance from midsummer until the onset of winter. Although the thickets of this species that were in the immediate vicinity of developed area of Tassajara were eradicated in the late 2000s, it is still common along Tassajara Creek for many miles downstream. This species was first introduced into California gardens by the famous horticulturalist Luther Burbank (1849-1926), from seeds he had imported from India (and hence his name "Himalaya Giant"). In a circular that was issued by Burbank's Experimental Farms in 1897, it was stated that "The vines, which are quite thorny, make an annual growth of 15 or 20 feet." ●R: an invasive weed in North America, especially in western temperate North America; native to Armenia and adjacent regions. ●H: very robust subshrubs with numerous very long and sprawling branches that typically form mound like thickets that can cover large areas. The leaves of the primary stems are divided into five roundish-ovate to obovate and serrately margined leaflets up to 12 cm. long, while the outer leaves of the lateral flowering stems are smaller and are often three (or one) foliate. The flowers are produced in terminal panicles, and the corollas consist of five white (or sometimes pinkish) obovate petals that are about 10 to 15 mm. long. The fruits are hemispheric to roundish-oblong aggregations of drupelets that are up to 2 or more cm. long; the fruits become purplish black when mature. ❀May-October.

Rubus parviflorus Nuttall [*R. p.* var. *velutinus* (Hooker & Arnott) E. Greene]. THIMBLE BERRY. This distinctive species is widely scattered and locally common in moist and shady riparian habitats in the Tassajara region, such as along Church Creek, the upper portion of Tassajara Creek, Oryoki Creek, and along Willow Creek (where it is abundant). ●R: western North America, from southeastern Alaska, British Columbia and Alberta to California and the Rocky Mountains of New Mexico. Also in the northern Great Lakes region in Ontario, Minnesota, Wisconsin and Michigan. In California its range extends southward in the outer Coast Ranges to the San Ynez Mountains of Santa Barbara County, and to Kern County in the Sierra Nevada. Disjunct populations occur in the Alamo Mountain region of Ventura County, the San Gabriel Mountains of Los Angeles County, the San Bernardino Mountains of San Bernardino County, the San Jacinto and Santa Rosa mountains of Riverside County, and in the mountains of San Diego County. ●H: semi shrubby plants with erect and thornless stems that range from about 1 to 2 m. (3.3-6.6') tall. The leaves are alternate and deciduous; the petioles are about 2 to 12 cm. long, and the blades are roundish to deltoid in outline, palmately five lobed with irregularly serrate margins, and about 10 to 15+ cm. wide. The showy flowers are produced in terminal corymbs, and the white or sometimes pinkish corollas consist of five elliptic-obovate petals that are about 15 to 30 mm. long. The fruits are hemispheric raspberry like aggregation of drupelets that are about 1 to 1.5 cm. wide; the fruits become red or orangish red in maturity. ❀March-June.

Rubus ursinus Chamisso & Schlechtendal [*R. vitifolius* (C. & S.) subsp. *u*. (C. & S.) Abrams]. COMMON WESTERN NORTH AMERICAN BLACKBERRY, BEAR BLACKBERRY, CALIFORNIA BLACKBERRY. This species is common along or near perennial and seasonal streams in the Tassajara region, and sometimes in other generally moist and/or shady habitats, such as on woodland slopes or where the water table is near the surface. Although the fruits are rather small and are not produced in abundance, their flavor is superb. Boysenberries and Loganberries, and other commercial blackberry strains are horticultural derivatives of this species. ●R: although the common name 'California Blackberry' is frequently applied to this species, it is a misnomer, for it is widespread in western North America, from British Columbia and Montana to northern Baja California. ●H: evergreen sub shrubs with sprawling and thorny stems that are up to 5.5 m. (18') long. The long petiolate leaves of the primary stems are divided into three (or rarely five) ovate to lance-ovate leaflets with doubly serrate margins. The terminal leaflet, which is the largest (up to 12 cm. long), is often three lobed. The flowers are produced in cyme like terminal clusters, and the corollas consist of five white petals; those of staminate flowers are narrow and up to 15 mm. long, while those of perfect or pistillate flowers are shorter and broader. The fruits are narrowly oblong to narrowly conical aggregations of drupelets (blackberries) that are about 1 to 2 cm. long; they become purplish black in maturity. ❀March-July.

RUBIACEAE. MADDER FAMILY.

This is a large and primarily tropical family that consists of about 500 genera and approximately 6,000 species of trees, shrubs and herbs. The family includes *Coffea* (coffee trees), *Cinchona* (from which quinine is derived), and many ornamentals, such as those of the genera *Gardenia*, *Pentas*, *Houstonia*, *Bouvardia* and *Hedyotis*.

GALIUM. BEDSTRAWS, CLEAVERS.

Galium is a widely distributed but primarily temperate genus that consists of about 650 species. The name is derived from the Greek word *gala*, milk, on account of the use of the juice of some species to curdle milk.

1a. Leaves 6 to 8 per whorl. Annual herbs with weak and trailing stems. . . . . ***G. aparine***.
1b. Leaves 4 per whorl. Evergreen perennial herbs or subshrubs with erect, spreading or climbing stems:
2a. Fruits densely bristly. Broom like subshrubs with numerous erect or ascending stems. . . . . ***G. angustifolium***.
2b. Fruits glabrous or hairy. Plants with trailing or climbing stems, or forming low mats. . . . . **the *Galium Californicum* Complex**.

^***Galium angustifolium*** Nuttall subsp. ***angustifolium***. CHAPARRAL BEDSTRAW. These broom like plants are widely scattered and locally common in chaparral at all elevations in the Tassajara region, particularly on highly exposed southfacing slopes that are dominated by subshrubs. ●R: Coast Ranges, southern Sierra Nevada foothills (in Kern County), and the Transverse and Peninsular ranges, from Carmel Valley in Monterey County and the Pinnacles National Monument in San Benito County, to northern Baja California. Also on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: broom like evergreen subshrubs with numerous slender, semi woody, and erect or ascending stems that range from about 3 to 12 dm. (1-4') tall. The leaves are produced in whorls of four and are sessile (or nearly so); the blades are narrowly linear to lance-linear, and about .5 to 2 cm. long. The small flowers are produced in the cymose clusters of an often elongated panicle. The four lobed and yellowish corollas are about 1.5 to 2.5 mm. wide. The fruits are two densely bristly nutlets that are about 1 to 2 mm. in diameter. ❀April-June.

Galium aparine Linnaeus. COMMON BEDSTRAW, GOOSE GRASS, CLEAVERS, VELCRO PLANT. These annual herbs are widely scattered and locally common to abundant in generally shady habitats at all elevations in the Tassajara region. ●R: widely distributed in the temperate regions of the northern hemisphere. ●H: annual herbs with weak and trailing stems that range from about 1 to 10 dm. (4-40") long. The stems are equipped with minute, backwardly curved hooks on the four angles, which enable plants to climb on other plants (or to cling to fur or clothing). The leaves are produced in whorls of six to eight at the nodes, and the blades are mostly linear-oblanceolate to oblanceolate, and about 1 to 7 cm. long. The small flowers are produced in axillary cymes of two to five, and the rotate corollas are four lobed, white or greenish white, and about 2 mm. wide. The fruits are two roundish and densely bristly nutlets about 3 to 5 mm. in diameter. ❀March-May.

THE *GALIUM CALIFORNICUM* COMPLEX:

Lauramay Dempster, in her treatment of the *Galium californicum* complex in volume four, part two, of Willis Jepson's *Flora of California* (1979), stated that:

> One the whole, the subspecies of *G. californicum* are not difficult to distinguish. In Monterey County, however, the situation becomes confused, probably owing to the continuing gene interchange among of the several subspecies that meet in this area. This refers particularly to subspecies *californicum* and subspecies *flaccidum*, each somewhat variable, yet sufficiently different in most parts of their ranges to be clearly recognizable. Some individuals in Monterey County are, nevertheless, not distinguishable on morphological grounds alone, and the ultimate criterion must be their chromosome number or, for practical purposes their location. The two subspecies, as defined by chromosome number, appear to be allopatric. On Cone Peak it is not always easy to distinguish tetraploid subspecies *luciense* from some forms of octoploid subspecies *flaccidum*. Similarly, subspecies *maritimum* is not always distinguishable from subspecies *flaccidum*, particularly in the southern portion of the range.
>
> The plants of this region are indeed highly variable, and although many clearly 'key out' to a particular taxon, many do not.

Key to the Galium Californicum Complex:

1a. Plant low, generally cushion-like, and generally not woody above ground:
3a. Leaves linear due to the margins being strongly rolled under. . . . . ***G. clementis***.
3b. Leaves generally ovate (obovate) to elliptic, the margins not or only slightly rolled under:
4a. Flowers and fruits glabrous. Plants woody at the base and congested (cushion like) . . . . . ***G. californicum*** subsp. ***miguelense***.
4b. Flowers and fruits hairy to glabrous. Plants not woody and more open:
5a. Plants low, stems less than 16 cm. long. Leaves generally less than 6 mm. long. . . . . ***G. californicum*** subsp. ***luciense***.
5b. Plants generally not low, stem generally more than 16 cm. long. Leaves generally more than 6 mm. long:
6a. Hairs generally coarse, sparse. . . . . ***G. californicum*** subsp. ***californicum***.
6b. Hairs generally fine, dense. . . . . ***G. californicum*** subsp. ***flaccidum***.
1b. Plant often climbing, and more or less woody above ground:
7a. Plants generally with recurved prickles. Woody stem generally long, slender, climbing or sprawling:
8a. Leaf tip acute to obtuse to rounded, generally short-pointed, generally not sharp to touch, terminal hair generally not persistent:
9a. Leaves widely oblong to ovate. . . . . ***G. porrigens*** var. ***porrigens***.
9b. Leaves more or less linear. . . . . ***G. porrigens*** var. ***tenue***.
8b. Leaf tip generally tapered, generally sharp to touch, terminal hair persistent:
10a. Plants not shiny. Stems wiry. Leaf surfaces hairy. . . . . ***G. californicum*** subsp. ***maritimum***.
10b. Plants shiny. Stems stout. Leaf surfaces more or less glabrous. . . . . ***G. cliftonsmithii***.
7b. Plant prickles generally absent. Woody stem generally short, climbing or not:
11a. Flowers and fruits glabrous. Plants woody at the base and congested (cushion-like) . . . . ***G. californicum*** subsp. ***miguelense***.
11b. Flowers and fruits hairy to glabrous. Plants not woody and generally more open:
12a. Hairs generally coarse, sparse. . . . . ***G. californicum*** subsp. ***californicum***.
12b. Hairs generally fine, dense. . . . . ***G. californicum*** subsp. ***flaccidum***.

v***Galium californicum*** Hooker & Arnott. CALIFORNIA BED-STRAW. This taxon is widely scattered and locally common in the Tassajara region, particularly in shady or semi shady woodland habitats, but mostly at higher to intermediate elevations. ●R: Coast Ranges, from Humboldt and Siskiyou counties to the Santa Lucia Mountains of northwestern San Luis Obispo County. ●H: highly variable evergreen perennial herbs with tufted or trailing (or sometimes climbing) and often semi woody stems that range from about .5 to 3 dm. (2-12") long. The leaves are sessile to very short petiolate and produced in whorls of four; the blades are ovate to narrowly or broadly oblong or elliptical, and range from about 3 to 12 mm. long. Staminate flowers are produced in few flowered terminal and

axillary clusters, while pistillate flowers are usually solitary in the axils of the upper leaves. The four lobed and rotate corollas are pale yellow or greenish, and are about 2 to 4 mm. wide. The fruits are two dark and fleshy berries that are about 1 to 3 mm. wide; they range from softly hairy to glabrous. ❁March-July.

Galium californicum subsp. ***flaccidum*** (E. Greene) Dempster & Stebbins [*G. f.* Greene]. This taxon is widely scattered and locally common at all elevations in the Tassajara region, and it mostly occurs in shady to semi open areas, especially in woodlands. ●R: Coast, Transverse and Peninsular ranges, from Colusa and Marin counties to the mountains of San Diego County. Also on Santa Cruz Island. ●H: like that of the typical species, but with softer and finer hairs on the leaves and stems. The local plants of this subspecies are often not clearly distinguishable from those of the typical subspecies. ❁March-July.

+∧***Galium californicum*** subsp. ***maritimum*** Dempster & Stebbins. COASTAL CALIFORNIA BEDSTRAW. This entry is based on a specimen that was collected by T. S. Ross "Between China Camp and upper reaches of Church Creek along trail to Big Sur" in May of 1992 (Ross 6435; RSA 585577). ●R: outer Coast Ranges, from the vicinity of Malpaso Creek on the northern Big Sur coast to the western Santa Ynez Mountains of Santa Barbara County. ❁March-July.

+∧***Galium californicum*** subsp. ***miguelense*** (E. Greene) Dempster & Stebbins. SAN MIGUEL ISLAND CALIFORNIA BEDSTRAW. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3325; DS 20252). This specimen was originally assigned to typical *Galium californicum*. ●R: mostly on San Miguel and Santa Rosa islands (Santa Barbara County), but herbarium specimens that have been assigned to this taxon have been collected in the vicinities of Pismo Beach and Cambria in San Luis Obispo County, Sunset Point on the Monterey Peninsula, and at "Tassajara Hot Springs." ❁ March-July.

Galium californicum subsp. ***luciense*** Dempster & Stebbins. This taxon occurs on the Ventana Double Cone, on the north Coast Ridge, in Big Sur River watershed, on and in the vicinity of Cone Peak, on the southern Monterey County coast at Villa and Salmon creeks, and in the vicinity of Cambria in San Luis Obispo County. I have included it in the preceding key just in case. Some of the plants of this region, with thickish leaves less than 6 mm. long, approach the description of *G. c.* subsp. *luciense*, but they are scarcely if at all petiolate, an thus may represent intermediates between subsp. *luciense* and subsp. *flaccidum*.

e ***Galium clementis*** Eastwood. SANTA LUCIA BEDSTRAW. This morphologically distinct species occurs in at least three areas in the Tassajara region. The first two were discovered by Vern Yadon in 1979. One site is amongst granitic rock outcrops and boulders along the crest of Black Butte, about .75 to 1 mile south-southeast of Tassajara Road (at the point where the road first reaches the summit if one is coming from the hot springs). The other site is amongst granitic outcrops on the summit of Yadon's "Never Again Ridge," which separates the water sheds of upper Tassajara Creek and Church Creek. A third site was discovered along the Black Cone Trail while the Ventana Wilderness Alliance was clearing the trail in the early 2000s. ●R: this rare species is restricted to the higher elevations of the Santa Lucia Mountains of Monterey County. Besides for the three locations listed above, the only other documented localities where this species exists are on the Ventana Double Cone, Junipero Serra Peak, on and in the vicinity of Cone Peak, on Bear Mountain and on Pinyon Peak. The type specimen was collected by (and named for) Mary Strong Clemens on Junipero Serra Peak in October of 1921, while she was on outing from Tassajara Hot Springs to The Indians. ●H: tufted and densely leafy evergreen perennial herbs with numerous slender and erect stems that range from about 8 to 13 cm. (3-5") long; the stems arise from a system of slender rhizomes. The leaves, which are produced in whorls of four (or rarely six), are narrowly ovate-lanceolate to elliptic-oblong, but appear to be linear due to the strongly revolute margins. The leaves are finely hispid pubescent, and about 2 to 7 mm. long. The small flowers are produced singularly or in small cymes in the axils of the upper leaves, and the four lobed corollas are pale yellow and about 1 mm. wide. The fleshy two lobed fruits are about 1 to 2 mm. wide. ❁June-July.

Galium cliftonsmithii (Dempster) Dempster & Stebbins (*G. nuttallii* var. *c.* Dempster). Included in the Consortium of California Herbaria data base is a specimen that was collected by Vern Yadon that is assigned to *Galium cliftonsmithii*. It was collected along the "Pine Ridge Trail ½ mi. from Pine Ridge Camp—between Bear Basin Trail junction and Pine Ridge Camp" in June of 1979 (PGM 1934). ●R: this is the only Monterey County specimen that has been assigned to this taxon, and all of the remaining specimens are from the coastal regions of San Luis Obispo, Santa Barbara, Ventura and Los Angeles counties. ●H: evergreen perennial herbs or subshrubs with more or less climbing stems that range from about 3 to 18 cm. long. The leaves, which are produced in whorls of four, are ovate to elliptic and about 7 to 15 mm. long. The flowers are produced in small clusters that are terminal and lateral on the branchlets. The small and four lobed corollas are greenish to yellowish. The fruits are two white berries. ❁April-June.

Galium porrigens Dempster [*G. nuttallii* A. Gray subsp. *ovalifolium* (Dempster) Dempster & Stebbins]. CLIMBING BEDSTRAW. This species is widely scattered and locally common at all elevations in the Tassajara region, and it occurs mostly in chaparral or in transitional areas. ●R: Cascade, Coast, Transverse and Peninsular ranges, from Josephine and Jackson counties in southwestern Oregon to northern Baja California. Also in the Sierra Nevada, from Nevada County to El Dorado County. ●H: evergreen subshrubs with slender, semi woody, and climbing or trailing stems that can be up to 20+ dm. (6.5+') long. The typically remote branches are often profusely divided into branchlets. The sessile or nearly sessile leaves are produced in whorls of four, and the blades are broadly oval to oblong, and about 4 to 15 mm. long; the margins are often revolute. The pistillate flowers are produced singularly or in small groups at the ends of the branchlets, while the staminate flowers are produced in axillary cymes. The four lobed corollas are yellowish white and about 1 mm. wide. The two lobed berry like fruits are about 4 to 6 mm. wide; they become wrinkled and nearly black when dry. ❁March-June.

Galium porrigens var. ***tenue*** (Dempster) Dempster [*G. nuttallii* subsp. *tenue* (Dempster) Dempster & Stebbins]. This taxon is widely scattered in the Tassajara region, and it mostly occurs in chaparral. ●R: Coast Ranges, mostly towards the interior, from Trinity and Tehama counties to the Temblor Range in eastern San Luis Obispo County, and the Sierra Nevada foothills, from Shasta County to Kern County. ●H: similar to the typical species, except for the narrowly linear or linear-oblong leaves. ❁March-June.

SALICACEAE. WILLOW OR COTTONWOOD FAMILY.

Salicaceae is a widely distributed family that consists of about 55 genera and approximately 1010 species. Traditionally this family was considered to consist of only two genera, *Populus* and *Salix*; its much broader circumscription is the result of phylogenetic research.

1a. Leaves ovate to deltate or reniform, and about as long as wide to no more than twice as long as wide. Catkin scales divided into narrow segments. Staminate flowers with many stamens and surrounded by a cup like disk. Buds with many scales. . . . . ***Populus***.

1b. Leaves narrowly linear to lanceolate or oblanceolate, and at least three times longer than wide. Catkin scales entire. Staminate flowers with 1 or 2 stamens and not surrounded by a cup like disk. Buds with a single scale. . . . . ***Salix***.

POPULUS. POPLAR, ASPEN AND COTTONWOOD TREES.

Populus consists of perhaps as many as 40 species of trees that are endemic to the temperate and boreal regions of the northern hemisphere. *Populus* is the Latin name for members of this genus.

1a. Leaves broadly to narrowly ovate, longer than wide, and with finely serrate or crenate margins. . . . . ***P. trichocarpa***.
1b. Leaves broadly deltate, about as long as wide, and with coarsely crenate to serrate or irregularly lobed margins. . . . . ***P. fremontii***.

Populus trichocarpa Torrey & A. Gray ex Hooker [*P. balsamifera* Linnaeus subsp. *trichocarpa* (T. & G. ex H.) Brayshaw]. BLACK COTTONWOOD. This species is fairly rare in the watershed of Tassajara Creek. Prior to the Basin Complex Fire of 2008 a few remotely scattered trees existed along Tassajara Creek between the confluences of Oryoki and Church creeks. None of the these trees survived the fire, but in the following two years many young trees were seen along Tassajara Creek in the same area, and a number of young trees also were seen along Tassajara Creek in the vicinity of The Narrows and at points further downstream. This species also occurs in Pine Valley. ●R: widely distributed in western North America, from southern Alaska to western North Dakota, Wyoming, Utah and northern Baja California. ●H: deciduous trees that are up to 30+ m. (98+') tall, with fully mature trees typically being free of branches for more than half their height. The grayish bark is fissured into narrowly elongated plates. The alternate leaves have petioles that are about 1 to 3.5 cm. long, and the blades, which are about 3 to 7 cm. long, are broadly to narrowly ovate, rounded to cordate at the base and acute to acuminate at the apex; the margins are finely serrate or crenate. The catkins, which are either staminate or pistillate, are about 4 to 8 cm. long. The fruit is a subglobose capsule that is about 4 mm. wide. ❀February-April.

Populus fremontii S. Watson. FREMONT COTTONWOOD. This species is scattered along perennial streams and occasionally at springs or seeps at lower to intermediate elevations of the Tassajara region, but it is generally uncommon. Small groves also occur along some of the intermittent streams, but such trees tend to be small. ●R: widespread in riparian habitats in California Floristic Province, from Humboldt and Siskiyou counties to northern Baja California, and eastward to Colorado, New Mexico and western Texas, and southward into northern Mexico. ●H: deciduous trees that range from about 12 to 30 m. (40-98') tall when fully mature. The bark is roughly cracked into more or less squarish or rectangular checks, the outer surfaces of which have a whitish cast. The alternate leaves have petioles that are about 2 to 6 cm. long, and the blades, which are about 3 to 7 cm. long, are broadly deltate, and sub cordate to truncate at the base and abruptly acute at the apex; the margins are crenate to serrate, and they are often irregularly lobed. The catkins, which are either staminate or pistillate, are about 4 to 5 cm. long. The fruit is an ovate to roundish capsule that is about 8 to 12 mm. long. ❀March-April.

SALIX. WILLOW.

Salix is a widely distributed but primarily northern temperate and boreal genus that is comprised of approximately 450 species. *Salix* is the Latin name for willow trees.

1a. Bark smooth. Leaves mostly oblanceolate and obtuse or broadly acute at the apex. . . . . ***S. lasiolepis***.
1b. Bark rough. Leaves lanceolate to narrowly linear (or sometimes narrowly oblanceolate), and narrowly acute at the apex:
2a. Leaves lanceolate to oblong-lanceolate, about 1.5 to 3 cm. wide, and with finely serrate margins. . . . . ***S. laevigata***.
2b. Leaves narrowly linear to narrowly elliptic or oblanceolate, usually less than 1 cm. wide, and with remotely toothed or entire margins:
3a. Leaves narrowly linear and more than 10 times longer than wide. Stigma lobes about 1 mm. long, the style about .5 mm. long. . . ***S. exigua***.
3b. Leaves linear to narrowly elliptic or narrowly oblanceolate, and less than 10 times longer than wide. Stigma lobes less than 1 mm. long, the stigma sessile. . . . . ***S. melanopsis***.

Salix exigua Nuttall [*S. hindsiana* Bentham, *S. sessilifolia* Nuttall var. *hindsiana* Andersson]. SANDBAR WILLOW, NARROW LEAF WILLOW. This species is widely scattered and locally common along perennial streams in the Tassajara region, and it sometimes occurs on dry floodplains. ●R: widespread in temperate western North America, from British Columbia and Saskatchewan to northern Mexico. ●H: large deciduous shrubs or sometimes small trees that range from about 3 to 7 m. (10-23') tall. The bark is gray and furrowed. The alternate leaves are short petiolate, and the blades, which are about 4 to 8 cm. long, are linear to lance-linear; they have tapering bases and acute apices. The margins are entire or remotely toothed. The inflorescences are staminate or pistillate catkins that are about 2 to 7 cm. long. The fruits are many seeded capsules that are about 5 to 6 mm. long. ❀March-May.

Salix laevigata Bebb. RED WILLOW, POLISHED WILLOW. This distinctive species is widespread and locally common to abundant along perennial streams in the Tassajara region. Although this is the only willow species in this region that attains truly tree sized proportions, fully mature plants are generally uncommon, and occur mostly at sites that are protected from the swift torrents that follow major storms (the torrents sweep away a high percentage of young trees). ●R: southern Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Jackson and Klamath counties in southwestern Oregon to northern Baja California, and eastward to southern Utah and northwestern New Mexico, and southward to northern Central America. ●H: deciduous trees that range from about 5 to 15 m. (16-50') tall. The bark is dark and roughly textured. The alternate leaves are short petiolate, and the blades, which are about 5 to 15 cm. long, are lanceolate to oblong-lanceolate, green above and pale below, and the margins are finely serrate. The catkins, which are either staminate or pistillate, are about 3 to 11 cm. long. The fruits are ovoid capsules that are about 3.5 to 5 mm. long. ❀April-May.

Salix lasiolepis Bentham. ARROYO WILLOW, WHITE WILLOW. This species is widely scattered and locally common along perennial or mostly perennial streams in the Tassajara region, and it is particularly common along smaller streams. ●R: western North America, from Washington and Idaho to Baja California, northern Mexico and western Texas. ●H: large deciduous shrubs or sometimes small trees that are usually less than 6 m. (20') tall. The barks is smooth and light colored. The alternate leaves are short petiolate, and the blades, which are about 3 to 12 cm. long, are oblanceolate to lanceolate-elliptic; they are obtuse to acute at the apex and narrowed at the base. The margins are entire or irregularly serrate. The catkins, which are about 1.5 to 7 cm. long, are either staminate or pistillate. The capsules are about 4 to 5 cm. long. ❀March-April.

Salix melanopsis Nuttall [*S. m.* var. *bolanderiana* (Rowlee) Schneider]. DUSKY WILLOW. This species is scattered along Tassajara Creek and perhaps along other perennial streams in the Tassajara region. I was first made aware of the presence of this taxon in this region by Diane Renshaw and Flip Dibner. ●R: temperate western North America, from British Columbia and Alberta to California, Utah and

Colorado. In California the range of this species extends southward through the Coast Ranges to the Santa Lucia Mountains of northwestern San Luis Obispo County, and to Kern County in the Sierra Nevada. Disjunct populations occur in the Mount Pinos region of Ventura County, and in the San Gabriel and San Bernardino Mountains of Los Angeles and San Bernardino counties. ●H: large deciduous shrubs or small trees that range from about 3 to 5 m. (10 to 17') tall. The shortly petiolate leaves are alternate, and the blades, which are about 3 to 8 cm. long, are narrowly oblanceolate to elliptic, acute at both ends, and the margins are remotely toothed. The flowers are produced in staminate or pistillate catkins that are about 2 to 5 cm. long. The fruits are many seeded capsules that are about 4 to 5 mm. long. ❁March-May.

SAPINDACEAE. SOAPBERRY FAMILY.

Due to the findings of phylogenetic research, the circumscription of *Sapindaceae* has been expanded, and it now includes the genera that were formerly placed in *Aceraceae* (the Maple Family) and *Hippocastanaceae* (the Buckeye Family). According to the Angiosperm Phylogeny website, *Sapindaceae* now consists of about 140 genera and approximately 1,630 species. *Sapindaceae* is represented on all major landmasses except for Antarctica, Greenland and Iceland.

1a. Leaves deeply lobed, but not divided into leaflets. The fruits are 2 weakly united samaras (winged nutlets). . . . . ***Acer***.
1b. Leaves divided into 5 to 7 leaflets. The fruits are large pear shaped capsules containing one very large roundish seed. . . . . ***Aesculus***.

ACER. MAPLE AND BOX ELDERS.

The genus *Acer* consists of approximately 126 species of trees and shrubs that are endemic to the temperate and boreal regions of the northern hemisphere. The generic name is the Latin word for maple trees.

Acer macrophyllum Pursh [*A. hemionitis* Greene]. BIG LEAF MAPLE. This is one of the common tree species in the Tassajara region, as well as one of the most easily recognizable. At lower to intermediate elevations it occurs in both woodlands and riparian woodlands, but at higher elevations it tends to have a more restricted distribution, where in occurs on densely forested north facing slopes or along streams and in gulches. A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901 (Elmer 3179; DS 32772), served as the type specimen Edward Greene's *A. hemionitis*. ●R: Pacific Slope of temperate western North America, from southeastern Alaska to southern California. In California this species is abundant in the North Coast Ranges, and in the South Coast Ranges major populations occur in the Santa Cruz Mountains and in the Santa Lucia Mountains of Monterey County. Acer macrophyllum is common in the northern Sierra Nevada, but it becomes increasing uncommon south of Nevada County, and it is rare south of Mariposa County (it appears that there are no documented locations south of Tulare County). In the South Coast Ranges and in the Transverse and Peninsular ranges, this species becomes increasingly uncommon south of Monterey County, and its occurrence also becomes more restricted to riparian habitats. The most southern documented location is in the Laguna Mountains of San Diego County. This species also occurs on Santa Cruz and Santa Catalina islands. ●H: broadleaf deciduous trees that mostly range from about 10 to 30 m. (30-95') tall; plants growing in unfavorable habitats may be shrub like. The bark is generally dark gray and roughly textured. The opposite leaves have petioles that are about 5 to 12 cm. long; the blades are generally roundish in outline, about 1 to 4 dm. (4-16") in diameter, and deeply divided into five (or sometimes three) major lobes that are lobed or toothed at the ends of the major veins. As implied by both the common and botanical names, the leaves of this species are the largest of all maples. The flowers are produced in relatively broad and pendant catkins that contain more than 30 staminate and perfect flowers. The catkins appear just before the new leaves. The corollas consist of five yellowish green petals that are about 3 mm. long. The petals are about the same size and shape as the sepals. The fruits are two weakly united samaras that have wings that are about 2 to 4 cm. long. The samaras fall with the leaves in autumn. ❁March-April.

AESCULUS. BUCKEYE.

The genus *Aesculus* consists of about 15 species of trees and shrubs that occur in the temperate and subtropical regions of the northern hemisphere. *Aesculus* is a Latin name for some kind of oak.

Aesculus californica (Spach) Nuttall in Torrey & A. Gray [*Calothyrsus c.* Spach]. CALIFORNIA BUCKEYE. This distinctive species is common in woodlands along the lower Arroyo Seco, and in a narrow strip of woodlands above Tassajara Creek and below the Marble Peak Trail, from the Arroyo Seco to near the junction of the Marble Peak and Horse Pasture trails. In recent years a tree was planted along the path to the lower barn, it is on the creek side of the path near the gate to the swimming pool. ●R: Coast Ranges, from Humboldt and Trinity counties to western Santa Barbara County, and in the Sierra Nevada foothills, the Tehachapi Mountains and the central Transverse Ranges, from Shasta County to northwestern Los Angeles County. ●H: deciduous trees or large shrubs with rounded crowns that range from about 3 to 10 m. (10-32') tall. The bark is relatively smooth and light gray. The opposite leaves have petioles that are about 1 to 12 cm. long, and the blades are palmately divided into five to seven oblong-lanceolate leaflets about 5 to 15 cm. long, the margins of which are finely serrate. This species is unusual in that it sheds its leaves during the dry season. The flowers are numerous in conical to oblong panicles that are about 1 to 2 dm. long. The corollas consist of four or five petals that are about 12 to 18 mm. long; the petals are white or sometimes pinkish. The fruits are large pear shaped capsules that are about 5 to 8 cm. wide; they contain one large and roundish seed that is about 2 to 5 cm. wide. ❁May-June.

SAXIFRAGACEAE. SAXIFRAGE FAMILY.

As currently circumscribed, *Saxifragaceae* consists of about 38 genera and approximately 600 species. This family is particularly well represented northern temperate, alpine and arctic regions.

1a. Plants generally of shady or partly shady woodland habitats, and dying back to the root during the dry season. Fertile (pollen producing) stamens 10 per flower:
  2a. Leaves primarily but not strictly basal. Petals mostly three lobed and 5 to 15 mm. long. Styles 3. . . . . ***Lithophragma***.
  2b. Leaves strictly basal. Petals entire and 2.5 to 4.5 mm. long. Styles 2. . . . . ***Micranthes***.

1b. Plants of wet habitats and remaining green throughout the dry season. Fertile stamens 5 per flower:
3a. Leaves basal and cauline, the blades generally round to reniform in outline. Ovaries 2 celled. . . . . ***Boykinia***.
3b. Leaves strictly basal, the blades generally ovate in outline. Ovaries 1 celled. . . . . ***Heuchera***.

BOYKINIA.

Boykinia consists of eight species of North America and eastern Asia. The genus was named for the naturalist Dr. S. Boykin (1786-1848).

Boykinia occidentalis Torrey & A. Gray [*B. elata* (Nuttall) E. Greene]. BROOK FOAM. These perennial herbs are widely scattered along perennial streams at lower and intermediate elevations in the Tassajara region, particularly in areas where streams have cut deep into the bedrock. ●R: Pacific Slope of temperate North America, from British Columbia to Calaveras County in the Sierra Nevada, and through the Coast Ranges and western Transverse Ranges, to the Santa Monica Mountains of western Los Angeles County. ●H: perennial herbs with one to several erect or ascending stems that range from about 2 to 6 dm. (8-24") tall. The leaves are basal and cauline, and the later are alternate. The larger basal leaves have petioles that are about 5 to 30 cm. long, and the blades are reniform to ovate-cordate in outline, about 2 to 8 cm. wide, and divided into five to seven primary lobes which are further lobed and/or toothed. The cauline leaves are similar, but are reduced in size and are on shorter petioles, while the upper most leaves are sessile and bract like. The flowers are produced mainly on the upward side of the branches of an open panicle, and the corollas consist of five white and generally obovate petals that are about 3 to 4 mm. long. The fruit is a two celled and many seeded capsule about 3 to 5 mm. long. ❁June-August.

HEUCHERA. ALUM ROOT.

The genus *Heuchera* consists of about 50 species of temperate North America. The genus was named for J. H. von Heucher (1677-1747), a German professor of botanical medicine.

Heuchera micrantha Douglas ex Lindley [*H. m.* var. *pacifica* Rosendahl, Butters & Lakela]. This species is scattered along perennial streams at lower and intermediate elevations in the Tassajara region, and it is locally common at major rock outcrops where streams have cut deep into the bedrock. ●R: from British Columbia and Idaho to Tulare County in the Sierra Nevada, and to western Santa Barbara County in the Coast Ranges. ●H: perennial herbs with several erect or ascending stems that range from about 3 to 7 dm. (12-28") tall. The leaves are strictly basal; the petioles are about 3 to 20+ cm. long, the blades, which are about 2 to 8 cm. long, are generally ovate-cordate in outline, and have five to seven deep to shallow and crenately toothed lobes. The small flowers are produced on the very slender branches of an open panicle that is about 1 to 6 dm. long, and the corollas consist of five white and narrowly oblanceolate petals about 3 to 5 mm. long. The fruit is an ovoid capsule about 4 to 5 mm. long. ❁May-July.

LITHOPHRAGMA. WOODLAND STAR.

Lithophragma consists 10 taxa (nine species and one lesser taxon) of temperate western North America. All of the taxa occur in California, and seven are endemic to the California Floristic Province. The name is derived from the Greek words *lithos*, stone, and *phragma*, hedge or fence.

1a. Base of calyx abruptly constricting to the pedicel. Pedicels less than 2 mm. long. . . . . ***L. heterophyllum***.
1b. Base of calyx tapering to the pedicel. Pedicels 2 to 8 mm. long. . . . . ***L. affine***.

Lithophragma affine A. Gray. WOODLAND STAR. These white flowered herbs are widely scattered at all elevations in the Tassajara region, and they are locally common in partly shady and usually grassy woodland habitats. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Josephine and Jackson counties in southwestern Oregon to northern Baja California. Also on Santa Catalina Island. ●H: delicate perennial herbs with erect stems that range from about 2 to 6 dm. (8-24") tall. The basal and lower cauline leaves are long petiolate. The basal leaves, which are produced in loose rosettes, have orbicular to reniform blades that are about 1 to 4 cm. wide, and generally have with three to five shallow lobes that are variously sub lobed or toothed. The one to three cauline leaves are alternate, reduced, and have blades that are generally ovate in outline and deeply cleft into three primary lobes. The flowers are produced in terminal racemes that are about 5 to 15 cm. long, and the corollas consist of five white and distally three lobed petals about 5 to 13 mm. long. The fruit is a many seeded capsule about 3 to 4 mm. long. ❁March-May.

Lithophragma heterophyllum (Hooker & Arnott) Torrey & Gray [*Tellima h.* H. & A.]. HILL STAR. This species is widely scattered in shady woodland habitats at all elevations in the Tassajara region, and it is fairly common in some areas. It is often found in the same locations as the preceding species. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Yamhill County in northwestern Oregon to northern Baja California. ●H: delicate perennial herbs with slender stems that range from about 2 to 5 dm. (8-20") tall. The basal leaves, which are produced in loose rosettes on petioles up to 8 cm. long, have generally orbicular blades that are about 1.5 to 4 cm. wide; the margins are shallowly lobed. The cauline leaves are alternate, reduced, and have blades that are often deeply parted into three to five lobes. The flowers are produced in terminal racemes that are about 1 to 4 dm. long, and the corollas consist of five white petals that are about 5 to 12 mm. long. The petals are usually three lobed or toothed towards the apex, but are sometimes simple or have five or seven lobes or teeth. The fruit is a many seeded capsule about 3 to 4 mm. long ❁March-May.

MICRANTHES. SMALL FLOWERED SAXIFRAGE.

According to the Jepson eFlora (as of 12/30/2014), the genus *Micranthes* includes about 80 species, but according to the Flora of North America website, it includes 68 to 93 species. In any case, this genus is represented in Eurasia, North America and the mountains of South America, and most of the species are endemic to the cooler regions of the northern hemisphere. The name is derived from the Greek words *mikros*, small, and *anthos*, flower, in contrast to the larger flowers of the closely related genus *Saxifraga*, in which the species of this genus were formerly placed.

Micranthes californica (E. Greene) Small [*Saxifraga c.* Greene; *S. virginiensis* Michaux var. *c.* Jepson]. CALIFORNIA SAXIFRAGE. This white flowered species is widely scattered and locally common in shady woodland habitats at lower to intermediate elevations in the Tassajara region. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Douglas County in southwestern

Oregon to northwestern Baja California. Also on Santa Cruz and Santa Catalina islands. ●H: small perennial herbs from a caudex that produces rhizomes and bulbs; the stems are erect and range from about 1 to 3.5 dm. (4-14") tall. The leaves are strictly basal and produced in rosettes; the petioles are about .5 to 3 cm. long, and the blades are ovate to oblong-elliptic with serrate to denticulate margins, and about 1 to 5 cm. long. The flowers are produced in open and loosely branched panicles, and the corollas consist of five white and obovate to broadly elliptic petals that are about 3.5 to 5 mm. long. The fruit is a purplish tinged follicle like capsule that is about 2.5 to 3.5 mm. long. ❀March-June.

SCROPHULARIACEAE. FIGWORT FAMILY.

Up until the early 1990s, *Scrophulariaceae* was considered to be comprised of about 200 genera and approximately 3,000 species, but due to the findings of phylogenetic research, it has been greatly dismembered. Its present circumscription consists of 65 species and about 1800 species that, as a whole, are widely distributed; the species range from annual herbs to trees.

SCROPHULARIA. FIGWORT.

The genus *Scrophularia* consists of about 150 to 200 species that primarily occur in the temperate regions of Eurasia. The name is based on the disease scrofula, for which the type species, *Scrophularia nodosa*, was used as a treatment.

Scrophularia californica Chamisso & Schlechtendal. CALIFORNIA FIGWORT, BEE PLANT. This red flowered species is widely scattered and locally common along streams and in other generally moist habitats at lower to intermediate elevations of the Tassajara region, especially in sunny areas that are along smaller streams. Nectar bearing disks at the inner base of the corollas make this species highly attractive to bees. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Del Norte and Siskiyou counties to northern Baja California, and on Santa Rosa and Santa Catalina islands. ●H: fairly robust perennial herbs with erect or ascending stems that range from about 10 to 18 dm. (3.3-6') tall. The opposite leaves have petioles that are about 1 to 7 cm. long, and the blades, which are about 3 to 10+ cm. long, are narrowly to broadly ovate. They usually have truncate to sub cordate bases, and the margins are coarsely and often doubly serrate. The flowers are produced on the cymose branches of an open and terminal panicle, and bilabiate corollas, which are about 8 to 12 mm. long, are dull red to maroon. The throat is conspicuously enlarged, the upper lip is two lobed, and the reduced lower lip is three lobed. The fruit is a conically shaped capsule that is about 6 to 8 mm. long. ❀April-July.

Another member of this family, *Verbascum thapsus* (Woolly Mullein), has for many years been weedy in and about the gardens at Tassajara. This is a robust and densely woolly perennial herb with erect stems that terminating with long and densely floriferous spike like racemes. The flowers differ from most members of the family in having nearly symmetrical rotate corollas and five fertile stamens.

SOLANACEAE. NIGHTSHADE FAMILY.

According to the Angiosperm Phylogeny website, *Solanaceae* consists of 102 genera and about 2460 species, and although the family is widely distributed, the overwhelming majority of the species are endemic to the tropical and subtropical regions of the Americas. The species range from annual herbs to shrubs. This family includes many common vegetables, such as potatoes, tomatoes and eggplants (*Solanum*), tomatillos (*Physalis*), and the various peppers of the genus *Capsicum* (bell pepper, jalapeno, cayenne, etc.). Other well known plants include *Datura*, *Mandragora* (mandrake), *Petunia*, *Atropa* (belladonna), and *Nicotiana* (tobacco). Many of the species are poisonous, including the foliage of some of the common vegetables, while others have narcotic properties, such as *Nicotiana*, *Datura*, and *Atropa*.

SOLANUM. NIGHTSHADE.

This is a large and widely distributed genus consisting of about 1,500 species. *Solanum* is particularly well represented in the tropical regions of the Americas. The name is based on the Latin word *solomen*, quieting, on account of the narcotic properties of some species, probably *S. nigrum*.

1a. Leaves green and about 2 to 15 cm. long. Corollas white, 3 to 6 mm. wide, and deeply lobed. . . . . ***S. americanum***.
1b. Leaves gray green and about 1 to 4 cm. long. Corollas pale violet, 15 to 25 mm. wide, and disk like. . . . . ***S. umbelliferum***.

Solanum americanum Miller [*S. nodiflorum* Jacquin]. AMERICAN NIGHTSHADE. This species is widely scattered at lower to intermediate elevations in the Tassajara region, primarily in moist and/or semi shady habitats, but it is generally uncommon, except for along Willow Creek. This taxon is often mistaken for the very similar *S. nigrum*, the weedy Black Nightshade. ●R: widely distributed in temperate and subtropical North America, from British Columbia to Colorado, Kansas, Missouri, Georgia and Florida to Mexico and northern Baja California. ●H: annual or perennial herbs, sometimes shrub like, with fairly lanky stems that range from about 3 to 8 dm. (12-32") long. The alternate leaves have petioles that are about .5 to 5 cm. long, and the blades are generally ovate with entire or wavy toothed margins, and about 2 to 15 cm. long. The flowers are produced in lateral and terminal umbels. The white corollas, which are deeply five lobed, are about 3 to 6 mm. wide. The fruits are greenish to black berries that are about 5-8 mm. wide. ❀April-November.

Solanum umbelliferum Eschscholtz. BLUE WITCH. This species is widespread and locally common at all elevations in the Tassajara region, primarily in openings in chaparral or other transitional areas. ●R: Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California. Also in the northern Sierra Nevada (in Butte and Plumas counties) and on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: evergreen perennial herbs or subshrubs typically with rounded or spreading crowns that range from about 6 to 10 dm. (24-40") tall. The alternate leaves have petioles that are about 4 to 10 mm. long, and the gray green blades, which are about 1 to 4.5 cm. long, are elliptic-ovate; the margins are entire, but sometimes they have two opposing lobes near the base. The aromatic flowers are produced in umbel like clusters that are terminal and lateral on the upper stems. The discoid corollas, which are mostly pale violet and about 15 to 25 mm. wide, have crepe like margins. Elevated in the center of the disk is a five pointed star like area, the points of which extend beyond the margins and thus produce small lobes. Five pairs of white margined green spots are positioned at the base of the bright yellow and nearly united anthers. The fruits are roundish berries that are about 10 to 14 mm. in diameter. ❀May-July (-October).

URTICACEAE. NETTLE FAMILY.

According to the Angiosperm Phylogeny website, *Urticaceae* is a widely distributed but primarily tropical family that consists of about 54 genera and approximately 2625 species.

URTICA. NETTLE.

The genus *Urtica* consists of about 45 species that primarily occur in temperate regions. Most of the species (including the two listed below) are armed with needle like hairs that contain a stinging fluid, the tips of which break off on contact. The name is derived from the Latin word *urere*, to burn, on account of the stinging hairs.

1a. Perennial herbs usually much more than 6 dm. tall. Leaves broadly lanceolate. Flowers produced in elongated and generally dangling raceme or panicle like formations. . . . . ***U. dioica***.
1b. Annual herbs less than 6 dm. tall. Leaves roundish to ovate. Flowers produced in generally roundish clusters. . . . . ***U. urens***.

Urtica dioica Linnaeus subsp. ***holoserica*** (Nuttall) Thorne [*U. holoserica* Nuttall, *U. gracilis* var. *h.* Jepson]. HOARY NETTLE. This species is scattered along perennial streams at all elevations in the Tassajara region, and it is sometimes found at springs or seeps. ●R: western North America, from Washington and Montana to northern Mexico. ●H: rhizomatic perennial herbs with erect (and often upwardly dangling) stems that range from about 1 to 2+ m. (40-80+") tall. The opposite leaves have petioles that are about 1 to 4.5 cm. long, and the blades are narrowly ovate to lanceolate with coarsely serrate margins, and about 2 to 12 cm. long. The flowers are very small and are produced in elongated and generally dangling raceme or panicle like formations that are produced in the axils of the leaves. The staminate racemes are longer and more loosely flowered. The fruits is an ovate achene about 1.5 mm. long. ❁June-September.

Urtica urens Linnaeus. DWARF NETTLE, DOG NETTLE. This species is weedy in and around the developed area of Tassajara Hot Springs, and occasionally elsewhere, such as along Tassajara Creek downstream from the hot springs, and on Chew's Ridge. ●R: a common weed in North America; native to Eurasia. ●H: annual herbs with erect stems that range from about 1 to 5 dm. (4-20") tall. The leaves are opposite and have petioles that are about 3 to 20 mm. long; the blades are roundish to ovate with deeply serrate margins, and about 1 to 4 cm. long. The small flowers are produced in opposite and generally roundish axillary clusters. The fruit is a flattened achene about 2 mm. long. ❁January-April.

VALERIANACEAE. VALERIAN FAMILY.

According to the Angiosperm Phylogeny Website, *Valerianaceae* has been transferred to *Caprifoliaceae*, where it represents the *Valerianoideae*, the Valerian Subfamily, which consists of 17 genera and about 315 species. At present (4/15/2015), *Valerianaceae* is still accepted on the Jepson eFlora website, and thus, at least for the time being, I have not transferred the following genus to *Caprifoliaceae*.

PLECTRITIS. SPUR FLOWER.

Plectritis consists of five species of annual herbs of western North America and Chile. Three species occur in California, but none are endemic to the California Floristic Province. The name is derived from the Greek word *plectron*, which means spur, on account of the corolla spurs that are present in most species.

1a. Corolla spurs, if present, less than 1/3 as long as the tubes. Lengthwise spine of the convex side of achenes not grooved, and the wings, if developed, are thin, inwardly curling at the base, and spreading above. . . . . ***P. congesta***.
1b. Corolla spurs about 1/3 as long to longer than the tubes. Lengthwise spine of the convex side of the achene with a dark grove, at least in the lower half, and the wings have thickened margins:
2a. Corollas strongly bilabiate, pale to dark pink, usually with 2 red spots at the base of the lower lip, and with slender spurs that are often longer than the tubes. Convex side of fruits with a distinct row of coarse hairs on each side of the spine. . . . . ***P. ciliosa***.
2b. Corollas weakly bilabiate, white to pale pink, usually without red spots, and with broad spurs that are about 1/3 to 1/2 as long as the tubes. Convex side of achenes without distinct rows of hairs. . . . . ***P. macrocera***.

!***Plectritis ciliosa*** (E. Greene) Jepson [*Valerianella c.* Greene; *Plectritis c.* subsp. *insignis* (Sukdorf) Morey; *P. macroptera* (Suksdorf) Rydberg]. LONG SPURRED SPUR FLOWER. These fairly inconspicuous wildflowers are widely scattered on open or semi open and usually grassy slopes at lower to intermediate elevations in the Tassajara region, and are locally common in small colonies. They were even more common during the first spring after the Basin Complex Fire of 2008. ●R: from Klickitat County in south central Washington to northern Baja California. Also on Santa Cruz Island and in the mountains of Arizona. ●H: annual herbs with erect and usually simple stems that range from about 1 to 5.5 dm. (4-22") tall. The leaves are opposite and have entire or sometimes toothed margins. The lower most leaves are petiolate and generally have spatulate to obovate blades, while the upper are sessile and have narrowly to broadly oblong (or narrowly obovate) blades. The flowers are produced in dense terminal clusters, and the strongly bilabiate corollas, which can be as little as 1.5 mm. long to as much 8.5 mm. long, range from light to dark pink. The corollas usually have two red spots on the lower lobe. The fruits are winged achenes that are about 2 to 4 mm. long. ❁March-May.

Plectritis congesta (Lindley) deCandolle [*Valerianella c.* Lindley] subsp. ***brachystemon*** (Fischer & C. Meyer) Morey [*P. brachystemon* F. & M.]. PINK SPUR FLOWER. This species is scattered in open woodlands along the Church Creek Fault from the upper Church Creek region to Pine Valley. It also occurs in Miller Canyon and in Anastasia Canyon. During the first spring after the Basin Complex Fire of 2008, this species was also lightly scattered on the floodplains of Tassajara Creek upstream from the hot springs. ●R: widespread on the Pacific Slope of western North America, from British Columbia to the mountains of San Diego County. ●H: annual herbs with erect and usually simple stems that range from about 1.5 to 6 dm. (6-24") tall. The leaves are opposite and have entire or sometimes toothed margins; the lower most are petiolate with generally spatulate to obovate blades, while the upper are sessile and have narrowly to broadly oblong or narrowly obovate blades. The flowers are produced in dense terminal clusters, and the bilabiate corollas are five lobed, about 1.5 to 3.5 mm. long, and range from dark pink to nearly white. The fruits are winged or wingless achenes that are about 2 to 4 mm. long. ❁March- June.

!***Plectritis macrocera*** Torrey & A. Gray [*P. eichleriana* (Suksdorf) Heller]. WHITE SPUR FLOWER. These small flowered annuals are widely scattered and locally common on grassy and semi shady woodland slopes at lower to intermediate elevations in the Tassajara region, and they were even more common during the first spring

after the Basin Complex Fire of 2008. ●R: widespread in western North America, from British Columbia, Montana and Utah to the mountains of San Diego County. ●H: annual herbs with erect and usually simple stems that range from about 1 to 6.5 dm. (4-26") tall. The opposite leaves have entire or sometimes toothed margins; the lower most leaves are petiolate and generally have spatulate to obovate blades, while the upper are sessile and have narrowly to broadly oblong or narrowly obovate blades. The flowers are produced in terminal clusters that are sometimes broken into closely spaced whorls, and the slightly bilabiate corollas, which are about 2 to 3.5 mm. long, range from white to pale pink. The fruit is a winged achene about 2 to 4 mm. long. ❀April-May.

VERBENACEAE. VERVAIN FAMILY.

According to the Angiosperm Phylogeny website, *Verbenaceae* consists of about 31 genera and approximately 918 species. The species range from annual herbs to trees, and they primarily occur in tropical and warmer temperate regions. This family is especially well represented in South America.

VERBENA. VERVAIN.

Verbena consists of about 200 species that occur in the temperate and tropical regions of the Americas and in the Mediterranean region. *Verbena* is the Latin name for vervain.

Verbena lasiostachys Link [*V. prostrata* Brown]. CALIFORNIA VERVAIN. This distinctive species is widely scattered at all elevations in the Tassajara region, primarily in open areas that are transitional between major habitat types, but it is never abundant at any locality. ●R: southern Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Douglas and Klamath counties in southwestern Oregon to northern Baja California. Also on the islands off the coast of southern California. ●H: perennial herbs generally with procumbent to ascending stems that range from about 3 to 8 dm. (12-32") long. The opposite leaves have petioles that are about 2 to 20 mm. long, and the blades, which are about 2 to 6 cm. long, are broadly ovate to broadly elliptic. The blades are broadly to narrowly cuneate at the base, and the margins are coarsely serrate and often deeply lobed. The flowers are produced on narrow terminal and lateral spikes that are about 5 to 20 cm. long. The five lobed salverform corollas have bilabiate limbs; they are generally lavender and about 2.5 to 5 mm. long. The fruits consist of four nutlets that are about 1 to 2 mm. long. ❀May-August.

VIOLACEAE. VIOLET FAMILY.

Violaceae consists of 34 genera and about 985 species of annual and perennial herbs, shrubs and trees. The family is widely distributed, but the species primarily occur in temperate regions and in tropical mountains.

VIOLA. VIOLET, PANSY.

Viola is a widely distributed (but primarily temperate) genus of about 525 species, which includes the various pansies and violets of ornamental horticulture. The name is the Latin word for plants belonging to this genus.

1a. Petals mostly white adaxially (on the front side). The lateral petals have dark purple spots or markings near the base, which are above a small yellow area. Leaf bases generally cordate to truncate. . . . . ***V. ocellata***.

1b. Petals mostly yellow or orangish yellow adaxially:

2a. Leaves all cauline. Petals golden yellow adaxially, the lowest 10 to 20 mm long. Cleistogamous flowers absent. . . ***V. pedunculata***.

2b. Leaves basal and cauline. Petals deep to medium yellow adaxially, the lowest 6 to 16 mm long. Cleistogamous flowers often present:

3a. Basal leaf blade bases strongly to weakly truncate (or sometimes cordate):

4a. Basal leaves generally gray-green, or occasionally purple-tinted abaxially (on the underside).

5a. Basal leaf blades with 3 to 5 (-6) prominent lobes per side. . . . . ***V. purpurea*** subsp. ***mohavensis***.

5b. Basal leaf blades without prominent lobes. . . . . ***V. purpurea*** subsp. ***quercetorum***.

4b. Basal leaves generally purple-tinted, occasionally gray-green abaxially. Cauline leaves with 3 to 4 (-5) prominent lobes per side. ***V. purpurea*** subsp. ***mohavensis***.

3b. Basal leaf blade bases strongly to slightly tapered:

7a. Basal leaves generally gray-green, occasionally purple-tinted abaxially. . . . . ***V. purpurea*** subsp. ***mohavensis***.

7b. Basal leaves generally purple-tinted abaxially:

8a. Basal leaves with 4–5(6) prominent lobes per side, not shiny adaxially (on the upper side). . . ***V. purpurea*** subsp***. mohavensis***.

8b. Basal leaves without prominent lobes, occasionally shiny adaxially. . . . . ***V. purpurea*** subsp. ***purpurea***.

+∨***Viola ocellata*** Torrey & Gray. TWO-EYED VIOLET, WESTERN HEART'S EASE. A specimen of this species was collected on Pine Ridge by Heather Gates in June of 1998, which she showed me on the day that I personally delivered copies of the just completed first edition of this text to Tassajara (on July 4th, 1998). The Pine Ridge population is one of the most southern; elsewhere in this part of the Santa Lucia mountains specimens have been collected at the campgrounds in Big Sur (Baker; UC 1763469), along the Pine Ridge Trail between Big Sur and Ventana Camp (Howitt 947; PGM 7083), and in the vicinity Botchers Gap (Howitt; PGM 7084, & Selzer; PGM 0550). ●R: Cascade and Coast ranges, from Lane County in western Oregon to the Santa Lucia Mountains of Monterey County. ●H: perennial herbs from a generally erect rhizome; the stems are erect to trailing and about 5 to 37 cm. long. The basal leaves have petioles that are up 15 cm. long; the blades are strongly cordate (or sometimes truncate at the base) and about 1 to 6 cm. long. The cauline leaves are smaller and less cordate. The flowers are produced in the axils of the leaves on peduncles about 1 to 10 cm. long, and the corollas consist of five asymmetrical petals about 8 to 15 mm. long. The forward side of the petals are primarily white and the back sides, or at least the back side of the upper petals, are dark reddish-violet. The forward side of the petals are yellow at the base, and the two lateral petals have dark purple spots or markings (eyes) just above the yellow area; the lower petal has reddish-purple veins near the base. The fruit is a round-ovoid capsule about 5 to 8 mm. long. ❀March-July.

Viola pedunculata Torrey & Gray [*V. p.* subsp. *tenuifolia* Baker & Clausen]. JOHNNY JUMP UP, CALIFORNIA GOLDEN VIOLET. The only area in this region where this species is known to occur is in partly shady meadows along the Marble Peak Trail, between Tassajara Camp and the Horse Bridge, where it is rather common. The plants of this region, with leaf blades mostly less than 2 cm. long, rather small petals that are generally yellow, and styles about 2 mm. long, correspond to what was recognized by Baker & Clausen as subsp. *tenuifolia*. Showier flowered plants representing the typical species are common along sections of Carmel Valley Road. ●R: Coast, Transverse and Peninsular Ranges, from Lake County to northern Baja California, and the Sierra Nevada foothills in Fresno and Tulare counties. ●H: small perennial herbs with erect or ascending stems that range from about 1 to 3 dm. (4-12") long. The alternate leaves are cauline and have petioles about 2 to 6 cm. long; the blades are about 1 to 5.5 cm. long, broadly ovate to deltoid with an acute or obtuse apex, and have crenate or serrate margins. The flowers are produced singularly on axillary pedicels up to 15 cm. long, and the corollas consist of five asymmetrical petals about 8 to 20 mm. long. The petals are primarily golden yellow to slightly orangish; the base of the lower petal is tinged reddish brown and marked with dark lines, while the upper petals are reddish brown on the back side. The fruit is a three celled capsule about 8 to 11 mm. long. ❀February-May.

+***Viola purpurea*** Kellogg subsp. ***purpurea***. MOUNTAIN VIOLET. The presence of this taxon in the Tassajara region is based on two herbarium specimens. One was collected "One mile below China Camp" by D. Demaree in April of 1933 (Demaree 10308; GH 381906), and the other was collected "Two miles west of China Camp" by Philip Munz and W. Kinch in May of 1955 (Munz 20594; RSA 113486). ●R: western North America, from British Columbia to Montana, Wyoming, Colorado, Utah, Arizona and northern Baja California. ●H: small perennial herbs with erect or ascending stems that range from about 5 to 22 cm. (2-10") long. The leaves are basal and cauline and have petioles about 2 to 10 cm. long; the blades are about 1 to 5 cm. long, and are mostly ovate to lanceolate with cuneate to sub cordate bases, and the margins are irregularly toothed. The flowers are produced singularly on axillary pedicels about 4 to 13 cm. long, and the corollas consist of five asymmetrical and primarily yellow petals about 10 to 12 mm. long. The base of the lower petal is marked with fine purplish brown lines, while the upper petals are tinged purplish brown on the back side. The fruit is a three celled capsule about 7 to 8 mm. long. ❀March-July.

+<>***Viola purpurea*** subsp. ***mohavensis*** (M. Baker & J. Clausen) J. Clausen [*V. aurea* subsp. *m.* Baker & Clausen]. This subspecies is known to occur in the Tassajara region only on Chew's and Pine ridges (re. PGM 1948, 3029 & 7078, and UCD 110622). The only other locality in the Santa Lucia Mountains where this taxon is known to occur is on Junipero Serra Peak. ●R: Coast Ranges of Monterey and San Benito counties, the southern Sierra Nevada (in Mono, Fresno, Tulare and Inyo counties, and the Transverse and Peninsular ranges, from Santa Barbara County to San Diego County. The nearest documented population to the south is in the Sierra Madre of Santa Barbara County. ●H: similar to the preceding taxon, except for the characteristics listed in the key. ❀March-July.

Viola purpurea subsp. ***quercetorum*** (Baker & Clausen) R. J. Little [*V. q.* Baker & Clausen]. OAK VIOLET. This is the most common of the *V. purpurea* subspecies in the Tassajara region, where it is widely scattered at all elevation in generally open woodland habitats, and it is fairly common in some areas, such as the upper regions of Willow Creek and from the Church Creek area to Pine Valley. Plants are occasionally seen on the floodplains of Tassajara Creek, both upstream and downstream from the hot springs. ●R: Cascade and Coast ranges, Sierra Nevada foothills, and the Transverse and Peninsular Ranges, from Jackson and Klamath counties in southwestern Oregon to San Diego County. ●H: perennial herbs mostly similar to the typical taxon, except for the characteristics listed in the preceding key. They are also generally larger (up to 37 cm.—15" tall). ❀February-July.

VISCACEAE. MISTLETOE FAMILY.

Viscaceae consists of 7 genera and about 450 species, all of which are parasitic on trees or shrubs. The species are primarily endemic to tropical regions and to temperate regions of the northern hemisphere. The name is based on that of the genus *Viscum*, which includes the introduced *V. album*, the European Mistletoe.

1a. Plants woody and parasitic on broadleaf trees (particularly oaks). Leaves present. . . . . ***Phoradendron***.
1b. Plants herbaceous and parasitic on pine trees. Leaves absent. . . . . ***Arceuthobium***.

ARCEUTHOBIUM. CONIFER MISTLETOE.

Arceuthobium consists of about 45 species of temperate and tropical regions of the Northern Hemisphere. The name is derived from the Greek words *arkeuthos*, juniper, and *bios*, life.

Arceuthobium campylopodum Englemann [*Arceuthobium occidentale* Engelmann]. WESTERN PINE MISTLETOE. This easily overlooked species is parasitic on pine trees at higher elevations in the Tassajara region, but it appears to be absent at lower elevations, such as in The Pines. The berry like fruits rupture with great force when fully mature, and discharge minute sticky seeds which adhere to the needles of adjacent branches, thus setting the stage for a reproductive cycle that takes five or six years to complete. The fruits rupture in late summer or early autumn, and the seeds are washed down to the stems with the first rains. The seeds germinate in spring, and begin to penetrate the stems in summer. By the summer of the second year, infected stems begin to swell, and during the summer of the third year the first shoots appear. By the summer of the fourth year, staminate and pistillate plants can be distinguished. The flowers of pistillate plants may mature as early as the late summer of the fourth year, while those of staminate plants usually mature in the spring of the fifth year. The fruits take a year to mature. ●R: from northern Washington and eastern Idaho southward, through the Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, to Mount San Pedro Martir in northern Baja California. ●H: small perennial herbs with fragile and leafless stems that are comprised of jointed segments. The stems are yellowish to brownish and about 6 to 17 cm. long. The staminate flowers of male plants are produced in short spikes, while the pistillate flowers of female plants are produced in the axils of the stem segments. The fruit is a roundish-compressed berry about 2 to 5 mm. wide. ❀generally July-November.

PHORADENDRON. MISTLETOE.

Phoradendron consists of about 240 species that occur in the temperate and tropical regions of North and South America. The name is derived from the Greek words *phor*, a thief, and *dendron*, tree, and thus means a tree thief.

Phoradendron leucarpum (Rafinesque) Reveal & M. C. Johnston [*P. villosum* (Nuttall) Nuttall; *P. flavescens* (Pursh) Nuttall var. *v.* (Nuttall) Engelmann] subspecies ***tomentosum*** (deCandolle) J. R. Abbott & R. L. Thompson. OAK MISTLETOE, HAIRY MISTLETOE. These woody parasitic plants are widely scattered in the Tassajara region, but they are generally uncommon, and they occur mostly on *Quercus chrysolepis* (Canyon Live Oak). Although this subspecies primarily occurs *Quercus* trees and shrubs, it sometimes occurs on *Adenostoma* (chamise), *Arctostaphylos* (manzanita) and *Umbellularia* (California bay laurel). If similar plants are discovered on other hosts, they almost certainly represent *Phoradendron leucarpum* subsp. *macrophyllum*, which primarily occurs on *Alnus* (birch), *Fraxinus* (ash), *Juglans* (walnut), *Platanus* (sycamore), *Populus* (cottonwoods) and *Salix* (willows). Mistletoe seeds are primarily spread by the droppings of birds who have eaten mistletoe berries. ●R: widespread in western North America, from northern Oregon to Texas and northern Mexico. ●H: woody branched evergreen shrubs that are parasitic on the branches of oak trees. The opposite leaves are short petiolate, and the rather thick yellowish green blades are roundish to narrowly obovate, entire, and about 1.5 to 4 cm. long. The staminate flowers of male plants and the pistillate flowers of female plants are produced in axillary spikes; the flowers are congested and somewhat sunken in the internodes. The fruit is a white or pinkish berry about 3 to 4 mm. wide. ❀July-September.

Calochortus pulchellus, Mount Diablo Fairy Lantern (left), *Calochortus albus*, Fairy Lantern, and *Lupinus nanus*, Sky Lupine, as illustrated volume one of the second series of the *Transactions of the Horticultural Society of London*, 1835. Sarah Ann Drake, delineator.

ANTHOPHYTA. FLOWERING PLANTS. p. 207.
Class *MONOCOTYLEDONEAE*. MONOCOTYLEDONS (MONOCOTS).

Monocotyledoneae consists of about 97 families, roughly 3,550 genera and approximately 68,000 species, and thus represents about 30% of all species of flowering plants. Although *Monocotyledoneae* is well represented worldwide, especially by *Poaceae* (the Grass Family), the species are most diversified in tropical and subtropical regions.

1a. Perianths (corollas) petal like, i.e., they are colorful and/or delicately textured:
2a. Ovaries inferior (they are positioned below or partially below the perianth segments):
3a. Perianth segments asymmetrical. Ovaries one celled. Stamens one or two. . . . . ***Orchidaceae***.
3b. Perianth segments symmetrical. Ovaries three celled. Stamens three. . . . . ***Iridaceae***.
2b. Ovaries superior (they are positioned above the perianth segments and in no way joined to the segments):
4a. Leaves stiff and sword like, up to 1 m. (40") long, tapering to a very sharp and penetrating spine, and produced in dense basal tufts. Flowers borne in profusion in massive panicles on thick stalks up to 4 m. (13') tall. . . . . ***Agavaceae*** (*Hesperoyucca*).
4b. Plants that are in no way similar to the above:
5a. Flowers produced in terminal umbellate clusters, the flowers clearly radiating from a common point:
6a. Lower portion of perianth segments united into a tube, or if the perianth segments are divided to the base (as in *Bloomeria*), then the flowers are yellow and the filaments have a cup shaped appendage at their bases. Plants not smelling or tasting onion like. . . . . ***Themidaceae***.
6b. Perianth segments divided to the base, the flowers are not yellow (ours), and the filaments do not have basal appendages (the bases are wide and fused into a ring). Plants with an onion like scent and taste. . . . . ***Alliaceae***.
5b. Flowers not produced in umbellate clusters, or if the inflorescence is somewhat umbellate, then the flower do not radiate from a common point:
7a. Styles three and distinct to the base. . . . . ***Melanthiaceae***.
7b. Styles singular (but often 3 lobed or parted at the apex):
8a. Well developed leaves borne only at or near the base of the plant, upper "leaves" reduced to scarious bracts. . . ***Agavaceae*** (*Chlorogalum*).
8b. Well developed leaves present on the stems above the base of the plant, but may be reduced in size or modified in shape and/or arrangement. . . . . ***Liliaceae***.
1b. Perianth segments not petal like; they are husk or scale like, and green when young but brown or brownish yellow later on:
9a. Flowers with three or more perianth segments:
10a. Flowers densely compacted on elongated spikes. Perianth segments are slender thread like fibers. The fruit is an achene. Cat Tails. . . . . ***Typhaceae***.
10b. Flowers borne on branching panicles. Perianth segments green when young and husk like when mature, and arranged in two series of three's. The fruit is a many seeded capsule. Rushes. . . . . ***Juncaceae***.
9b. Flowers with one or two perianth segments:
11a. Flowers with one scale like perianth segment (bract) covering or partly covering the flowers and fruits. Stems solid, not jointed, and typically three angled (and thus triangular) in cross section. Plants mostly of wet or moist habitats. Sedges. . . . ***Cyperaceae***.
11b. Flowers with two husk like perianth segments (glumes) subtending or sometimes enclosing the flowers and fruits. Stems hollow, solid only at the nodes (joints), and usually round in cross section. Most species not of wet or moist habitats. Grasses. . ***Poaceae***.

AGAVACEAE. AGAVE FAMILY.

Agavaceae consists of 23 genera and 637 species that are widely distributed on earth. The species range from perennial herbs to shrubs and trees (such as Joshua Trees, *Yucca breviflora*). The genera of this family have often been included in *Liliaceae*, but due to the results of phylogenetic research, they have been elevated to the family level.

1a. Shrub like plants with dense basal tufts of stiff and sword like leaves that terminate with dangerously sharp spines. Flowers are produced on massive flowering spikes that are up to 4 m. (13') tall. . . . . ***Hesperoyucca***.
1b. Herbaceous plants from large bulbs and loose basal rosettes of limber leaves. Flowers are produced broad panicles. . . ***Chlorogalum***.

CHLOROGALUM.

Chlorogalum consists of five species and three lesser taxa, all of which are endemic to the California Floristic Province. The genus includes the rare *C. purpureum*, which is endemic to the watersheds of the San Antonio and Nacimiento rivers in the Santa Lucia Mountains of southern Monterey County and adjacent areas in San Luis Obispo County. The name is derived from the Greek words *chloros*, green, and *gala*, milk or juice.

Chlorogalum pomeridianum (deCandolle) Kunth [*Scilla p*. deCandolle; *Antherium p*. Ker Gawler; *Ornithogalum divaricatum* Lindley]. SOAP PLANT, AMOLE. In the first edition of this text I stated that this species was conspicuous by its rarity in this region, for I have seen this taxon in only two locations: at the start of the Pine Ridge Trail just off of Tassajara Road, and along the Arroyo Seco River in the vicinity of the confluence of Tassajara Creek. In May of 2009 I discovered that another and much larger population of this species in southeastern Pine Valley; perhaps this population had been obscured by brush in prior years, and was made more conspicuous due to the fire during the previous summer. The species name means 'Of the afternoon,' and refers to flowers, which open towards evening. The bulbs of this species produce a lather when wet, and were used as a soap by the indigenous peoples of California. *C. pomeridianum* was first named and described by the Swiss botanist Agustin deCandolle (1778-1841), as *Scilla p*., and his description, which was published in 1813, was based on a plant that was growing in the Botanical Garden at Montpellier. Although DeCandolle and his contemporary botanists had no idea where the original bulbs or seeds had come from, they were collected by either Tadeo Haenke of the Spanish exploratory expedition lead Alessandro Malaspina, which paid a visit to Monterey in September of 1791, or by Archibald Menzies of the British exploratory expedition lead by George Vancouver, which set anchor at a number ports in California during the later months of 1792, 1793 and 1794. ●R: Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from Coos and

Douglas counties in southwestern Oregon to San Diego County. ●H: bulbous perennial herbs with generally erect and freely branched stems that range from about 6 to 25 dm. (2-8+') tall. The broadly linear and wavy margined leaves are produced in basal rosettes, and are up to 2.5 cm. wide and 70 cm. long; the cauline leaves are small and bract like. The flowers are produced in broad panicles on pedicels about 5 to 35 mm. long, and the perianth is divided to the base into six linear segments about 15 to 25 mm. long; the segments are white with a green or purple mid vein. The fruit is a roundish capsule about 5 to 7 mm. long. ❁May-August.

HESPEROYUCCA. QUIXOTE PLANT, CHAPARRAL YUCCA.

Hesperoyucca consists of three species that are endemic to California, Arizona and northern Mexico (only one species occurs in California). Due to the results of phylogenetic research, the members of this genus have been segregated from the genus *Yucca*. The name is derived from the Greek word *hesperos*, western, and yucca.

^***Hesperoyucca whipplei*** (Torrey) Baker ex Trelease [*Yucca whipplei* Torrey; *Y. w.* subsp. *percursa* Haines]. CHAPARRAL YUCCA, SPANISH BAYONET, OUR LORD'S CANDLE, MESCAL. This highly conspicuous species is rather common in openings in chaparral at all elevations in this region, and especially so in rocky areas. It also occurs in transitional areas, and due to the extreme topography of the region, seeds often become planted in unsuitable habitats, such as in shady woodlands, but such plants are usually depauperate. Yucca species are fertilized through a symbiotic relationship with *Pronuba* moths. Female moths collect pollen from one plant, roll it into a ball, and then carry it to another plant, where they deposit their eggs in a floral ovary, then push the pollen ball down the stigma tube, thus causing fertilization. Although the larva destroy many of the seeds, many are left intact. ●R: Coast Ranges, from the Santa Lucia, Gabilan and Diablo ranges of Monterey and San Benito counties, and from Fresno County in the Sierra Nevada, to the Transverse and Peninsular ranges of southern California and northern Baja California. ●H: robust evergreen perennials which at about 6 to 8 years of age produce massive flowering stalks that range from about 2 to 4 m. (6.5-13') tall. The leaves are gray green and produced in dense and generally doom shaped basal rosettes. The leaves are stiff and very narrowly lance-linear (and thus sword like), up to 1 m. long, and terminate with a hardened (and thus dangerously) sharp spine. The flowers are produced in massive panicles that are about 2 m. long; the panicles are lanceolate to oblanceolate or elliptic in outline, and about three times longer than wide. The numerous branches are crowded with aromatic flowers which are produced on pedicels about 1 to 3 cm. long. The perianth is divided into six ovate-lanceolate and creamy white segments that are about 2.5 to 3.5 cm. long. The fruits are oblong to oblong-obovate capsules that are about 3 to 4 cm. long. ❁usually from May to July.

TASSAJARA MESCAL. Due to its being a highly conspicuous plant, *Hesperoyucca whipplei* has often been noted in historical literature pertaining to Tassajara Hot Springs. At that time it was commonly known as mescal.

In "A Trip to the Hot Springs," which was published in the June 24th, 1869 edition of the *Monterey Gazette*, it was noted that "On one highest peaks stood a solitary stock of mescal, which, being in full bloom, looked like some sentry guarding the sacred waters, and to which we gave the name Sentinel Peak." In "From Tassajara Springs," an article that was published in the June 5th, 1879 edition of the *Salinas City Index*, it was stated that "On the mountain sides we find numbers of the mescal in bloom. It is a beautiful thing indeed. It is, I believe, a species of cacti, something like an agave or century plant, sending up a stalk from the center to a height of twelve to fourteen feet, with short branches grown thickly around it, fitted with beautiful, creamy white flowers, richly fragrant." In "Tassajara Springs, Editorial Visit to the Famous Locality," which was published in the October 4th edition of the *Salinas Weekly Index*, it was stated that "Large numbers of the mescal plants, a species of cactus, grow on the mountain slopes around the springs. It sends up a stalk 12 to 15 feet high, with stout branches growing around it filled with beautiful creamy white flowers richly fragrant." In "Tassajara Springs," an article that was published in June 9th, 1911 edition of the *Monterey Daily Cypress*, it was noted that "On this side [the Tassajara side of the road between Jamesburg and the hot springs] one sees hundreds of the mescal or Spanish bayonet plants in bloom. The wonderful creamy flowers are borne on stalks ten feet high and more."

"Mescal," or sometimes "Tassajara Mescal," was by far the most frequently used pen name of Tassajara newspaper correspondents from 1898 to 1922. One of these reports, "What is Doings at the Springs," which was published in June 30th, 1910 edition of the *Salinas Weekly Index*, stated that "'Mescal,' the poet laureate of Tassajara Springs, the origin of whose name is obvious to the most casual observer, has broken into verse…"

ALLIACEAE. ONION OR GARLIC FAMILY.

Alliaceae consists of 13 genera and about 750 to 800 species, which, as a whole, are widely distributed on earth. The members of this family have often been placed in *Liliaceae*, the Lily Family, but the results of phylogenetic research has lead to their placement into a distinct family. Many *Alliaceae* species are cultivated for the flavors that they add to prepared foods, such as onions, garlic, chives, leeks and shallots, and a number of species are cultivated for the ornamental qualities of their flowers.

ALLIUM. ONION, GARLIC, LEEK, ETC.

The genus *Allium* consists of about 700 species, most of which are endemic to northern temperate regions. The genus is represented in California by 45 species and 12 lesser taxa occur. The name is the Latin word for garlic.

1a. Scapes (flowering stems) 1 to 3 dm (4-12") tall. Leaves two to three. Perianth segments pale rose. . . . . ***A. campanulatum***.
1b. Scapes less than 1 dm. (4") tall. Leaves singular. Perianth segments pinkish purple with dark mid veins. . . . . ***A. burlewii***.

^<>***Allium burlewii*** Davidson. This species is known to occur at only two locations in this region: in granitic sand on the northeasterly side of the massive boulders on the crest of Black Butte, where it was discovered by Vern Yadon in May of 1979, and on Pine Ridge, along the trail to Bear Basin, where it was discovered by Vern Yadon in May of 1981. The only other site in the Santa Lucia Mountains that I am aware of is on Cone Peak, where it was discovered by Steven Talley in 1972 (Griffin 1975). ●R: southern Sierra Nevada and the Transverse and northern Peninsular ranges, from Madera and Santa Barbara counties to the San Jacinto Mountains of Riverside County. Disjunct populations occur in the New Idria region in San Benito County, and in the Santa Lucia Mountains of Monterey County. ●H: small bulbous perennial herbs with scapes that range from about 2 to 8 cm. (.75-3") tall. The linear leaves are singular and basal, and are usually longer than the scapes. The inflorescences are terminal umbels that are comprised of about 8 to 20 flowers that have pedicels that are about 6 to 10 mm. long. The perianth is divided into six narrowly ovate to oblong-lanceolate

The cover of a Tassajara Hot Springs booklet that was published in 1928.

and erect segments about 7 to 10 mm. long; the segments are pinkish purple with dark mid veins. The fruit is a small roundish to slightly oval capsule about 4 mm. long. ֍April-July.

<>***Allium campanulatum*** S. Watson. SIERRA ONION. This species is scattered on serpentine plugs and occasionally on granitic talus slopes in mixed evergreen forests along the Pine Ridge Trail from near the Church Creek Divide to Pine Ridge. It also occurs on serpentine plugs on Chew's Ridge. Elsewhere in the Santa Lucia Mountains this species occurs on the Coast Ridge in the vicinity of Cold Spring, and on Junipero Serra Peak. The nearest populations to the north are in the mountains of Mendocino and Lake counties, and to the south the nearest populations are in the Sierra Madre Mountains of Santa Barbara County. ●R: mountains of western North America, from Columbia County in southeastern Washington to California. In California this species occurs in the southern Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, as far south as the mountains of San Diego County. ●H: small bulbous perennial herbs with one or two scapes that range from about 1 to 3 dm. (4-12") tall. The linear blades are produced in 2s or 3s near the base of the scapes. The flowers are produced in terminal umbellate clusters on pedicels about 1 to 2 cm. long. The perianth is divided into six lanceolate to ovate segments that are about 7 to 10 mm. long (inclusive of the very slender and somewhat awn like tip); the segments are usually rose pink and they sometimes have darker hued lines or markings. The fruit is a small and roundish capsule about 3 mm. long. ֍May-July.

CYPERACEAE. SEDGE FAMILY.

Cyperaceae is a large vascular plant family that is represented on all major landmasses except for Antarctica; it is comprised of grass like herbs that are typically found in wet or moist habitats. According to the Angiosperm Phylogeny Website, this family consists of 98 genera and 5,430 species.

1a. Spikelets closely adhering to the axis of the inflorescence. Flowers imperfect (with pollen producing stamens or fruit producing pistils, but never with both). Achenes enclosed in a perigynium (a womb like structure) . . . . . ***Carex***.
1b. Spikelets borne on the branches of spreading umbellate panicles. Flowers perfect. Achenes fully exposed:
2a. Spikelets two ranked (achenes alternate on opposing sides of the axis), and are thus relatively flattened in cross section. Main body of achenes of the local plants are triangular in cross section. . . . . ***Cyperus***.
2b. Spikelets imbricated (achenes layered in an upwardly spiraling pattern), and are thus relatively round in cross section. Main body of achenes of the local plants are elliptical in cross section. . . . . ***Scirpus***.

CAREX. SEDGE.

Carex is a large and widely distributed genus that, according to the Angiosperm Phylogeny Website, consists of about 1776 species. The name is the Latin word for sedge, and it means cutter, on account of the sharp edges of the leaves and/or stems.

1a. Perigynia (fruit) puberulent, the main body is round in cross section. . . . . ***C. globosa***.
1b. Perigynia glabrous, the main body is not round in cross section:
2a. Inflorescence comprised of one spikelet (the lowest perigynium often appears to be separate from the spikelet). Main body of perigynia strongly 3 lobed in cross section. . . . . ***C. multicaulis***.
2b. Inflorescence with two of more spikelets: Main body of perigynia not three lobed in cross section (they are generally flat on one side and rounded or angled on the other—the later are thus broadly triangular in cross section):
3a. Stigmas three, perigynia three angled (broadly triangular in cross section). Terminal spikelet narrowly linear, in sharp contrast to the short and broad lower spikelets, which are usually less than three times as long as wide. . . . . ***C. serratodens***.
3b. Stigmas two, perigynia lenticular or planoconvex in cross section. Terminal spikelet not or not extremely narrower than the lower spikelets, which are usually much more than three times longer than wide:
4a. Pistillate and staminate flowers on different stems (unisexual stems). In other words, they are dioecious—all of the flowers of an inflorescence are staminate or pistillate, but never both. In our species, the plants are only sometimes dioecious. . . . . ***C. alma***.
4b. Pistillate and staminate flowers on same stem (bisexual stems). In other words, the plants are monoecious—staminate flowers are present in at least one spikelet of an inflorescence:
5a. Terminal spikelet generally staminate; lateral spikelets pistillate (tips of lateral spikelets rarely staminate):
6a. Plants strictly and densely cespitose (clumped). They form large tufts in rocky stream beds and banks of major perennial streams, usually at and below the mean water level. Lowest bract subtending inflorescence not very blade like, and shorter to not much longer than the first spikelet. Perigynia slightly obovate and about two times longer than wide. . . . . ***C. nudata***.
6b. Plants rhizomatic and thus spreading (the individual above ground manifestations are often cespitose). They form colonies on shady stream banks (above the mean water level) or on moist woodland slopes. Lowest bract subtending inflorescence blade like and usually about as long to much longer than the entire inflorescence. Perigynia generally roundish and not much longer than wide:
7a. Perigynia comparatively soft and thin, and strongly 3 to 7-veined. . . . . ***C. senta***.
7b. Perigynia comparatively tough and thick, and faintly veined. . . . . ***C. barbarae***.
5b. Terminal and lateral spikelets a mix of staminate and pistillate flowers:
8a. Spikelets each with pistillate flowers above staminate flowers
9a. Perigynia with winged margins. Perigynia scales pale brown to reddish. . . . . ***C. subfusca***.
9b. Perigynia without winged margins. Perigynia scales green to golden brown. . . . . ***C. bolanderi***.
8b. Spikelets each with staminate flowers above pistillate flowers (often easiest to see in terminal spikelet; look for remnants of stamens):
10a. Inflorescence mostly 3 to 15 cm. long, and sometimes up to 20 cm. long. Perigynia dark brown to black, 3.5 to 4 mm. long, and generally widest towards the base. . . . . ***C. alma***.
10b. Inflorescence mostly 1.5 to 5 cm. long, and not more than 7 cm. long. Perigynia pale to medium brown, 2 to 3.7 mm. long, and generally widest in the middle. . . . . ***C. densa***.

^***Carex alma*** L. Bailey. STURDY SEDGE. This distinctive sedge is locally common along perennial or mostly perennial streams in the Tassajara region, particularly in sunny places along smaller streams. ●R: Coast Ranges, from the watershed of the Carmel River in Monterey County southward, and the Sierra Nevada, from Butte County southward, to northern Baja California, and eastward to southwestern Utah and Arizona. ●H: tufted evergreen perennial herbs with culms that range from about 3 to 12 dm. (1-4') tall. The blades are about 1 to 5 dm. long and 2 to 6 mm. wide, and are produced near the base of the culms. The blades are often split along the mid vein. The spikes vary from densely contracted and head like to elongate, with the spikelets irregularly scattered along an axis up to 2 dm. long. The spikelets are androgynous in monoecious plants (staminate at the tip and pistillate below), or exclusively staminate or pistillate in dioecious plants. The perigynia are ovate to oblong-ovate, planoconvex, about 3.5 to 4 mm. long, and are obscured by straw colored to brownish scales with hyaline margins. ❀May-July.

+***Carex barbarae*** Dewey. WHITE ROOT SEDGE, SANTA BARBARA SEDGE. This species was not included in the first edition of this text, but its presence in the Tassajara region is verified by two herbarium specimens that were collected in the immediate vicinity of the confluence of Tassajara Creek and the Arroyo Seco on May 30th of 1861 (Brewer 682 [UC 72428] & 683 [UC 72426]), and thus represent two of the three earliest scientific plant specimens that were collected in the Tassajara region of the Santa Lucia Mountains. ●R: from Douglas County in western Oregon southward, through the Cascades, Sierra Nevada, and the Coast, Transverse and Peninsular ranges, to San Diego County. The species was named for its type locality: Santa Barbara. ●H:tufted perennial herbs with culms that range from about 3 to 10 dm. tall. The blades are usually shorter than the culms, and range from about 3.5 to 9 mm. wide. The inflorescence consists of 4 to 6 spikelets, the lateral pistillate spikelets range from about 2.5 to 8 cm. long. The oblong-obovate to roundish perigynia are about 3 to 4.5 mm. long. ❀May-August.

Carex bolanderi Olney [*C. deweyana* Schwein var. *bolanderi* W. Boott]. BOLANDER SEDGE. This species is locally common along perennial streams in the Tassajara region, and occasionally at springs or seeps. ●R: widespread in the mountains of western North America, from British Columbia to Wyoming, New Mexico and southern California. In California this species ranges southward to the Santa Lucia Mountains of San Luis Obispo County in the Coast Ranges, and through the Sierra Nevada to Kern County, with additional populations in the San Gabriel and San Bernardino Mountains of the eastern Transverse Ranges, and in the San Jacinto Mountains of Riverside County. ●H: somewhat loosely tufted evergreen perennial herbs with slender culms that range from about 2 to 8 dm. (8-32") tall. The blades, which are fairly lax and grass like, are about 2 to 5 dm. long and 2 to 5 mm. wide, and number about 3 to 5 on the lower quarter of the culms. The spikes are about 3 to 8 cm. long and are comprised of about 5 to 8 spikelets. The spikelets, which are mostly pistillate, are about 6 to 25 mm. long, and usually have fewer than 20 perigynia. The perigynia are narrowly lanceolate to oblanceolate and range from about 3 to 4.5 mm. long. The beaks are cleft. ❀April-June.

+***Carex densa*** L. Bailey [*Carex dudleyi* Mackenzie, not L. Bailey]. I was not able to locate this species in the Tassajara region, but Tassajara Hot Springs is the type locality for the synonymous taxon *C. dudleyi*. The type specimen was collected by A. D. E. Elmer in June of 1901 (Elmer #3132 DS), and although it is probable that the specimen contains an envelope enclosing a note stating the exact location of collection, the type specimen was on loan at the time of my research at the California Academy of Sciences/Dudley Herbarium in San Francisco. The species should be looked for in wet or seasonally wet habitats in this region. ●R: Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges,

from Lewis and Yakima counties in western Washington to San Diego County. ●H: tufted perennial herbs with slender culms that range from about 3 to 7 dm. (12-28") tall. The blades are about 1 to 3 dm. long and 4 to 7 mm. wide, and are produced on the lower quarter of the culms. The spikes are ovate to oblong in outline, about 1.5 to 6.5 cm. long, and have up to ten or more small and androgynous spikelets. The perigynia are narrowly rhombic to lance-ovate, about 2 to 4 mm. long, and generally plano-convex; the margins are winged and upwardly serrulate. The perigynia scales are commonly terminated by a conspicuous awn. ֍May-July.

Carex globosa Boott. REDWOOD SEDGE, ROUND FRUITED SEDGE. This small and inconspicuous sedge widely scattered in shady woodland habitats of the Tassajara region, and it is locally common some areas, such as in Pine Valley. This species is most common in and near redwood forests, and thus the common name Redwood Sedge. ●R: Coast, Transverse and Peninsular ranges, from Humboldt County to mountains of San Diego County. ●H: loosely tufted perennial herbs with very slender (wire like) culms that range from about 1.5 to 4 dm. (6-16") tall. The blades are slender, about .3 to 3 dm. long and 1.5 to 2 mm. wide, and averaging about five to eight per culm. Staminate flowers are produced in slender spikelets (7-20 mm. x 2.5-4 mm.) that terminate the longer culms, while pistillate flowers are produced in one to three shorter but broader spikelets (5-10 mm. x 4-8 mm.) that closely subtend the staminate spikelet. Pistillate spikelets are also produced on short basal culms. The perigynia are about 4 to 5 mm. long, and the main body is distinctly roundish in cross section. ֍May-July.

<>***Carex multicaulis*** Bailey. WOODLAND SEDGE, MANY STEMMED SEDGE. This rather inconspicuous species is widely scattered in shady woodland habitats in the Tassajara region, and it is locally common in suitable habitats at higher elevations. Plants are also occasionally found in the shade of tall and Ceanothus dominated chaparral, and sometimes in riparian woodlands, such as along Tassajara Creek, but away from the immediate banks of streams. ●R: from Lane and Klamath counties in western Oregon southward, to Napa and Sonoma counties in the north Coast Ranges, and through the Sierra Nevada, to the Transverse and Peninsular ranges of southern California (to San Diego County), with a disjunct population in the Santa Lucia Mountains of Monterey County. The nearest populations to the north of the Santa Lucia Mountains are on Howell Mountain and Mount Saint Helena in Napa County, and to the south in the San Rafael Mountains of Santa Barbara County. This species is also reported to occur in Grant and Malheur counties in northeastern Oregon, and in Elko County in northeastern Nevada. ●H: loosely to moderately densely tufted grass like perennial herbs with many slender (wire like) culms that range from about 2 to 6 dm. (8-24") tall. The blades are up to 3 dm. long and about 1 to 1.5 mm. wide, and are produced near the base of the culms (the upper most blades are short bract like structures that subtend the inflorescence). The spikes consist of one androgynous spikelet that contain one to six perigynia, and the lowest perigynium (and sometimes the only perigynium) often appears to be somewhat removed from the main body of the spikelet. The perigynia are about 5 to 7 mm. long, and the main body is distinctively three lobed in cross section. ֍May-July.

Carex nudata Boott. TORRENT SEDGE, PROTECTOR SEDGE, CREEK GRASS. This species is both the most common and most conspicuous sedge in the Tassajara region, for it is abundant in the bed of Tassajara Creek and in the lower portions of the beds of its major tributaries. This species is apparently ecologically dependent on rocky bedded perennial streams that are regularly subjected to swift and sometimes massive water flows, for it is absent along the smaller streams of this region. The large tufts of this species, which often occur as islands, are one of the most aesthetically appealing characteristics of Tassajara Creek. Closely spaced *Carex nudata* tussocks, which are frequent, also provide protective habitats for many other streamside plant species, which include a number of showy flowered species, such as Common Monkey Flower (*Mimulus guttatus*), Scarlet Monkey Flower (*Mimulus cardinalis*), Leopard Lily (*Lilium pardalinum*) and Giant Stream Orchid (*Epipactis gigantea*). This phenomenon was scientifically demonstrated during a two year field experiment on the South Fork of the Eel River in northern California that was performed by Jonathan Levine of the Department of Integrative Biology of the University of California at Berkeley (*Ecology* 81 (12): 3431-3444, 2000). In brief, populations of plants that were in plots in which *Carex nudata* plants were thinned, pinned back or completely clipped, suffered a morality rate of up to 100 per cent during winter floods. It was also discovered that plants that were growing in and around unaltered *Carex nudata* tussocks suffered much less by the grazing of deer during the growing season, which in some plots was by more than 75 percent. ●R: Cascade and Coast ranges, from Skamania and Klickitat counties in southwestern Washington to the western Transverse Ranges of Santa Barbara County (the Santa Ynez Mountains), and in the Sierra Nevada, from Butte and Plumas counties to Tulare County. ●H: very densely cespitose sedges often forming tufts up to 9 dm. (3') wide in rocky streambeds. The numerous culms, which are at first erect but tend to arc downward as the spikelets reach maturity, are about 3 to 8 dm. (12-32") long. The basal blades, which are usually split along the mid vein, are shorter to about as long as the culms, while the two to four leaves of the culms have blades about 1 to 2.5 dm. (4-10") long. The inflorescens are comprised of four or five spikelets. The terminal spikelet is staminate and about 1.5 to 3.5 cm. long, while the two or three lateral spikelets are pistillate or pistillate below and staminate towards the apex, and about 1 to 4 cm. long. The semi glossy flower scales are quite distinctive, for they are purplish black with straw colored mid ribs, and create a rather vivid contrast of shade in the pistillate spikelets, for the scales only partially obscure the light straw colored perigynia. The perigynia are oblong to obovate, plano-convex, and about 2.5 to 4 mm. long. ֍April-May.

Carex senta Boott. BANK SEDGE, ROUGH SEDGE. This species is locally common on shady stream banks and other moist habitats at lower to intermediate elevations of the Tassajara region, and it forms dense colonies in some areas, such as along the trail to The Narrows about half way between the hot springs and the pools. Occasionally plants are found on shady woodland slopes, well away from water. ●R: from Siskiyou County southward, through the Sierra Nevada and the Coast, Transverse and Peninsular ranges, to northern Baja California. Also in the mountains of Arizona and northern New Mexico. ●H: moderately to densely cespitose sedges with culms that range from about 3 to 10 dm. (12-40") tall, and often forming dense colonies via horizontal stolons. The blades, which number about 4 to 8 on the lower half of the culms, and range from about 1 to 4 dm. long and 3 to 5 mm. wide. The inflorescence is comprised of about three to five elongated rusty brown spikelets are about 3 to 5 cm. long, which tend to persist on the culms well after maturation. The terminal and often the uppermost lateral spikelets are staminate, the lowermost pistillate, while the central spikelets are often pistillate below and staminate above. The perigynia are broadly ovate to obovate or nearly round, slightly plano-convex, abruptly short beaked, and about 3 to 3.5 mm. long. ֍May-July.

Carex serratodens Boott [*C. bifida* Boott]. BIFID SEDGE. This species is widely scattered and locally common along perennial streams in the Tassajara region, and sometimes at springs and seeps. ●R: Cascade and Coast ranges, from Douglas County in western Oregon to the San Rafael Mountains of Santa Barbara County. Also in the Sierra Nevada, from Plumas and Butte counties to Fresno County, and in the Tehachapi Mountains of Kern County. This species is also reported to occur in the mountains of central Arizona (in Gila County). ●H: rather loosely cespitose sedges with culms that range from about 3 to 12 dm. (1-4') tall. The longer blades number 2 to 5 and are produced on the lower quarter of the culms; they range from about 1 to 6 dm. long and about 1.5 to 4 mm. wide.

The spikes consist of about three to five spikelets. The terminal spikelet is staminate, narrowly linear, and about 15 to 30 mm. long, while the 2 to 4 lateral spikelets are pistillate, swollen, and about 6 to 18 mm. long. The perigynia are ovate to oblong ovate, triangular in cross section, and about 3 to 5 mm. long. ❀May-June.

Carex subfusca Boott. RUSTY SEDGE. This species is scattered in wet or moist habitats in Pine Valley, on Chew's Ridge, in Strawberry Valley, and probably in Miller's Canyon, but it is not known to occur elsewhere in this region. ●R: widely distributed in mountains of western North America, from British Columbia to Montana, Wyoming, New Mexico and northern Baja California. ●H: tufted evergreen perennial herbs with culms that range from about 2 to 6 dm. (8-24") tall. The blades are about 5 to 20 cm. long and 1.2 to 3.7 mm. wide, and are mostly produced on the lower third of the culms. The spikes are small and head like, usually less than 3 cm. long, and the spikelets are less than 1 cm. long. The spikelets are staminate below and pistillate above. The perigynia are narrowly to broadly ovate, plano-convex, and about 2.5 to 4 mm. long. ❀May-July.

CYPERUS. UMBRELLA SEDGE, NUT SEDGE, GALINGALE.

Cyperus consists of about 600 species of that are widely distributed in tropical, subtropical and temperate regions. The name is based on *cypeiros*, the Greek name for *Cyperus longus*.

Cyperus eragrostis Lamarck. TALL UMBRELLA SEDGE. This species is scattered along the larger perennial streams of the Tassajara region, mostly below about 2,000 ft. elevation, and it is locally common in rhizomatic colonies in areas that are generally protected from major torrents, such as on the upstream side of bends in streams. ●R: Pacific Slope of temperate western North America, from southern British Columbia to northwestern Baja California. This species is also native to temperate South America, its type locality, and it has become naturalized in other regions, such as in the eastern United States and in Europe. ●H: rhizomatic perennial herbs with culms that range from 2 to 9 dm. (8-36") tall. The blades are basal and range from about a fourth as long to about as long as the culms. The leaves subtending the inflorescence are produced in whorls; these leaves are unequal in length, and the largest are up to 5 dm. long. The flowers are produced in an umbel like panicle, and the spikelets are irregularly clustered at the ends of the branches. The fruits are semi glossy achenes that are about 1 mm. long. The achenes are obovate in outline and triangular in cross section, and have dark and truncated bases and short linear tips. ❀May-November.

SCIRPUS. BULRUSH.

Scirpus consists of about 35 species of North America, Eurasia and Australia. The genus name is a Latin word that the Roman naturalist Pliny the Elder (A. D. 0023-0079) applied to rushes or bulrushes.

Scirpus microcarpus Presl. SMALL FRUITED BULLRUSH. This species is widely scattered along perennial streams in the Tassajara region, and sometimes at springs and seeps. Along streams at lower elevations it is often found growing in association with the generally similar looking *Cyperus eragrostis*. ●R: widely distributed in the temperate regions of North America and eastern Asia. ●H: rhizomatic perennial herbs with culms that range from about 6 to 16 dm. (2-5') tall. The blades, which are basal and cauline, are up to 60 cm. long and about 1 to 2 cm. wide. The leaves subtending the inflorescence are produced in whorls and are about 2 to 20 cm. long and .3 to 1 cm. wide. The flowers are produced on open and freely branched compound umbels, the primary branches of which range from about 3 to 15 cm. long. The small and imbricated spikelets, which are about 2 to 8 mm. long, are clustered at the ends of the secondary branches. The fruits are lenticular and straw colored achenes that are about 1 mm. wide. ❀May-August.

Cyperaceae species that occur in areas of the Santa Lucia Mountains near to the Tassajara region include: *Cyperus erythrorhizos*, *Eleocharis macrostachya*, *Schoenoplectus* (*Scirpus*) *acutus* var. *occidentalis*, *Isolepis cernua* (*Scirpus cernus*) and *Bolboschoenus* (*Scirpus*) *maritimus*.

IRIDACEAE. IRIS FAMILY.

The Iris Family consists of about 80 genera and 1,500 species of perennial herbs of tropical and temperate regions. The family is the source of many fine ornamentals, and the flowers of Crocus sativus (saffron) have for many centuries been used as both a colorful food seasoning and as a fabric dye.

SISYRINCHIUM.

The genus *Sisyrinchium* consists of about 80 (or perhaps more than 100) species that are endemic to the Americas. According to some authorities, the name is derived from the Greek words *sus*, pig, and *rhynchos*, snout, which applied to the bulbous roots of some species that was mentioned by Pliny the Elder and Theophrastus, which pigs feed upon.

Sisyrinchium bellum S. Watson. CALIFORNIA BLUE EYED GRASS. The only area in the Tassajara region where I have seen this species was in the bed of the Arroyo Seco in the vicinity of the confluence of Tassajara Creek. The plants were probably the offspring of plants that were growing somewhere upstream, such as in Hanging Valley or in the vicinity of Santa Lucia Memorial Park, where this species occurs. According to James Griffin's "The Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), this species is common between 600 to 1200 m. (1968-3937') on Chew's Ridge, and this population almost certainly occurs somewhere on the Jamesburg side of the ridge (it is widely distributed in grasslands on the Hastings Natural History Reservation). ●R: Cascade Ranges, the Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Clatsop County in northwestern Oregon to northern Baja California. ●H: tufted perennial herbs with flowering stems that range from about 1 to 5 dm. (4-20") tall. The primary leaves are generally grass like and produced at or near the base of the plant, while upper (cauline) leaves are reduced in size and are often bract like. The flowers are produced in umbel like clusters that are subtended by two bracted spathes. The perianth is comprised of six equal or nearly equal and generally oblong to obovate segments that are dark blue or purple blue; they are about 12 to 15 mm. long, and are terminated by a short point. The fruit is a globose and pale to dark brown capsule about 2 to 7 mm. long. ❀March-May.

JUNCACEAE. RUSH FAMILY.

Juncaceae consists of seven genera and about 440 species that primarily occur in temperate and arctic regions, and in tropical mountains.

1a. Leaves, if present, relatively stiff, usually round in cross section, and glabrous. Sheaths split. Capsules many seeded and three celled. . . . ***Juncus***.

1b. Leaves lax, flat or V shaped in cross section, and the margins have long, soft, wavy hairs. Sheaths not split. Capsules three seeded and one celled. . . . . ***Luzula***.

JUNCUS. RUSH.

The genus *Juncus* consists of about 315 species, which, as a whole, are of worldwide distribution; but most of the species are endemic to the northern hemisphere. The name is the classical Latin word for a rush, which is based on the Latin word *jungere*, to bind or join, from the use of the stems.

1a. Annual herbs usually less than 3 dm. (1') tall. . . . . ***J. bufonius***.

1b. Evergreen perennial herbs usually more to much more than 5 dm. (20") tall:

2a. Bracts subtending the panicles short and inconspicuous. Cauline leaves with well developed blades.

3a. Stems roughened by minute transverse ridges. . . . . ***J. rugulosus***.

3b. Stems not roughened. . . . . ***J. dubius***.

2b. Bracts subtending the panicles conspicuous and resembling a continuation of the stem that exceeds the length of the panicles (the panicles thus appear to be lateral). Blades absent or just small rudiments:

4a. Stamens 6. Capsules rounded at the apex. . . . . ***J. patens***.

4b. Stamens 3. Capsules three lobed at the apex. . . . . ***J. effusus***.

Juncus bufonius Linnaeus. TOAD RUSH. This species is common in seasonally wet habitats Pine Valley, mostly north of Pine Valley Camp ground, and occasionally in similar habitats on Chew's Ridge. ●R: nearly worldwide, except for polar and tropical regions. ●H: tufted annual herbs with slender stems that range from about 3 to 30 cm. tall. The leaves number one to three per stem; they are short, flat or involute, and less than 1.5 mm. wide. The flowers are produced singularly or in small groups that are scattered in cymose panicles which occupy much of the upper half of the plant. The perianth is divided into six light green segments about 3 to 6 mm. long. The fruit is an oblong to obovoid capsule that is shorter than the perianth segments. ❀April-July (-September).

+***Juncus dubious*** Englemann. DUBIOUS or MARIPOSA RUSH. This entry is based on a specimen that was collected by Beatrice Howitt on "Chews Ridge, Los Padres National Forest—on ridge—Santa Lucia Mountains," in July of 1969 (Howitt 3160, PGM 5990). While there is a possibility that the identity of this specimen may have been mistaken for the very similar *J. rugulosus*, *J. dubious* is present in the Santa Lucia Mountains of Monterey County, as evidenced by eleven other specimens that are presently listed in the Consortium of California Herbaria database. ●R: Sierra Nevada and the Cascade, Coast, Transverse and Peninsular ranges, from Siskiyou County to northern Baja California. ●H: densely matted rhizomatic perennial herbs with erect stems that range from about 15 to 70 cm (6-28") long. The cauline leaf blades are about 1 to 4 dm. long and 1.5 to 3 mm. wide. The branches of the compound panicles are spreading, and the flowers are produced in clusters of 4 to 10. The perianth segments are about 2.5 to 3 mm. long, and are about equal in size, and the flowers have six stamens. The fruit is a three sided capsule that barley exceeds the length of the perianth. ❀July-September.

Juncus effusus Linnaeus subsp. ***pacificus*** (Fernald & Wiegand) Piper & Beattie [*J. e.* var. *p*. Fernald & Wiegand]. WESTERN COMMON RUSH. This species is widely scattered in wet or seasonally wet habitats in the Tassajara region, but it is fairly uncommon. ●R: widespread in western North America, from Alaska and Montana to northern Baja California. The typical species is widely distributed in the northern temperate regions of North America and Eurasia. ●H: densely tufted evergreen perennial herbs from stout branching rhizomes, with erect stems that range from about 6 to 12 dm. (2-4') tall. The leaf sheaths are brown and essentially lack blades, except for an occasional rudiment. The branching panicles appear to be lateral due to an erect subtending bract that strongly resembles a continuation of the stem. The perianth is divided into six pale greenish brown segments about 2.5 to 3.5 cm. long. The fruit is an obovoid capsule that is about as long as the perianth. ❀June-August.

Juncus patens E. Meyer. UPRIGHT RUSH. This is perhaps the most common rush species in the Tassajara region, and it is fairly regularly encountered in seasonally or perennially wet habitats. ●R: Cascade, Coast, Transverse and Peninsular ranges, from Skamania County in south southwestern Washington to northern Baja California. Also in the northern Sierra Nevada from Butte County to Placer County, and on the Channel Islands. ●H: densely tufted evergreen perennial herbs from stout rhizomes, with erect stems that range from about 4 to 8 dm. (16-32") tall. The brown leaf sheaths that are usually without blades, except for an occasional rudiment. The branching panicles appear to be lateral due to an erect subtending bract that strongly resembles a continuation of the stem. The perianth is divided into six generally lanceolate segments about 2.5 to 3 mm. long; the segments are light brown and have a green midrib. The fruit is a subglobose capsule that is slightly shorter to about as long as the perianth. ❀June-July.

^***Juncus rugulosus*** Englemann. WRINKLED STEMMED RUSH. This species is widely scattered, but uncommon, along streams or in other moist or seasonally moist habitats in the Tassajara region. The plants of this region are very near to their most northern limit of distribution; the two most northern locations of herbarium specimens that are presently listed in the Consortium of California Herbaria data base are "Just n. Big Sur P. O. (River Village), along Big Sur River" (JEPS 25248), and at "The Indians, headwaters of the Arroyo Seco" (RSA 180199). This species can be easily distinguished from the very similar *J. dubius* by touch, for the stems are roughened by minute transverse ridges. ●R: Coast, Transverse and Peninsular ranges, from the Santa Lucia Mountains of Monterey County to northern Baja California. ●H: evergreen perennial herbs from stout rhizomes, with erect and relatively stout stems that range from about 4 to 10 dm. (16-40") tall. The basal leaf sheaths lack blades, but the sheaths have narrowly linear blades about 1 to 4 dm. long; the blades are round in cross section and generally hollow. The inflorescence is a diffuse compound panicle, and the flowers are produced in clusters of four to eight. The perianth segments are generally narrowly lanceolate, light greenish brown, and about 2.5 to 3 mm. long. The fruit is a three angled and narrowly oblong capsule that is longer than the perianth. ❀July-September.

Juncus species that occur in areas of the Santa Lucia Mountains near to the Tassajara region include *J. bryoides* (The Indians), *J. kelloggii* (The Indians), *J. luciensis* (The Indians), *J. macrophyllus*

(Hanging Valley), *J. mexicanus* (Santa Lucia Memorial Park), *J. occidentalis* (Hastings Natural History Reservation), *J. phaeocephalus* (between Escondido Camp and Santa Lucia Memorial Park), and *J. xiphioides* (Hastings Natural History Reservation and along the Arroyo Seco between the Horse Bridge and Escondido Camp).

LUZULA. WOODLAND RUSHES.

A nearly worldwide but mostly northern hemispheric genus that is comprised of about 115 species of grass like perennial herbs. There are a number of etymologies as to the origin and meaning of the name for this genus. One is that it is based on the Italian word *lucciola*, and means firefly or glowworm, on account of the shiny inflorescence. Other etymologies also state that it is based on *lucciola*, but according to one the meaning is to sparkle or shine, and the other states that it means a midsummer field. Another explanation is that it is based on the Latin word *luzulae* or *luxulae*, from *lux* (light), which is due to the way the plants sparkle when wet, and yet another states that the name is based on the Latin word *luculus*, and means a small place. According to Philip Munz (*A California Flora*, 1959), the name is based on the Latin word *lucus*, a wood or thicket, in reference to type of habitat in the plants occur.

Luzula comosa E. Meyer [*L. subsessilis* (S. Watson) Buchenau]. PACIFIC WOOD RUSH. This inconspicuous species is apparently widely scattered on semi shady and grassy woodland slopes in the Tassajara region, but it is uncommon. I have seen this species in the lower Tassajara Creek and Willow Creek areas, in the vicinity of the hot springs, at the Church Creek Divide, and in Pine Valley. ●R: from Alaska and Montana to the mountains of southern California, as far south as San Diego County. Also on the Channel Islands and in the Rocky Mountains of central Colorado. ●H: grass like herbs with culms that range from about 1 to 3 dm. (4-12") tall. The plants are perennial, but die back to the root during the dry season. The leaves are primarily basal; the blades are about 5 to 15 cm. long and 3 to 7 mm. wide, and have wavy cilia on the margins. The umbellate like inflorescence consists of head like clusters that are produced on rays about .5 to 5 cm. long. The perianth is divided into six segments about 2 to 5 mm. long; the segments are generally brown or brownish and have broad translucent margins. The fruit is a roundish capsule that is shorter to about as long as the perianth segments. ❁March-May.

LILIACEAE. LILY FAMILY.

Due to the results of phylogenetic research, the circumscription of *Liliaceae* has been greatly reduced. As treated in the first edition of *The Jepson Manual* (1993), the family consisted of about 300 genera and approximately 4,600 species, but only 16 genera and about 635 species are now included. As a whole, the species of *Liliaceae* are widely distributed in the temperate regions of the northern hemisphere. *Liliaceae* includes many species that that are widely cultivated for their ornamental appeal, such as the various lilies and tulips.

1a. Stems rising from creeping root stalks. Perianth (corolla) 8 to 15 mm. long. The fruit is a moist berry. . . . . ***Prosartes***.
1b. Stems rising from bulbs. Perianth 15 to 50 mm. long. The fruit is a dry capsule:
  2a. Inner perianth segments larger than the outer segments. . . . . ***Calochortus***.
  2b. Inner and outer perianth segments about the same size:
    3a. Perianth segments reflexed backward (ours). Plants of wet habitats. . . . . ***Lilium***.
    3b. Perianth segments not reflexed backward. Plants of dry or mostly dry habitats. . . . . ***Fritillaria***.

CALOCHORTUS. MARIPOSA LILY, GLOBE LILY.

Calochortus consists of about 67 species of western North America and Central America. This genus is primarily Californian, for 43 species (plus 8 lesser taxa) occur within the state, and 33 of these (plus 7 lesser taxa) are endemic to the California Floristic Province. Many of the taxa that occur in California have very limited distributions, and many of these range from being uncommon to very rare. The genus name is derived from the Greek words *kalos*, beautiful, and *chortos*, grass, alluding to the showy flowers and grass like leaves of most of the species.

1a. Flowers facing downward or at a downward angle. The inner perianth segments (petals) converge at the apex, thus the flowers are globe like in shape. Perianth segments white to red or reddish. . . . . ***C. albus***.
1b. Flowers facing upward or at an upward angle. The inner perianth segments are ascending, thus the flowers are bowl or bell like in shape. Perianth segments white to bluish, purplish or lilac:
  2a. Glands of inner perianth segments not or just slightly depressed, not surrounded by a membrane, but usually covered by long fungus like hairs. . . . . ***C. splendens***.
  2b. Glands of inner perianth segments depressed, surrounded by a membrane, and with only short and sparse hairs. . . . . ***C. invenustus***.

!*Calochortus albus* (Douglas ex Bentham) Maund & Henslow [*Cyclobothra alba* Doug. ex Benth.; *C. a.* var. *rubellus* E. Greene]. FAIRY LANTERNS, WHITE GLOBE LILY. This well known species is widely scattered and locally common in shady or partly shady habitats at all elevations in the Tassajara region, and although it mostly occurs in woodlands, it is often found in chaparral. During the first spring after the Basin Complex Fire of 2008 this species spectacularly manifested itself, and although shady places were rare that season, the plants showed no adverse effects from being exposed to full sunlight. Most of the plants of this region, with petals that are pink tinged and red streaked, and with glands that resemble blood blisters, correspond to what was recognized by Edward Greene as variety *rubellus*. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Butte and Napa counties to northern Baja California. Also on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: bulbous perennial herbs with erect or ascending and usually upwardly branching stems that range from about 2 to 8 dm. (8-32") tall. The leaves are linear to linear-lanceolate. The singular basal leaf, which arises from the bulb before the stem, is about 3 to 7 dm. long and 1 to 5 cm. wide, while the smaller cauline leaves diminish in size upward on the stem. The flowers are produced singularly in the axils of bract like upper leaves and are usually coupled at the apex of the branches; they are generally turned downward, and have pedicels that are about 1 to 4 cm. long. The outer segments of the globose perianths are ovate and about 10 to 15 mm. long, while the inner segments are broadly elliptic, about 20 to 25 mm. long, and converge at the apex. The segments of most of the plants of this region are pink tinged and red streaked, and the glands of the inner segments resemble blood blisters. Such plants correspond to the description of var. *rubellus*. Also fairly common in this region are plants that have nearly pure white flowers. The fruit is a three winged elliptic-oblong capsule about 25 to 40 mm.

long. ֍April-June.

Calochortus invenustus E. Greene. PLAIN MARIPOSA LILY. This species is scattered on the small serpentine plugs that occur in the mixed evergreen forests along the Pine Ridge Trail between the Church Creek Divide and Pine Ridge, and also on the large serpentine outcrop that extends from Pine Ridge to Bear Basin. This species also occurs on Chew's Ridge, and it formerly occurred on a firebreak that ran from Tassajara Road (at a point opposite to the start of the Pine Ridge Trail) to the crest of Chew's Ridge; this break was cut during the Marble Cone Fire of 1977. As this species is most commonly found in granitic soils, it probably occurs in other areas in this region that are not accessible via roads or trails. Of the seven Monterey County specimens of this species that are presently listed on the Consortium of California Herbaria data base (as of March 16, 2015), six are from the Tassajara region (three are from Chew's Ridge, and three are from Pine Ridge). *Calochortus invenustus* primarily occurs in montane coniferous forests that are between 4,500 and 9,800 ft. in elevation. ●R: Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Tuolumne and Alameda counties to the mountains of northern Baja California. It also occurs in mountainous areas to the east of the central Sierra Nevada, and in adjacent mountainous regions of western Nevada. ●H: bulbous perennial herbs with flowering stems that range from about 1.5 to 5 dm. (6-20") tall. The leaves are linear. The basal leaves are about 1 to 2 dm. long and wither early, while the upper leaves are reduced in size and are involute. The flowers are produced singularly or in umbel like racemes that have up to six flowers. The perianth is broadly campanulate; the three outer segments are lance-ovate and about 2 to 3 cm. long, while the three inner segments, which are pale lavender to purplish, are cuneate-obovate, and about 1.5 to 4 cm. long. The fruit is a lance linear capsule that is about 5 to 7 cm. long. ֍May-June.

Calochortus splendens Douglas ex Bentham. LILAC or SPLENDID MARIPOSA LILY. This showy flowered species is scattered in both woodlands and chaparral on Chew's Ridge, from the vicinity of China Camp northward, and it often occurs on or near serpentine plugs. ●R: Coast, Transverse and Peninsular ranges, from Glenn County to northern Baja California. Also on Santa Catalina Island. ●H: bulbous perennial herbs that annually produce upwardly branching stems that range from about 2 to 6 dm. (8-24") tall. The leaves are linear and range from about 2 to 20 cm. long. The largest leaf is basal and withers with the growth of the stem, while the cauline leaves become increasingly reduced in length upward on the stem and branches, and the upper most are bract like. The flowers are singular and terminal on the branches. The outer segments of the campanulate perianth are lance-ovate and about 2 to 3 cm. long, while the inner segments, which are dark to pale lilac, are obovate and about 3 to 5 cm. long. The inner segments have long fungus like hairs on the gland. The fruit is a linear and angled capsule about 2 to 7 cm. long. ֍May-June.

FRITILLARIA. FRITILLARY.

Fritillaria consists of approximately 100 species that occur in temperate regions of the northern hemisphere. The name is based on the Latin word *fritillus*, a dice box, alluding to the shape of the seed capsules of some species.

1a. Plants about 2 dm. to 12 dm. (8-48") tall. Middle cauline leaves produced in whorls. Flowers nodding. . . . . ***F. affinis***.
1b. Plants about .7 to 2 dm. (3-8") tall. Cauline leaves alternate. Flowers positioned upward or outward. . . . . ***F. falcata***.

Fritillaria affinis (Schultes) Sealy [*Lilium affine* Schultes; *F. lanceolata* Pursh]. CHECKER LILY, MISSION BELLS. I have seen this species at only two sites in this region: in shady and seasonally moist depressions within a few hundred feet southwest of the four way trail intersection at the Church Creek Divide, and on Pine Ridge, on serpentine rock in the generally open area west of the trail. According to James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975), it is also present on Chew's Ridge, but uncommon. ●R: British Colombia and Idaho southward, through the Cascades and Coast ranges, to the western Transverse Ranges of Santa Barbara and Ventura counties. ●H: bulbous perennial herbs with erect stems that range from about 2 to 12 dm. (8-48") tall. The basal leaf, which is produced and shed in advance of the rising stem, have long petioles which terminate with very broadly obovate blades. The cauline leaves are about 4 to 16 cm. long and are generally narrowly lanceolate; the lower are whorled and the upper are alternate. The flowers are produced in terminal racemes; the flowers are positioned in the axils of the upper leaves on generally recurving pedicels that are about 5 to 25 mm. long. The perianth is divided to the base into oblong to ovate segments that are about 1.5 to 4 cm. long. The coloration of the segments range from brown purple and mottled with yellow and white, to pale greenish yellow and faintly mottled with purple. The fruits are six angled capsules that are about 1.5 to 2.5 cm. long. ֍February-June.

∨***Fritillaria falcata*** (Jepson) Beetle [*F. autropurpurea* var. *f.* Jepson]. TALUS FRITILLARY. This species is rare and apparently rather ephemeral on north facing granitic talus slopes along the Pine Ridge Trail above Bear Basin (near the Tassajara Canyon overlook), and on serpentine talus on Pine Ridge. The former population was discovered by Ronald Branson and the latter by Vern Yadon, both in early July of 1980 (Yadon field notes, July 5-5 1980). As talus slopes are rather common in areas of the Tassajara region that are not accessible by trails, the species may be more widely scattered in this region. ●R: a rare species of serpentine talus slopes in the Diablo Range, from Alameda County to the San Benito Mountain region of southeastern San Benito County, and on granitic and serpentine talus slopes in the vicinity of the South Ventana Cone and adjacent Pine Ridge. ●H: small bulbous perennial herbs with stems that range from about 7 to 20 cm. (3-8") tall. The leaves number from two to six; they are broadly linear and upwardly folded and curved, like a sickle. The leaves, which are fleshy toward the base, are about 4 to 8 cm. long. The flowers are singular and terminal or produced in two to four flowered terminal racemes. The perianths are divided to the base into six obovate segments that are about 15 to 22 mm. long; the segments are greenish externally and mottled rusty brown and yellow internally. The fruits are three valved and sharply angled capsules that are about 2 cm. long. ֍March-July.

LILIUM. LILY.

This well known genus consists of about 105 species of the temperate regions of the northern hemisphere and the tropical mountains of eastern Asia. The name is derived from the ancient Greek word for white lilies, *lirion*.

Lilium pardalinum Kellogg. LEOPARD LILY, PANTHER LILY. This showy flowered species is widely scattered in wet and usually shady habitats in the Tassajara region, but it is fairly rare, although it is locally common along Church Creek above The Caves. A colony has long been established along Wildcat Creek above the 'Cascades' or 'Bathtub Spring' along Tassajara Road (twelve plants were counted at this site in June of 1992), and a single plant has persisted for many years in a rock crevice on the south bank of the deepest pool at The Narrows. In 2009 a plant was established along Tassajara Creek immediately upstream from the confluence of Oryoki Creek, but this plant was washed away when an upstream debris dam gave way during the winter of 2009-2010. Perhaps its

bulb was washed into in a thicket of *Carex nudata* (Torrent Sedge) tufts in the immediate vicinity of the first stream crossing of the upstream trial beyond the junction of the trail over the Hogback, where a fully mature plant was discovered in the spring of 2010. According to the note enclosed in the envelope pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of this species (Elmer 3383 DS), it was collected along "Zigzag Creek, near junction of trails." ●R: Cascade Ranges, Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Lane County in western Oregon to northern Baja California. ●H: bulbous perennial herbs with erect stems that range from about 1 to 2 m. (40-80") tall. The leaves are lanceolate to linear and about .3 to 2 dm. long and 6 to 25 mm. wide. The lower and upper leaves are singular and alternate, while the middle leaves are produced in remote whorls of three's to eight's. The flowers are produced in terminal racemes, and the flowers face more or less downward on reflexed pedicels that are about 6 to 12 cm. long. The perianth is divided into six lanceolate and strongly reflexed segments that are about 5 to 11 cm. long; the segments vary from yellow to reddish orange and are speckled with maroon spots. The fruits are three celled capsules that are about 3 to 6 cm. long. ❁May-July.

PROSARTES. FAIRY BELLS.

Prosartes consists of six species of temperate North America; they were formerly placed in the genus *Disporum*. The name is derived from the Greek word *prosarto*, to append, and alludes to the pendulous ovules of the type species, *P. lanuginosa*.

∨***Prosartes hookeri*** Torrey [*Disporum h.* (Torrey) Nicholson]. This species is scattered in shady and often wet or seasonally wet habitats at higher elevations in this region. Plants are fairly regularly encountered in suitable habitats along the Pine Ridge Trail, such as between Tassajara Road and the first summit to the west, and between the Church Creek Divide and Pine Ridge. ●R: from British Columbia and Montana to California, where it extends southward in the Coast Ranges to the Santa Lucia Mountains of northwestern San Luis Obispo County, and to Tulare County in the Sierra Nevada. ●H: perennial herbs from slender root stocks, with generally erect and leafy stems that range from about 3 to 8 dm. (12-32") long. The alternate leaves are about 3 to 15 cm. long, and the blades are ovate to oblong-ovate and clasp the stem at the base. The pendulous flowers are produced singularly or in groups of two or three at the end of the branches, and the perianth is divided to the base into two series of three greenish to creamy white and narrowly elliptic to oblanceolate segments; the segments are about 8 to 15 mm. long. The fruits are scarlet berries, which are ovoid to globose and about 7 to 9 mm. wide. ❁March-May.

MELANTHIACEAE. FALSE HELLEBORE FAMILY.

Melanthiaceae includes ten genera and about 130 species of the northern hemisphere. The genera were formerly placed in *Liliaceae*, the Lily Family.

TOXICOSCORDION. DEATH CAMAS.

Toxicoscordion includes about 8 species of central and western temperate North America that have been segregated from *Zigadenus*. The name is derived from Greek and means poisonous garlic, alluding to the toxic bulbs.

1a. Perianth segments 4 to 6 mm. long, stamens longer than the segments. Plants of wet or moist habitats. . . . . ***T. venenosum***.
1b. Perianth segments 5 to 15 mm. long, the stamens shorter than the segments. Plants of dry habitats. . . . . ***T. fremontii***.

!*Toxicoscordion fremontii* (Torrey) Rydberg [*Zigadenus f.* (Torrey) S. Watson; *Anticlea f.* Torrey]. STAR LILY. The only area in the Tassajara region where this species is known to occur is along the Black Cone Trail between South Ventana Cone and the Elephant's Back, and along the Pine Ridge Trail northeast of Pine Ridge. It was abundant in these areas during the first springs after the Kirk Complex Fire of 1999 and the Basin Complex Fire of 2008. ●R: Coast, Transverse and Peninsular ranges, from Coos County in southwestern Oregon to northern Baja California. Also in the Sierra Nevada foothills, from Shasta County to Tuolumne County, and on the northern Channel Islands. ●H: bulbous perennial herbs with erect stems that range from about 3 to 10 dm. (12-40") tall. The leaves, which are narrowly linear and sheathing, are about 2 to 6 dm. long and 8 to 25 mm. wide. The flowers are produced in terminal and often paniculate racemes that are about 5 to 40 cm. long; the pedicels are up to 4 cm. long. The perianth is divided into six lance-ovate and white or yellowish white segments about 8 to 15 mm. long; the nectar glands are yellow. The fruit is a three lobed cylindric capsule about 15 to 35 mm. long. ❁March-May.

Toxicoscordion venenosum (S. Watson) Rydberg [*Zigadenus venenosus* Watson]. DEATH CAMAS. This species is known to occur in only two areas in this region: in the bed of the Arroyo Seco near the confluence of Tassajara Creek, and along brooks in Pine Valley. ●R: widely scattered in the mountains of temperate western North America, from British Columbia and Alberta to Utah and northern Baja California. ●H: bulbous perennial herbs with erect stems that range from about 2.5 to 6 dm. (10-24") tall. The leaves are narrowly linear and about 1 to 4 dm. long. The flowers are produced in terminal racemes about 5 to 25 cm. long; the flowers are on pedicels about 1 to 2 cm. long. The white or whitish perianth is divided into six ovate segments about 3 to 6 mm. long. The fruit is a three lobed cylindric capsule about 8 to 15 mm. long. ❁May-July.

ORCHIDACEAE. ORCHID FAMILY.

According to the Jepson eFlora website, *Orchidaceae* includes about 800 genera and about 25,000 species, while according to the Angiosperm Phylogeny website this family consists of about 880 genera and approximately 27,800 species. In any case, *Orchidaceae* is the largest family of vascular plants. This family is primarily tropical, and is particularly well represented in tropical rain forests, where most species are epiphytic, i.e., non parasitic plants which grow on the trunks and branches of trees. The family is the source of many ornamentals, and vanilla is derived from the fruit of *Vanilla planifolia*.

1a. Plants saprophytic (without chlorophyll and thus not green, and living off of decaying organic material). Leaves comprised of bladeless sheaths:
  2a. Plants white. Sepals 12 to 20 mm. long. . . . . ***Cephalanthera***.
  2b. Plants yellowish green to purplish. Sepals less than 10 mm. long. . . . . ***Corallorhiza***.
1b. Plants not saprophytic and thus green. Leaves well developed, at least at the base:

3a. Plants with two broad and strictly basal leaves (upper leaves small bract like structures). Flowers spurred on lower side. Plants of dry habitats. . . . . ***Piperia***.

3b. Plants leafy throughout. Flowers not spurred. Plants of stream banks, springs, seeps, etc. . . . . ***Epipactis***.

CEPHALANTHERA. PHANTOM ORCHID.

This is a primarily Eurasian genus that is comprised of about 15 species of saprophytic perennial herbs. The name is derived from the Greek words *kephale*, head, and *anthera*, anther, on account of the head like anthers.

<>***Cephalanthera austiniae*** (A. Gray) A. Heller [*Chloroea a*. Gray; *Eburophyton austinae* (Gray) Heller]. This exotic species is rare in the Tassajara region, and it is only know to occur on Pine Ridge and along the Carmel River below the campground in Pine Valley. According to the note that is enclosed in an envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of June, 1901, (Elmer 3237 DS), he collected it in "Canyon below Pine Valley cabin." Elsewhere in the Santa Lucia Mountains this species this species is only known to occur on the Coast Ridge in the vicinity of Redwood Springs. These populations are greatly disjunct from the nearest documented population, which is in the vicinity of the petrified forest in eastern Sonoma County. ●R: from British Columbia and Idaho to California. In California it occurs in the North Coast Ranges, from Sonoma and Lake counties northward, and in the Sierra Nevada, from Butte and Plumas counties to Tulare County. Disjunct populations occur in the Santa Lucia Mountains of Monterey County, in the San Bernardino Mountains of San Bernardino County, in the San Jacinto Mountains of Riverside County, and on Hot Springs Mountain in San Diego County. ●H: saprophytic perennial herbs from creeping rootstocks, the stems are erect and range from about 2 to 5.5 dm. (8-22") tall. The entire plant is at first white but becomes yellowish or brownish with age. The leaves are bladeless sheaths that are about 2 to 6 cm. long. The flowers are produced in dense terminal racemes on pedicel like floral columns that are about 4 to 9 mm. long. The perianth, which is about 12 to 20 mm. long, is outwardly divided into elliptic to oblanceolate segments, while the lower and shorter inner segment (the lip) is upwardly folded and has a yellow spot. The fruits are ripening floral columns that are about 4 to 9 mm. long. ❀May-June.

CORALLORHIZA. CORAL ROOT.

The genus *Corallorhiza* includes 11 species, 10 of which are endemic to North and Central America (*C. trifida* has a circumboreal distribution). The name is based on the Greek words *korallion*, coral, and *rhiza*, root, alluding to the coral like appearance of the roots.

Corallorhiza maculata Rafinesque [*C. multiflora* Nuttall; *C. maculata* var. *occidentalis* Lindley]. SPOTTED CORAL ROOT. This species lightly scattered in densely wooded areas on Chew's Ridge and in the upper watershed of the Carmel River. Prior to the Marble Cone Fire of 1977, this species occurred along the Pine Ridge Trail between Tassajara Road and the first summit to the west, an area that, prior to the fire, was a dense woodland that was dominated by Tan Oaks. Specimens were collected in this locality by Beatrice Howitt in 1958 (Howitt 1059; PGM 6369), and by Vern Yadon in 1969 (PGM 491), and this is probably where Junea Kelly collected her "Tassajara Springs" specimen in July of 1916 (CAS). James Griffin collected a specimen on Chew's Ridge "North of summit below Tassajara Road" in June of 1973 (Griffin 3650; JEPS 73780), and A. D. E. Elmer's "Tassajara Hot Springs" specimen of June 1901 (Elmer #3236, DS) was collected, according to the note enclosed in the envelope that is pasted to the specimen sheet, in "Fir Canyon above big oak," which is almost certainly the canyon of Ventana Mesa Creek. ●R: widely distributed in North America, from British Columbia and Newfoundland to Guatemala. In California this species ranges southward in the Coast Ranges to the Santa Lucia Mountains of Monterey County, and to the Greenhorn Mountains of Kern County in the Sierra Nevada. Disjunct populations occur in the higher mountains of Los Angeles, San Bernardino, Riverside and San Diego counties. In California this species primarily occurs in mountainous regions between 3,000 and 9,000 feet. ●H: saprophytic perennial herbs from short coral like rhizomes; the brownish stems are erect and about 2 to 7 dm. (8-28") tall. The 'leaves' are bladeless sheaths. The flowers are produced in spike like racemes on pedicels about 3 to 5 mm. long. The three outer perianth segments, which are about the same color as the stems, are about 7 to 10 mm. long. The inner segments are shorter, and the irregularly lobed lower segment (the lip) is white with crimson veins and spots, while the entire upper segments are crimson to deep pink. A spur less than 2.5 mm. long is located at the lower base of the perianth. The fruit is a three valved and minutely seeded capsule about 15 to 25 mm. long. ❀June-August.

EPIPACTIS. HELLEBORINE, STREAM ORCHID.

Epipactis consists of about 25 species that are endemic to temperate regions of the northern hemisphere. One etymology for the name is that it is "Either from the Greek *epipaktis* or *epipegnuo*, the name adopted for this genus which was originally called helleborine [*Serapia helleborine* L, *=Eplipactis h*. (L.) Crantz], and which refers to a milk-curdling property claimed for some species." Another etymology states that it is an ancient Greek name used by Theophrastus for a plant that was used to curdle milk.

Epipactis gigantea Douglas ex Hooker. GIANT STREAM ORCHID. This species has been found at three locations in the watershed of Tassajara Creek. One is along Tassajara Creek about a quarter of mile downstream from The Narrows. At this site it grows in bed of Tassajara Creek, and in the immediate vicinity of this site it also occurs in the seepy rocks at the base of a small stream that enters Tassajara Creek from the west (these populations were observed during the summer of 2010). It has also been observed growing in seepy cracks in boulders along Tassajara Creek between the Horse Pasture Trail crossing and the Arroyo Seco River. David Basil discovered another population in the later 1990s; it was at a point along Tassajara Creek about a third or a half mile upstream from the confluence of Willow Creek, where a cliff that is at least 100 feet high overhangs the stream. A. D. E. Elmer's "Tassajara Hot Springs" specimen of June 1901 (Elmer #3220 DS) was collected, according to the note enclosed in the envelope that is attached to the specimen sheet, at the "Fall in Fir Canyon" (probably the canyon of Ventana Mesa Creek, where Santa Lucia Firs are common). ●R: widely distributed in temperate western North America, from British Columbia to South Dakota, Colorado, Texas, northern Mexico and northern Baja California. It also occurs in southern Japan, China and in the Himalayan Mountains (Tibet, India and Pakistan). ●H: perennial herbs with erect or ascending stems that range from about 3 to 9 dm. (1-3') tall. The leaves are alternate and sheathing, the larger ones, which are about 5 to 15 cm. long, range from broadly to narrowly lanceolate. The flowers are produce in terminal spike like racemes in which the flowers are singular in the axils of the reduced upper leaves. The floral columns are about 4 to 9 mm. long. The three outer perianth segments are concave, about 12 to 20 mm. long, and light green with reddish purple veins, the dorsal segment is

smaller and generally elliptic-lanceolate, while the lateral segments are ovate to lance-ovate. The upper two inner segments are about 13 to 15 mm. long and are purplish to reddish, while the lower segment (the lip) is about 14 to 20 mm. long. The lower half is broad, concave, and yellowish with reddish purple veins, while the upper half is narrowed, grooved, twice constricted, and yellow and reddish tinged or veined below. The fruit is a three valved and minutely seeded capsule about 20 to 28 mm. long. ֍May-August.

PIPERIA. REIN ORCHID.

Piperia consists of ten species that are endemic to North America. The genus was named for the North American botanist Charles Vancouver Piper (1867-1926).

1a. Flower spurs 6 to 18 mm. long:
- **2a**. Spur generally straight and perpendicular to inflorescence axis. Upper sepal pointed forward. Stem generally less than 3 mm. in diameter. . . . . ***P. transversa***.
- **2b**. Spur generally curved and parallel to inflorescence axis. Upper sepal ascending to erect to curved back. Stem generally more than 3 mm. in diameter:
  - **3a**. Lateral petals generally sickle-shaped, 2 mm. wide at base, and 2 to 3 times as long. . . . . ***P. elongata***.
  - **3b**. Lateral petals linear, 1 mm. wide at base, and 4 to 5 times as long. . . . . ***P. leptopetala***.

1b. Flower spurs 1 to 6 (-9) mm. long:
- **4a**. Lateral petals linear, and 4 to 5 times longer than wide. Spur tapered. . . . . ***P. leptopetala***.
- **4b**. Lateral petals lanceolate to deltate-ovate, and 3.5 times longer than wide. Spur cylindric. . . . . ***P. unalascensis***.

Piperia elongata Rydberg. ELONGATE REIN ORCHID. This species is widely scattered but uncommon in shady habitats in the Tassajara region, and it is found primarily in mixed evergreen forests and in dense stands of tall *Ceanothus* dominated chaparral. ●R: from British Columbia and western Montana to California, where it extends southward, through the Sierra Nevada and the Coast, Transverse and Peninsular ranges, to San Diego County. Also on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: bulbous perennial herbs which annually produce a slender and erect stem that ranges from about 1 to 13 dm. (4-52") tall. Before the rise of the flowering stem the plants produce two basal and sub opposite prostrate leaves; the long leaves range from about 8 to 30 cm. long and 10 to 65 mm. wide. Upper 'leaves' are small bract like structures. The flowers are produced on narrow spikes that are up to 3 dm. long. The asymmetrical perianths are about 4 to 6.5 mm. long, and are at first pale green to greenish white, but turn reddish brown with age. Protruding from the base of the perianth is a narrow and curving spur that ranges from about 6 to 14 mm. long. The fruit is a narrowly cylindric capsule that contains countless very minute seeds. ֍May-July.

+***Piperia leptopetala*** Rydberg. NARROW FLOWERED REIN ORCHID. This entry is based on a specimen that was collected along the Pine Ridge Trail at Divide Camp by Vern Yadon in June of 1979 (PGM 1941). ●R: Cascade Ranges, Sierra Nevada and the Coast, Transverse and Peninsular ranges, from Klickitat County in southern Washington to San Diego County. ●H: bulbous perennial herbs with erect stems that range from about 1.2 to 7 dm. (5-30") tall. The two prostrate basal leaves are about 6.5 to 15 cm. long, and 15 to 30 mm. wide. The flowers are produced on a slender spikes that range from about 4 to 40 cm. long. The asymmetrical flowers are green and about 1 cm. long, inclusive of the slender spur. The fruit is a narrow capsule. ֍May–July.

+***Piperia transversa*** Suksdorf. SIDEWAY SPURRED REIN ORCHID. In July of 1973 James Griffin collected a specimen of this species at a point along Tassajara Road that was about 4,000 ft. in elevation (Griffin 3754; JEPS 74192). Thus it could have been collected in the vicinity of the bend in the road that is known as Mary's Flats (between Bruce Flat's and White Oaks Camp), or at a point along the road about half way between the Bathtub Spring (The Cascades) and the bend in the road (on a shoulder of Black Butte) between the Bathtub Spring and the Black Butte summit. This species was also collected somewhere along Tassajara Road by Randall Morgan in 1988 (UCSC 8210). It also occurs in the upper region of Miller Canyon, between China Camp and the former Chew homestead (now owned by Tanbark Inc.), were a specimen of it was collected by Harvey Monroe Hall in July of 1915 (Hall 10074; UC 186201). ●R: Cascade Ranges, Sierra Nevada and the Coast, Transverse and Peninsular ranges, from British Columbia to San Diego County. ●H: bulbous perennial herbs with erect stems that range from about 12 to 60 cm. (5-24") tall. The two basal leaves are about 6 to 19 cm. long and 10 to 45 mm. wide. The flowers are produced on slender spikes that are about 7 to 26 cm. long, and the small asymmetrical flowers are white to yellowish and have green veins; the spur is about 6 to 12 mm. long. ֍May–August.

Piperia unalascensis (Sprengel) Rydberg. This species probably occurs in the Tassajara region, for Vern Yadon collected a specimen of it along "Along Arroyo Seco Road—near Santa Lucia Road crossing" in May of 1992 (PGM 4326). I have thus included it in the preceding key.

POACEAE (*Gramineae*). GRASS FAMILY.

According to the Angiosperm Phylogeny Website, *Poaceae* consists of about 707 genera and approximately 11,337 species. Although in regards to the number of species *Poaceae* ranks as the fifth largest vascular plant family, its species typically greatly excel in their multitudes of extant plants. Thus, as a whole, Poaceae is the largest vascular plant family in regards to the total percentage of the earth's terrestrial vegetation, and it is estimated that in the present epoch grasses dominate 20% of the land surface of the planet. Grasses are generally common to abundant in nearly all regions of the Earth, and are absent only in areas that are too cold or too dry to support any form of plant life.

The domestication of cereal grasses, such as wheat, rice, corn, oats, barley, millet and sorghum, lies at the foundation of the development of early civilizations. Another major food crop is sugar cane (*Saccharum*). As grasses are used extensively as both forage and feed for domestic livestock, they play a major role in the production of meat, eggs and dairy products. In East Asia the bamboos are very important sources of building and manufacturing materials, and kusa grass is used extensively in the manufacture of flooring materials, such as tatami mats. Grasses are also extensively used as ornamentals, especially in the form of lawns.

Human activities, such as the practice of agriculture, the trade of agricultural goods and migrations have greatly altered the natural distribution of many grass species, perhaps to a greater extent than that of any other family of flowering plants. This is particularly true in California, were European annuals now dominate most of the grassland habitats within the state. Although the exact nature of the pristine grasslands of the California Floristic Province is lost in antiquity (the only historical descriptions of such habitats are so scant in specific

information that definite conclusions cannot be made), the great majority of the native grasses are perennial, while the majority of introduced species are annual. It is thus fairly certain that the pristine grasslands of California were dominated by perennial bunch grasses.

1a. Lemmas (grains) without awns:
2a. Spikelets with one lemma (or rarely with 2), or with one fertile (grain producing) lemma and one small infertile lemma:
3a. Inflorescence comprised of palmately (digitally) divided panicles (the branches diverging from a common point). Spikelets borne in two overlapping rows on the upper side of the rachis (axis) . . . . . ***Cynodon***.
3b. Inflorescence a branching panicle:
4a. Glumes covered with upwardly curving barbs. . . . . ***Echinochloa***.
4b. Glumes without barbs:
5a. Lemmas round or roundish. . . . . ***Panicum***.
5b. Lemmas not round or roundish:
6a. Glumes paper like; the lower 3 to 5 veined, the upper 1 to 3 veined. . . . . ***Melica imperfecta***.
6b. Glumes not paper like and 1 veined. . . . . ***Agrostis***
2b. Spikelets with two or more fertile (grain producing) lemmas:
7a. Upper glume wider (when flattened) than the lower glume. . . . . ***Koeleria***.
7b. Glumes more or less alike in shape:
8a. Lemmas with tufts of cobwebby hairs at the outside base. . . . . ***Poa***.
8b.Lemmas without tufts of hairs at the base:
9a. Lemmas five veined (two of these may be faint). . . . . ***Poa secunda***.
9b. Lemmas seven to nine veined. . . . . ***Melica***.
1b. Lemmas with long to very short awns:
10a. Lemmas rarely with an awn. . . . . ***Agrostis***.
10b. Lemmas always with awns (they can be very short and stubby):
11a. Inflorescence a spike, i. e., the spikelets are sessile along the axis of an unbranched inflorescence:
12a. Spikelets produced in groups of three's, each spikelet with one fertile floret. Glumes awn like. . . . . ***Hordeum***.
12b. Spikelets produced singularly or in groups of two's to four's, each spikelet with two or more fertile florets. Glumes awn like only in *Elymus multisetus*:
13a. Spikelets two to four at most nodes. . . . . ***Elymus***.
13b. Spikelets singular at each node:
14a. Spikelets appressed to the side of the rachis. . . . . ***Elymus stebbinsii***.
14b. Spikelets turned edgewise to the rachis. . . . . ***Festuca perennis*** (*Lolium*).
11b. Inflorescence a branching panicle (panicles with short and upwardly appressed branches may at first appear to be spikes- bend the inflorescence if not sure):
15a. Lemma awns originating on the back side of the lemmas:
16a. Spikelets with two or more lemmas:
17a. Glumes 12 to 30 mm. long and 5 to 7 veined. . . . . ***Avena***.
17b. Glumes not more than 10 mm. long and no more than 5 veined:
18a. Delicate annual herbs. Panicle branches spreading. Not restricted to wet habitats. . . . . ***Aira***.
18b. Perennial bunch grasses. Panicle branches upwardly contracted. Restricted to wet habitats. . . . . ***Deschampsia***.
16b. Spikelets with one lemma:
19a. Annual herbs of dry habitats. Glumes and lemma awns three or more times longer than the lemma. . . . . ***Gastridium***.
19b. Perennial herbs of wet habitats. Glumes and lemma awns less than twice as long as the lemma. . . . . ***Calamagrostis***.
15b. Lemma awns terminal (they may protrude from a deep bifid apex and thus appear at first not to be terminal):
20a. Spikelets with one lemma:
21a. Lemma awn much more than three times longer than the lemmas. Glumes persistent, the lemmas fall individually. . . ***Stipa***.
21b. Lemma awns less than three times longer than lemmas. Spikelets disarticulating below glumes and falling as a unit. . . . . ***Polypogon***.
20b. Spikelets with two or more lemmas:
22a. Lower glumes longer than the lowest lemmas. Awns twisted near the base. . . . . ***Danthonia***.
22b. Lower glumes shorter than the lower lemmas (except in *Elymus glaucus* & *multisetus*). Awns not twisted near the base (except in *Trisetum*):
23a. Glumes (and lemmas) papery. Lemmas clearly 5 to 7 veined, the upper margins usually translucent. . . . . ***Melica***.
23b. Glumes not papery. Lemmas obscurely veined, the margins usually opaque:
24a. Lemmas with two teeth at the apex (on opposite sides of the base of the lemma awns):
25a. Lemmas body 7 to 17 mm. long. . . . . ***Bromus***.
25b. Lemma body 4 to 7 mm. long. . . . . ***Festuca elmeri***.
24b. Lemmas without two teeth at the apex (the apex is bifid in *Trisetum*):
26a. Spikelets strongly compressed and borne in dense one sided clumps at the ends of relatively stiff panicle branches. Lemma awns stubby and about .5 to 2 mm. long. . . . . ***Dactylis***.
26b. Spikelets not strongly compressed and not borne in dense one sided clumps. Lemma awns 2 to 15 mm. long:
27a. Lemma awns wavy and protruding from a deep bifid apex. . . . . ***Trisetum***.
27b. Lemma awns straight and not protruding from a bifid apex. . . . . ***Festuca***.

AGROSTIS. BENT GRASS.

Agrostis is a widely distributed (but primarily northern temperate) genus that consists of about 220 species. The name is based on the Greek word *agron* or *agros*, field, pasture or green fodder, which is undoubtedly a root word for agriculture.

1a. Panicle densely floriferous, the branches erect to ascending. Sheaths glabrous. . . . . ***A. exarata***.
1b. Panicle sparsely floriferous, the branches ascending to spreading. Sheaths pubescent. . . . . ***A. pallens***.

Agrostis exarata Trinius. WESTERN NORTH AMERICAN BENT GRASS. This species is scattered along streams and in other generally wet or moist habitats at all elevations in the Tassajara region. ●R: widely distributed in western North America, from Alaska to the Great Plains and northern Mexico. ●H: moderately to densely cespitose perennial herbs with culms that range from about 2 to 12 dm. (1-4') tall. The blades are about 4 to 15 cm. long and 2 to 10 mm. wide. The inflorescence is a dense panicle that is comprised of upwardly contracted or upwardly ascending branches that bear hundreds of small spikelets. The one flowered spikelets have sub equal glumes that are about 2.5 to 4 mm. long. The lemmas are about 1.7 to 2 mm. long, and they sometimes have a short awn that protrudes from the back side of lemma above the middle. ❀June-August.

Agrostis pallens Trinius [*A. diegoensis* Vasey]. LEAFY BENT GRASS. This species is lightly scattered on shady and seasonally moist woodland slopes in the vicinity of Tassajara Hot Springs and along Willow Creek, and probably in other areas in this region. ●R: western North America, from British Columbia and Montana to northern Baja California. This species is reported to have a common form in which the lemmas are awned. ●H: loosely cespitose rhizomatic perennials with culms that range from about 4 to 10 dm. (16-40") tall. The rather lax blades, which are flat or sometimes involute, are about 2 to 3 dm. long and 2 to 6 mm. wide The inflorescence is a relatively narrow panicle that is comprised of loosely ascending branches. The glumes of the one flowered spikelets are nearly equal in length and about 2.5 to 3 mm. long. The awnless lemmas are about 1.5 to 2.5 mm. long. ❀April-August.

AIRA. HAIR GRASS.

The genus *Aira* consists of about nine species that are native to western Eurasia and Africa. *Aira* is a Greek name for some kind of weedy grass.

Aira caryophyllea Linnaeus [*Aspris c.* (L.) Nash]. SILVER HAIR GRASS. These annual herbs are widely scattered in the Tassajara region, and they are locally common in areas with poor or sandy soils. This species was very abundant in this region during the first spring after the Basin Complex Fire of 2008, including areas of burnt out chaparral. ●R: a common weed in North America; native to Eurasia. ●H: small annual herbs with slender culms that range from about 1 to 3 dm. (4-12") tall. The nearly filiform blades are mostly basal and range from about .5 to 7 cm. long and .5 to 2 mm. wide. The inflorescence is an open and slender branched panicle. The two flowered spikelets have silvery-shiny glumes that are about 3 mm. long; they completely enclose the lemmas. The lemmas are about 1.5 to 2 mm. long, and the lemma awns are about 3 to 4 mm. long. ❀April-May.

AVENA. OATS.

Avena consists of 29 species that are native to northern temperate regions of the eastern hemisphere. The name is the Latin word for oats. The most commonly cultivated oat is *Avena sativa*.

1a. Glumes 20 to 30 mm. long. Lemmas with two bristles at the apex that are about 3 to 4 mm. long. Foliage generally glabrous. . . . . ***A. barbata***.
1b. Glumes 12 to 18 mm. long. Lemmas with a minutely bifid apex, the segments less than 1 mm. long. Foliage sparsely pubescent. . . . ***A. fatua***.

Avena barbata Pott ex Link. SLENDER WILD OAT. This alien species is widely scattered and locally common in grasslands and in other open habitats at all elevations in the Tassajara region. ●R: widespread in western North America; native to the Mediterranean Region. ●H: annual herbs with relatively slender culms that range from about 3 to 6 dm. (1-2') tall. The flat blades are about 2 to 6 mm. wide. The inflorescence is an open and typically nodding panicle on which the spikelets hand on the spreading branches. The glumes of the usually two flowered spikelets are nearly equal in length (they are about 18 to 30 mm. long). The lemmas are about 12 to 18 mm. long and have a twisted awn protruding from the back. ❀March-June.

!*Avena fatua* Linnaeus. COMMON WILD OAT. This well known species is widespread and locally common to abundant at all elevations in the Tassajara region, and especially so in grasslands. It was exceedingly abundant in many grassy areas during the first spring after the Basin Complex Fire of 2008. ●R: one of the most common of the introduced grass species in North America; native to the northern temperate regions of the eastern hemisphere. ●H: annual herbs with culms that range from about 3 to 12 dm. (1-4') tall, or sometimes as much as 2 m. (6.5') tall. The blades are flat and range from about 4 to 12 mm. wide. The inflorescence is an open and typically nodding panicle on which the spikelets pendulously hang on the widely spreading branches. The spikelets are usually three flowered, and the nearly equal glumes are about 18 to 25 mm. long. The lemmas are about 14 to 20 mm. long, and have bent awns that are about 25 to 40 long; the awns originate from about the middle of the back side. ❀March-June.

BROMUS. BROME, CHESS.

Bromus consists of about 160 to 170 species of annual and perennial herbs, which, as a whole, are widely distributed in temperate regions. The name is derived from the ancient Greek word *bromos*, a name for oats, which was based on *broma*, food.

1a. Spikelets strongly flattened, the lemmas and glumes sharply creased on the back side:
  2a. Most lemma awns 7 to 15 mm. long. . . . . ***B. carinatus***.
  2b. Most lemma awns 4 to 7 mm. long. . . . . ***B. carinatus*** var. ***marginatus***.
1b. Spikelets not strongly flattened, the lemmas (and sometimes glumes) rounded over mid rib and not sharply creased on the back side:
  3a. Panicles dense and upwardly contracted. All spikelets short stalked or nearly sessile, and erect or ascending:
    4a. Lemmas narrowly lanceolate, the awns 10 to 25 mm. long. . . . . ***B. rubens***.
    4b. Lemmas oblong and rounded at each end, the awns 4 to 10 mm. long. . . . . ***B. hordeaceus***.
  3b. Panicles open, the lower branches ascending-spreading to drooping. Spikelets long stalked:
    5a. Lemma awns (8) 10 to 55 mm. long:
      6a. Lemma body 18 to 30 mm. long, the awns are 30 to 65 mm. long. . . . . ***B. diandrus***.

6b. Lemma body 9 to 15 mm. long, the awns are 8 to 30 mm. long:
7a. Lemma awns 18 to 30 mm. long. . . . . ***B. sterilis***.
7b. Lemma awns 8 to 18 mm. long:
8a. Lower glume one veined. Lemmas narrow and tapering to an acute apex. . . . . ***B. tectorum***.
8b. Lower glume three veined. Lemmas relatively broad and rounded at the apex. . . . . ***B. arenarius***.
5b. Lemma awns less than 9 mm. long:
9a. Upper glume five veined. Lemma unevenly hairy. Sheaths glabrous or rarely with outwardly spreading hairs
10a. Ligules (1.5) 2 to 4 mm. long. Blades and sheaths glabrous. Glumes glabrous, the upper 7 to 11 mm. long. . . ***B. laevipes***.
10b. Ligules .4 to 1 (2) mm. long. Blades and sheaths hairy or glabrous. Glumes scabrous or hairy, the upper 6 to 9 mm. long. . . ***B. pseudolaevipes***.
9b. Upper glume three veined. Lemma evenly pubescent or glabrous. Sheaths with downwardly angled hairs:
11a. Panicles 14 to 21 cm. long, the lower branches spreading to drooping, the spikelets typically hanging in a more or less pendulous manner. Longest leaf blades (13) 18 to 38 cm. long. Nodes 3 to 7 per stem. . . . . ***B. grandis***.
11b. Panicles 5 to 16 cm. long, the lower branches ascending to spreading, the spikelets not pendulous. Longest leaf blades 7.5 to 16.5 mm. long. Nodes 1 to 2 (3) per stem. . . . . ***B. hallii***.

Bromus arenarius Labillardiere. AUSTRALIAN BROME. This introduced species is sporadic in grasslands and in grassy openings in chaparral at lower and intermediate elevations in the Tassajara region. In the vicinity of the hot springs it is known to occur at three sites: a small grassland area in The Pines below Lime Point, in an opening in chaparral along Tony's Trail on the hot springs side of the grade, and in the Tassajara cemetery on the Hog's Back. The Hog's Back plants may be descendants of plants that were included in bouquets that were placed at the graves, for the wavy stemmed panicles of this species have an ornamental appeal. ●R: a common weed grass in California, Oregon, Nevada and Arizona; native to Australia. This is the only *Bromus* species that is native to Australia. ●H: annual herbs with culms that range from about 2 to 6 dm. (8-24") tall. The blades are about 6 to 12 cm. long and 2 to 6 mm. wide. The inflorescence is an open and upwardly nodding panicle with very slender (and nearly hair like) wavy branches, on which the spikelets dangle in a more or less pendulous manner. The 5 to 9 flowered spikelets are about 1 to 1.75 cm. long, and the glumes are about 5 to 10 mm. long; the lower glume is shorter than the upper glume. The lemmas are about 7 to 10 mm. long and are terminated by slender awns that range from about 6 to 16 mm. long. ❀April-June.

Bromus carinatus Hooker & Arnott. CALIFORNIA BROME. According to revision 7 of the Jepson eFlora, this taxon in now *B. sitchensis* var. *carinatus*, This species is widespread and locally common in grasslands and other open or semi open habitats at all elevations in the Tassajara region. ●R: western North America, from British Columbia and Alberta to northern Baja California, New Mexico and Kansas. ●H: annual or perennial herbs with culms that range from about 5 to 15 dm. (20-60") tall. The blades are flat and range from about 1.5 to 4 dm. long and 3 to 12 mm. wide. The inflorescens are relatively large and generally nodding panicles that are about 1.5 to 3 dm. long; the branches vary from loosely ascending to widely spreading. The strongly compressed spikelets are about 2 to 5 cm. long, and contain about 6 to 10 lemmas. The glumes are sharply creased at the mid vein; the lower is about 7 to 12 mm. long, and the upper is about 9 to 15 mm. long. The lemmas, which are about 12 to 17 mm. long, are strongly keeled on the back side, and they are terminated by slender awns that are about 7 to 15 mm. long. ❀April-June.

Bromus carinatus var. ***marginatus*** (Nees ex Steudel) Barkworth & Anderton [*B. m.* Nees ex Steudel]. MOUNTAIN BROME. According to revision 7 of the Jepson eFlora, this taxon in now *B. sitchensis* var. *marginatus*. Plants fitting the description of this variety are scattered in wooded areas at higher elevations in this region. Besides for the length of lemma awns, this taxon also differs from the typical variety in having more erect or upwardly ascending panicles, and lemmas which are closely if at all spaced in maturity. ●R: western North America, from British Columbia and Saskatchewan to northern Baja California and New Mexico.

Bromus diandrus Roth [*B. rigidus* Roth; *B. diandrus* var. rigidus (Roth) Sales]. RIPGUT GRASS, DEVIL GRASS, NEEDLE BROME. This species is widespread in open or semi open habitats in the Tassajara region. As implied by the names 'Ripgut Grass' and 'Devil Grass,' this species becomes unpalatable to grazing animals upon the maturation of the long awned lemmas. The lemmas also readily penetrate deep into fur or clothing, and can become lodged into ear canals or nasal passages. ●R: a common weed grass in North America; native to northern temperate regions of the eastern hemisphere. ●H: annual herbs with culms that range from about 1.5 to 12 dm. (6-48") tall. The blades are fairly remote and about 2.5 to 5 dm. long and 2 to 7 mm. wide. The inflorescences are open panicles with upwardly ascending upper branches and often nodding lower branches; the panicles are about 6 to 25 cm. long. The 5 to 8 flowered spikelets are about 25 to 70 mm. long; the lower glume is 12 to 25 mm. long and the upper is about 18 to 35 mm. long. The lemmas are 18 to 35 mm. long, and the lemmas awns are about 30 to 65 mm. long. ❀February-June.

Bromus grandis (Shear) A. S. Hitchcock [*B. orcuttianus* var. *g.* Shear]. GRAND BROME. This species is widely scattered at intermediate and higher elevations in the Tassajara region, and it primarily occurs in open woodland habitats. ●R: Sierra Nevada, from Placer County to Fresno County, and the Coast, Transverse and Peninsular ranges, from San Mateo County to northern Baja California; this species mostly occurs between 1,200 and 8,000 ft. ●H: perennial herbs with culms that range from about 7 to 18 dm. (2-5') tall. The blades are flat and range from about 13 to 38 cm. long and about 3 to 12 mm. wide. The spikelets hang more or less pendulously on the slender and usually wavy branches of an open, spreading and ultimately nodding panicle that is about 15 to 26 cm. long. The spikelets are about 2.5 to 4.5 cm. long and are mostly four to nine flowered. The pubescent glumes, which are shorter than the lemmas, are sub equal. The lower glume is about 5 to 8.5 mm. long and generally three veined, while the upper glume is about 7 to 10+ mm. long and three or sometimes five veined. The linear-oblong lemmas are about 11 to 14 mm. long, and the lemma awns are about 3 to 6 mm. long. ❀May-June.

<>^***Bromus hallii*** (A. S. Hitchcock) Saarela & P. M. Peterson [*Bromus orcuttianus* Vasey var. *hallii* Hitchcock]. This newly recognized species, which was listed under the name *B. orcuttianus* in the first edition of this text, occurs on Chew's Ridge and on Pine Ridge, but it is not known to occur elsewhere in the Tassajara region. ●R: mostly between 5200 and 8800 ft. in the southern Sierra Nevada, from Fresno County to Kern County, and disjunct populations occur in the San Rafael Mountains of Santa Barbara County, the San Gabriel and San Bernardino mountains in Los Angeles and San Bernardino counties, the San Jacinto Mountains in Riverside County, the Laguna Mountains in San Diego County, and in the Santa Lucia Mountains of Monterey County. ●H: tufted perennial herbs with culms that range from about 9 to 15 dm. (3-5') tall. The blades are flat and range from about 7.5 to 16.5 cm. long, and 3 to 12 mm. wide. The panicles range from about 5 to 16 cm. long, and the braches range from erect to ascending or spreading at right angles. The 3 to 7 flowered spikelets range from 2.5 to 3.5 cm. long, and the

lemmas are about 10 to 14 mm. long; the lemma awns range from 3.5 to 7 mm. long. ֍June-July.

Bromus hordeaceus Linnaeus [*B. mollis* Linnaeus]. SOFT BROME OR CHESS. This species ranks among the most common grass species in open grassland habitats at all elevations in the Tassajara region. ●R: a common weed grass in North America; native to Eurasia. ●H: annual herbs with culms that range from about 1 to 7 dm. (4-36") tall. Plants growing in favorable habitats tend to be rather tall and produce large and densely floriferous panicles, while plants growing in unfavorable habitats can be quite depauperate (often less than 1 dm. [4"] tall), and with panicles comprised of only one to several small spikelets. The blades are mostly about 4 to 16 cm. long and 1 to 5 mm. wide. The inflorescences are generally head like panicles with short and upwardly contracted branches; the panicles are about 1 to 10 cm. long. The spikelets are about 1 to 2 cm. long, generally oblong- elliptical in outline, and 5 to 10 flowered. The glumes are about 5 to 9 mm. long, with the lower glume averaging about 1 mm. shorter than the upper glume. The lemmas are about 6.5 to 10 mm. long, more or less rounded at both ends, and are terminating with a fairly limber awn about 4 to 10 mm. long. ֍April-May.

Bromus laevipes Shear. WOODLAND BROME, This species is widespread and locally common at all elevations in the Tassajara region, and it primarily occurs in open woodland habitats. ●R: Cascade Ranges, Coast Ranges, the Sierra Nevada, and the Transverse and Peninsular ranges, from Klickitat County in southern Washington to northern Baja California. This species also occurs in the mountains of Wallowa and Baker counties in northeastern Oregon, on the Sutter Buttes of the Sacramento Valley, in the mountains of southern Nevada, an on Santa Catalina Island. ●H: tufted perennial herbs with culms that range from about 6 to 15 dm. (2-5') tall. The blades are about 1 to 4 dm. long and 4 to 10 mm. wide. The spikelets hang more or less pendulously on the slender and often wavy branches of an open, spreading and ultimately nodding panicle that is about 1 to 2.5 dm. long. The spikelets are about 2.5 to 3.5 cm. long and contain about five to eleven lemmas; the lower glume is about 4 to 9 mm. long and three veined, while the upper glume is about 6 to 11 mm. long and five to seven veined. The lemmas are about 12 to 15 mm. long, and the terminal awn is about 4 to 6 mm. long. ֍April-June.

Bromus rubens Linnaeus [B. *madritensis* Linnaeus subsp. *rubens* (Linnaeus) Husnot misapplied]. RED BROME, FOXTAIL BROME. This species is widely scattered at all elevations in the Tassajara region, and it primarily occurs in open areas with poor soils, and thus where there is little competition from other grasses or herbs. ●R: a common weed grass in western North America; native of the northern temperate regions of the eastern hemisphere. ●H: relatively short annual herbs with culms that range from about 1 to 5 dm. (4-20") tall. The blades are generally remote (except at the base of more robust plants), and are about 2 to 14 cm. long and 1 to 5 mm. wide. The inflorescence is a shortly branched, head like and commonly reddish tinged panicle about 2 to 8 cm. long. The spikelets are about 2.5 cm. long and contain seven to eleven lemmas; the lower glume is about 7 to 11 mm. long, and the upper glume is about 10 to 12 mm. long. The lemmas are narrowly lanceolate, about 12 to 16 mm. long, and are terminated by a stiff awn that is about 18 to 22 mm. long. ֍April-May.

+Bromus pseudolaevipes Wagnon. According to James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975), this species is uncommon to rare below 1,400 m. (4,593') on Chew's Ridge. A specimen of this species was collected on "Chew's Ridge, Santa Lucia Mountains" by Clare Hardham in June of 1960 (Hardham 6191; RSA 180202). ●R: Coast, Transverse and Peninsular ranges, from Tehama County to northern Baja California. Also on Santa Rosa, Santa Cruz and Santa Catalina islands. ●H: perennial herbs with culms that range from about 6 to 12 dm. (2-4') tall. The blades range from about 8 to 35 cm. long, and from 2 to 10 mm. wide. The open panicles, the axis of which vary from erect to nodding, range from about 7 to 20 cm. long; the lower branches range from ascending to spreading. The 4 to 10 flowered spikelets range from about 15 to 35 mm. long, and the lemmas range from about 10 to 12.5 mm. long. The lemma awns range from about 2 to 5.5 mm. long. ֍April-July.

+Bromus sterilis Linnaeus. POVERTY BROME, WANTING BROME. This species is widespread and locally common in open or semi open habitats in the Tassajara region, and especially so the vicinity of the developed area of Tassajara. ●R: a common weed grass in much of North America; native to northern temperate regions of the eastern hemisphere. ●H: annual herbs with culms that range from about 25 to 85 cm. (10-34") tall. The blades are few and range from about 2 to 5 mm. wide. The inflorescences are open panicles that are about 10 to 25 cm. long; the branches are at first ascending, but in maturity the inflorescence nods due to the weight of the maturing spikelets. The 6 to 11 flowered spikelets are about 20 to 35 mm. long; the lower glume is about 6 to 14 mm. long and the upper is about 7.5 to 21 mm. long. The lemmas are about 13 to 20 mm. long, and the lemma awns are about 15 to 30 mm. long. ֍March-June.

Bromus tectorum Linnaeus. DOWNY CHESS, CHEAT GRASS. This species is locally common in grasslands or grassy openings in chaparral on Chew's Ridge, along the Pine Ridge Trail from the first summit west of Tassajara Rd. to about halfway to the Church Creek Divide, along the spine of Black Butte Ridge, and in savannas on alluvial terraces above Tassajara Creek northeast of the confluence of Blackberry Creek. ●R: a common weed grass in North America, native to Eurasia. ●H: annual herbs with slender culms that range from about 2 to 5 dm. (8-20") tall. The blades are mostly basal and range from about 2 to 12 cm. long and 1 to 4 mm. wide. The inflorescence is an open panicle with very slender, wavy and typically drooping branches, on which the spikelets hang in a fairly pendulous manner. The spikelets are three to seven flowered, and the glumes are about 5 to 12 mm. long; the lower glume is about 2 to 4 mm. shorter than the upper glume. The lemmas are about 9 to 13 mm. long, and they are terminated with slender awns that are about 8 to 18 mm. long. ֍May-June.

CALAMAGROSTIS. REED GRASS.

Calamagrostis consist of about 265 species that primarily occur in cool temperate regions, and especially in moist montane regions. The name is based on the Greek words *kalamos*, reed, and *agrostis*, grass.

∨***Calamagrosits rubescens*** Buckley. PINE GRASS. According to James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975), this species occurs in wet habitats on Chew's Ridge and on Pine Ridge. I suspect that more research during summer months will reveal that this species is more widely distributed in riparian and shady woodland habitats in this region. ●R: western North America, from British Columbia and Manitoba to the mountains of Colorado and California. In California this species occurs only in the Coast Ranges, where its distribution extends southward to the Santa Lucia Mountains of San Luis Obispo County, and a disjunct population occurs on Santa Cruz Island. ●H: perennial herbs with slender culms that range from about 6 to 10 dm. (24-40") tall. The blades are flat and about 2 to 5 mm. wide. The inflorescence is an upwardly contracted panicle about 6 to 25 cm. long, and the one flowered spikelets have glumes that are about 4 to 5 mm. long. The lemmas, which are about 3 to 4 mm. long, are awned from near base of the back side; the awn is about 3.5 to 4.5 mm. long and strongly twisted or bent. ֍June-September.

CYNODON.

The genus *Cynodon* includes about 8 to 10 species that are native to tropical and warmer temperate regions of Eurasia and Africa. The name was derived from the Greek words *kyon*, dog, and *odous*, tooth, and alludes to the hard and sharp scales of the rhizome.

Cynodon dactylon (Linnaeus) Persoon. BERMUDA GRASS. This species is a major component of the lawns at Tassajara, and it also occurs in The Flats and in the bed of Tassajara Creek downstream from the hot springs. ●R: a common lawn grass and weed in generally moist places in the tropical and warmer temperate regions of the Western Hemisphere; native to Africa. ●H: deciduous perennials with flattened and wiry culms that range from about 1 to 4 dm. (4-16") long. The culms arise from procumbent stolons. The numerous blades are flat and mostly less than 6 cm. long. The panicles are palmately divided into slender spikes; the spikelets are produced in two overlapping rows on the upper axis. The one flowered spikelets are about 2 mm. long, and have glumes that are about 1.5 mm. long. The lemmas, which are sharply keeled, are about 2 mm. long. ❀June-August.

DACTYLIS. ORCHARD GRASS.

The genus *Dactylis* includes only one species. The name was derived from the Greek word *daktylos*, finger, and probably alludes to the appearance of the lemmas.

Dactylis glomerata Linnaeus. This distinctive species is scattered along the Pine Ridge Trail between Tassajara Road and the Church Creek Divide, and in Pine Valley. It is almost certainly of relatively recent introduction in this region, for although I have hiked the Pine Ridge Trail countless times during the late 1970s and the 1980s, I did not notice this species until July of 1990, when a few plants were encountered near the first summit west of Tassajara Road. By May of 1992 plants were fairly regularly encountered westward along the trail nearly all the way to the Church Creek Divide, and in May of 1993 the first plants were found in Pine Valley. This species is not listed in James Griffin's "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975). The most likely means of its introduction is by undigested grains within horse manure. ●R: a common weed grass in North America; native to Eurasia. ●H: tufted perennial herbs with culms that range from about 4 to 15 dm. (16-60") tall. The blades are flat and about 6 to 40 cm. long and 2 to 8 mm. wide. The inflorescence is a a generally open panicle about 1 to 1.5 dm. long; the short branches are rather stiff and erect to spreading, and are terminated by dense clusters of spikelets. The spikelets are two to four flowered, and the glumes are about 3 to 6 mm. long and nearly equal in length. The lemmas are about 5 to 6 mm. long and are terminated by a very short awn or awn like formation. ❀May-August.

DANTHONIA. OATGRASS.

The genus *Danthonia* consists of about 20 species that primarily occur in the warmer temperate and tropical regions of the Americas, Europe and northern Africa. The genus was named for the French botanist and agrostologist Etienne Danthoine (1739-1794).

+***Danthonia californica*** Bolander. CALIFORNIA OATGRASS. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3306; DS 58548). According to the note that is enclosed the envelope that is pasted to the specimen sheet, Elmer collected it in "Indian Valley," which is about 5 ½ linear miles southwest of Tassajara Hot Springs. It is unlikely that this species occurs elsewhere in this region, for in this part of California it is restricted to areas that are near to the coast. ●R: western North America, from British Columbia to Saskatchewan, South Dakota, Colorado, New Mexico and California. In California this species occurs in the Sierra Nevada, from Tulare County northward, and in the Coast Ranges, from the western coast of Santa Barbara County northward. Disjunct population occur in the San Bernardino Mountains and in the Laguna Mountains of San Diego County. ●H: perennial bunchgrasses with erect culms that range from about 3 to 13 dm. (12-50") tall. The cauline blades are about 8 to 30 cm long and about 2 to 5 mm. wide. The inflorescence is short and raceme like; it consists of about 2 to 5 spikelets. The spikelets contain about 3 to 8 florets, and the lemmas are about 5 to 15 mm. long. The twisting awns are about 4 to 12 mm. long. ❀April-August.

DESCHAMPSIA. HAIR GRASS.

Deschampsia is a widely distributed genus that includes about 40 species. The genus was named for the French physician and naturalist Louis Auguste Deschamps (1765-1842).

Deschampsia elongata (Hooker) Monro in Bentham [*Aria e*. Hook.]. SLENDER HAIR GRASS. This species is scattered along streams and sometimes at springs and seeps at all elevations in the Tassajara region. ●R: widespread in western North America, from Alaska to Wyoming, New Mexico, northern Mexico and northern Baja California. It is also native to temperate South America. ●H: densely tufted perennial herbs with culms that range from about 3 to 10 dm. (12-40") tall. The blades are primarily basal and vary from flat to involute, they are about 4 to 8 cm. long and 1 mm. wide. The inflorescence is a narrow and upwardly contracted panicle about 1 to 3 dm. long. The spikelets are one to three flowered, and the glumes are about 3 to 5 mm. long; they equal to slightly exceed the lemmas. The lemmas are about 2 to 3 mm. long, and have a generally straight awn about 1 to 5 mm. long that originates from about the middle of back side. ❀May-August.

DISSANTHELIUM.

It has been stated in botanical literature that Tassajara Hot Springs is the only known mainland location for the occurrence of *Dissanthelium californicum*, a rare grass species that occurs on some of the islands off the coast of southern California and northern Baja California. The basis of this misinformation was due to a misidentification of one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3317; DS 57982). This specimen actually represents *Poa howellii* (at one time it was also assigned to *Melica torreyana*), and according to the note that is enclosed in the envelope that is pasted to the specimen sheet, Elmer collected it in "Pine Valley." Texts that list Tassajara Hot Springs as a location for *Dissanthelium californica* include volume one of Willis Jepson's *A Flora of California* (1912), volume one of Leroy Abram's *Illustrated Flora of the Pacific States* (1923), and Mary Ann Mathews' *An Illustrated Field Key to the Flowering Plants of Monterey County* (1997).

ECHINOCHLOA. HEDGEHOG GRASS.

Echinochloa is a widely distributed genus that includes about 35 species. The name is derived from the Greek words *echinos*, hedgehog, and *chloa*, grass, and alludes to the bristly spikelets of some of the species.

Echinochloa crus-galli (Linnaeus) Beauvois. BARNYARD GRASS. This distinctive species is lightly scattered in streambeds in the vicinity of Tassajara Hot Springs, such as along Horse Pasture Creek in and below the Horse Pasture, along Cabarga Creek below The Pines, and along Tassajara Creek downstream from the hot springs. ●R: a common weed in North America; native to Eurasia. ●H: annual herbs with stout culms that range from about 3 to 10 dm. (12-40") tall. The blades are about 1 to 30 cm. long and 5 to 20 mm. wide. The inflorescence is an erect or nodding panicle that is about 6 to 10 cm. long; the densely floriferous branches are upwardly appressed to loosely ascending. The two flowered spikelets are about 3 to 4 mm. long; the lower glume is about 1 to 1.5 mm. long, while the upper glume is about 3 to 4 mm. long. The upper glumes are terminated with stout awns that vary from very short to up to 3 cm. long. The lemmas are about 3 mm. long. ❀July-October.

ELYMUS. WILD RYE.

The genus *Elymus* includes about 235 to 240 species that primarily occur in the temperate regions of the northern hemisphere. There are several etymologies for the name. One states that it is based on the Greek word *elyo*, rolled up, for the caryopses are tightly embraced by the lemma and palea. Another etymology states that the name is based on the Greek word for millet, *elymos*. Yet another etymology states that the name is based on the Greek word *elumos*, which is a name for some kind of grain.

1a. Glumes divided at the base into 3 to 5 narrowly linear formations that are awn like. Rachis readily disarticulating (falling apart) at the nodes in maturity. . . . . ***E. multisetus***.
1b. Glumes normal (they are awl like in *E. triticoides*). Rachis not disarticulating in maturity, except in *E.* x *hansenii*:
2a. Spikelets singular at each node. . . . . ***E. stebbinsii***.
2b. Spikelets two or more at some or all of the nodes:
3a. Rachis readily disarticulating (falling apart) at the nodes in maturity. . . . . ***E.* x *hansenii***.
3b. Rachis not readily disarticulating in maturity:
4a. Glumes awl like. Lemmas acute or with an awn less than 5 mm. long. . . . . ***E. triticoides***.
4b. Glumes narrowly elliptic to lanceolate. Lemmas awned, the awns up to 3 cm. long. . . . . ***E. glaucus***.

Elymus glaucus Buckley. BLUE WILD RYE, WESTERN RYE GRASS. This species is widespread and locally common at all elevations in the Tassajara region, and it primarily occurs in open and grassy woodland habitats and in openings in chaparral. Some of the plants that occur on the higher ridges of the Tassajara region, such as on Chew's Ridge, on Black Butte, along the Pine Ridge Trail between China Camp and the Church Creek Divide and on Pine Ridge, correspond to the description of *E. glaucus* subsp. *jepsonii*, at taxon that was recognized in the first edition of *The Jepson Manual* (1993), but not in the second edition (2012). Such plants differ from the typical species in having leaf sheaths that are sparsely to densely hairy (as opposed to leaf sheaths that are smooth to rough, but not hairy). ●R: widely distributed in western North America, from Alaska and Ontario to northern Mexico. ●H: loosely to densely tufted perennial herbs with culms that range from about 6 to 15 dm. (2-5') tall. The blades are generally flat and are about .5 to 3 dm. long and 4 to 12 mm. wide. The inflorescence is a narrow and erect (or slightly nodding) spike about .5 to 2 dm. long. The spikelets are sessile, two to six flowered, and are mostly about 10 to 14 mm. long. The glumes are about 7 to 15 mm. long and are terminated with a short awns. The lemmas are about 8 to 14 mm. long and have slender awns that are up to 3 cm. long. ❀May-August.

Elymus* x *hansenii [*Sitanion hanseni* (Scribner) J. G. Smith; *Elymus h.* Scribner]. These sterile hybrids between *E. multisetus* and *E. glaucus* are scattered in open and usually rocky habitats the Tassajara region, but they are not common. ●R: generally the same as *Elymus multisetus*. ●H: perennial herbs with erect culms that range from about 9 to 12 dm. (3-4') tall. The blades are about 10 to 30 cm. long, and 2 to 5 mm. wide. The inflorescence is a spike about 5 to 8 cm. long, and the spikelets are 3 to 5 flowered. The glumes are tipped with two or three unequal awns that are up to 3.5 cm. long. The lemmas are about 1.5 mm. long. ❀May-July.

Elymus multisetus (J. G. Smith) Burtt Davy [*Sitanion jubatum* Smith]. BIG SQUIRREL TAIL. This species is widely scattered and locally common in open and usually rocky habitats at all elevations in Tassajara region. ●R: western North America, from Washington to Wyoming, Colorado, Arizona and northern Baja California. ●H: tufted perennial herbs with culms that range from about 2 to 6 dm. (8-24") tall. The blades are commonly involute and range from about 3 to 20 cm. long and 1 to 5 mm. wide. The culms are terminated with distinctive head like spikes that are about 3 to 17 cm. long. The spikelets at first erect but in maturity they are ascending to widely spreading, and the mature inflorescence readily disarticulates (falls apart) at the nodes when disturbed. The spikelets are sessile and about 8 to 10 mm. long (excluding the awns), and the glumes are divided at the base into three to five awns that are about 2 to 8+ cm. long. The slender lemmas are about 7 to 10 mm. long; they are terminated with an awn that is up to 10 cm. long. ❀May-July.

Elymus spicatus (Pursh) Gould. Included in the Consortium of California Herbaria database is a specimen from the Tassajara region that has been assigned to *Pseudoroegneria spicata* (Pursh) A. Love, which is a synonym of *Elymus spicatus*. The specimen is one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3308; DS 56585); it was originally assigned to *Agropyron vaseyi*. This specimen actually represents *Elymus stebbinsii*.

Elymus stebbinsii Gould [*Agropyron parishii* Scribner & Smith, *A. p.* var. *laeve* S. & S.]. CALIFORNIA WHEATGRASS. This species is widely scattered and locally common in grassy areas within shady or semi shady woodlands at all elevations in the Tassajara region. ●R: Coast Ranges, Sierra Nevada, Transverse and Peninsular ranges, from Siskiyou and Plumas counties to the mountains of San Diego County. ●H: loosely tufted evergreen perennial herbs with culms that range from about 6 to 12 dm. (2-4') tall. The blades are about 1 to 3 dm. long and 2 to 6 mm. wide. The inflorescens are narrow and typically upwardly nodding spikes that range from about 12 to 30 cm. long. The sessile spikelets, which are alternately arranged at the nodes, are about 1.2 to 3 cm. long and contain 5 to 7 florets. The slender glumes are about 10 to 15 mm. long; they gradually taper to an awn that is usually less than 6 mm. long. The lemmas, which are about 8 to 12 mm. long, are terminated by slender awns that are about 1 to 2.8 cm. long. ❀May-July.

Elymus triticoides Buckley [*Leymus triticoides* (Buckley) Pilger]. VALLEY WILD RYE, BEARDLESS WILD RYE. According to the note that is enclosed in the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of June 1901 (Elmer

3312; DS 56336), he collected it at "Church's place, not abundant." This species is also listed as local in wet places on Chew's Ridge in James Griffin's "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975). Plants that probably represent this species are scattered in open and seasonally wet habitats in Pine Valley and Strawberry Valley, but none of the plants that I observed were in their flowering or fruiting stages. ●R: widely distributed in temperate western North America, from British Columbia and Montana to northern Baja California and Texas. ●H: rhizomatic perennial herbs with culms that range from about 5 to 12 dm. (20-48") tall. The flat or involute blades are about 2 to 5 mm. wide. The inflorescences are narrow spikes that are about 5 to 20 cm. long; there are one to three spikelets at each node. The spikelets have two to seven florets, and the awl like glumes, which are about 5 to 16 mm. long, often have short awned tips. The lemmas, which are about 5 to 12 mm. long, have acute to shortly awned tips. ❁June-July.

FESTUCA. FESCUE.

The genus *Festuca* consists of about 500 species which, as a whole, are widely distributed on earth. *Festuca* is an ancient Latin name that was used by Roman naturalist Pliny the Elder (0023-0079) for some kind of a of a weedy grass.

1a. Inflorescence a spike-the spikelets are sessile at the nodes (subgenus *Lolium*) . . . . . ***F. perennis***.
1b. Inflorescence a panicle-the branches range from upwardly appressed to spreading:
  2a. Perennial herbs that are mostly 4 to 10 dm. (12-40") tall. Stamens usually 3 (subgenus *Festuca*):
    3a. Leaf sheath closed. Panicle with upwardly ascending branches. Lemma awn terminal. . . . . ***F. rubra***.
    3b. Leaf sheath open. Panicle with ascending to spreading and often drooping branches. Lemma awn sub terminal from between two short teeth. . . . . ***F. elmeri***.
  2b. Very slender stemmed annual herbs that are mostly 2 to 6 dm. (4-24") tall. Stamens usually 1 (subgenus *Vulpia*):
    4a. First glume less than half the length of the second glume. . . . . ***F. myuros***.
    4b. First glume more than half the length of the second glume:
      5a. Panicle branches upwardly contracted; the lower branches without callus like formations in the axils. . . . . ***F. bromoides***.
      5b. At least the lower panicle branches spreading to reflexed downward; the lower branches with small callus like formations in the axils. . . . . ***F. microstachys***.

Festuca bromoides Linnaeus [*Vulpia b.* (L.) S. F. Gray; *Festuca dertonensis* (Allioni) Ascherson & Graebner]. SQUIRREL TAIL FESCUE, BROME FESCUE. This species is widely scattered and locally common in the Tassajara region, mostly in exposed areas with poor or compacted soils, such as in the beds of trails. ●R: a common weed nearly throughout the temperate regions of the world; native to Eurasia. ●H: slender culmed annual herbs that range from about 2 to 6 dm. (8-24") tall. The narrowly linear blades, which vary from flat to involute, are up to 15 cm. long and about .5 to 2.5 mm. wide. The inflorescences are upwardly contracted panicles that are about 2 to 15 cm. long. The spikelets are about 5 to 10 mm. long and contain four to seven lemmas; the lower glume is about 3.5 to 5 mm. long and the upper glume is about 4.5 to 7 mm. long. The lemmas are about 5.5 to 8 mm. long and are terminated with a slender awn that is about 3 to 12 mm. long. ❁March-May.

Festuca elmeri Scribner & Merrill. BROME LIKE FESCUE, A. D. E. ELMER'S FESCUE. I have noticed this species only at two locations in the Tassajara region, both of which were along the Horse Pasture Trail between Tassajara Road and the Horse Pasture. At both locations the plants were growing on mostly shady woodland slopes. Although I have not noticed this species elsewhere in this region, it is almost certainly more widespread. According to the note that is enclosed in the envelope that is pasted to the sheet of A. D. E. Elmer's "Tassajara Hot Springs" specimen of *F. elmeri*, it was collected in "Pine Valley" (Elmer 3322; DS 57148). Mr. Elmer collected the type specimen (Elmer 2101) on the campus of Stanford University in April of 1900. ●R: Coast Ranges, from Douglas County in southwestern Oregon to Santa Barbara County. Also on the Sutter Buttes, and in the northern Sierra Nevada, from Plumas County to El Dorado County. ●H: loosely tufted perennial herbs with slender culms that range from about 4 to 10 dm. (16-40") tall. The blades are about 1 to 4 dm. long and 2 to 6 mm. wide, and are flat to slightly involute. The inflorescence is an open panicle about 10 to 20 cm. long; the branches are ascending to widely spreading, and the lower most branches are up to 1 dm. long. The spikelets are about 7 to 11 mm. long and contain two to six lemmas; the lower glume is about 2 to 4 mm. long and the upper glume is about 3 to 4.5 mm. long. The lemmas, which are about 5.5 to 7 mm. long, are generally narrowly oblong with an acute apex, and are terminated with a slender awn about 2 to 5 mm. long. ❁May-June.

Festuca microstachys Nuttall [*Vulpia microstachys* (Nuttall) Bentham]. SMALL SPIKED FESCUE. This species is widespread and locally common at all elevations in the Tassajara region, and it mostly occurs in openings in chaparral or in grassy areas that are transitional between chaparral and woodlands. Four varieties of this species were recognized in the first edition of *The Jepson Manual* (1993), but they are not in second edition. All four occur in the Tassajara region, with the typical variety and var. *pauciflora* being the most common. These taxa were distinguished as follows:

1a. Lemmas glabrous:
  2a. Glumes glabrous. . . . . var. ***pauciflora***.
  2b. Glumes pubescent. . . . . var. ***confusa***.
1b. Lemmas pubescent:
  3a. Glumes glabrous. . . . . var. ***microstachys***.
  3b. Glumes pubescent. . . . . var. ***ciliata***.

●R: western temperate North America, from British Columbia and Idaho to northern Baja California and New Mexico. ●H: annual herbs with slender culms that range from about 2 to 5 dm. (4-20") tall. The generally remote and very narrowly linear blades, which are flat or upwardly folded, are about 2 to 14 cm. long and 1 to 2 mm. wide. The inflorescences are open panicles that are about 2 to 24 cm. long; the lower branches are generally remote and are spreading to reflexed. The spikelets, which contain one to six lemmas, are about 6 to 10 mm. long, and the lower glumes are about 2 to 5.5 mm. long, while the upper glumes are about 3.5 to 7.5 mm. long. The narrowly lanceolate lemmas, which are about 4 to 9 mm. long, are terminated with slender awns that are about 4 to 12 mm. long. ❁April-May.

Festuca myuros Linnaeus [*Vulpia myuros* (L.) Gmelin]. RAT TAIL FESCUE. This is now one of the most common grasses in the Tassajara region, were it is widespread and locally common to abundant in open areas at all elevations. Less common in this region are plants in which the lemmas have cilia on the upper margins. Such plants correspond to *Festuca myuros* var. *hirsuta*, a taxon that was recognized in the first edition of *The Jepson Manual* (1993), but not in the second edition (2012). ●R: a common weed in temperate and subtropical regions nearly worldwide (and particularly common on the Pacific Slope of western North America); native to southern Europe and probably the Mediterranean regions of North Africa and West Asia. ●H: annual herbs with slender culms that range from about 2 to 6 dm. (8-24") tall. The narrowly linear blades are about 1 to 15 cm. long and rarely more than 2 mm. wide; they

appear to be filiform due to the strongly involute margins. The inflorescence is an upwardly contracted and often fairly dense panicle about 3 to 24 cm. long. The spikelets are about 5 to 11 mm. long and with three to seven lemmas, the lower glume is about .5 to 2 mm. long and the upper glume is about 2.5 to 5.5 mm. long. The lemmas are about 4.5 to 6.5 mm. long, and are terminated with slender awns that are about 5 to 15 mm. long. ֍April-May.

Festuca perennis (Linnaeus) Columbus & J. P. Smith [*Lolium perenne* Linnaeus; *Lolium multiflorum* Lamarck]. RYE GRASS, DARNEL. This species was introduced into this region by the U. S. Forest Service as part of a reseeding program after the Marble Cone Fire of 1977. The person who made this decision must have been unaware of the fact that the wilderness has its own reseeding program, as evidenced the spectacular first spring after the Basin Complex Fire of 2008. I can't recall seeing any plants of this species in recent years. ●R: widespread in temperate North America; native to the western temperate regions of the eastern hemisphere. ●H: annual or biennial herbs with erect or ascending culms that range from about 4 to 10 dm. (16-40') tall. The blades are generally flat and about 5 to 20 cm. long and 3 to 7 mm. wide. The inflorescence is a terminal spike about 1 to 3 dm. long, with the spikelets alternately arranged at the nodes. The spikelets are about 10 to 15 mm. long and contain about 10 to 20 flowers; the glumes are linear lanceolate and about 5 to 9 mm. long. The lemmas are about 5 to 8 mm. long and are terminating with an awn about 1 to 8 mm. long. ֍May-August.

Festuca rubra Linnaeus. RED FESCUE. According to James Griffin ("Plants of the Highest Santa Lucia and Diablo Range Peaks," 1975), this species occurs in wet places on Pine Ridge between 1200 and 1400 m. (3937-4593'). ●R: widely distributed in the northern temperate regions of Eurasia and North America. On the Pacific Slope this species extends as far south as San Diego County. ●H: loosely tufted perennial herbs with culms that range from about 4 to 10 dm. (12-40") tall. The culms typically have decumbent and reddish to purplish tinged bases. The blades are about .5 to 3 dm. long, usually involute, and less than 3 mm. wide. The inflorescence is a fairly open panicle about .5 to 2 dm. long that consists of upwardly ascending branches. The spikelets are about 9 to 12 mm. long and contain three to ten lemmas; the lower glume is about 2.5 to 3.5 mm. long and the upper glume is about 3.5 to 5.5 mm. long. The lemmas are about 5 to 7 mm. long; they are narrowly oblong with an acute apex, and are terminated by a slender awn about 2 to 4 mm. long. ֍May-July.

GASTRIDIUM. NITGRASS.

Gastridium consists of two species that are native to the Mediterranean region. The name is derived from the Greek word *gastridion*, a small pouch, and alludes to the pouch like glumes.

Gastridium phleoides (Nees & Meyen) C. E. Hubb [*G. ventricosum* (Gouan) Schinz & Thellung misapplied]. This distinctive species is scattered in open grasslands in the Horse Pasture and in The Pines. This species has been present in this region for at least 121 years, for a specimen of it was collected by A. D. E. Elmer in June of 1901 (Elmer #3320 DS). ●R: a common weed grass in California; native to Eurasia. ●H: annual herbs with slender culms that range from about 1 to 5 dm. (4-20") tall. The narrowly linear blades are about 2 to 12 cm. long and up to 3 mm. wide. The narrow and tightly compacted panicles, which are about 3 to 8 cm. long, panicles exhibit a sheen due to the glossy glumes. The one flowered spikelets have glumes that are about 3 mm. long; they enclose the lemma in their sack like base. The lemmas are about 1 mm. long and have an awn that is about 5 mm. long; the awn originates from near the top of the back side. ֍May-June.

HORDEUM. BARLEY.

The genus *Hordeum* includes about 32 species of annual and perennial herbs that occur in temperate regions nearly worldwide. The cultivated barley is *Hordeum vulgare*. *Hordeum* is the Latin name for barley.

1a. Auricles at the inner top of the leaf sheaths well developed. Annual herbs of dry habitats. . . . . ***H. murinum***. p. 368.
1b. Auricles absent:
2a. Perennial herbs of wet or seasonally wet habitats. . . . . ***H. brachyantherum*** subsp. ***californicum***. p. 368.
2b. Annual herbs of dry habitats. . . . . ***H. marinum***. p. 368.

Hordeum brachyantherum Nevski subsp. ***californicum*** (Covas & Stebbins) Bothmer, Jacobsen & Seberg [*H. c.* C. & S.]. CALIFORNIA BARLEY. This species is scattered in seasonally wet habitats in Pine Valley, Strawberry Valley and on Chew's Ridge, and probably in suitable habitats in other areas in this region. ●R: southern Cascade Ranges, the Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from southwestern Oregon to San Diego County. Also on San Miguel, Santa Rosa, Santa Cruz, San Nicolas, Santa Catalina and the Anacapa islands. ●H: tufted perennial herbs with culms that range from about 2 to 6.5 dm. tall. The flat blades are less than 11 cm. long, and are about 1.5 to 3.5 mm. wide. The spikelets are produced in terminal and commonly purplish tinged spikes that are about 2.5 to 8 cm. long. The spikelets are produced in groups of three's, and the awn like glumes are about 6.5 to 19 mm. long. The lemmas of the central spikelets are about 5.5 to 10 mm. long and are terminated with an awn that is up to 7.5 mm. long, while the reduced lemmas of lateral spikelets are less than 7 mm. long and have awns that are less than 7 mm. long. ֍April-August.

Hordeum marinum Hudson subsp. *gussoneanum* (Parlatore) Thellung [*H. hystrix* Roth, *H. geniculatum* Allioni]. MEDITERRANEAN BARLEY. This species is locally common in open grassy areas from The Caves area to Pine Valley, but it is rare to absent in most of the Tassajara region. ●R: a common weed grass in western North America, native to Eurasia. ●H: annual herbs with culms that range from about 1 to 4 dm. (4-16") tall. The flat blades are relatively short, and range from about 1 to 5 mm. wide. The densely flowered spikes are about 1.5 to 7 cm. long. The spikelets are produced in groups of three's; the awn like glumes of the central spikelets are about 10 to 26 mm. long, while those of the lateral spikelets are about 2 to 4 mm. shorter. The lemmas of the central spikelet are about 5 to 8 mm. long and are terminated by awns that range from about 6 to 18 mm. long, while lemmas of the lateral spikelets are generally less than 5 mm. long, and are terminated by awns that range from about 3 to 8 mm. long. ֍April-June.

Hordeum murinum Linnaeus subsp. *leporinum* (Link) Arcangeli [*H. leporinum* Link]. WILD BARLEY, FOXTAIL BARLEY. This species is weedy in and around the developed area of Tassajara, and occasionally along Tassajara Road, along trails, and at campsites, etc. ●R: a common weed in western North America, native to the Mediterranean region. ●H: annual herbs with culms that range from about 1 to 6 dm (4-24") tall. The flat blades, which are relatively short, are about 1 to 5 mm. wide. The dense inflorescences are bristly spikes that range from about 3 to 8 cm. long. The spikelets are produced in groups of three's; the awn like glumes of the central spikelets are about 11 to 35 mm. long, while those of the lateral spikelets are up to 10 mm. longer. The lemmas range from about 8 to 15 mm. long, and they are terminated by awns that range from about 2 to 5 cm. long. ֍April-May.

KOELERIA. JUNE GRASS.

Koeleria consists of about 30 species that occur in the temperate regions of northern hemisphere. The genus was named for the German botanist Georg Ludwig Koeler (1765-1807).

Koeleria macrantha (Ledebour) Schultes [*Aira m.* Ledebour; *K. cristata* (Linnaeus) Persoon often misapplied and illegitimate]. JUNE GRASS. This distinctive species is widely scattered and fairly common in open grasslands and sometimes semi open woodland habitats at all elevations in the Tassajara region. This species can be very long lived, and in a pattern similar to the growth of rings on trees, new growth is annually produced at the outer parameters of the original tufts. Rings of growth, or partial rings of growth, thus occur long after the original tuft has expired. ●R: widely distributed in the temperate regions of the northern hemisphere. In North America it ranges from Alaska to the eastern coast and northern Mexico. ●H: densely tufted perennials herbs with slender culms that range from about 2 to 6 dm. (8-24") tall. The blades, which range from about 3 to 30 cm. long and 1 to 3 mm. wide, are primarily basal; some are flat while others are involute. The inflorescences are narrow and upwardly contracted panicles that range from about 2 to 15 cm. long. The spikelets, which are two to four flowered, are about 4 to 6 mm. long; the lower glumes are about 3 mm. long and the upper glumes are about 5 mm. long. The lemmas, which are about 3 to 4 mm. long, are awnless, but they sometimes have a very short awn like tip. ❀May-July.

MELICA. MELIC, ONION GRASS.

Melica consists of about 80 species that primarily occur in the temperate regions of the Americas, Eurasia and Africa. *Melica* is an old Italian name for some kind of sorghum with sweet sap (*mel* is a Latin word for honey). The culms of some species have bulb like bases, and hence the common name Onion Grass.

1a. Lemmas awned:
- **2a**. Awns 5 to 12 mm. long, lemma surface glabrous or hairy on the lower margins. . . . . ***M. aristata***.
- **2b**. Awns less than 5 mm. long, lemma surface hairy towards the base. . . . . ***M. harfordii***.

1b. Lemmas not awned:
- **3a**. Spikelets with one 1 (or 2) fertile (grain producing) lemmas, and a small imperfect (staminate) lemma. . . . . ***M. imperfecta***.
- **3b**. Spikelets with 2 to 5 fertile lemmas:
  - **4a**. Sterile floret at tip of spikelet axis widest above middle, the tip truncate. . . . . ***M. californica***.
  - **4b**. Sterile floret at tip of spikelet axis widest below middle, the tip acute to acuminate. . . . . ***M. geyeri***.

∨<>***Melica aristata*** Thurber ex Bolander. LONG AWNED MELIC. Plants that key out to this species are lightly scattered in shady woodland habitats on Chew's Ridge. With the exception of the length of the awns, the plants of this region are unclearly differentiated from *M. harfordii*, and thus may represent a localized longer awned variant of *M. harfordii*. At the present time (on 11/23/2014) only three herbarium specimens of this species from Monterey County are listed in the Consortium of California Herbaria database. These are: A. A. Beetle 4294 (UCD 67019), June 5th, 1946, "Chew's Ridge Ranger Station, Los Padres National Forest;" Clare B. Hardham 6191 b (CAS 524494), June 21st, 1960, 5000 ft., "Chews Ridge, Santa Lucia Mountains;" and G. L. Stebbins, Jr., & L. A. Snyder 3767 (UC 774217), June 19th, 1947, 4900 ft., "s Jamesburg (summit of Chew's Ridge)." ●R: Cascade Ranges, Sierra Nevada and Coast Ranges, from Skamania County in southwestern Washington to Lake and Sonoma counties in the north Coast Ranges, and to Kern County in the Sierra Nevada, with disjunct populations in the Santa Lucia Mountains of Monterey County and in the San Bernardino Mountains in San Bernardino County. ●H: tufted evergreen perennial herbs with culms that range from about 5 to 12 dm. (20-48") tall. The flat blades are about 8 to 10 cm. (3-4") long and about 3 to 6 mm. wide. The inflorescence is about 10 to 23 cm. long, and the spikelets are borne on relatively short and upwardly appressed to ascending branches. The spikelets are about 1 to 2 cm. long and contain 2 to 5 lemmas; the glumes are about 7 to 12 mm. long, and the upper glume is generally longer than the lower glume. The lemmas are about 8 to 13 mm. long and are terminated by an awn about 5 to 12 mm. long. ❀June-August.

Melica californica Scribner. CALIFORNIA MELIC. This species is uncommon in grassy areas in The Pines, in the Horse Pasture, and on Chew's Ridge. ●R: Cascade Ranges, Sierra Nevada, and the Coast, Transverse and Peninsular ranges, from southwestern Oregon to Riverside County. ●H: tufted perennial herbs with culms that range from about 6 to 12 dm. (2-4') tall; the blades are about 10 to 25 cm. long and 2 to 5 mm. wide. The inflorescence is an upwardly contracted and fairly densely flowered panicle about .5 to 3 dm. long. The spikelets are about 5 to 15 mm. long and contain two to five lemmas; the larger glume is up to 12 mm. long. The awnless lemmas are about 5 to 9 mm. long and are obtuse or notched at the apex. ❀April-May.

∨***Melica geyeri*** Munro ex Bolander. This species is uncommon in woodland areas at higher elevations in the Tassajara region, such as in the upper Church Creek area, Pine Valley, Bear Basin, Miller Canyon and on Chew's Ridge. ●R: from British Columbia southward, to the Santa Lucia Mountains of San Luis Obispo County in the Coast Ranges, and to Mariposa County in the Sierra Nevada. ●H: tufted perennial herbs with culms that range from about 8 to 20 dm. (32-80") tall. The flat blades range from about 2 to 8 mm. wide. The inflorescence is an open panicle about 1 to 2 dm. long; the branches are ascending to spreading. The spikelets are about 12 to 20 mm. long and contain two to five lemmas; the lower glume is about 3.5 to 7 mm. long, and the upper glume is about 5.5 to 11 mm. long. The awnless lemmas are about 8 to 11 mm. long. ❀April-July.

∨***Melica harfordii*** Bolander. This species is widely scattered in shady woodland habitats at higher elevations in the Tassajara region, and it is fairly common in some areas. Occasionally plants are found in open and seasonally wet sites, such as in the beds of smaller streams. ●R: from British Columbia and Montana southward, along the Pacific Slope, to the Santa Lucia Mountains of San Luis Obispo County in the Coast Ranges, and to Fresno County in the Sierra Nevada. ●H: tufted evergreen perennial herbs with culms that range from about 6 to 12 dm. (2-4') tall. The blades, which are often widely spreading, range from about 10 to 30 cm. long and about 2 to 6 mm. wide. The inflorescence is an upwardly contracted panicle ranging from about 6 to 22 cm. long. The spikelets are about 7 to 20 mm. long and contain two to six lemmas. The lemmas are about 6 to 16 mm. long and have a terminal awn less than 4 mm. long. ❀May-July.

Melica imperfecta Trinius. IMPERFECTLY FLOWERED MELIC. This distinctive species is widely scattered and locally common at all elevations in the Tassajara region, and it primarily occurs in rocky areas in woodlands and in openings in chaparral. It is common in rocky areas on the floodplains of Tassajara Creek. The botanical name refers to the conspicuous imperfect floret that is technically positioned above the lemma, but it appears to be appressed to the

inner side. ●R: Coast Ranges, Sierra Nevada, Transverse and Peninsular ranges, from Lake and Calaveras counties to northern Baja California. ●H: loosely to densely cespitose perennial herbs with culms that range from about 1 to 12 dm. (1-4') tall. The blades are primarily basal and range from about 10 to 30 cm. long and 1 to 6 mm. wide. The inflorescence is a variable panicle about 5 to 35 cm. long, the branches, which are often whorled at the nodes, range from upwardly contracted to outwardly spreading or reflexed. The spikelets are about 3 to 6 mm. long and contain one or sometimes two fertile lemmas; the glumes are nearly equal in length and tinged purplish brown. The awnless lemmas are about 3 to 7 mm. long. ❀April-May.

PANICUM. MILLET.

Panicum consists of about 440 species that are primarily endemic to tropical and warm temperate regions. The name is based on the Latin word *panis*, bread, or perhaps *panus*, an ear of millet.

Panicum acuminatum Swartz var. ***fasciculatum*** (Torrey) Lelong [*P. pacificum* Hitchcock & Chase; *P. occidentale* Scribner]. PACIFIC MILLET or PANIC GRASS. This distinctive species is scattered along perennial streams of the Tassajara region, and it is most often found growing out of the cracks and crevices of streamside boulders and cliffs. ●R: widely distributed in temperate North America. ●H: winter deciduous perennial herbs with erect or spreading culms that range from about 3 to 6 dm. long. Erect culms are generally produced in the spring, while spreading culms are generally produced in summer. The blades, which are produced in basal tufts as well as on the culms, are about 2 to 10 cm. long and 2 to 8 mm. wide. The florets are produced in open panicles that range from about 3 to 10 cm. long; those of spreading culms are often obscured by foliage. The one flowered spikelets are about 1 to 2 mm. long; the first glume is a minute bract and the second glume is as long as the spikelet. The roundish to obovate lemmas are about 1 to 2 mm. long. ❀April-October.

POA. BLUEGRASS.

Poa includes about 500 species that occur in temperate and cool regions in both the northern and southern hemispheres. The name is an ancient Greek word for various grasses and fodder plants.

1a. Annual grasses. Panicle branches mostly spreading. Back side of lemmas sharply creased:
  2a. Culms mostly 2 to 9 dm. tall. Outside base of lemmas with cotton or cobweb like tufts of hairs. . . . . ***P. howellii***.
  2b. Culms mostly .5 to 3 dm. tall. Outside base of lemmas without tufts of hairs. . . . . ***P. annua***.
1b. Perennial grasses. Panicle branches erect or loosely ascending. Back side of lemmas rounded (except for the mid rib):
  3a. Bases of culms bulbous. Most spikelets replaced by leafy bulblets or not. . . . . ***P. bulbosa***.
  3b. Bases of culms not bulbous. Spikelets not replaced by bulblets. . . . . ***P. secunda***.

Poa annua Linnaeus. ANNUAL BLUEGRASS, WINTER GRASS. This species is scattered in streambeds and in other wet or moist habitats in the Tassajara region, and it is weedy in and around the developed area of the hot springs. ●R: a common weed in North America; native to Eurasia. ●H: annual herbs with erect or ascending culms that range from about .5 to 3 dm. (2-12") tall. The blades are about 1 to 10 cm. long and 1 to 5 mm. wide. The open panicles are generally triangular in outline and range from about 1 to 10 cm. long. The spikelets, which contain about three to six lemmas, are about 3 to 6 mm. long; the glumes are unequal in length and less than 4 mm. long. The lemmas are about 2.5 to 4 mm. long. ❀February-September.

+*Poa bulbosa* Linnaeus. BULBOUS BLUE GRASS. Diane Renshaw discovered this species along the Horse Pasture Trail in April of 2009, and Vern Yadon collected a specimen of it at White Oaks Camp in May of 1980 (PGM 2073). It was unstated which subspecies the plants belonged to, but subsp. *vivipara* is by far the most common in California. Such plants differ from the typical species in having most of the spikelets replaced by leafy bulblets. ●R: a common weed grass in temperate regions nearly worldwide; native to Europe. ●H: perennial bunchgrasses with bulbous based culms that range from about 1.5 to 6 dm. (6-24") tall. The blades, which are about 1 to 2 mm. wide, are fairly short and soon wither. The panicles are ovate to lanceolate in outline and range from about 3 to 10 cm. long. The spikelets are mostly 5 flowered, and the lemmas are about 2.5 mm. long. ❀March-July.

Poa howellii Vasey & Scribner [*P. bolanderi* Vasey subsp. *h.* (Vasey & Scribner) Keck]. This species is lightly scattered on shady wood-land slopes and on rocky stream banks at lower to intermediate elevations in the Tassajara region. ●R: Pacific Slope of temperate western North America, from British Columbia to northern Baja California. Also on Santa Cruz and Santa Catalina islands. ●H: annual herbs with culms that range from about 2 to 9 dm. (8-36") tall. The blades are mostly basal and range from about .5 to 7 dm. long and 1 to 4 mm. wide. The inflorescences are open panicles that range from about 10 to 25 cm. long; the branches range from ascending to spreading. The two to five flowered spikelets are about 3 to 5 mm. long; the narrow glumes are about 1.5 to 2 mm. long. The lemmas are about 3 mm. long and have a tuft of cobwebby hairs at the outside base. ❀April-May.

Poa secunda Presl [*P. scabrella* (Thurber) Vasey]. PINE BLUE GRASS, ONE SIDED BLUEGRASS, MUTTON GRASS. This species is widely scattered and locally common at all elevations in the Tassajara region, and it occurs in most habitats types except for deeply shady and/or wet areas. Many of the plants of this region approach the description of the closely related *P. tenerrima*. Such plants differ from the typical species in having smaller tufts, more slender and delicate culms, and open, spreading panicle branches. ●R: widely distributed in the western hemisphere. In North America its range extends from southeastern Alaska to eastern Quebec, Nebraska, New Mexico and northern Mexico. In South America it occurs in Chile and Argentina. ●H: usually densely cespitose perennial herbs with slender culms that range from about 3 to 10 dm. (12-40") tall. The blades are primarily basal and range from about 2 to 16 cm. long and 1 to 3 mm. wide. The panicles, which are about 5 to 20 cm. long, range from fairly open to dense; the branches are upwardly contracted to loosely ascending. The three to eight flowered spikelets are about 6 to 10 mm. long; the glumes are about 2 to 5 mm. long, and the upper glume is slightly longer than the lower glume. The lemmas are about 4 to 5 mm. long. ❀March-May.

POLYPOGON. BEARD GRASS.

Polypogon consists of about 18 species that, as a whole, are widely distributed in temperate and tropical regions. The name is derived from the Greek words *poly*, many or much, and *pogon*, beard, alluding to the appearance of the inflorescence of some of the species.

1a. Glumes and lemmas awnless. . . . . ***P. viridis***.
1b. Glumes and lemmas awed:
2a. Plants perennial. Inflorescence interrupted. Glume awns 1.5 to 4.5 mm. long. . . . . ***P. interruptus***.
2b. Plants annual. Inflorescence head like. Glume awns 2 to 10 mm. long. . . . . ***P. monspeliensis***.

Polypogon interruptus Humboldt, Bonpland & Kunth [*P. lutosus* (Poiret) Hitchcock]. DITCH BEARD GRASS. This species is widely scattered in the beds of perennial and larger intermittent streams in the Tassajara region. ●R: western North America, from Washington, Wyoming and Nebraska southward, to temperate South America. ●H: often tufted perennial herbs generally with decumbent-ascending culms that range from about 1 to 10 dm. (4-40") long. The blades are generally flat and about 1 to 20 cm. long and 3 to 6 mm. wide. The inflorescence is a densely flowered and more or less upwardly contracted panicle about 2 to 18 cm. long; the panicles are typically irregular in outline. The one flowered spikelets fall with the matured lemmas. The glumes are about 1.5 to 3 mm. long and are terminated by slender awns about 1.5 to 4.5 mm. long. The lemmas are about 1 to 2 mm. long, and the lemma awns are about .5 to 3 mm. long. ❀May-August.

Polypogon monspeliensis (Linnaeus) Desfontaines. RABBIT'S FOOT GRASS. This distinctive species is lightly scattered along streams in the Tassajara region, and sometimes at springs and seeps. ●R: a common weed nearly worldwide; native to Eurasia. ●H: annual herbs with culms that range from about 1.5 to 5 dm. (6-20") tall. The blades are generally flat and about 1 to 20 cm. long and 4 to 6 mm. wide. The inflorescence is a dense and upwardly contracted panicle about 1 to 17 cm. long; the panicles have a soft and fur like texture. The one flowered spikelets, which fall with the matured lemmas, have glumes that are about 1 to 2.5 mm. long. The glume awns are about 2 to 10 mm. long. The lemmas are about .5 to 1.5 mm. long, and the lemma awns are about .5 to 4.5 mm. long. ❀April-August.

Polypogon viridis (Gouan) Breistroffer [*Agrostis viridis* Gouan; *A. semiverticillata* (Forsskal) C. Christensen, *A. verticillata* Villars, *Polypogon semiverticillatus* (Forskal) Hylander]. WATER BENT GRASS. This introduced species is scattered in streambeds and other moist places at lower and intermediate elevations in the Tassajara region. ●R: a common weed in tropical and temperate regions of the Western Hemisphere; native to Africa and Eurasia. ●H: small perennial herbs typically with decumbent culms that range from about 1 to 4 dm. (4-16") tall. The blades are about 3 to 18 cm. long and 2 to 10 mm. wide. The inflorescence is an erect and many flowered panicle with upwardly contracted to ascending (and often whorled) branches. The spikelets are very small and one flowered; the glumes are equal in length, about 2 mm. long, and fall with the matured lemma. The awnless lemmas are about 1 mm. long. ❀May-June.

STIPA. NEEDLE GRASS, FEATHER GRASS.

According to some botanists, *Stipa* includes about 600 species that occur in temperate and tropical regions nearly worldwide, while according to others, these species represent section *Stipeae* of the subfamily *Pooideae*, which includes 15 genera. There is also disagreement in regards to the origin an meaning of the name. One etymology states that it is derived from Greek word *stupe*, tow, alluding to the feathery awns of the type species (*S. pennata*). Another states that it is derived from the Greek word *stupe* or *stuppeion*, for fiber or cordage, referring to plumose awns of Eurasian species or fibers from especially *Stipa tenacissima*. Yet another states that it is the Latin word *stipa*, 'oakum' (a loose bunch of fibers), alluding both to the feathery inflorescences and the use of *Stipa tenacissima* as a source of cordage. The awns of many of the species become twisted when dry but straighten out when moisture is applied; this adaptation enables the awn to drill the lemma into the ground at the beginning of the rainy season.

1a. Culms mostly 1 to 2 m. (40-78") tall. Panicle branches upwardly contracted. Blades flat and mostly about 4 to 10 mm. wide. . . . . ***S. coronatum***.
1b. Culms generally less than 1 m. (40") tall. Panicle branches upwardly ascending to spreading. Blades mostly involute and less than 4 mm. wide:
2a. . Lemmas about 6 mm. long. Lemma awns very slender and flexuous, and less than 5 cm. long. . . . . ***S. lepida***.
2b. . Lemmas about 5 to 12 mm. long. Lemma awns relatively stout and stiff, and usually more to much more than 5 cm. long
3a. Lemma body in age hairy throughout. . . . . ***S. pulchra***.
3b. Lemma body in age glabrous in distal three quarters except on veins. . . . . ***S. cernua***.

+***Stipa cernua*** Stebbins & Love [*Nassella c*. (S. & L.) Barkworth]. NODDING NEEDLE GRASS. James Griffin, in his "Plants of the Highest Santa Lucia and Diablo Range Peaks" (1975), lists this species as being uncommon between 600 and 1200 m. (1968-3937') on Chew's Ridge, and it is also included in the California Native Plant Society's list of the vascular plants of Chew's Ridge. As defined in Griffin's text, Chew's Ridge included Black Butte Ridge, but my hunch is that Griffin observed this species on the Jamesburg side of Chew's Ridge, for it occurs on the Hasting Natural History Reservation. It also occurs in the lower Arroyo Seco Canyon. ●R: Coast Ranges, Sierra Nevada, and the Transverse and Peninsular ranges, from Tehama and Butte counties to northern Baja California, and on Santa Rosa, Santa Cruz, Santa Catalina and San Clemente islands. ●H: perennial bunchgrasses with culms that range from about 3 to 10 dm. (12-40") tall. The narrow blades, which are flat or inrolled, range from about 3 to 26 cm. long and .4 to 1.2 mm. wide. The open and usually nodding panicles range from about 15 to 80 cm. long. The one flowered spikelets have narrowly lanceolate glumes that are about 12 to 22 mm. long, and the lemmas, which are about 5 to 10.5 mm. long, have terminal awns that range from about 6 to 11 cm. long. ❀February–July.

Stipa coronata Thurber [*Achnatherum coronatum* (Thurber) Barkworth]. GIANT STIPA. *Stipa coronata*, which is the largest grass species in the Tassajara region, is widespread in open and often rocky habitats at all elevations in the Tassajara region, especially in openings in chaparral. ●R: Coast, Transverse and Peninsular ranges, from Monterey and San Benito counties to northern Baja California. Also in the southern Sierra Nevada, in Tulare and Kern counties, and in the Inyo, White and Panamint mountains of Inyo County. Disjunct populations occur along highway 128 in eastern Napa County, to the south of Lake Berryessa. ●H: large and densely cespitose perennials with stout culms that range from about 1 to 2 m. (40-80") tall. The blades are flat and range from about 3 to 6 dm. long and 5 to 10 mm. wide. The large panicles range from about 3 to 6 dm. long, and the upwardly contracted branches are densely floriferous. The lower glumes of the one flowered spikelets are about 16 to 21 mm. long, while the upper glumes are about 11 to 18 mm. long. The lemmas, which are about 9 mm. long, are densely covered with long appressed hairs which fan out beyond the apex; they are terminated by twice bent awns that range from about 25 to 45 mm. long. ❀April-June.

Stipa lepida A. S. Hitchcock [*Nassella l.* (Hitchcock) Barkworth]. ELEGANT STIPA, FOOTHILL NEEDLE GRASS. This species is scattered in open grasslands and grassy areas in open woodlands at lower to

intermediate elevations in the Tassajara region, but it is generally uncommon. It was abundant in the Windcaves area during the first spring after the Basin Complex Fire of 2008. For many years a colony has been established at the summit of the trail over the Hog's Back. ●R: Coast, Transverse and Peninsular ranges, from Humboldt and Shasta counties to northern Baja California. Also in the Sierra Nevada foothills, from Nevada County to Kern County, and on the islands off the coast of southern California. ●H: often very densely tufted perennial bunch grasses with slender culms that range from about 3 to 9 dm. (1-3') tall. The glaucus gray green blades, which are about 10 to 25 cm. long and 1 to 3.5 mm. wide, appear to be nearly filiform due the involute margins. The wispy looking panicles are about .5 to 3 dm. long; the branches are erect to loosely ascending. The glumes of the one flowered spikelets are very slender and sharply acute; they are about 4 to 10 mm. long, and the lower glume is usually longer than the upper glume. The lemmas are about 4 to 6 mm. long and mostly less than 1 mm. wide; they are terminated with very slender awns that are about 2 to 4.5 cm. long. ❀March-May.

Stipa pulchra A. S. Hitchcock [*Nassella p.* (Hitchcock) Barkworth]. PURPLE NEEDLE GRASS, CALIFORNIA STIPA. This species is widely scattered in open grassland habitats at lower to intermediate elevations in the Tassajara region, and it is fairly common in some areas. This species, the "State Grass" of California, is believed to have been abundant in the grasslands of much of northern and central California before the arrival of European settlers. ●R: Coast Ranges, the Sierra Nevada foothills, the Sacramento Valley and the northern San Joaquin Valley, and the Transverse and Peninsular ranges, from Humboldt and Tehama counties to northern Baja California. Also on the islands off the coast of southern California. ●H: tufted perennial herbs with slender culms that range from about 6 to 10 dm. (24-40") tall. The blades, which are about 8 to 30 cm. long and 1 to 3 mm. wide, appear to be filiform due to their involute margins. The nodding and often purplish tinged panicles are about 10 to 30 cm. long; the branches are loosely ascending to spreading. The one flowered spikelets have glumes that are about 12 to 19 mm. long; they are about equal in length. The lemmas are about 6.5 to 10 mm. long and are terminating with twice bent awns that range from about 5 to 9 cm. long. ❀April-June.

TRISETUM. THREE BRISTLE GRASS.

The genus *Trisetum* consists of about 70 to 75 species of the Americas, Eurasia and Australia. The species primarily occur in temperate, subarctic and alpine regions. The name is a combination of the Latin words *tri*, three, and *setum*, bristle, alluding to the awn and the two long teeth of the lemma tips.

+***Trisetum canescens*** Buckley [*T. cernnum* var. *c*. (Buckley) Beal]. TALL TRISETUM. This entry is based on one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June, 1901 (Elmer 3309; DS 58435). According to the note that is enclosed in the envelope that is pasted to the sheet, Elmer collected it "Near Black Oak Camp." It is probable that Elmer's Black Oak Camp was what was is now known as Tan Oak Camp. On that outing Elmer was accompanied his teacher, professor William Russell Dudley of Stanford University, and Dudley collected a specimen of *Tauschia kelloggii* "Along Leigh Trail, head of Zigzag Creek at Oak Camp." Dudley's Leigh Trail is certainly the same as what is now known as the Marble Peak Trail, and thus his Oak Camp is certainly the site of what is now known as Tan Oak Camp. *Quercus kelloggii* (California Black Oak) trees are scattered in the woodlands of that region, and I have never noticed Tan Oak (*Notholithocarpus*) trees in the vicinity of Tan Oak Camp. This is a species that occurs along streams or in moist meadows, especially in coniferous forests. ●R: western North America, from Alaska and Alberta to the mountains of California and Arizona. In California its range extends through the Coast Ranges to the San Rafael Mountains in Santa Barbara County, and to Kern County in the Sierra Nevada, and disjunct populations occur in the San Bernardino and San Jacinto mountains of San Bernardino and Riverside counties. ●H: perennial bunch-grasses with erect culms that range from about 5 to 12 dm. (20-48") tall. The cauline blades are about 1.5 to 3 dm. long, and about 2 to 8 mm. wide. The panicles, which are usually narrow, loose and some-times interrupted, are about 6 to 25 cm. long. The spikelets are 2 to 3 flowered, and the lemmas are about 4 to 6 mm. long. The twisted lemma awns are about 6 to 11 mm. long. ❀May-August.

THEMIDACEAE. BRODIAEA FAMILY.

Themidaceae consists of ten or eleven genera and about 60 to 70 species of western North America and Central America. The family name is based on the very long time defunct genus name *Themis*, into which what is now known as *Triteleia ixioides* was once placed.

1a. Perianth segments ('petals') divided nearly to the base. Flowers yellow. . . . . ***Bloomeria***.
1b. Perianth segments united for at least ¼ of the length of the perianth. Flowers yellow to dark blue or purple:
  2a. Perianth segments yellow. . . . . ***Triteleia***.
  2b. Perianth segments ranging from pale magenta or blue, to dark purplish blue or bluish purple:
    3a. Umbels open, the pedicels 1 to 4 cm. long. Staminodes unlike and alternate with the fertile stamens. . . . . ***Brodiaea***.
    3b. Umbels dense and head like, the pedicels .2 to 1.5 cm. long. Filaments forming a crown like tube outside anthers. . . . . ***Dipterostemon*** (*Dichelostemma*).

BLOOMERIA. GOLDEN STARS.

Bloomeria consists of two species that are endemic to the California Floristic Province. The genus is named for Dr. Hiram G. Bloomer (1821-1874), a pioneer California botanist and one of the founding members of the California Academy of Sciences (Bloomer served as the Curator of Botany at that institution from 1858 to 1862).

!***Bloomeria crocea*** (Torrey) Coville [*Allium c*. Torrey; *B. aurea* Kellogg; *Nothoscodum areum* J. D. Hooker]. GOLDEN STARS. This showy flowered species occurs in clayey soils along the Church Creek Fault, which the routes of the Horse Pasture and Church Creek trails follow. In normal years it is locally common in such habitats, but during the first spring after the Basin Complex Fire of 2008 it was abundant. This species is often found growing in association with the similar looking *Triteleia ixioides*, from which it can be easily distinguished by having perianth segments that are divided almost to the base. ●R: from western Stanislaus County in the Coast Ranges, and from Tulare County in the southern Sierra Nevada, to northern Baja California. ●H: bulbous perennial herbs with scapes that range from about 2 to 8 dm. (8-32") tall. The usually singular leaves are basal; they are grass like in shape and are up to 4 dm. long. The flowers are produced in open terminal umbels on pedicels about 2 to 6 cm. long; as the pedicels spread out in all directions, the

umbels resemble the shape of an exploding firework. The perianth is divided nearly to the base into six yellow or orangish yellow segments about 8 to 12 mm. long; the midribs are brownish on the external surface. The fruit is a three angled capsule about 5 to 6 mm. long. ֍May-July.

BRODIAEA.

As currently treated, *Brodiaea* consists of 17 species of temperate western North America. All of the species occur in California, and 16 are endemic to the California Floristic Province. The genus was named for the Scottish botanist James Brodie (1744-1824).

^***Brodiaea jolonensis*** Eastwood. JOLON BRODIAEA. In the first edition of this text I stated that this entry is based one of A. D. E. Elmer's "Tassajara Hot Springs" specimens of June 1901 (Elmer #3218 DS). According to a note enclosed in an envelope pasted to the specimen sheet, Elmer collected his specimen in "Pine Valley, near open meadow." I also stated that I was not able to find this species in Pine Valley, or anywhere else in this region. To my surprise I came across a small population while performing a botanical survey of Pine Valley in late May of 2009. The plants were located on the eastern edge of the perpetually swampy area in the large meadow to the northwest of Jack English's cabin. ●R: Coast, Transverse and Peninsular ranges, from the Santa Lucia Mountains of Monterey County (in Pine Valley and on the Hastings Natural History Reservation) to northwestern Baja California. Also on Santa Cruz and Santa Catalina islands. ●H: bulbous perennial herbs with scapes that range from about .5 to 1.5 dm. (2-6") tall. The grass like leaves are usually longer than the scapes. The flowers are produced in open terminal umbels on pedicels about 1 to 4 cm. long. The tube and the lobes of the perianth range from dark purplish blue (ours) to violet; the tube is 7 to 9 mm. long, and the lance-ovate lobes are about 11 to 18 mm. long. The outer lobes are about 2 mm. wider than the inner lobes. The fruit is an ovoid capsule about 5 to 6 mm. long. ֍April-June.

DIPTEROSTEMON.

The genus *Dipterostemon* is comprised of one species of the western United States and northern Baja California that has been segregated from the genus *Dichelostemma*. The name is derived from Greek and refers to the stamens which have two wings.

!!***Dipterostemon capitatus*** (Bentham) Rydberg [*Dichelostemma capitatum* (Bentham) Alphonso Wood; *Brodiaea capitata* Bentham, *Milla capitata* Baker; B. *pulchella* (Sailsbury) E. Greene misapplied]. BLUE DICKS, BLUE DIPS. In the first edition of this text I stated that this species was "Widespread and locally common in open habitats in the Tassajara region, and one of the most common of the local wildflowers." During the first spring after the Basin Complex Fire of 2008, this species was exceedingly abundant, and not just in places that had previously been open, but also in areas that had been dominated by dense stands of chaparral or woodlands. This species occurs in suitable habitats at all elevations in this region. ●R: from Yamhill and Hood River counties in northwestern Oregon to Utah, New Mexico and northern Baja California. ●H: bulbous perennial herbs with scapes that range from about 3 to 9 dm. (1-3') tall. The long linear leaves are strictly basal and are usually produced in two's, but sometimes there are three. They are about 1 to 4 dm. long and 5 to 12 mm. wide, and they typically lay on the ground or on other plants. The flowers are produced in head like terminal umbels that are comprised of about 2 to 15 flowers. The perianth, which is about 11 to 19 mm. long, is six lobed above and united below into a cylindric to bell shaped tube that is about 4 to 7 mm. long; the color ranges from blue to magenta, and sometimes they a quite pale. The fruits are ovoid capsules that are about 4 to 6 mm. long. ֍April-June.

TRITELEIA.

This genus consists of 15 species of western North America. Thirteen species occur in California, and eleven (plus five lesser taxa) are endemic to the California Floristic Province. The name is derived from the Greek words *tri*, three, and *teleios*, perfect or complete, on account of the arrangement of flower parts in threes.

!***Triteleia ixioides*** (S. Watson) E. Greene [*Ornithogalum i*. W. T. Aiton; *Callipora lutea* Lindley; *Brodiaea lutea* (Lindley) Morton]. GOLDEN BRODIAEA, PRETTY FACE. This showy flowered species is widely scattered at all elevations in the Tassajara region, but it is most common in clay loam soils along fault zones (the Church Creek, Willow Creek and Miller Canyon Faults), where it is locally common to abundant in open and grassy habitats. During the first spring after the Basin Complex Fire of 2008 it was common along the floodplains of Tassajara Creek. This species is often found in association with the very similar looking *Bloomeria crocea*, from which it can be distinguished by the perianth segments being united for a distance above the base (instead of being divided to the base). ●R: Coast Ranges, from San Mateo and Santa Clara counties to Santa Barbara County. Along with its four subspecies, the complex ranges from Jackson County in southwestern Oregon southward, through the Sierra Nevada and Coast Ranges, to the Transverse Ranges of Los Angeles County. One of the subspecies, *cookii*, is endemic to the Santa Lucia Mountains of San Luis Obispo and southern Monterey County; it differs from the typical species in having white flowers and perianth tubes that are about as long as the lobes. ●H: bulbous perennial herbs with scapes that range from about 2 to 8 dm. (8-32") tall. The strictly basal leaves are often produced in two's, but sometimes there is a smaller third leaf. They are linear and range from about 2 to 4 dm. long and 3 to 15 mm. wide. The showy flowers are produced in spreading terminal umbels on pedicels that are about 1 to 7 cm. long. The creamy yellow perianths, which are about 1 to 2.5 cm. long, are divided about two thirds of the way to the base into six lance-ovate lobes. The fruits are shortly oblong capsules that are about 7 or 8 mm. long. ֍April-June.

TYPHACEAE. CAT TAIL FAMILY.

Typhaceae consists of two genera and about 32 species, most of which are of wide distribution. The genus *Typha* represents the subfamily *Typhoideae*, and the genus *Sparganium* (Bur Reed) represents the subfamily *Sparganioideae*. In many older texts the bur reeds are placed in their own family, *Sparganiaceae*.

TYPHA. CAT TAILS.

Typha includes about 15 species that are distributed in boreal to tropical regions worldwide. The name is derived from the ancient Greek word for members of this genus, and according to the Jepson eFlora, it means to smoke or to emit smoke. It thus probably refers to the shedding of its plumose fruits in the wind.

Typha angustifolia Linnaeus. NARROW LEAVED CAT TAIL, NAIL ROD. As typical of cat tails, this species is best adapted to standing or slowly flowing water. Although the swiftly flowing streams of the Tassajara region present a challenge to this species, it has, however, become established along sections of some of the smaller perennial streams (such as Blackberry Creek and in a marshy area along Waterfall Creek, above the three waterfalls), and occasionally in protected sites along larger streams. ●R: widely distributed in the temperate regions of the northern hemisphere. ●H: rhizomatic perennial herbs with culms that range from about 1 to 2 m. (3.3-6.5') tall. The long linear leaves are about as long as the culms; they are planoconvex with a spongy interior, and are up to 15 mm. wide. The long and very densely flowered terminal spikes are divided into two sections, the upper is staminate (male) and the lower is pistillate (female). The seeds, which have a mealy endosperm, are produced from stipitate ovaries that are subtended by hair like perianth segments. ♔June-July.

Phacelia viscida as illustrated in volume six of Benjamin Maund's *The Botanic Garden*, 1835-1836.

GLOSSARY. p. 233.

Acaulescent. Plants without stems or true stems. Flowers are basal or on leafless scapes (stem-like peduncles) (see caulescent).

Achene. An alternate spelling of akene.

Acuminate. More or less abruptly tapering to a somewhat extended and sharply acute apex.

Acute. Tapered to a more or less sharp apex (at less than a 45 degree angle).

Akene. A dry, indehiscent, and one-seeded fruit. Also spelled as achene.

Alternate. Arranged singularly along an axis, such as leaves on a stem.

Annual. A plant that lives for less than one year.

Anther. The pollen-bearing and usually terminal part of a stamen.

Anthesis. The time of expansion of a flower; often used to describe the entire period in which the stamens are pollen emitting and/or the pistils are receptive to pollen.

Apetalous. Without petals.

Appendage. Any secondary or supplementary part attached to another formation.

Appressed. Pressed flat or nearly so against a structure (and usually parallel to the axis of the structure), such as the hairs on a leaf, or the flowers of a raceme.

Arborescent. Tree-like in size and/or habit of growth.

Articulate. Here used to describe a point where natural separation occurs (see disarticulating).

Ascending. Curving or angled upward, not strictly erect.

Asymmetric. Irregular in shape, the various parts unequal in size, shape or arrangement.

Auricle. An appendage, most commonly ear-shaped.

Awn. A terminal or sometimes lateral bristle, such as on the lemmas and/or glumes of many grasses.

Axes. The plural of axis.

Axil. The upper angle of a juncture, such as stem and branch, or a leaf and stem, branch or branchlet.

Axillary: pertaining to an axil, or to formations occurring at or from an axil.

Axis. A real or imaginary line passing along the length and direction of a stem or branch, or through the center of a formation, such as a leaf.

Banner. The upper (and usually largest) petal of most members of *Fabaceae* (Pea Family).

Basal. Produced from or pertaining to the base (of either an entire plant or a part of a plant). In this text, the term almost exclusively pertains to the lower-most leaves of a plant.

Beak. In this text used only to describe a narrowed and usually elongated appendage terminating akenes, or other types of fruits or seeds.

Berry. A juicy or fleshy and indehiscent fruit, usually with two or more seeds that are not stone-like (see drupe & pome).

Biennial. A plant that lives through two growing seasons, often flowering only in the second season.

Bifid. Two-cleft to about the middle.

Bilabiate. A tubular corolla with two lips that are unequal in size or shape, such as in the flowers of *Scrophulariaceae* or *Lamiaceae.*

Bipinnate. Twice pinnate, such as a leaf that is pinnately parted into leaflets or segments that are again pinnately parted or lobed (see pinnate).

Bipinnatifid. Twice pinnately cleft (see pinnate).

Biternate. Divided into three divisions which are again divided into three divisions (see ternate).

Blade. The expanded part of a leaf or petal; in grasses, the free part of a leaf, above the sheath.

Bract. A much reduced or rudimentary leaf or scale, often subtending flowers or flower clusters.

Bractlet. A secondary bract produced on rather than subtending a pedicel. Often sepal-like.

Bud. An immature and unopened flower, or an immature leaf or stem.

Bulb. An underground stem surrounded by fleshy leaf bases, such as an onion.

Bunch-grass. A grass producing a tuft of basal leaves.

Caducous. Falling off early or prematurely, such as sepals that fall before the anthesis of the flower.

Calyx. The outer and usually green part of flower, comprised of a whorl of segments or lobes (sepals), or united and entire, or lobed only at the apex.

Calyces: the plural.

Campanulate. More or less bell-shaped.

Canescent. Covered with fine grayish-white hair.

Capillary. Exceedingly slender or hair-like.

Capitate. Head-like, usually pertaining to a dense, terminal, and more or less roundish flower cluster.

Capsule. A dry and usually many-seeded fruit comprised of more than one carpel, and irregularly dehiscent or dehiscent by slits or pores.

Carpel. A simple or compound pistil.

Caryopsis. The fruit (grain) of grasses.

Catkin. A scaly, deciduous, and unisexual floral spike, such as in *Quercus* or *Salix.*

Caudex. A sometimes woody, more or less vertical, and underground or exposed base of an herbaceous perennial.

Caulescent. Pertaining to plants with true and usually leafy stems (see acaulescent).

Cauline. Pertaining to or produced on a stem, such as cauline leaves (as opposed to basal leaves).

Cell. In this text pertaining to a cavity in an ovary.

Cespitose. Having a densely tufted or cushion-like habit of growth.

Chaff. Thin and dry scales or bracts. In *Asteraceae* pertaining to the inner bracts of a receptacle.

Chamber. In this text pertaining to a cavity in an ovary.

Chaparral. A more or less dense plant community comprised of evergreen and sclerophyllous shrubs that are adapted to a Mediterranean climate. The original Spanish name, *chaparro,* means a thicket of shrub oaks.

Chartaceous. Paper-like in texture.

Ciliate. Having fringe-like hairs on a margin.

Cismontane. West of the crest of the Sierra Nevada and the axis of the higher mountains of southern California. Roughly the same as the California Floristic Province.

Clavate. Narrow at the base and gradually widening upwards, like the shape of a club.

Claw. A narrow and petiole-like base of a petal.

Cleistogamous. Applied to small and bud-like flowers that do not open and are self pollinated.

Coma. A tuft of hair or fibers, particularly on seeds (see pappus).

Comose: having a coma.

Cone. A reproductive structure comprised of an axis and scales, the scales woody (as in alder and coniferous trees) or not (as in horsetails).

Connate. A union of like structures.

Cordate. Shaped like an upside-down valentine heart, the cleft at the point of attachment.

Corm. A thick, generally roundish and bulb-like fleshy tuber.

Corolla. The usually colorful and delicately textured inner perianth of a flower, which may be partly to completely united or divided into distinct petals (see petal).

Corymb. A racemose inflorescence with a more or less flat-topped or convex crown, with the outer (lower) pedicels longer and with flowers that typically open earlier.

Corymbose: produced in corymbs.

Cotyledon. The one or two leaf-like and often food supplying structures of a germinating seed.

Crenate. A margin with rounded or scalloped teeth.

Crenulate: the diminutive of crenate.

Crisped. A margin that is irregularly wavy or curled (contorted) perpendicular to the plane of the blade (wavy up and down as opposed to in and out).

Culm. The name applied to the hollow or pithy stems of grasses and similar plants.

Cuneate. Wedge-shaped, gradually widening from the point of attachment.

Cyme. An inflorescence or flower cluster with the terminal or central flowers blooming first.

Cymose: comprised of or pertaining to cymes.

Deciduous. Falling off seasonally or in maturity, such as leaves in autumn, petals after anthesis, ripened fruits, etc.

Decompound. Several times divided.

Decumbent. Lying more or less flat on the ground, but turning upward towards the apex (see ascending).

Decurrent. A sessile leaf in which the base is fused to and extends down the sides of a stem.

Deflexed. Turned downward or backward.

Dehiscent. Opening irregularly or by slits or valves to discharge the contents, such as the manner in which a capsule releases its seeds (see indehiscent).

Deltate, Deltoid. More or less broadly triangular, equilateral, and with the basal corners generally rounded.

Dentate. A margin with sharp teeth directed outward (as opposed to forward or backward). Denticulate: the diminutive. **Depauperate.** Stunted or dwarfed in habit of growth, starved.

Dichotomous. Two-forked or branched. Often applied to an inflorescence that is repeatedly two-branched.

Dicot, Dicotyledon= Dicotyledoneae.

Dicotyledoneae. The larger class of flowering plants, in which the seeds are with 2 cotyledons at germination, the leaves are typically with a pinnate or palmate vein structure, the wood of shrubs or trees develops growth rings, and the outer flower parts (calyces & corollas), if present, are generally lobed or divided in 4's, 5's, or more.

Dioecious. Plant species in which individual plants produce either staminate or pistillate flowers, but never both, i.e., a heterosexual plant (see monoecious and perfect).

Diploid. Having a maternal and paternal set of chromosomes; *2n* (see haploid, polyploid and tetraploid).

Disarticulating. Separating at a point of demarcation in maturity, such as at nodes or joints (see articulate).

Discoid. A composite flower head of the *Asteraceae* comprised of only tubular disk flowers.

Disk. In *Asteraceae* the central area or receptacle of a composite flower head.

Disk flower. A tubular flower of the *Asteraceae* (see ray flower & ligulate flower).

Distal, Distally. A way from the base or point of attachment; towards the apex.

Divaricate. Widely diverging.

Dorsal. The outer or back side of a structure, away from the axis (refer to ventral).

Drupe. A moist or fleshy and indehiscent fruit with one hard and usually one-seeded stone, such as a cherry (see berry & pome).

Druplet. A small drupe, often produced in aggregations, such as in a blackberry.

Ellipsoid. A three-dimensional structure in the shape of an ellipse.

Elliptic. A flat structure in the shape of an ellipse.

Emarginate. With a notched or cleft apex.

Endemic. A species in which the natural distribution is restricted to a geographical region.

Entire. Pertaining to margins that are continuous, i.e., not lobed or toothed.

Ephemeral. Of very short duration. In this text often used to describe a species that goes through prolonged periods of being very rare or absent, such as an annual "burn species"

Erect. With a vertical habit of growth, or a formation that is vertical in relationship to an axis.

Erose. Irregularly toothed or lobed.

Evergreen. Pertaining to persistent leaves that remain green and functional throughout the year, or to plants with such leaves.

Exserted. Protruded outward or beyond other formations, such as stamens in relationship to a corolla.

Falcate. Sickle-shaped, curving to one side.

Fascicle. A cluster of flowers, leaves, stems or roots.

Fastigiate. Clustered, parallel, and erect branches.

Fertile. A reproductive part that is functional, or a plant that is reproductively functional (see sterile).

Fibrous. Comprised of or containing fibers.

Filament. The stem-like portion of a stamen which supports the anther.

Filiform. Exceeding slender; thread-like.

Fistulous. A stem or leaf that is hollow.
Flaccid. Weak or limp.
Floccose. With floes or tufts of fine woolly hair.
Floret. The individual flowers of *Poaceae* or *Asteraceae;* a small flower of a dense cluster.
Floriferous. Producing flowers, usually applied to plants that produce many flowers.
Flower head: An inflorescence of *Asteraceae* species, in which the flowers are sessile and clustered on a common receptacle.
Foliaceous. Leaf-like, such as bracts or sepals that resemble leaves.
Follicle. A dry, one-carpeled and usually many-seeded fruit that opens from a suture on the inner (ventral) side.
Frond. The leaf of a fern, inclusive of the petiole.
Fruit. A ripened and one to many seeded pistil, such as a capsule, follicle, drupe, pome, berry, nutlet, akene, etc. A fruit may be simple, such as an acorn, or compound, such as a blackberry.
Funnelform. Funnel-shaped, i.e., tubular but narrowed at the base, and gradually expanding or spreading upward.
Fusiform. Widest at the middle and tapering to each end, like a spindle.

Galea. A hood or helmet-like upper corolla lip, such as in *Castilleja* (the paint brushes) and related genera of *Scrophulariaceae.*
Gibbous. Swollen to one side, such as a gibbous moon.
Glabrous. Without hairs; bald.
Gland. A sunken or raised formation on a surface, or the tip of a hair, that secretes a usually sticky fluid.
Glaucus. Covered with a usually whitish or bluish and waxy or powdery substance, such as the bloom of a fruit that is easily rubbed off.
Globose. Round or roundish, like a globe.
Glomerule. A terminal and compact flower cluster or cyme.
Glumes. The (usually) two outer bracts of a grass floret (see lemma, palea & spikelet).
Glutinous. With a gluey substance.
Granular. Covered with small grains or granules; mealy.
Gregarious. Here pertaining to plants that grow in groups or colonies.

Habit. Here used to describe the general form and manner of growth of a plant, such as being woody, herbaceous, annual, perennial, a vine, a tree, erect, rounded in outline, prostrate, climbing, etc.
Habitat. A distinguishable plant community or environment, or pertaining to the type of plant community or environment that a plant species usually occurs.
Haploid. Having one set of chromosomes (see diploid, polyploid and tetraploid).
Hastate. Generally shaped like an arrowhead, with the basal points or lobes at a downward angle in relationship to the apex.
Head. A dense and often roundish cluster of sessile or nearly sessile flowers (see flower head).
Hemispheric. Shaped like half of a sphere; dome-shaped.
Herb. A non-woody plant, or at least not woody above the ground.
Herbaceous. Without woody tissue; herb-like.
Herbage. Pertaining to the green parts of a plant.
Heterogamous. Producing flowers with different characteristics.
Hirsute. With rough or coarse and generally erect hairs.
Hispid. With stiff and bristly hairs.
Holotype. A specimen on which the description of a species or other taxon is based (see type and isotype).
Hyaline. Colorless to translucent or nearly transparent.
Hybrid. A cross between two taxa.
Hypanthium. A generally disk, cup or tube-like floral structure comprised of the fused bases of the calyx, corolla, and sometimes the stamens. Inferior ovaries are partly to entirely fused into a hypanthium.
Hypogynous. Produced on a receptacle below and free from the pistil, such as petals or stamens.
Imbricate. Layered in an overlapping pattern, such as shingles on a roof.

Imperfect. In botany the term is applied to a flower that has either stamens or pistils, but not both (see perfect).
Incised. Deeply cut or divided.
Incurved. Bending or curving inwards.
Indehiscent. Pertaining to a nonopening fruit, such as an akene (see dehiscent).
Indusium. A tissue or scale-like formation that partly or entirely covers the sori of many fem species.
Inferior ovary. An ovary that is partly or entirely positioned below the hypanthium (and thus the calyx, corolla and stamens), and is partly to entirely fused to the hypanthium.
Inflorescence. The flowering portion or portions of a plant, inclusive of its associated parts.
Inserted. Attached to or growing upon.
lnternode. A portion of a stem that is situated between nodes.
Involucel. A secondary involucre, such as the bracts subtending a secondary umbel of a compound umbel.
Involucre. A fused or divided group of bracts subtending a flower or flower cluster, such as the phyllaries in *Asteraceae* or the disk-like formations in many *Trifolium* (clover) species.
Involute. Pertaining to margins that are turned inward (upward).
lsotype. A specimen of the type collection, but not the holotype (see type and holotype).

Joint. A node, point of attachment or point of articulation.

Keel. A dorsal ridge or crease centrally located along the axis of a formation, similar to the keel of a boat. Also the inner two and often united petals of *Fabaceae* species.

Lacerate. A margin appearing irregularly torn or cleft.
Laciniate. A leaf or margin divided into narrow lobes or segments.
Lanate. Densely covered with long woolly hairs.
Lanceolate. Lance shaped, widest in the lower half and gradually tapering to a generally acute apex, and more abruptly tapering to the base.
Lateral. Pertaining to or positioned on or at the side.
Leaflet. An often leaf-like segment of a compound leaf.
Legume. The fruit of *Fabaceae* species, a one-celled pod from a simple pistil, with one to many seeds positioned along the ventral suture, most commonly splitting longitudinally into two halves that remain united at the base. Also a generic name for *Fabaceae* species.
Lemma. The lower and generally larger of the two bracts immediately subtending the flowers of *Poaceae* (grass) species (see glumes, palea and spikelet).
Lenticular Lens, lentil or disk-shaped.
Ligulate. Strap or tongue shaped.
Ligulate head. A flower head of *Asteraceae* species in which all of the flowers are with ligulate corollas.
Ligulate flower. Flowers of *Asteraceae* species in which the corollas are generally strap-shaped, but narrowed at or near the base into a tube. Distinguished from a ray flower in being produced in a ligulate head (see ray flower and disk flower).
Ligule. The strap-shaped corollas of some *Asteraceae* species. Also the thin and collar-like appendage situated at the juncture of a grass blade and sheath.
Limb. The expanded and often lobed portion of a united corolla or calyx, situated above the tube or throat.
Linear. Narrow to very narrow, elongated, and generally uniform in width. More narrow than oblong.
Lyrate. Lyre-shaped, such as a pinnatifid leaf with a much larger terminal segment.

Margin. The edge of a more or less flat formation.
Membranaceous, membranous. Membrane-like, i.e., thin, pliable, and often translucent.
Midrib. The central rib or vein of a leaf or other formation.
Monocot, Monocotyledon= Monocotyledoneae.
Monocotyledoneae. The smaller class of flowering plants, in which the germinating seeds are with one cotyledon, the leaves are most typically linear and with a parallel vein structure, the trunks or branches of tree or shrub like plants are not truly woody and do not develop growth rings, and the outer flower parts are in 1's or 2's, or arranged in one or more series of 3's. Grasses, sedges, rushes, cat tails, lilies, orchids, irises, etc.
Monoecious. A species in which pistillate and staminate flowers are produced separately, often in separate formations.
Monotypic. A taxon with only one type or representative, such as genus with only one species.
Montane. Of or pertaining to mountains.

Nectariferous. Containing or producing nectar.
Node. A joint of a stem, the juncture of a stem and a branch, or the point of insertion of a leaf.
n. The number of chromosomes of a cell.
Nut. A one-seeded fruit with a hard and indehiscent shell. In some taxa the shell is at first enclosed by a fleshy and deciduous outer casing.
Nutlet. A small nut or nut-like fruit, with an individual flower often producing more than one. Like an akene but with a thicker shell.

Obcompressed. Flattened front to back as opposed to side to side.
Obconic. Inversely conic, like a cone turned upside down.
Obcordate. Generally shaped like a valentine heart, with the point of attachment at the base and the notch at the apex (see cordate).
Oblanceolate. Inversely lanceolate, wider in the outer half and gradually tapering to the base (see lanceolate).
Oblong. Longer to much longer than wide, and equal or nearly equal in width. Broader than linear.
Obovate. Inversely ovate, much wider in the outer half and narrowing to the base (see ovate).
Obovoid. A three-dimensional formation that is obovate in outline.
Obsolete. A formation that is much reduced or absent.
Obtuse. An apex or point that is blunt or rounded.
Opposite. Located directly across from, such as leaves that are produced in pairs but on opposing sides of a node.
Orbicular. Pertaining to a flat and round or nearly formation, such as a leaf.
Oval. In botany referring a broadly elliptic formation (not an egg-shaped formation).
Ovary. The generally larger and ovule producing portion of a pistil.
Ovate. Pertaining to a flat formation (such as a leaf or petal) that is generally egg-shaped in outline, wider to much wider at the base and tapering to the apex.
Ovoid. A three-dimensional formation that is ovate in outline (i.e., egg-shaped).
Ovule. The reproductive formation or formations within an ovary. After fertilization the ovules develop into seeds.

Palate. The enlarged and/ or raised central portion of the lower lip of a bilabiate corolla.
Palea. In *Asteraceae* a chaff-like scale on the receptacle. In *Poaceae* the inner or upper and usually smaller bract immediately subtending a flower (see glumes, lemma & spikelet).
Palmate, palmately Radiating from a central point, like a hand with the fingers spread. Generally applied to lobes, divisions or veins of leaves.
Panicle. A compoundly branched inflorescence. In strict usage the term applies to a compound inflorescence in which some or all of the basal or lateral flowers of any axis open before the terminal or central flowers.
Pappus. The modified calyx limbs of many *Asteraceae* species, comprised one to several series of scale, bristle or plume-like formations that are terminally positioned on an akene.

Pedicel. The stalk of an individual flower or fruit (see peduncle).

Pedicellate. Having or with a petiole, as opposed to sessile.

Peduncle. The common stalk of an inflorescence or flower cluster, or of an individual flower that is not produced in an inflorescence (see pedicel).

Pedunculate. With or having a peduncle.

Perennial. Here applied to plants that live for at least three years or three growing seasons.

Perfect. In botany the term is applied to a flower that is both staminate or pistillate, i.e., bisexual or hermaphroditic (see imperfect).

Perianth. The calyx and corolla collectively. The term is used mostly in families or genera in which the calyx and corolla are often not clearly differentiated, such as in *Liliaceae* and *Polygonaceae.*

Pericarp. The inner and fruiting wall of an ovary.

Perigynia. The plural of perigynium.

Perigynium. Here used to describe the womb or sac-like structures surrounding the akenes in *Carex*, and which at first may appear to be akenes.

Perigynous. Produced around the ovary as opposed to below it, such as stamens or petals inserted on a floral tube.

Petal. A distinct or mostly distinct segment of a corolla; usually colorful and delicately textured (see corolla).

Petiolate. With a petiole (see petiole).

Petiole. The stalk of an individual leaf.

Petiolule. The stalk of an individual leaflet.

Phyllary. An individual bract subtending a flower head in *Asteraceae* species, collectively the phyllaries form the involucre.

Pilose. With soft and spreading hairs.

Pinae. The plural of pinna.

Pinna. A leaflet or primary leaflet of a pinnately compound leaf, most commonly used to describe the primary leaflets of ferns.

Pinnate. Applied to a compound or deeply lobed leaf in which the segments are arranged in rows on opposing sides of a common axis (petiole). Also used to describe the vein structure of a leaf or other formations.

Pinnatifid. Pinnately cleft or divided.

Pinnule. The secondary leaflet or lobe of a bipinnately divided leaf, or of a leaf that is more than two times pinnately parted.

Pistil. The female reproductive structure of a flower. Pistils are typically comprised of a basal ovary, one or more styles, and one or more terminal and pollen receiving stigmas.

Pistillate. Applied to a flower possessing a pistil but without stamens (or fertile stamens).

Placenta. The ovule producing surface of an ovary.

Planoconvex. Flat on one side and convex on the other side.

Plumose. Plume-like; with fine and generally downy hairs arranged along more than one side of an axis.

Pod. A general term for a dehiscent fruit, such as the legumes of *Fabaceae* species.

Pollen. The male spores produced by an anther.

Polygamous. Applied to a plant that produces staminate, pistillate and perfect flowers.

Polyploid Having three or more sets of chromosomes (see diploid, haploid and tetraploid).

Pome. An apple or apple-like fruit of some *Rosaceae* species, i.e., an indehiscent fruit comprised of an inferior and compound ovary (core) that is surrounded by a thick (or relatively thick) and fleshy hypanthium.

Procumbent. A prostrate stem or branch, primarily applied to such a formation when it does not root at the nodes.

Prostrate. A stem, branch or leaf that lays flat or nearly flat on the ground.

Puberulent. Minutely pubescent.

Pubescent. Covered with short and soft hairs.

Raceme. An unbranched inflorescence with pedicellate flowers, with the lower (the first produced) flowers opening first. Often becoming much elongated with age.

Rachilla. A small and secondary axis; most commonly applied to the axes of the spikelets of *Poaceae* (grass) species.

Rachis. The axis of a spike, raceme, or compound leaf.

Radiate. Spreading outward from a common point.

Radiate Head. A flower head of *Asteraceae* species, in which the central portion of the receptacle produces tubular disk flowers and marginal portion produces ligulate or ray flowers. The ray flowers generally radiate outward and thus resemble petals (see discoid head and ligulate head).

Ray. A primary and radiating branch of a compound umbel. In *Asteraceae* often applied to a ray flower.

Ray flower. A flower of *Asteraceae* species that is characterized by having short tube at the base and an elongated and one-sided limb, and thus resembling a petal. Distinguished from a ligulate flower in being situated at or near the margins of a radiate head (see disk flower & ligulate flower).

Receptacle. The portion of a flower to which the various parts are attached. In *Asteraceae* species the structure to which the sessile flowers are attached.

Recurved. Gradually curved backward or downward.

Reflexed. Bent or curved downward or backward at an abrupt angle.

Relict. Applied to a plant species generally of limited and/or localized distribution that was in ancient times more widely distributed.

Reniform. Kidney-shaped.

Reticulate. With a network of veins or vein-like ridges or markings.

Retrorse. Bent backward or downward.

Retuse. A rounded apex with a shallow notch.

Revolute. Applied to a margin which is downwardly curved or rolled.

Rhizomatic. Applied to a plant that produces rhizomes.

Rhizome. An underground and generally horizontal stem with scales and buds, producing roots on the lower side and stems or leafy shoots on the upper side. Rhizomatic plants often appear to be groups of plants growing in close proximity.

Rhombic. With the general shape of a baseball diamond.

Riparian. A plant community comprised of plants that are generally restricted to wet or moist habitats, such as along perennial or mostly perennial streams, lake shores, at springs, in marshy areas, etc. Riparian woodland: a riparian habitat dominated by water-loving tree species, such as *Alnus* (alder), *Platanus* (sycamore), *Populus* (cottonwood), and *Salix* (willow).

Rosette. A radiating cluster of leaves, usually at or near ground level.

Rotate. Wheel-shaped; applied mostly to a united corolla with a short to nearly absent tube and a flat and spreading limb.

Ruderal. Weedy.

Rudiment. A much reduced and sometimes imperfectly developed formation.

Rugose. A wrinkled and thus roughened surface.

Rugulose. Minutely rugose.

Sagittate. Shaped like an arrowhead, with the basal lobes pointed downward.

Salverform. With a narrow tube and an abruptly spreading and generally flat limb.

Samara. An indehiscent winged nutlet.

Saprophyte. A plant that lives off of dead organic material. Such plants do not produce chlorophyll, and are thus not green.

Savannah. A grassland characterized by the presence of spaciously placed trees.

Scabrous. Rough to the touch due to a roughened surface or the presence of short and stiff hairs.

Scape. The leafless peduncle of an acaulescent plant.

Scarious. A nongreen formation that is thin, dry, and translucent to dark colored.

Sclerophyll. Pertaining to woody plants with rather thick and/or leathery evergreen leaves.

Scorpioid. Pertaining to a raceme or racemose branch of a panicle that is ultimately coiled, at least when young.

Scree. An unstable slope comprised of an amalgamation of small rock fragments, sometimes as small as gravel.

Scurfy. Covered with small scales.

Secund. One sided, often applied to an inflorescence in which the flowers are produced on only one side of the axis.

Seed. A fertilized ovule; usually applied to such a formation when at full maturation.

Seep. A wet or moist area where underground water comes to or near the surface.

Sepal. A segment or lobe of a calyx.

Seriate. Produced in series or rows.

Serpentine. Rock outcrops, and the soils derived from them, which represent parts of the earth's mantle that have been forced to the surface of the crust by the forces of plate tectonics. The composition of both the rocks and soils are characterized by being low in calcium and other nutrients, while high in magnesium, iron, and sometimes toxic metals. Many plants will not grow on serpentine, while others are largely to entirely restricted to serpentine. The word serpentine specifically refers a type of metamorphosed ultramafic rock that has a greasy, silky or soapy texture, and is so named for having a texture like the skin of a snake. Ultramafic rock is a non metamorphosed type of rock that also comes from the mantle of the earth, and the soils derived from them have a similar effect on plant life.

Serrate. Applied to a sharply toothed margin in which the teeth are angled towards the apex of the formation, such as the teeth of a saw.

Serrulate. Finely or minutely serrate.

Sessile. Without a stalk and thus attached directly to an axis, such as a leaf without a petiole or a flower without a pedicel.

Sheath. An often tubular formation that surrounds or partially surrounds another formation, such as the lower portion of grass leaves.

Shrub. A woody plant that is smaller than a tree and usually with two or more branches at the base (see tree and subshrub).

Silicle. A short silique, generally not more than twice as long as broad (see silique).

Silique. A narrow and many-seeded capsule of *Brassicaceae* species. The valves detach from the bottom to the top.

Simple. Comprised of only one part or axis; not divided or branched.

Sinuate. A strongly wavy margin (wavy in and out).

Sinus. The space or indentation between lobes.

Sordid. With a dull or dirty hue.

Sori. The plural or sorus.

Soros. A cluster of sporangia on the undersurface of a fem leaf.

Spatulate. Spatula or spoon-shaped, generally elongate and roundish to broadly elliptic at the apex.

Spicate. Spike-like in form or arranged in a spike.

Spike. An elongated and unbranched inflorescence with sessile flowers, flower clusters, or spikelets. Often loosely applied to any narrow and racemose inflorescence.

Spikelet. A secondary spike. In *Poaceae* (grasses) and *Cyperaceae* (sedges and related plants) applied to the individual and one to many flowered floral structures and their associated parts.

Spine. A stiff, sharply pointed, and sometimes woody projection. Also applied to a raised or otherwise prominent axis.

Spinulose. With diminutive spines.

Sporangia. The plural of sporangium.

Sporangium. A spore producing structure of non-flowering plants (such as ferns and fern allies).

Spores. The minute and dispersing reproductive units of non-flowering plants (such as ferns and fern allies) that are capable of producing new plants.

Stamen. The male reproductive organs of a flower, most commonly comprised of a slender filament and a terminal and pollen producing anther.

Staminate. With stamens, or pertaining to a flower (or plant) with stamens but without a pistil or a functional pistil (see pistillate).

Staminode. A sterile stamen lacking an anther.

Stellate. Star-like, applied mostly to a hair with three or more branches radiating from a common point.

Stem. The axis or axes of a plant, here used mostly to describe primary axes (secondary axes are usually referred to as branches or branchlets).

Sterile. Not reproductively functional, such as a stamen without an anther, a flower without a pistil, or a seed without an embryo.

Stigma. The pollen receiving organ(s) of a pistil. Stigmas are usually terminal and elevated on a style (see pistil, style and ovary).

Stipe. The petiole of a fem leaf or the peduncle of an ovary.

Stipitate. With a stipe or stalk.

Stipules. A pair of appendages situated at the base of a petiole. Stipules vary from being leaf-like to scale-like or gland-like.

Stolon. A prostrate or semi prostrate (or hanging) stem (runner) that roots at the nodes and/or tip, and (usually) from which erect or generally erect stems arise. The shoots of some species can produce new plants.

Strigose. With upwardly appressed hairs that are straight and relatively stiff.

Strigulose. Minutely strigose.

Style. The narrowed portion of a pistil situated between the ovary and the stigma, which is often simple but may be cleft into two or more segments. Pistils vary from being without a style (the stigmas then sessile) to having two or more styles.

Subshrub. A perennial that is woody at or near the base, but not or only slightly woody upward.

Subtend. Positioned below of and in close proximity to, such as bracts placed just below a flower.

Subulate. Awl-shaped.

Succulent. Generally thick and fleshy or juicy, such as the stems or segments of cacti or the leaves of a jade or aloe plant.

Suffrutescent. Semi-shrubby or semi-woody at the base; often used in the description of subshrubs.

Superior ovary. An ovary that is situated above the point of attachment of calyx, petals and stamens, or the hypanthium on which these formations are inserted, although the ovary may be surrounded by such formations (see inferior ovary).

Symmetrical. Here used to describe a formation in which the parts of are of equal or nearly equal size, shape and arrangement.

Talus. A sloping accumulation of generally large rock fragments.

Taproot. A more or less stout and vertical primary root sending off small lateral roots. A carrot is a good example of such a structure.

Taxa. The plural of taxon.

Taxon. Any taxonomic unit, such as an order, genus, species, variety, etc.

Tendril. Slender, coiling and grasping formations, usually terminal on a stem or leaf, which allow a vine to climb on plants or other objects.

Terminal. The upper-most or outer-most point of a structure.

Ternate. Divided into three leaflets or sections, such as the leaves in *Trifolium* (clover). If the sections are again divided into three's, the leaf is biternate, and if once again divided into threes, the leaf is triternate.

Tetraploid. Having four sets of chromosomes (see diploid, haploid and polyploid).

Throat. Here used to describe the portion of a fused corolla between the basal tube and the terminal limb, lobes or lips.

Thyrse, thyrsus. A compact and generally ovate inflorescence or flower cluster, with the main axis indeterminate, while the secondary axes are cymose.

Tomentose. Densely covered with short, soft, and interwoven woolly hairs.

Tooth. Here used to describe any small marginal lobe or projection.

Tortuous. Twisted, full of turns, curves or windings.

Tripinnate. Three times pinnately divided (see pinnate).

Triternate. Three times ternately divided (see ternate).

Truncate. Abruptly ending at the apex or base, as if cut off.

Tuber. A short and thick underground stem functioning as a storage area for food and/or water, and sometimes propagating. A potato is a good example.

Tufted. Bearing a close cluster (clump) of leaves or short, leafy branches from the base. Most frequently used in the description of perennial grasses and sedges, but sometimes in the description of low shrubs, subshrubs, or perennial herbs.

Turbinate. Inversely conical, like a top.

Type. A specimen on which the description of a species or other taxon is based (see holotype and isotype).

Umbel. A commonly flat or convex flower cluster in which the pedicels arise from a common point, such as the spokes of an umbrella. Compound umbel: an umbellate inflorescence in which the peduncles (rays) diverge from a common point, and end
in a simple umbel.

Undulate. A slightly to moderately wavy margin (see sinuate).

Urticle. A small and one-seeded fruit in which the seed is loosely enclosed in a balloon or bladder-like ovary wall.

Vascular plant. A plant which has a system of veins that transport a fluid comprised of water and dissolved minerals. Vascular plants include the ferns and related plants (fern allies), coniferous trees, and all flowering plants. Nonvascular plants include true mosses, fungi (mushrooms and related organisms), lichen, algae, etc.

Ventral. The inner side or face of a formation (see dorsal).

Vernal. Of or pertaining to the spring season.

Versatile. An anther attached to the filament at or near the middle, and easily swaying from one side to the other.

Villous. With relatively long, soft, and wavy or shaggy hairs.

Virgate. Used to describe branches that are slender and relatively straight and erect.

Viscid. Bearing a sticky or glutinous substance.

Whorl. A ring of three or more leaves or flowers attached at the same point on a stem.

Wing. A thin and often extending border of a structure, such as on a fruit, stem, or petiole.

Wings. The two lateral petals of *Fabaceae* species, which are positioned below the singular and usually larger petal (the banner), and are often wholly or partly obscuring the inner petal(s) (the keel).

Xerophyte. Here used to describe annual herbs in which most of the growth occurs during the dry season (generally starting in May), and in which the flowering season occurs from about July through September (in some species the flowering season may extend to late fall). In strict usage the term applies to desert plants or plants that are resistant to prolonged periods of drought.

Xerophytic. Being or pertaining to a xerophyte.

Epilobium canum subspecies *latifolium* as illustrated in volume thirteen of Benjamin Maund's *The Botanic Garden*, 1851-1852.

ILLUSTRATION SOURCES, EXPLANATIONS OF THE PLATES, AND CREDITS FOR THE ILLUSTRATIONS OF VOLUME TWO.

As the sources of illustrations that are used in volume one are cited in their accompanying texts, there is no need to mention them here. This is not the case for the extensively illustrated volume two, as evidenced by the following long list of sources, credits and explanations of the plates. This section is placed in volume one in order to allow the reader to be able to read this information while at the same time to be able to view the plates in the other volume. This is particularly useful when viewing plates that have numbered details that are explained in the text.

The primary resource for finding illustrations from texts that were published before 1935 was *Iconum Botanicarum Index Londinensis* (in English, the London Index to Botanical Icons). This eight volume work was a joint effort of the Horticultural Society of London and the Royal Botanical Garden at Kew, and its goal was list all then known illustrations of plant species. The first six volumes of this text were published in 1920, and two supplemental volumes were published in 1935.

Even with the aid of *Index Londinensis*, extensive detective work was required, for the citations of texts in this work are very tersely abbreviated, and the taxa are listed only by the name under which they were published. As it is rare for a plant to have been known by only one scientific name, in order fully utilize this great resource I first had to first compile a list of the synonyms for each species, arrange them alphabetically, and then proceed through the volumes of *Index Londinensis*. This work was primarily accomplished through the use of three works that have extensive bibliographies for each species. These are Leroy Abrams and Roxana Ferris' *Illustrated Flora of the Pacific States* (four volumes; 1923 to 1960), *The Vascular Plants of the Pacific Northwest* (five volumes, 1955 to 1969), and Charles Sargent's *The Silva of North America*, which was published in fourteen volumes from 1891 to 1902. While performing this research I discovered The Plant List website, which also provides lists of synonyms for each plant species.

The work at acquiring digital images from the numerous works turned out be much easier than at first anticipated, and this was due to the advent of online libraries, where the images could be downloaded with a click of a mouse. The online resources were Botanicus, where the library holdings of the Missouri Botanical Garden have been made available to the general public, Biblioteca Digital Real Jardin Botanico, were the holdings of the library of the Madrid Botanical Garden are online, and from the following websites at which titles that are held at large number of institutions are made available: the Biodiversity Heritage Library, the Hathi Trust Digital Library, and Internet Archive. My work was made even easier when I discovered the Plant Illustrations.org website, where plant illustrations, along with their bibliographic information, could be found by just typing in the current name of the species.

Abies bracteata. Plate one. The cone is a lithographic image by Franz Antoine that was published in his *Die Coniferen*, 1840. Antoine's image is a replica of a plate that was published in David Don's 1837 edition of *A Description of the Genus Pinus*; the delineator of which was not stated. The details were delineated by Charles E. Faxon and published in volume 12 of Charles Sprague Sargent's *The Silva of North America*, 1898. The details are: **1**. Axis of a cone, with its peduncle, natural size. **2**. A cone scale, lower side, with its bract, natural size. **3.** A seed, enlarged. **4**. A cone scale, upper side, with its seeds and bract, natural size. **5**. Part of a branch with an infant cone, natural size. **6**. An anther, seen from below, enlarged. **7**. An anther, side view, enlarged. **8.** Part of a branch with staminate flowers, natural size. **9**. A staminate flower, enlarged. **10**. A bract of a pistillate flower, lower side, enlarged. **11**. A scale of a pistillate flower, upper side, with its bract and ovules, enlarged.

Abies bracteata. Plate two. This hand colored landscape image was delineated by William Murray and published in volume two of Edward J. Ravenscroft's *The Pinetum Britannicum*, 1884.

Acer macrophyllum. Plate one. This lithographic plate was delineated by Charles E. Faxon and published in volume two of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. A staminate flower, enlarged. **3**. A vertical section of a staminate flower, enlarged. **4**. A stamen, enlarged. **5**. A pistillate flower, enlarged. **6**. A vertical section of a staminate and pistillate flower, enlarged. **7**. A vertical section of an ovary, enlarged. The photographic image of a catkin is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The illustration of a very robust leaf in the lower right is from Philip Munz' *A California Flora*, 1959. I have forgotten the source of the leaf illustration in the lower left.

Acer macrophyllum. Plate two. This lithographic plate was also delineated by Charles E. Faxon and published in volume two of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A fruiting branch, natural size. **2**. A vertical section of a samara, natural size. **3**. An embryo, greatly magnified. **4**. An embryo displayed, greatly magnified. **5**. A winter stem, natural size. The illustration of a leaf in the lower left is from Willis Linn Jepson's *The Trees of California*, 1909. The illustration of a leaf in the lower right is from Howard McMinn's *An Illustrated Manual of Pacific Coast Trees*, 1937.

Achillea millefolium. This illustration was delineated by Otto Thome and published in volume four of his *Flora von*

Deutschland Osterreich und der Schweiz, 1889. The numbered details are: **1**. A flower head. **2**. A disk flower. **3**. A ray flower. **4**. A budding disk flower with its receptacle bract. **5**. A style tip. **6**. A cross section of a flower head. **7**. An achene. The habit of growth illustration in the lower right was drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957.

Achyrachaena mollis. Most of this illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, 1960 (this volume was completed by Roxana Ferris). The depictions of a fruiting flower head in the upper left and a budding flower head on the left are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of the top of a budding flower head in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Carol W. Witham; © 2004, Carol Witham. The photographic image of a more mature budding flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004, Keir Morse. The photographic image of a mature flowering flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007, Neal Kramer.

Acmispon americanus. The main illustration, and the details of a flower and a fruit, were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The color illustration of an inflorescence is the work Edith Clements; it was published in her "Wildflowers of the West," which was published in the May, 1927 edition of *The National Geographic Magazine*. The photographic image of a pink flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2000 by Jo Ann Ordano-CAS. The photographic image of a purplish flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2001 by Jeff Abbas.

Acmispon argophyllus var. ***argophyllus***. The main illustration and the detail of a group of flowers are from the first edition of *The Jepson Manual, Higher Plants of California*, 1993. The details of a flower and a fruit were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Neal Kramer.

Acmispon argophyllus var. ***fremontii***. The image of a group of flowers is from the first edition of *The Jepson Manual, Higher Plants of California*, 1993. The detail of an inflorescence was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944.

Acmispon brachycarpus. The main illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The details of a leaf and a fruit were also drawn by Jeanne Janish, but published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2005 by Steve Matson.

Acmispon glaber. The main illustration and the details of a fruit and a flower, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The color illustration of an inflorescence is the work Edith Clements; it was published in her "Wildflowers of the West," *The National Geographic Magazine*, May, 1927. The illustration of a fruiting inflorescence was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944.

Acmispon grandiflorus. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse.

Acmispon maritimus. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a front view of a yellow flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Gary A. Monroe. The photographic images of a side view of a yellow flower, and a side view of a pinkish flower, are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Acmispon parviflorus. The central illustration and the detail of a flower in the lower right are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The fruiting branch to the right and the details of a fruit and a flower (lower left) were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; from left to right they are © 2013 by Debra L. Cook, © 2005 by Steve Matson, © 2008 by Steve Matson, and © 2016 by John Doyen.

Acmispon strigosus. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a yellow flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Steve Matson. The photographic image of a mostly red flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Keir Morse. The photographic image of a top view of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Debra L. Cook.

Acmispon wrangelianus. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The details of a branch and a flower were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a side view of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a front view of a flower is

a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Steve Matson.

Adenostoma fasciculatum. The main illustration and all but one of the details were delineated by Sir William Jackson Hooker and published in *The Botany of Captain Beechey's Voyage*, by Sir William Jackson Hooker and Walker Arnott, 1841. The explanation of the plate is as follows: **1**. A fascicle of leaves. **2**. A single leaf. **3**. A flower bud. **4**. An expanded flower. **5**. A flower, from which the petals have fallen away. **6**. Inner view of a portion of the flower, to show the glands. **7**. A petal. **8**. A stamen. **9**. A pistil. The habit of growth illustration and the lobed leaf detail were drawn by Aida Montier and published in Arthur Sampson and Beryl Jespersen's *California Range Brushlands and Browse Plants*, 1963. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Thomas Stoughton.

Adiantum aleuticum. The main illustration is a scan of a frond that was made soon after I collected it. The illustration of part of a rhizome of the very closely related *Adiantum pedatum* was delineated by James H. Emerton and published in volume one of Daniel Cady Eaton's *The Ferns of North America*, 1879. The details in the upper left and upper right were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The detail in the lower left depicting a sorus is from a collection of drawings that were prepared for United States Forest Service publications; these are accessible online via the Hunt Institute for Botanical Documentation website.

Adiantum capillus-veneris. The principal illustration was delineated by James H. Emerton and published in volume one of Daniel Cady Eaton's *The Ferns of North America*, 1879. The gray illustration in the background depicts a specimen that was collected in California. The illustration of an infant plant was delineated by Otto Thome and published in volume one of his *Flora von Deutschland Osterreich und der Schweiz*, 1886. The details of fertile manifestations in the lower right were delineated by Francis Bauer and published in Sir William Jackson Hooker's *Genera Filicum*, 1842. The details in the lower left are from volume two of Sir William Jackson Hooker's *Species Filicum*, 1858.

Adiantum jordanii. The principal illustration and the spore in the upper right were delineated by James H. Emerton and published in volume one of Daniel Cady Eaton's *The Ferns of North America*, 1879. The detail in the middle upper right depicting segments of a sterile frond is from Jahrgang 22 of *Botanische Zeitung* (Berlin), 1864. The habit of growth and frond segment illustrations in the lower right were drawn by Rita Whitmore and published in *Ferns and Fern Allies of California* by Steve Grillos, 1962. The illustration of an enlarged fertile frond segment in the lower right is from volume two of Sir William Jackson Hooker's *Species Filicum*, 1858.

Aesculus californica. Plate one. This chromolithographic image was delineated by Walter Hood Fitch and published in volume 84 of *Curtis' Botanical Magazine*, 1858.

Aesculus californica. Plate two. This lithographic plate was delineated by Charles E. Faxon and published in volume two of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. A diagram of a flower, natural size. **3**. A vertical section of a staminate flower, natural size. **4**. A vertical section of staminate and pistillate flower, natural size. **5**. A stamen, enlarged. **6**. A vertical section of an ovary, enlarged. **7**. A winter bud, natural size. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Aesculus californica. Plate three. This lithographic plate was also delineated by Charles E. Faxon and published in volume two of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A fruiting branch, natural size. **2**. A vertical section of a fruit, natural size. **3**. A seed, natural size.

Agoseris grandiflora. The main illustration and the details depicting the phyllaries and a long beaked achene with its terminal pappus bristles, were drawn by John H. Rumely and published in part five of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1955. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Zoya Akulova.

Agoseris heterophylla var. ***cryptopleura***. The main illustration and leaf detail are from a collection of drawings that were prepared for United States Forest Service publications; these are accessible online via the Hunt Institute for Botanical Documentation website. The details depicting the phyllaries and a long beaked achene with its terminal pappus bristles, were drawn by John H. Rumely and published in part five of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1955. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse. The photographic image of a fruiting flower head is also a snip from a photo-graph that was uploaded to the CalPhotos: Plants website; © by Lynn Watson.

Agoseris heterophylla* var. *heterophylla. The main illustration and the details depicting the phyllaries and a long beaked achene with its terminal pappus bristles, were drawn by John H. Rumely and published in part five of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1955.

Agoseris retrorsa. The main illustration and the details depicting the phyllaries and a long beaked achene with its terminal pappus bristles, were drawn by John H. Rumely and published in part five of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1955. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Steve Matson. The photographic image of a fruiting flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Neal Kramer.

Agrostis exarata. The main illustration, and the numbered details, were delineated by Theodore Holm and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered illustrations are: **1**. A floral glume, dorsal view. **2**. A spikelet, greatly magnified. The illustration of a spikelet in the upper left is from George Vasey's *The Agricultural Grasses of the United States*, 1884. The dorsal and ventral views of a floret in the upper right were drawn by Jeanne Janish and published in part one of *Vascular Plants of the*

Pacific Northwest (Hitchcock et al), 1969. The illustrations of a group of spikelets on the left, and a floret and spikelet on the right, were drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957.

Agrostis pallens. The main illustration, and the numbered details, were delineated by W. School and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered illustrations are: **1**. A floral glume, ventral view. **2**. A floral glume, dorsal view. **3**. A spikelet with the floret lifted out of the glumes. The remainder of the illustrations, showing awned and unawned lemmas and the habit of growth, were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Aira caryophyllea. This chromolithographic illustration is from volume two of Nikolaus Host's *Icones et Descriptiones Graminum Austriacorum*, 1802.

Allium burlewii. The habit of growth illustration, and the detail of a flower laid open, were drawn by Mr. W. S. Atkinson and published in volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923. The flower and pistil details were drawn by Yevonn Wilson-Ramsey and published in volume 26 of Flora of North America, 2002. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse.

Allium campanulatum. The habit of growth illustration and the flower details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper right is © 2016 by Keir Morse, and the one to the left is © 2008 by Ron Wolf.

Allophyllum divaricatum. The main illustration and the large flower detail are from heft 27 (4/250, *Polemoniaceae*) of *Das Pflanzenreich*, 1907. The capsule, corolla laid open and pistil illustrations are from volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a side view of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson. The photographic images of top views of bluish flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; both are © 2015 by John Doyen. The photographic image of a pink flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Steven Perry.

Allophyllum gilioides subsp. ***gilioides***. The main illustration and the detail of a flower are from Philip Munz' *California Spring Wildflowers*, 1961. They were probably drawn by Steven Tillett, who was the principal illustrator for this text. The leaf details are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a flower cluster is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Neal Kramer.

Allophyllum gilioides subsp. ***violaceum***. The main illustration and the flower and fruit details were drawn by Robin Jess and published in volume four of *Intermountain Flora*, 1984. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper two are © 2008 by Chris Winchell, and the lower two are © 2016 by John Doyen.

Allophyllum integrifolium. The main illustration and leaf details have been adapted from the photograph of the neotype specimen (UC 23582), which is accessible online via both the Consortium of California Herbaria and CalPhotos: Plants websites. I took the upper most photographic image on Black Butte Ridge in late spring of 2010. The other two photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one to the left is © 2003 by Michael Charters, and the one to the right is © 2003 by Steve Matson.

Alnus rhombifolia. Plate one. This lithographic plate was delineated by Charles E. Faxon and published in volume nine of Charles S. Sargent's *The Silva of North America*, 1896. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. A staminate flower, enlarged. **3**. Pistillate flowers with their scale, front view, enlarged. **4**. A fruiting branch, natural size. **5**. Scale of a strobile, front view, with nutlets, enlarged. **6**. A sterile branch, natural size.

Alnus rhombifolia. Plate two. The image of catkins is from Willis Linn Jepson's *The Trees of California*, 1909. The rest of the illustrations were published in published in George Sudworth's *Forest Trees of the Pacific Slope*, 1908.

Amelanchier utahensis. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2017 by Thayrie Tuason, and the one of a fruit is © 2013 by Barry Breckling.

Amorpha californica. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse.

Amsinckia intermedia. The main illustration is from band five, teil three, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1927. The photographic image of flowers is a snip from a photograph that was taken by J. E. (Jed) and Bonnie McClellan, and uploaded to the CalPhotos: Plants website by the California Academy of Sciences; © 2007 by CAS.

Amsinckia menziesii. This illustration was drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Neal Kramer.

Anisocarpus madioides. The main illustration was drawn by Jeanne Janish and published in *Shore Wildflowers of California, Oregon and Washington* by Philip Munz, 1964. The details of a ray flower and achene are from volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic detail of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Richard Spellenberg.

Anthriscus caucalis. The color illustrations are details from a plate that was published in volume one of William Curtis's *Flora Londinenis*, 1777; the image was delineated and sculpted by William Kilburn. The detail of an enlarged flower was delineated by Albert G. Dietrich and published in volume 9 of' his *Flora Regni Borussici*, 1841. The details of a fruit and a portion of a leaf were delineated by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961.

Antirrhinum kelloggii. The main illustration and most of the details are from David M. Thompson's *Systematics of Antirrhinum* (*Scrophulariaceae*) *in the New World*. *Systematic Botany Monographs* volume 22, 1988. The illustrations of part of an inflorescence and the lower part of a plant were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Antirrhinum multiflorum. The chromolithographic image was delineated by Sarah Ann Drake and published in volume 22 of *Edwards Botanical Register*, 1836. The middle stem illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The flower and fruit details are from David M. Thompson's *Systematics of Antirrhinum* (*Scrophulariaceae*) *in the New World*. *Systematic Botany Monographs* volume 22, 1988. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Dylan Neubauer.

Aphyllon californicum. The inflorescence and habit of growth illustrations were drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, Roxana Ferris, 1960. The color image of a flower was delineated by Anst Fischer and published in volume four of *Bibliotheca Botanica*, 1890. The details of an anther, a stigma and a seed capsule in the lower left were published in heft 96 (IV-261, *Orobanchaceae*) of *Das Pflanzenreich*, 1930.

Aphyllon fasciculatum. The main illustrations, and the details of a stamen and a pistil, were delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The illustrations of a seed and a seed capsule were published in heft 96 (IV-261, *Orobanchaceae*) of *Das Pflanzenreich*, 1930. The illustrations of an anther, a pistil and a cross section of an ovary are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen. The photographic image of a plant is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Aaron Schusteff.

Aphyllon purpureum. The main illustration, the two larger flower illustrations, and the larger cross section of a seed capsule illustration, were delineated by A. Putterlick and published in E. Endlicher's *Iconographia Generum Plantarum*, 1838. The three smaller flower and fruit illustrations are from volume three of *Dictionnaire des Sciences Naturelles, Plates Botanique*, 1830. The photographic image of a front view of a flower in the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Vernon Smith. The photographic image of a side view of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Lynn Watson. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Aphyllon tuberosum. The main illustration and the front view of a flower illustration were drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, Roxana Ferris, 1960. The side view of a flower illustration was published in volume four of *Bibliotheca Botanica*, 1890. The photographic image of a plant is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer.

Apocynum androsaemifolium. The color images, and the images of a tufted seed and a rupturing capsule in the upper right, were delineated by Pancrace Bessa and published in volume three of *Herbier de l'Amateur de Fleurs*, 1829. The figure in the lower left, and the cross section of a flower in the upper left, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was credited as being the principal illustrator of this text. The habit of growth illustration in the middle left is from volume 12 of *Le Jardin*, 1898. The photographic image of a pink flower in the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004, Steve Matson. The photographic image of a nearly white flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Chris Winchell.

Apocynum cannabinum. The main illustration and the image of two fruits in the upper left, were probably delineated by Sir William Jackson Hooker (he was the principal illustrator for this text), and they were published in volume two of his *Flora Boreali Americana*, 1840. The details of the flower characteristics and a fruit are from band three of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1927 (by that time this North American species had become naturalized in Europe). The photographic inset of a flower is a small snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016, Keir Morse.

Aquilegia formosa. The main illustration was delineated by Frederick A. Walpole, and published in volume one of the report of the Harriman Alaska Expedition: *Alaska: Narrative, Glaciers, Natives*, by John Burroughs, John Muir and George Grinnell, 1901. The color illustrations of a flower (in the upper left) and a fruit (in the middle right) were published in volume two of Desire Bois' *Atlas de Plantes de Jardins*, 1896. The flower and fruit details in the lower right were delineated by A. Barnard and published in volume 107 of *Curtis' Botanical Magazine*, 1881. The habit of growth illustration on the left, and the illustration of a fruit in the lower left, were drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The photographic illustration in the upper right is a snip from a photograph that I took along Oryoki Creek in the spring of 2010.

Aralia californica. The main drawing and the image of an

enlarged flower in the upper right are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925; they were probably drawn by Joyce M. Saunders, who was credited as being the principal illustrator of this text. The image of a fruit in the upper right was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower in the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of fruits in the lower left is also a snip from a photograph that was uploaded to the CalPhotos Plants website; © 2016 by Zoya Akulova. The photographic image of an umbel in the lower right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Terry Dye. The photograph at the bottom of this plate was shot by the author of this text, and it depicts my long time friend and fellow Tassajara botanist Diane Renshaw standing in close proximity to an *Aralia californica* plant that was growing in the bed of Tassajara Creek upstream from the hot springs.

Arbutus menziesii. Plate one. This plate was delineated by Charles E Faxon and published in volume five of Charles Sprague Sargent's *The Silva of North America*, 1893. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. Diagram of a flower. **3**. A flower, enlarged. **4**. Vertical section of a flower, enlarged. **5**. A stamen, side and front views, enlarged. **6**. A flower, the corolla removed, cut transversely through the ovary, enlarged. **7**. An ovule, much magnified. **8**. A branch of a fruit cluster, natural size. **9**. Vertical section of a fruit, slightly enlarged. **10**. Cross section of a fruit, slightly enlarged. **11**. A seed, enlarged. **12**. Vertical section of a seed, enlarged. **13**. An embryo, much magnified. The photographic images of flowers are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse. The photographic images of fruits are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Neal Kramer.

Arbutus menziesii. Plate two. The chromolithographic portion of this plate, and the details of a pistil and a stamen, were delineated by Sarah Ann Drake and published volume 21 of *Edwards Botanical Register*, 1835. The detail of a flower was published in volume 135 of *Curtis' Botanical Magazine*, 1909.

Arceuthobium campylopodum. The figure in the upper left was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The details of mature fruits on the right, and the personate male flowers in the lower left, were also drawn by Jeanne Janish, but these were published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The other illustrations were drawn by Sharon Harris and published with Frank Hawksworth and Delbert Wiens' *Biology and Classification of Dwarf Mistletoes* (*Arceuthobium*), USDA Agriculture Handbook no. 401, 1972. These illustrations represent a young fertilized fruit (above), a pistillate shoot (on the left), a remnant of a staminate flower (to the right), and a staminate shoot.

Arctostaphylos canescens. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Terry Grosliner.

Arctostaphylos glandulosa subsp. ***cushingiana***. This illustration was drawn by Emily Paterson Thompson and published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939.

Arctostaphylos glandulosa subsp. ***glandulosa***. The illustrations of old and young burls is from volume three (part one) of Willis Jepson's *A Flora of California*, 1939. The illustrations of a flowering branch, a fruiting branch, a cross section of a flower, a flower, a stamen, and seeds were drawn by Charles E. Faxon and published in volume one of Charles Sprague Sargent's *Trees and Shrubs: Illustrations of New or Little Known Ligneous Plants*, 1905. The illustration of a sterile branch was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Neal Kramer. The photographic image of a stem is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Steven Perkins.

Arctostaphylos glandulosa subsp. ***howellii***. This illustration was drawn by Emily Paterson Thompson and published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939.

Arctostaphylos glandulosa subsp. ***mollis***. This image of stem is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Steven Perkins.

Arctostaphylos glauca. Plate one. This chromolithographic illustration was published in part three (the Botanical Report) of volume six of *Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean*, which is the *Report of Lieut. Henry L. Abbot upon Explorations of a Railroad Route from the Sacramento Valley to the Columbia River, made by Lieut. R. S. Williamson*, 1857.

Arctostaphylos glauca. Plate two. The chromolithographic illustration was delineated by Matilda Smith and published in volume 133 of *Curtis' Botanical Magazine*. The illustrations of a cross section of a flower, a cross section of a fruit, and fused seeds were drawn by M. Tebbs and published in volume 15 (of the new series) of *Curtis' Botanical Magazine*, 1998. The photographic image of flowers in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Neal Kramer. The image of one flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The picture of green fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by David A. Tharp. The picture of mature fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Neal Kramer. The photographic image of smooth bark is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Ellen Tatum. The image of a trunk is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Neal Kramer.

Arctostaphylos pungens. The chromolithographic illustration, and the details of a flower in the upper left, and a

stamen and a cross section of a flower in the lower right, were delineated by Walter Fitch and published in volume 68 of *Curtis' Botanical Magazine*, 1842. The eight details in the lower left were delineated Pierre Turpin and published in volume three of Humboldt, Bonpland and Kunth's *Nova Genera et Species Plantarum*, 1818. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse. The photographic image of bark is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Dr. Amadej Tmkoczy.

Arctostaphylos tomentosa subsp. ***hebeclada***. This illustration was drawn by Emily Paterson Thompson and published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939.

Arctostaphylos tomentosa subsp. ***tomentosa***. The chromolithographic image, and the details of a cross section of an ovary in the lower left and a stamen in the lower right, were delineated by Sarah Ann Drake and published in volume 21 of *Edwards Botanical Register*, 1836. The images of stamens to the left and of a flower to the right, were delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Neal Kramer. The photographic images of fruits and bark are snips from photograph that were uploaded to the CalPhotos: Plants website; © 2016 by Dean Wm. Taylor.

Arctostaphylos tomentosa subsp. ***bracteosa***. The main illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The details of a leaf and flowers were drawn by Emily Paterson Thompson and published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939.

Arnica cordifolia. The main illustration was drawn by Leta Hughey and published in *Range Plant Handbook* by William Dayton (US Forest Service, 1937). The details of a leaf, achene, phyllaries and a flower head were drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic detail of a flower head with broader rays is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Steve Matson. The photographic detail of a flower head with narrower rays is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Richard Spellenberg.

Arnica discoidea. Most of the illustrations were drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The image in the center was published in *Spring Wildflowers of the San Francisco Bay Region* by Helen K. Sharsmith (1965); it was drawn by either Emily Reid or Charlotte Mentges. The photographic detail of a flower head with broader rays is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Aaron Arthur.

Artemisia californica. The main illustration and the enlarged details were drawn by Ruth J. Powell and published in *The North American Species of Artemisia, Chrysothamnus and Atriplex* by Harvey M. Hall and Frederic E. Clements, Carnegie Institution of Washington publication 326, 1923. The image of a leafy stem was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Artemisia douglasiana. The illustration and the enlarged details were drawn by Ruth J. Powell and published in *The North American Species of Artemisia, Chrysothamnus and Atriplex* by Harvey M. Hall and Frederic E. Clements, Carnegie Institution of Washington publication 326, 1923. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Artemisia dracunculus. The main illustration and the enlarged details were drawn by Ruth J. Powell and published in *The North American Species of Artemisia, Chrysothamnus and Atriplex* by Harvey M. Hall and Frederic E. Clements, Carnegie Institution of Washington publication 326, 1923. The image of a leafy stem was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Asclepias californica. The numbered images are from John Torrey's *Botany of the Boundary*, which is part one of volume two of *Report on the United States and Mexican Boundary Survey Made Under the Direction of the Secretary of the Interior*, by William H. Emory. The botany report was issued in 1858, and the illustrator was probably Issac Sprague, who illustrated a number of Torrey's texts. **1**. Upper portion of a plant, natural size. **2**. A flower, enlarged. **3**. A pollen appendage. **4**. A pod, natural size. The drawing of a flower in the middle left, depicting a flower with its filament attachments (hoods) elevated above the corolla base, and the drawing of a pair of pollen appendages in the lower left, are from *The North American Species of Asclepias* by Robert Woodson, in *Annals of the Missouri Botanical Garden* v. 42, 1954; the drawing are credited to Elsie Froeschner and Albert Heinze. The photographic inset near the top is a small snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Neal Kramer.

Asclepias eriocarpa. The illustration of two umbels and a leaf were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The drawings of a pair of pollen appendages at the top, and an enlarged flower at the bottom, are from "The North American Species of Asclepias" by Robert Woodson, which was published in the *Annals of the Missouri Botanical Garden* v. 42, 1954; the drawings are credited to Elsie Froeschner and Albert Heinze. The upper photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Thomas Stoughton. The photographic image of a white flower in the lower left is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Aaron Schusteff.

Asclepias fascicularis. The color image was delineated by W. E. Hitchcock and published in John Cassin's *Illustrations of the Birds of California, Texas, Oregon, British and Russian America*, 1862. The details of a seed pod and a tufted

seed to the right were delineated by Antonio Jose Cavanilles and published in volume one of his *Icones et Descriptiones Plantarum*, 1791. The image of an enlarged flower in the upper left, a pair of pollen appendages in the lower left, and an anther group in the lower right, are from Botanical Report by E. Durand and T. C. Hilgard, which is part three of *Report of Explorations in California for Railroad Routes to Connect with the Routes Near the 35th and 32nd Parallels of North Latitude* by Lieutenant R. S. Williamson, which is volume five of *Reports of Explorations and Surveys to Ascertain the most Practical and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean*, 1855. The delineator(s) of the lithographic plates in this work was not stated. The image of a flower in the lower center is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925; it was probably drawn by Joyce M. Saunders, who was credited as being the principal illustrator of this text. The photographic image of a pink flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Barry Rice. The photographic image of a white flower in the lower left is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Michael Charters.

Aspidotis californica. The upper details were delineated by Walter Hood Fitch and published in volume two of Sir William Jackson Hooker's *Species Filicum*, 1858. The color illustrations were delineated by James H. Emerton and published in volume one of Daniel Cady Eaton's *The Ferns of North America*, 1879.

Aspidotis carlotta-halliae. This illustration is comprised of rearranged portions of a creative commons image that was uploaded to the CalPhotos: Plants website; © 2009 by john Game.

Aspidotis densa. The color illustrations were delineated by James H. Emerton and published in volume one of Daniel Cady Eaton's *The Ferns of North America*, 1879. The details depicting opposite views of a sporangium and a cross section of a fertile frond segment were delineated by W. J. Lawrence and published in the atlas of volume 16 (Botany: Filices) of the *Narrative of the United States Exploring Expedition*, 1854. The ultimate frond segment and the cross section of the same in the lower left were delineated by Walter H. Fitch and published in volume two Sir William Jackson Hooker's *Species Filicum*, 1858. The details in the lower right depicting sterile fronds were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Astragalus gambellianus. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of blue flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by John Doyen. The photographic image of violet flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a group of fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Astragalus lentiginosus var. ***idriensis***. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by James M. Andre.

Athysanus pusillus. This illustration was delineated by Sir William Jackson Hooker and published in volume one of his *Icones Plantarum*, 1837. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Baccharis glutinosa. The image of an inflorescence was drawn by Margaret Warriner Buck and published in Mary Elizabeth Parson's *The Wildflowers of California*, 1897. The image of the base of a plant and the enlarged details were drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957. The photographic images of flower heads are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Baccharis pilularis. The non photographic images are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic images of a flower head and white pappus are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Baccharis salicifolia. This illustration was drawn by Yevonn Wilson-Ramsey and published in volume 20 of *Flora of North America*, 2006. The photographic image of a red flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013, Keir Morse. The photographic image of white flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Barry Breckling.

Barbarea orthoceras. This illustration was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Berberis pinnata. The chromolithographic image was delineated by M. Hart and published in volume nine of *Edwards Botanical Register*, 1823. The image of fruits was delineated by Pierre Turpin and published in volume five of Humboldt, Bonpland and Kunth's *Nova Genera et Species Plantarum*, 1821. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Neal Kramer. The photographic image of fruits is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Margo Bors.

Berula erecta. The main illustration was delineated by Albert G. Dietrich and published in volume 12 of his *Flora Regni Borussici*, 1844. The detail of an enlarged flower in the upper left, and a cross section of a fruit in the lower right, were delineated by W. Muller and published in P. H. H. Esser's *Die Giftpflanzen Deutschlands*, 1910. The image of a flowering umbel in the upper center is a detail from volume three of Otto Thome's *Flora von Deutschland Osterreich und der Schweiz*, 1885; this work was illustrated by its author.

The images of a fruiting umbel and a fruit in the upper right were delineated by Ludweg Reichenbach and published in volume 21 of his *Icones Florae Germanica et Helveticae*, 1867.

Bloomeria crocea. The chromolithographic illustration and the flower and fruit details were delineated and sculpted by Walter Hood Fitch and published in volume 97 of *Curtis' Botanical Magazine*, 1871. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one on the left is © 2007 by Neal Kramer, and the one to the right is © 2017 by Steve Matson.

Boechera breweri. The main illustration, of a plant in its fruiting stage, is from Philip Munz' *California Spring Wildflowers*, 1961. It was probably drawn by Steven Tillett, who was the principal illustrator for this text. The illustration of a group of flowers was drawn by Jeanne Janish and published in Philip Munz's *Shore Wildflowers of California, Oregon and Washington*, 1964. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Bowlesia incana. The main illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The details of flowers are from *Flora Peruviana et Chilensis* (plates 153 to 325), by Hippolyto Ruiz and Josepho Pavon, 1802. The details of fruits and a leaf are from volume 11 (part 1) of Karl von Martius' *Flora Brasiliensis*, 1879. The photographic image is a small snip from a photograph that was uploaded to the CalPhotos: Plants website, © 2008 Keir Morse.

Boykinia occidentalis. The illustrations of basal leaves, of a flower in the lower left, and of an inflorescence in the lower left, were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The flower detail in the upper right center, and the image of a fruit in the lower right, were also drawn by Jeanne Janish, but these were published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The illustrations of an inflorescence on the left, and of a vertical section of a flower in the upper right, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper right is © 2003 by Michael Charters, and the other one is © 2015 by John Doyen.

Brassica nigra. The illustration of an inflorescence and a basal leaf was delineated by James Sowerby and published in the various editions of *English Botany*; this being a reproduction from the third edition (John Boswell, ed.), 1877. The details of a flower, fruit and a petal were delineated by Walther O. Muller and published in volume one of H. A. Kohler's *Medizinal Pflanzen*, 1887. The detail of an upper leaf was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964.

Brickellia californica. The drawings were published in *A Monograph of the Genus Brickellia* by Benjamin L. Robinson, *Memoirs of the Gray Herbarium* volume one, 1917. The name of the illustrator was not stated. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Brodiaea jolonensis. The line illustrations were drawn by Charles L. Ripper and published in Theodore F. Niehaus' *A Field Guide to Pacific States Wildflowers*, 1976. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Robert E. Preston.

Bromus arenarius. The illustration in the upper left is from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935. The other images were delineated by Pierre Antoine Poiteau and published in volume one of Jacob Labillardiere's *Novae Hollandiae Plantuarum Specimen*, 1804.

Bromus carinatus var. ***carinatus***. The upper details were delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The illustration in the lower left was published with Cornelius Shear's *A Revision of the North American Species of Bromus Occurring North of Mexico*, U. S. Department of Agriculture Division of Agrostology Bulletin no. 23, 1900.

Bromus carinatus var. ***marginatus***. The three details to the left were delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The illustration of a group of spikelets is from the U. S. Department of Agriculture Division of Agrostology Bulletin no. 23, 1900.

Bromus diandrus. The color illustration is from volume 12 of Gaston Bonnier's *Flore Complete de France, Suisse et Belgique*, 1934. The illustration of a floret in the upper left is from volume six of Cavanilles' *Icones et Descriptiones Plantaurum*, 1801. The remainder of the illustrations were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Bromus grandis. The upper illustration is from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935. The illustration of the dorsal side of a lemma was drawn by Mary Gill and published in volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923. The illustrations of a spikelet and the upper part of a sheath are from volume 24 of *Flora of North America*, 2007. The habit of growth illustration was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969; they actually represent the morphologically very similar *B. ciliatus*.

Bromus hallii. This illustration, which is perhaps the only illustration of this taxon, is from volume 24 of *Flora of North America*, 2007. The illustration of an inflorescence, which represents the nearly identical *B. orcuttianus*, was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Bromus hordeaceus. The chromolithographic illustration in the upper left is from volume 11 of the third edition of *English Botany*, 1872. The lower part of a plant illustration is from volume three of Jaume Saint Hilarie's *La Flore et la Pomone Francaises*, 1830. The illustration of lateral view of a lemma was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969, and the dorsal view of the same is from Carl

Lindman's *Bilder ur Nordens Flora*, 1901-1905. .

Bromus laevipes. The lower illustration was published with Cornelius Shear's *A Revision of the North American Species of Bromus Occurring North of Mexico*, U. S. Department of Agriculture Division of Agrostology Bulletin no. 23, 1900. It was in this text that this species was first named and described. The lettered details are: **a**. Glumes with two florets. **b**. Dorsal view of a flowering glume. The upper illustration is from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935.

Bromus rubens. The chromolithographic illustration was delineated by Ludweg Reichenbach and published in the second (color) edition of volume one of his *Icones Florae Germanica et Helveticae*, 1850. The habit of growth illustration the floret detail in the lower right were delineated by Ferdinand Bauer and published in volume one of *Flora Graeca*, by John Sibthorp and James Edward Smith, 1806. The remainder of the details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Bromus pseudolaevipes. This illustration, which is perhaps the only illustration of this taxon, is from volume 24 of *Flora of North America*, 2007.

Bromus sterilis. The main illustration and the details of glumes and a lemma were delineated and sculpted by Richard Parnell and published in his *The Grasses of Scotland*, 1842. The color illustration of a spikelet is from volume 11 of the third edition of *English Botany*, 1872.

Bromus tectorum. The chromolithographic illustration was delineated by Otto Thome and published in volume one of his *Flora von Deutschland Osterreich und der Schweiz*, 1886.

Calamagrostis rubescens. The main illustration, and the numbered details, were delineated by F. Muller and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered details are: **1**. Empty glumes. **2**. A spikelet, much magnified. **3**. A floret. **4**. A floral glume. The habit of growth and floret illustrations on the left were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Calandrinia breweri. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Dean Wm. Taylor PhD.

Calandrinia menziesii. The chromolithographic image was delineated by Sarah Ann Drake and published in volume 19 of *Edwards Botanical Register*, 1833. The illustration of a flower bud is from volume one of Sir William Jackson Hooker's *Flora Boreali Americana*, 1833. The illustration of a cross section of a fruit is from volume four of Emile De Wilderman's *Icones Selectae Horti Thenensis*, 1909. The photographic image of a pale pink flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Matt Below. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Neal Kramer.

Calocedrus decurrens. This plate was delineated by Charles E. Faxon and published in volume 10 of Charles Sprague Sargent's *The Silva of North America*, 1896. The explanation of the plate is: **1**. A flowering branch, natural size. **2**. A staminate flower, enlarged. **3**. A stamen, rear view, enlarged. **4**. A stamen, front view, enlarged. **5**. A pistillate flower, enlarged. **6**. A fertile scale of a pistillate flower with its ovules, front view, enlarged. 7. A fruiting branch, natural size. **8**. A scale of a fruit, rear view, enlarged. **9**. A scale of a fruit with its seeds, front view, enlarged. **10**. Vertical section of a seed, enlarged. **11**. An embryo, enlarged. **12**. A leaf, enlarged. **13**. End of a branchlet, enlarged. **14**. Vertical section of a branchlet, enlarged. **15**. A seedling, natural size.

Calochortus albus. The chromolithographic illustration, and the details of a petal in the lower right, were delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The drawings of a petal, a stamen, a branched gland hair and a seed capsule, are from volume one (part 6) of Willis Linn Jepson's *A Flora of California*, 1922. The photographic images are the work of the author.

Calochortus invenustus. The main illustration was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The details of a petal, a gland hair and a stamen are from volume one (part 6) of Willis Linn Jepson's *A Flora of California*, 1922. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the lavender flowered one in the upper left is © 2016 by Keir Morse, the purple flowered one is © 2013 by Gary A. Monroe, and the white flowered one is © 2005 by Chris Wagner, SBNF.

Calochortus splendens. The chromolithographic illustration was delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The illustrations of a petal gland and a gland hair are from volume one (part 6) of Willis Linn Jepson's *A Flora of California*, 1922. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one showing the back side of a flower is © 2013 by Keir Morse, and the other one is © 2008 by Gary A. Monroe.

Calycadenia truncata. The light gray habit of growth illustration was drawn by Marjorie C. Leggitt and published in volume 21 of *Flora of North America*, 2006. The details of part of an inflorescence in the upper center, a ray flower achene and disk flower in the upper right, and a gland tipped bract and a disk flower achene in the lower right, were drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The images of gland tipped bracts in the upper left and lower left are from volume four of Joseph Velenovsky's *Vergleichende Morphologie der Pflanzen*, 1913. The photographic illustration of an above view of a flower head is a snip from a photograph that was taken by the author of this text.

Calyptridium monandrum. The upper illustration is from volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944, and the lower illustration is from Philip Munz' *California Desert Wildflowers*, 1962. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Keir Morse.

Calyptridium parryi var. ***hesseae***. This illustration is from the first edition of *The Jepson Manual, Higher Plants of*

California, 1993.

Calystegia malacophylla subsp. ***pedicellata***. The main illustration was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The details of a leaf and a flower are snips from photographs that were uploaded to the CalPhotos: Plants website; both are © 2011 by Neal Kramer.

Calystegia purpurata subsp. ***purpurata***. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The details of a leaf and the inner structures of a flower were drawn by Jeanne Janish but published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Neal Kramer.

Camissonia contorta. The main illustration was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Camissonia strigulosa. This drawing is from Harvey and Carlotta Hall's Yosemite Flora, 1912. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Keir Morse.

Camissoniopsis hirtella. The main illustration was drawn by J. Burger and published in Peter Raven's *A Revision of the Genus Camissonia* (*Onagraceae*), in *Contributions from the United States National Herbarium* volume 37 (part 5), 1969. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Camissoniopsis ignota. The main illustration was drawn by J. Burger and published in Peter Raven's *A Revision of the Genus Camissonia* (*Onagraceae*), in *Contributions from the United States National Herbarium* volume 37 (part 5), 1969. The photographic images of flowers are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Jason Matthias Mills.

Camissoniopsis intermedia. The main illustration was drawn by J. Burger and published in Peter Raven's *A Revision of the Genus Camissonia* (*Onagraceae*), in *Contributions from the United States National Herbarium* volume 37 (part 5), 1969. The upper and lower photographic images of flowers are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Vernon Smith. The lower-middle photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Neal Kramer.

Camissoniopsis luciae. This illustration was drawn by J. Burger and published in Peter Raven's *A Revision of the Genus Camissonia* (*Onagraceae*), in *Contributions from the United States National Herbarium* volume 37 (part 5), 1969.

Camissoniopsis micrantha. The main illustration was drawn by J. Burger and published in Peter Raven's *A Revision of the Genus Camissonia* (*Onagraceae*), in *Contributions from the United States National Herbarium* volume 37 (part 5), 1969. The illustration of a basal portion of a plant was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of flowers are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 3003 by Lynn Watson.

Capsella Bursa pastoris. This illustration is mostly from volume two of Amedee Masclef's *Atlas des Plantes de France*, 1893, but some of the details are from volume two of Otto Thome's *Flora von Deutschland Osterreich und der Schweiz*, 1886.

Cardamine californica var. ***californica***. This illustration was drawn by Margaret Buck and published in Mary Parsons' *The Wild Flowers of California*, 1897. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Lynn Watson.

Cardamine californica var. ***sinuata***. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of the back side of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Zoya Akulova.

Cardamine oligosperma. The main illustration was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The details of a flower, fruit, and flowering and fruiting inflorescens were also drawn by Jeanne Janish, but these were published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Ron Vanderhoff.

Carex alma. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and published in volume one of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. An achene. **2**. A spikelet. **3**. A dorsal view of a perigynium. **4**. A ventral view of a perigynium. **5**. A perigynium scale. **6**. A ventral view of a sheath apex. **7**. A dorsal view of a sheath apex. The illustrations to the left, of a spike, a perigynium and a perigynium scale, are from volume one (part 6) of Willis Linn Jepson's *A Flora of California*, 1922.

Carex barbarae. The habit of growth illustration and the numbered details were was drawn by Harry Charles Creutzburg and published in volume two of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. An achene. **2**. A spikelet, natural size. **3**. A perigynium scale. **4**. A dorsal view of a sheath apex. **5**. A ventral view of sheath apex. **6**. A perigynium.

Carex bolanderi. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and published in volume one of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. An achene. **2**. A dorsal view of a perigynium. **3**. A ventral view of a perigynium. **4**. A spikelet. **5**. A perigynium scale. **6**. Dorsal and ventral views of a sheath apex. The other details, of a spike (upper right), a perigynium (upper left) and a perigynium scale (lower left), are from volume one (part 6) of Willis Linn Jepson's *A Flora of California*, 1922.

Carex densa. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and

published in volume one of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. A spikelet. **2**. An achene. **3**. A perigynium scale. **4**. A ventral view of a perigynium. **5**. A dorsal view of a perigynium. **6**. A ventral view of a sheath apex. **7**. A dorsal view of a sheath apex. The "*C. dudleyi*" details in the upper right are from the *Carex dudleyi* plate in the Mackenzie text; this taxon, to which plants from this region have assigned, has been reduced to a synonym of *C. densa*. The detail of an enlarged spike in the upper left is from volume one (part 6) Willis Linn Jepson's *A Flora of California*, 1922.

Carex globosa. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and published in volume one of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. A staminate spike. **2**. A dorsal view of a perigynium. **3**. A perigynium scale. **4**. A staminate flower scale. **5**. An achene. The other details, of an inflorescence (upper left) and a perigynium (upper right), were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Carex multicaulis. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and published in volume one of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. A staminate spike. **2**. A dorsal view of a perigynium. **3**. An achene. **4**. A perigynium scale. **5**. A staminate flower scale. The details in the upper left, of an inflorescence, a perigynium and a perigynium scale, are from volume one (part 6) Willis Linn Jepson's *A Flora of California*, 1922.

Carex nudata. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and published in volume two of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. A dorsal view of a perigynium. **2**. An achene. **3**. A perigynium scale. The illustrations on the right, of an inflorescence and a perigynium, were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. Because the perigynium illustrations from the above texts are dissimilar, I have added (in the lower center) two more illustrations *C. nudata* perigynia; the one on the left is from the first edition of *The Jepson Manual, Higher Plans of California*, 1993, and the one on the right is from volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923. I took the photographic image of a plant along Tassajara Creek, upstream from the hot springs.

Carex senta. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and published in volume two of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. An achene. **2**. A perigynium scale. **3**. A dorsal view of a perigynium. The other illustrations were drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957. They represent an enlarged view of an inflorescence (to the right), two views of perigynia scales showing variations in shape (upper left), a perigynium (right center), and a dorsal view of a staminate flower (lower left center.

Carex serratodens. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and published in volume two of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. A dorsal view of a perigynium. **2**. A perigynium scale. **3**. An achene. The details in the upper right, of an inflorescence, a perigynium and a perigynium scale, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text.

Carex subfusca. The habit of growth illustration and the numbered details were drawn by Harry Charles Creutzburg and published in volume one of Kenneth Kent Mackenzie's *North American Cariceae*, 1940. The numbered details are: **1**. A ventral view of a sheath apex. **2**. A dorsal view of a sheath apex. **3**. A dorsal view of a perigynium. **4**. A ventral view of a perigynium. **5**. A perigynium scale. **6**. An achene.

Castilleja applegatei subsp. ***martinii***. The water color painting is the work of Mary Vaux Walcott; it was published in volume five of her *North American Wild Flowers*, 1925. The illustration to the right, and the detail of a floral bract in the lower left, were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The flower details were also drawn by Jeanne Janish, but these were published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Ron Wolf.

Castilleja attenuata. The main illustration and the upper two details were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The flower detail in the lower left was also drawn by Jeanne Janish, but it was published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of a flower and an inflorescence are snips from photographs that were uploaded to the CalPhotos: Plants website; both are © 2016 by Keir Morse.

Castilleja densiflora. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse.

Castilleja exserta. The chromolithographic illustration was published in volume 33 of *Gartenflora*, 1884. The details of flower and a fruit are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; in clock wise order from the lower left to the lower right, they are © 2017 by John Doyen, © 2015 by Barry Rice, © 2009 by Keir Morse, © 2006 by Steve Matson, © 2004 by Keir Morse, and © 2011 by Neal Kramer.

Castilleja foliolosa. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Gary A. Monroe.

Castilleja minor. The images of flowers and an inflores-

cence were drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957. The habit of growth image was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse.

Caulanthus lasiophyllus. The main illustration was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. Most of the details were also drawn by Jeanne Janish, but these were published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The detail of a leaf in the lower right is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Michael Charters.

Ceanothus cuneatus. The illustration of an inflorescence and a top view of a flower were published in the *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. As the text for the botany section of this work was written by John Torrey, the delineator of the plates was probably Issac Sprague, who illustrated a number of Torrey's texts. The illustration of a side view of a flower is from volume 78 of *Curtis' Botanical Magazine*, 1852. The illustration of part of a branch was drawn by Aida Montier and published in Arthur Sampson and Beryl Jespersen's *California Range Brushlands and Browse Plants*, 1963. The photographic images are snips from photographs that Neal Kramer uploaded to the CalPhotos: Plants website; the one of a flower is © 2014, and the one of a flower cluster is © 2009.

Ceanothus dentatus. The main chromolithographic illustration and the leaf details in the lower right were delineated by L. Constans and published in volume one of *Paxton's Flower Garden*, 1851. The chromolithographic illustration in the lower right, and the leaf and flower details in the lower left, were delineated and sculpted by Walter Hood Fitch and published in volume 80 of *Curtis' Botanical Magazine*. The upper flower details were published in the *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. As the text for the botany section of this work was written by John Torrey, the delineator of the plates was probably Issac Sprague, who illustrated a number of Torrey's texts.

Ceanothus foliosus. This illustration was drawn by Marjory DeJean and published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson.

Ceanothus integerrimus var. ***integerrimus***. This illustration of a leaf is from volume two of Willis Linn Jepson's *A Flora of California*, 1936.

Ceanothus integerrimus var. ***macrothrysus***. The chromolithographic image and the details of a flower, a pistil and a petal were delineated by Matilda Smith and published in volume 125 of *Curtis' Botanical Magazine*, 1899. The details of a capsule and an open capsule were published in teil 3 (5) of *Die Naturlichen Pflanzenfamilien*, 1895. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Barry Breckling.

Ceanothus oliganthus var. ***sorediatus***. The main illustration and the image of a seed capsule were drawn by Emily Thompson and published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939. The color illustration of leaves is from volume one of Maund and Henslow's *The Botanist*, 1837. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one with white flowers is © 2016 by Aaron Arthur, the one with light blue flowers is © by 2009 by Barry Breckling, and the one with a dark blue flower is © by Vernon Smith.

Ceanothus papillosus. The chromolithographic illustration and the details were delineated and sculpted by Walter Hood Fitch and published in volume 80 of *Curtis' Botanical Magazine*, 1854. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson.

Centaurea melitensis. The main illustration was delineated by Ferdinand Bauer and published in volume nine of *Flora Graeca*, by John Sibthorp and John Lindley, 1840. The close up of a group of flower heads in the upper left, and an achene in the lower right, were delineated by Ludweg Reichenbach and published in volume 15 of his *Icones Florae Germanica et Helveticae*, 1852. The detail of an enlarged phyllary is from band six, teil two, of Gustav Hegi's *Illustrierte Flora Mittel Europa*, 1928. The drawings of variations of lower leaves are from Helen M. Gilkey's *Weeds of the Pacific Northwest*, 1957.

Centaurea solstitialis. The main illustration was delineated by Ferdinand Bauer and published in volume nine of *Flora Graeca*, by John Sibthorp and John Lindley, 1840. The close up of a flower head in the upper right, and an achene in the lower left, were delineated by Ludweg Reichenbach and published in volume 15 of his *Icones Florae Germanica et Helveticae*, 1852. The illustrations of achenes are from band six, teil two, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1928. The drawings of variations of lower leaves are from Helen M. Gilkey's *Weeds of the Pacific Northwest*, 1957.

Cephalanthera austiniae. The main illustration and the flower details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper left is © 2014 by Steven Perry, the one in the upper center is © 2011 by Ron Wolf, and the one in the lower left is © 2016 by Barry Rice.

Cerastium glomeratum. The color image is from volume two of William Curtis' *Flora Londinensis*, 1778. The image of an inflorescence is from volume two of the second edition of *English Botany*, 1864. The illustrations of a flower, fruit and seed are from Amedee Masclef's *Atlas des Plantes de France*, 1893. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Debra L. Cook.

Cercocarpus betuloides. This lithographic plate was delineated by Charles E. Faxon and published in volume 4 of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. A flower, enlarged. **3**. Vertical section of a flower, enlarged. **4**. Front and rear views of a stamen, enlarged. **5**. A pistil, enlarged. **6**. A fruiting branch, natural size. **7**. A fruit, enclosed in the tube of the calyx, enlarged. **8**. An akene, enlarged. **9**. Vertical section of an akene, enlarged. **10**. A seed, enlarged. **11**. An embryo, much magnified. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2016 by John Doyen, and the one of a plumose fruit is © 2012 by Gary McDonald.

Chenopodium album. The main illustration was delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The detail of a lobed leaf is from volume 24 of Reichenbach's *Icones Florae Germanica et Helveticae*, 1907.

Chenopodium californicum. The main illustration was drawn by Wanda Coover and published in *Weeds of California* (Robbins et al), 1951. The details of a flower, fruit and leaf were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944.

Chimaphila menziesii. The lithographic illustration was delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The photographic image of a bluish flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen. The photographic image of a pinkish flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Christopher L. Christie.

Chlorogalum pomeridianum. The main chromolithographic illustration was delineated by Pierre Joseph Redoute and published in volume eight of his *Les Liliacees*, 1816. The details of a flower, flower buds and a pistil were delineated by Sarah Ann Drake and published in volume 28 of *Edwards Botanical Register*, 1842. The details of a cross section of an ovary and a greatly magnified ovule were published in the *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858.

Chorizanthe clevelandii. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944.

Chorizanthe douglasii. Most of this illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The drawing of an involucre in the lower left was published in Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one is © 2005 by Christopher L. Christie and the lower one is © 2011 by Chris Winchell.

Chorizanthe membranacea. The habit of growth illustration on the left and the image of an involucre in the upper right were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The illustrations of a seed, an involucre, a fruit and a cross section of a seed in the lower right were delineated by Sarah Ann Drake, and published with George Bentham's "On the *Eriogoneae*, a Tribe of the Order *Polygonaceae*," which was published in volume 17 of the *Transactions of the Linnean Society of London*, 1837. The photographic image of an involucre is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Neal Kramer.

Chorizanthe staticoides. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of flowers is a snip from a photograph that I took on Flag Rock in the spring of 2009.

Cicuta douglasii. The illustration of this species is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a flower is a small snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013, Margo Bors.

Cirsium occidentale var. ***californicum***. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The color image of a flower head, which has been inserted onto this figure, was painted by Edith S. Clements, and was featured in her article "Wildflowers of the West," which was published in the May, 1927 edition of *The National Geographic Magazine*.

Cirsium occidentale var. ***occidentale***. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic detail is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Vernon Smith.

Cirsium occidentale var. ***venustum***. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The color image of a flower head was painted by Edith S. Clements, and was featured in her article "Wildflowers of the West," which was published in the May, 1927 edition of *The National Geographic Magazine*.

Cirsium scariosum. This illustration is from volume five of *Intermountain Flora*, 1994. The photographic detail is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Neal Kramer.

Clarkia jolonensis. This illustration was drawn by Marni Fylling and published in Mary Ann Mathews *An Illustrated Field Key to the Flowering Plants of Monterey County*, 1997. The photographic image of a flower is a snip from a photograph that I took in the outer flats, which is a short distance upstream from Tassajara.

Clarkia lewisii. The main illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Katie Swanson.

Clarkia modesta. The main illustration is from volume two of Willis Linn Jepson's *A Flora of California*, 1936. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Keir Morse.

Clarkia purpurea subsp. ***quadrivulnera*** var. ***rubra-purpurea***. The main illustration was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; in descending order they are © 2010 by Steven Thorsted, © 2013 by Gary Mc Donald, and © 2005 by Keir Morse.

Clarkia purpurea subsp. ***quadrivulnera***. The chromolithographic images were delineated by M. Hart and published in volume 13 of *Edwards Botanical Register*, 1828. Most of the flower and fruit details were delineated by F. Legendre and published in the atlas of Edouard Spach's *Histoire Naturelle des Vegetaux, Phanerogames*, 1846. The habit of growth and fruit illustrations in the upper left were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; in descending order they are © 2009 by Barry Breckling, © 2007 by Lynn Watson, and © 2010 by Aaron Arthur.

Clarkia rhomboidea. The chromolithographic images, and the flower detail in the upper left, were delineated by Sarah Ann Drake and published in volume 23 of *Edwards Botanical Register*, 1837. The habit of growth and seed capsule illustrations to the right were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper left is © 2009 by George W. Hartwell, the one in the lower left is © 2014 by John Doyen, and the one in the upper right is © 2009 by Keir Morse.

Clarkia speciosa. The main illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower in the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Sara Reid. The photographic image of a flower in the lower left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Aaron Schusteff.

Clarkia unguiculata. The chromolithographic images were delineated by Sarah Ann Drake and published in volume 19 of *Edwards Botanical Register*, 1833. The enlarged flower detail in the lower left was also delineated by Sarah Ann Drake, but published in volume 23 of *Edwards Botanical Register*, 1837 (it was one of the details on the plate for *Clarkia rhomboidea*). The enlarged flower detail to the right was published in teil 3 (7) of *Die Naturlichen Pflanzenfamilien*, 1893. The enlarged flower detail in the lower right was published in volume 64 of *Curtis' Botanical Magazine*, 1837. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; in descending order they are © 2013 by John Doyen, © 2008 by Ron Wolf, © 2008 by Dee E. Warenycia, and © 2015 by John Doyen.

Claytonia exigua. This illustration was delineated by Sir William Jackson Hooker and published in volume one of his *Flora Boreali Americana*, 1833. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Jason Matthias Mills.

Claytonia parviflora. The main illustration was delineated by Sir William Jackson Hooker and published in volume one of his *Flora Boreali Americana*, 1833. The illustration in the lower left is from John Miller and Kenton Chambers' *Systematics of Claytonia*, *Systematic Botany Monographs* volume 78, 2006. The illustration in the lower right was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Gary McDonald.

Claytonia perfoliata subsp. ***mexicana***. This illustration is a modified version of a plate that was delineated by Pierre Turpin and published in volume one of Humboldt and Bonpland's Plantes Equinoxiales Recueilles, 1805.

Claytonia perfoliata subsp. ***perfoliata***. The color illustration is from volume 14 of *Flora Batava* (Kops et al), 1872. The other illustrations were drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964.

Claytonia rubra. This illustration is from John Miller and Kenton Chambers' *Systematics of Claytonia*, *Systematic Botany Monographs* volume 78, 2006. The photographic image of a leaf is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by George W. Hartwell.

Clematis lasiantha. The main illustration and the details of a flower and a carpel cluster were published in the *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. As the text for the botany section was written by John Torrey, the delineator of the plate was probably Issac Sprague, who illustrated a number of Torrey's texts. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Neal Kramer. The photographic image of a carpel cluster is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Zoya Akulova.

Clematis ligusticifolia. The illustration and flower details to the right, and a plumose fruit in the upper left, were drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The illustration of a leaf to the left was published in volume 50 of the *Bulletin of the Wyoming Agricultural Station*, 1902. The illustration of carpel cluster was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Lynn Watson. The photographic image of a carpel cluster is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Clinopodium douglasii. The main illustration was drawn

by Jeanne Janish and published in Gladys Smith's *Flowers and Ferns of Muir Woods*, 1963. The details are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a pair of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Bing Huey.

Clinopodium mimuloides. The two photographs were taken by the author in the late spring of 2009; the plant was growing on a wet bank of along Tassajara Creek a short distance downstream from the confluence of Oryoki Creek. A high water event during the subsequent rainy season caused the bank to collapse and the plant was swept away. The drawing is from part two of volume three of Willis Linn Jepson's *A Flora of California*, 1943.

Collinsia childii. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a whitish flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Steve Matson. The photographic image of a blue and white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Collinsia heterophylla. The chromolithographic image was delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The flower detail at the top, and the flower detail and habit of growth illustration in the lower right, were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The illustrations of seeds and a seedling were delineated by D. Bois and published in volume three of Edward Step's *Favourite Flowers of the Garden and Greenhouse*, 1897. The illustration of three leaves at a node is from volume 63 of *Curtis' Botanical Magazine*, 1836, and the illustration of a three lobed leaf is from volume 65 of *Curtis' Botanical Magazine*, 1839. The photographic image of white flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse. The photographic image flowers with pink lower lips is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Neal Kramer.

Collomia grandiflora. The chromolithographic illustration was delineated by M. Hart and published in volume 14 of *Edwards Botanical Register*, 1828. The illustrations of an inflorescence with many flower clusters in the lower right, a flower in the upper left, and an open seed capsule and seeds in the lower center, are from 5 band, 3 teil of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1927 (by that time this species had become naturalized in Europe). The elongated habit of growth illustration on the left was drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The illustration of a corolla laid open in the upper right is from volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one to the left is © 2015 by Barry Breckling, and the one to the right is © 2014 by Neal Kramer.

Collomia heterophylla. The chromolithographic illustration was delineated by M. Hart and published in volume 16 of *Edwards Botanical Register*, 1830. The habit of growth and flower details on the left were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The color details of a pistil and cross section of an ovary in the lower right are from 56 of *Curtis' Botanical Magazine*, 1829. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper most right is © 2015 by John Doyen, the one in the upper left is © 2012 by Steven Perry, and the one in upper middle right is © 2017 by Steve Matson.

Convolvulus arvensis. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Dr. Amadej Trnkoczy. The photographic image of a purplish flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Neal Kramer.

Corallorhiza maculata. The chromolithographic parts of this illustration were delineated by Sir William Jackson Hooker and published in volume three of his *Exotic Flora*, 1827. The illustration of a fruit is from volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923. The photographic images of flowers are snips from a photograph that was uploaded to the CalPhotos: Plants website; the photograph is © 2010 by Barry Breckling.

Cordylanthus rigidus. The images of flowers and an inflorescence were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a group of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse. The photographic image of a flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © Neal Kramer.

Corethrogyne filaginifolia. The chromolithographic image was delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1834. Most of the images to the left were delineated A. d'Apreval and published in volume one of Emile De Wilderman's *Icones Selectae Horti Thenensis*, 1900. The illustration of lower leaves in the lower center was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, Roxana Ferris, 1960. The illustration in the lower right depicting a plant with decumbent branches was drawn by Jeanne Janish and published in Roxanna Ferris' *Flowers of Point Reyes National Seashore*, 1970. The photographic image of a side view of a flower head in the upper left a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse. The image of a more darkly hued flower head I a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 Daniel Geiger. The image of white rayed flower head a snip from a photograph that was uploaded to the CalPhotos: Plants website; © Rick York and CNPS. The image of a sparsely rayed flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Debra L. Cook.

Cornus sericea. The color illustrations are from J. C. Krauss' *Afbeeldingen der Fraaiste*, 1802. The details of a

flower and two views of a fruit were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2018 by Dr. Mark Brunell. The photographic image of a cluster of fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse.

Crassula connata. Most of this illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944, but the detail on the far right was published in Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Debra L. Cook.

Crocanthemum scoparium. The main illustration is from heft 14 (IV-193, *Cistaceae*) of *Das Pflanzenriech*, 1903. The illustration of the woody base of a plant is from Philip Munz' *A Manual of Southern California Botany*, 1935. The illustrations of the back side of a flower, a capsule and a cross section of a capsule are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925.

Croton setiger. Most of this plate was delineated by Sarah Ann Drake and published in George Bentham's *The Botany of the Voyage H. M. S. Sulphur, Under the Command of Captain Sir Edward Belcher, During the Years 1836-1842*, 1844. The habit of growth illustration in the lower left is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Keir Morse. The photographic image of leaves is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Cryptantha clevelandii. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Brent Miller.

Cryptantha corollata. The illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer.

Cryptantha flaccida. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Cryptantha microstachys. The illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Cryptantha muricata. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Cryptantha rattanii. These illustrations were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. They are a combination of the illustrations of the very closely related *C. corollata* and *C. decipiens*. The photographic image is a slight enlargement of that for of *C. corollata*, which has smaller flowers.

Cuscuta californica. This illustration was published in volume three of *The Journal of the Horticultural Society of London*, 1848. The photographic image is a snip from a photograph that Betsy MacGowan sent to me in late spring of 2009.

Cymbalaria muralis. The chromolithographic image was delineated by E. D. Smith and published in volume four of Benjamin Maund's *The Botanic Garden*, 1831-1832. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Robert Steers NPS.

Cynodon dactylon. The habit of growth illustration on the left is from volume three of Hutchinson and Dalziel's *Flora of West Tropical Africa*, 1936. The image of an inflorescence is from George Vasey's *The Agricultural Grasses of the United States*, 1884. The drawings of a spikelet and floret in the right center are from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935. The illustration of a group of florets to the right was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Cynoglossum grande. The main illustration was drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The details of four still attached nutlets and a cross section of a flower are from heft 78 (IV-252, *Boraginaceae*) of *Das Pflanzenriech*, 1921. The detail of s single nutlet in the lower left is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a blue (young) flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Scott Loring. The photographic image of a purplish (old) flower is a also snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2002 by James B. Gratiot.

Cyperus eragrostis. This plate was drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957. The numbered details are: **1**. A young achene with its style and stamen. **2** & **3**. Ventral and lateral views of an achene and its enclosing scale. **4**. A mature three angled achene. **5**. A cross section of a culm. **6**. An enlarged view of a spikelet.

Cystopteris fragilis. The central illustration and the indusium scale in the lower right were delineated by Otto Thome and published in volume one of *Flora von Deutschland Osterreich und der Schweiz*, 1886. The color enlargements in the upper left are from band one of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1908. The here miniaturized entire plant illustration was delineated and sculpted by Walter Hood Fitch and published in volume three

of *The Botany of the Antarctic Voyage of H. M. Discovery Ships Erebus and Terror in the years 1839-1843*, by Joseph Dalton Hooker, 1860. The image depicting an indusium scale partially obscuring sporangia in the upper right was delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The image of a sporangium in the upper center was delineated by Francis Bauer and published in Sir William Jackson Hooker's *Genera Filicum*, 1842. The photograph was shot by the author of this text.

Dactylis glomerata. The main illustration and the floret details are from volume one Frank Lamson-Scribner's *American Grasses* (U. S. Department of Agriculture Division of Agrostology Bulletin no. 7), 1897. The illustration of a spikelet is from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935.

Danthonia californica. This plate was delineated by W. Scholl and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered details are: **1**. A floret. **2**. A floral glume. **3**. A palea. **4**. First empty glume. **5**. Second empty glume. **6**. A spikelet with the florets spread somewhat.

Datisca glomerata. The main illustration was delineated by F. Ficbur and published in volume two of Carl Presl's *Reliquiae Haenkeanae*, 1835. The details in the upper left and the upper right are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Daucus pusillus. The illustrations of this species were drawn by Jeanne Janish; the details of an inflorescence, a flower and a cross section of a fruit were published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951, and the remainder were published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a flower is a small snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013, Keir Morse.

Deinandra corymbosa. This illustration was drawn by Jeanne Janish and published in volume four of Illustrated *Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015, Neal Kramer.

Delphinium nudicaule. The chromolithographic illustration of an inflorescence was delineated and sculpted by Worthing G. Smith and published in volume nine of the *Floral Magazine*, 1870. The leaf details to the left and the flower details in the lower right were delineated by Walter Hood Fitch and published in volume 96 of *Curtis*' *Botanical Magazine*, 1870. The illustrations of a basal leaf, an inflorescence, and a seed in lower left, and of a fruit in the mid right, were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The illustration of a seedling was published volume two (part 3) of *Memoirs of the Torrey Botanical Club*, 1891. The habit of growth illustration is from volume one of Nicolson's *Illustrated Dictionary of Gardening*, 1884. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the lower one on the left is © 2012 by Jason Matthias Mills, and the rest are © 2009 by Ron Wolf.

Delphinium parryi. The main illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper left is © 2015 by Neal Kramer, and the one in the upper right is © 2009 by Keir Morse.

Delphinium patens subsp. ***hepaticoideum***. This illustration was drawn by Linda Ann Vorobik and published in *The Jepson Manual, Higher Plants of California*, 1993.

Delphinium patens subsp. ***patens***. This illustration, which was drawn by Marni Fylling, was and published in Mary Ann Mathew's *An Illustrated Field Key to the Flowering Plants of Monterey County, and Ferns, Fern Allies and Conifers*, 1997. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the lavender flowered one is © 2005 by David A. Tharp, and the blue flowered one is © 2012 by Gary McDonald.

Dendromecon rigida. The chromolithographic image, and the details of a portion of a leaf and a pistil in the upper left, and a stamen in the upper right, were delineated and sculpted by Walter Hood Fitch and published in volume 85 of *Curtis' Botanical Magazine*, 1859. The details of a flower bud in the upper center, a stamen in the left center, a seed in the far lower left, and a seed capsule in the lower right, were published in *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. The text for the botany section of this work was written by John Torrey, and the delineator of the plates was probably Issac Sprague, who illustrated a number of Torrey's texts. The detail of a flower in the upper left is from in teil 3 (2) of *Die Naturlichen Pflanzenfamilien*, 1889. The detail of an opening seed capsule in the lower left was published in 40 heft (IV-104, *Papaveraceae*) of *Das Pflanzenreich*, 1909. The detail of a seed in the lower left was delineated by Sir William Jackson Hooker and published in volume one of his *Icones Plantarum*, 1837.

Deschampsia elongata. The main illustration, and the numbered details, were delineated by W. Scholl and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered details are: **1**. A floral glume, dorsal view. **2**. A floret. **3**. A spikelet, partly dissected. The detail of an outer floret in the upper left, the detail of a spikelet in the upper right, and the details to two florets and an inner floret in the lower right, were delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The habit of growth illustration in the lower right was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Diplacus bolanderii. The illustrations of an inflorescence and a seed capsule are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The remainder of the illustrations were drawn by Linda Ann Vorobik and published in David Thompson's *Systematics of Mimulus Subgenus Schizoplacus*,

Systematic Botany Monographs volume 75, 2005. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Christopher L. Christie.

Diplacus douglasii. The upper illustrations of flowers and fruits were drawn by Linda Ann Vorobik and published in David Thompson's *Systematics of Mimulus Subgenus Schizoplacus*, *Systematic Botany Monographs* volume 75, 2005. The illustration of a plant in the lower left was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse. The photographic image of a plant is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Steven Perry.

Diplacus fremontii. The illustration of a small plant in the lower left was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The remainder of the illustrations were drawn by Linda Ann Vorobik and published in David Thompson's *Systematics of Mimulus Subgenus Schizoplacus*, *Systematic Botany Monographs* volume 75, 2005. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Diplacus linearis. The upper chromolithographic illustration was delineated by L. Constans and published in volume 3 of *Paxton's Flower Garden*, 1853, and depicts the closely related *Diplacus grandiflorus*. The lower chromolithographic illustration was published in volume three of Nikolaus Joseph von Jacquin's *Plantarum Rariorum Horti Caesarei Schoenbrunnensis, Descriptiones et Icones*, 1798, and depicts the closely related *Diplacus aurantiacus*. The illustration of a corolla in the upper right, and the illustrations of cross section of a fruit and a seed in the lower right, were published with Howard McMinn's "Studies in the Genus *Diplacus*, *Madrono* 11 (1): 33-128, 1951; the illustration of a corolla was drawn by Katherine Ball, the illustration of a seed was drawn by Marie Pettibone, and the illustration of a cross section of a fruit was drawn by Martha McMaster. The details in the center left and the far lower right were drawn by Linda Ann Vorobik and published in David Thompson's *Systematics of Mimulus Subgenus Schizoplacus*, *Systematic Botany Monographs* volume 75, 2005. The details in the lower left and center right were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower in the far upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Jason Matthias Mills. The photographic image of a more yellowish flower was taken in the Tassajara region by the author. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Dipterostemon capitatus. The chromolithographic illustration and the flower details in the lower left, and the cross section of an ovary detail in the lower right, were delineated and sculpted by Walter Hood Fitch and published in volume 97 of *Curtis' Botanical Magazine*, 1871. The opened flower detail in the mid left center is from volume one of Willis Linn Jepson's *A Flora of California*, 1922. The color illustration of a bulb is from volume 12 of *Meehan's Monthly*, 1902. The photographic image of flower clusters are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper left is © 2003 by Michael Charters, and the one in the upper right is © 2011 by John W. Wall.

Draba verna. The main illustration is from volume five of Jean Jaume Saint-Hilaire's *La Flore et Pomone Francaises*, 1832. The details of a very small plant, fruits and a seed are from volume two of Otto Thome's *Flora von Deutschland Osterreich und der Schweiz*, 1886. The flower illustrations are from volume six of *Flora Danica*, 1790.

Drymocallis glandulosa. The main illustration was published with Christian Lehmann's *Revisionem Potentillarum Iconibus Illustratum*, in *Novorum Actorum Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum*, volume 23 supplement, 1856. The flower and seed details were drawn by F. Emil and published with Per Axel Rydberg's *A Monograph of the North American Potentilleae*, which is volume two of *Memoirs from the Department of Botany of Columbia University*, 1898. The leaf detail is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925, and the flower bud detail is from volume 19 of *Edwards Botanical Register*, 1833. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper left is © 2014 by Neal Kramer, the one in the upper right is © 2014 by John Doyen, the upper one in the left center is © 2012 by Jean Pawek, and the one below it is © 2009 by Keir Morse.

Dryopteris arguta. The main image and four of the details were delineated by Charles Faxon and published in volume two of Daniel Cady Eaton's *The Ferns of North America*, 1880. The detail in the upper left was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The image of a cross section of a *Dryopteris* sorus was delineated by Otto Thome and published in volume one of his *Flora von Deutschland Osterreich und der Schweiz*, 1886.

Dudleya cymosa subsp. ***cymosa***. This illustration was delineated by Matilda Smith and published in volume 126 of *Curtis' Botanical Magazine*, 1900. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Steve Matson.

Dudleya cymosa subsp. ***pumila***. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Hartmut Wisch.

Echinochloa crus-galli. The main illustration and the details are from volume two of Frank Lamson-Scribner's *American Grasses* (U. S. Department of Agriculture Division of Agrostology Bulletin no. 17), 1899.

Ehrendorferia chrysantha. The chromolithographic image and the detail of a flower in the upper right were delineated and sculpted by L. Constans and published in volume three of *Paxton's Flower Garden*, 1853. The flower details in the

upper left were delineated by Matilda Smith and published in volume 130 of *Curtis' Botanical Magazine*, 1904. The illustration of part of leaf with narrow leaf segments in the lower right was published in Sir William Jackson Hooker and Walker Arnott's *The Botany of Captain Beechey's Voyage*, 1841. The illustration of a seed in the lower right was published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a fruit in the lower left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Aaron Arthur.

Elymus glaucus. The lemma illustrations were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The habit of growth and inflorescence illustrations are from volume 24 of *Flora of North America*, 2007.

Elymus multisetus. The habit of growth illustration was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The rest of the illustrations are from volume 24 of *Flora of North America*, 2007.

Elymus stebbinsii. This illustration is from volume 24 of *Flora of North America*, 2007.

Elymus triticoides. The main illustration, and the numbered details, were delineated by Theodore Holm and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered details are: **1**. A spikelet. **2**. A floral glume, dorsal view. **3**. A palea, opened. The remainder of the details and the habit of growth illustration to the right were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Elymus x ***hansenii***. This illustration is from volume six of *Intermountain Flora*, 1977.

Emmenanthe penduliflora. The main illustration and the detail of a flower are from heft 59 (IV-251, *Hydrophyllaceae*) of *Das Pflanzenriech*, 1913. The details of a seed, a capsule and a cross section of a flower were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers was taken by the author of this text.

Epilobium brachycarpum. The main illustration and the lower details were delineated and sculpted by Charles Cuisin and published in William Barbey's *Epilobium Genus a cl. Ch. Cuisin Illustratum*, 1885. The illustration of a flower in the upper left was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the lavender one is © 2017 by John Doyen, and the white one is © 2001 by Jeff Abbas.

Epilobium canum subsp. ***canum***. The chromolithographic illustration was published in volume 31 of *The Garden*, 1887. The flower details in the upper right were delineated by F. Ficbur and published in volume one of Carl Presl's *Reliquiae Haenkeanae*, 1831. The illustration of an inflorescence in the lower left is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The details of a seed and an opening seed capsule at the top are from volume 165 of *Curtis' Botanical Magazine*, 1948. The illustration of leaves in the lower right is from Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939.

Epilobium canum subsp. ***latifolium***. The chromolithographic illustration was delineated by W. E. Hitchcock and published in John Cassin's *Illustrations of the Birds of California, Texas, Oregon, British and Russian America*, 1862. The illustration in the upper right was published in volume 3 of the *Journal of the Horticultural Society of London*, 1848. The chromolithographic illustration in the lower left, and the flower and fruit details in the lower right, were delineated by Walter Hood Fitch and published in volume 76 of *Curtis' Botanical Magazine*, 1850. The flower detail to the left was published in teil 3 (7) of *Die Naturlichen Pflanzenfamilien*, 1893. The photographic image of an opening seed capsule is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse.

Epilobium ciliatum subsp. ***ciliatum***. The upper images of an inflorescence and flower details were drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957. The flower and seed details in the lower right were delineated and sculpted by Charles Cuisin and published in William Barbey's *Epilobium Genus a cl. Ch. Cuisin Illustratum*, 1885. The illustration of the basal portion of a plant was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the white one is © 2008 by Keir Morse, and the pink one is © 2016 by John Doyen.

Epilobium ciliatum subsp. ***watsonii***. The color image is from the *Geigy Weed Tables*, 1968-1975. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; in descending order they are © 2014 by John Doyen, © 2017 by John Doyen, © 2015 by John Doyen, and © 2013 by Neal Kramer.

Epilobium densiflorum. The main chromolithographic illustration was delineated by Sarah Ann Drake and published in volume 19 of *Edwards Botanical Register*, 1833. The chromolithographic illustration in the upper left was delineated by E. Smith and published in volume six of Benjamin Maund's *The Botanic Garden*, 1836. The enlarged flower and seed details to the right were published in teil 3 (7) of *Die Naturlichen Pflanzenfamilien*, 1893. The flower detail in the upper left and the fruit detail in the lower right were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Neal Kramer.

Epilobium minutum. The main illustration and most of the details were delineated and sculpted by Ch. Cuisin and published in William Barbey's *Epilobium Genus a cl. Ch. Cuisin Illustratum*, 1885. The image of a flower in the upper left was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the lavender one is © 2009 by Barry Breckling, and the white on is © 2008 by Keir Morse.

Epipactis gigantea. The chromolithographic illustration, and the front and side view images of a flower column on the right, were delineated by Matilda Smith and published in volume 125 of *Curtis' Botanical Magazine*, 1899. The illustration of a rhizome and lower stems was drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957. The rest of the non photographic images were delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The photographic image in the upper left is from a photograph that I took along Tassajara Creek, downstream from The Narrows.

Equisetum hyemale subsp. ***affine***. The color illustration was delineated by Charles F. Millspaugh, and it was published in his *American Medicinal Plants*, 1887. The enlarged details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et. al.), 1969.

Equisetum laevigatum. The habit of growth illustration was drawn by Rita Whitmore and published in *Ferns and Fern Allies of California* by Steve Grillos, 1962. The enlarged details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et. al.), 1969.

Equisetum telmateia. This illustration is from band one of *Illustrierte Flora von Mittel Europa* by Gustav Hegi, 1908.

Eriastrum densifolium. The main illustration is from volume three of *Flore des Serres et des Jardins de l'Europe*, 1847. The flower and bract illustrations are from heft 27 (4/250, *Polemoniaceae*) of *Das Pflanzenreich*, 1907. The photographic image of a flower cluster in the middle right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © by Neal Kramer. The photographic images of flower clusters in the lower left are snips from photographs that were uploaded to the CalPhotos: Plants website; both are © 2012 by Neal Kramer. The photographic image of an entire plant in the lower right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Keir Morse.

Ericameria arborescens. This drawing is the work of Helen M. Rearwin; it was published in Harvey M. Hall's *The Genus Haplopappus*, Carnegie Institution of Washington publication 389, 1928. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015, Hayley Ross.

Ericameria nauseosa var. ***mohavensis***. The main illustration is from volume four of *Reports of Explorations and Surveys to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean, Made Under the Direction of the Secretary of War, in 1853-1854*, 1856. The illustration is from part four of this work, "Descriptions of the General Botanical Collections;" the text was written by John Torrey and the delineator of the plate was not stated, but it is probably the work of Issac Sprague, who illustrated a number of Torrey's texts. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015, Neal Kramer.

Ericameria nauseosa var. ***speciosa***. The main illustration and the enlarged details were drawn by Ruth J. Powell and published in *The North American Species of Artemisia, Chrysothamnus and Atriplex* by Harvey M. Hall and Frederic E. Clements, Carnegie Institution of Washington publication 326, 1923. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005, Charles E. Jones.

Erigeron canadensis. The main illustration and the details of a ray and disk flower were delineated by Albert G. Dietrich and published in volume 9 of his *Flora Regni Borussici*, 1841. The image of a small plant in the lower left is from volume 9 of *Sciences Naturelles Botanique*, 1899. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Keir Morse; 2008 by Keir Morse. The photographic image of a fruiting flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website by; © 2012, Zoya Akulova.

Erigeron foliosus. The main illustration was drawn by Jeanne Janish and published in published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a lighter hued flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Keir Morse; © 2008, Keir Morse. The photographic image of a darker hued flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Debra L. Cook.

Erigeron petrophilus. This illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. One of the flower heads was transformed into a color image by the use of photographic editing software.

Eriodictyon californicum. The main illustration and the details of flowers (in the upper left), a cross section of a flower (in the middle left), a cross section of a fruit and a pistil (in the lower right), were delineated by Sir William Jackson Hooker and published in *The Botany of Captain Beechey's Voyage*, by Sir William Jackson Hooker and Walker Arnott, 1841. The details of an upper inflorescence in the upper right and a leaf in the lower right were drawn by Jeanne Janish and published in *Native Shrubs of the Sierra Nevada* by John Hunter Thomas and Dennis Parnell, 1974. The detail of old, dark and sooty leaves in the lower right is from the *USDA Bureau of Plant Industry Bulletin* no. 219, 1911. The photographic images of a blue flower and a whitish flower are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2015 and 2016 by John Doyen.

Eriodictyon tomentosum. The illustration on the left, and the details of an inflorescence, a flower, a cross section of a flower, and a pistil, are from heft 59 (IV-251, *Hydrophyllaceae*) of *Das Pflanzenriech*, 1913. The image of leaves to the right was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Keir Morse; © 2008 by Keir Morse.

Eriogonum davidsonii. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic images of flowers are snips from photographs that

were uploaded to the CalPhotos: Plants website; the upper one is © 2008 by Steve Matson and the lower one is © 2017 by Keir Morse.

Eriogonum elongatum. This illustration combines details from two Jeanne Janish drawings of this species. One was published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944, and the other was published in Philip Munz' *Shore Wildflowers of California, Oregon and Washington*, 1964. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one is © 2009 by Keir Morse and the lower one is © 2017 by Neal Kramer.

Eriogonum fasciculatum. The main illustration was drawn by Aida Montier and published in Arthur Sampson and Beryl Jespersen's *California Range Brushlands and Browse Plants*, 1963. The flower details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Gary McDonald.

Eriogonum gracile. The illustrations to the left and in the center were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The illustration on the right was drawn by Rodney Cross and published in Philip Munz' *A Manual of Southern California Botany*, 1935. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Eriogonum inerme. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Steve Matson.

Eriogonum nudum var. ***auriculatum***. This illustration of basal leaves is from *Range Plant Handbook*, which was issued by U. S. Forest Service in 1937.

Eriogonum nudum var. ***nudum***. The main illustration and the details of a flower and a leaf are from volume one (part four) of Willis Linn Jepson's *A Flora of California*, 1914. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one is © 2008 by Keir Morse and the lower one is © 2011 by Vernon Smith.

Eriogonum saxatile. This illustration combines details from two Jeanne Janish drawings of this species. One was published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944, and the other was published in Philip Munz' *California Mountain Wildflowers*, 1963. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one is © 2009 by Keir Morse and the lower one is © 2008 by Lynn Watson.

Eriogonum umbellatum. The main illustration and the close up of a flower cluster were delineated by Sarah Ann Drake, and published with George Bentham's "On the *Eriogoneae*, a Tribe of the Order *Polygonaceae*," which was published in volume 17 of the *Transactions of the Linnean Society of London*, 1837. The details of a flower and a fruit were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper most one on the left is © 2012 by Barry Rice, and the other two are © 2014 by Vernon Smith.

Eriophyllum confertiflorum var. ***laxiflorum***. This image is from Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939. It is probably the work of Emily Thompson, who was the principal illustrator of this book.

Eriophyllum confertiflorum. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The illustrations of a ray flower and a disk flower were drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Erodium cicutarium. This illustration was delineated by Otto Thome and published in volume three of his *Flora von Deutschland Osterreich und der Schweiz*, 1888. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by Steve Matson.

Erysimum capitatum. The main illustration was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The illustration of a cluster of orange petaled flowers was delineated by Edith Clements and published in Frederic and Edith Clements' *Rocky Mountain Flowers*, 1914. The photographic image of a cluster of yellow petaled flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by Charles E. Jones.

Erythranthe cardinalis. Plate one. The chromolithographic image was delineated by Sarah Ann Drake and published in volume two of the second series of *Transactions of the Horticultural Society of London*, 1842. The illustration of a cross section of a seed capsule is from Richard Wettstein's *Handbuch der Systematischen Botanik*, 1911.

Erythranthe cardinalis. Plate two. This chromolithographic plate, and the flower and habit of growth details, were published in volume one of Benjamin Maund and John Stevens Henslow's *The Botanist*, 1836.

Erythranthe floribunda. The chromolithographic image was delineated by M. Hart and published in volume 13 of *Edwards Botanical Register*, 1828. The illustration of a plant to left and a seed capsule in the lower left were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The illustration of a plant to the right, and the flower details, were also drawn by Jeanne Janish, but they were published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; in clock wise order from the top they are © 2016 by John Doyen, © 2001 by Steven Schoenig, © 2007 by Neal Kramer, © 2016 by Steve Matson.

Erythranthe guttata. Plate one. The main illustration and the details of a corolla laid open and of a capsule in the lower

right, were delineated by Pancrace Bessa and published in volume five of M. Drapiez' *Herbier de l'Amateur de Fleurs*, 1831. The color illustrations of a fruiting calyx in the upper left, a cross section of a seed capsule to the left, a pistil, a mature seed capsule and an immature seed capsule in the lower left, and a seed in the lower right, are from band 6 (1) of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1930. The illustration of the base of a plant in the lower right is from Herbert Mason's *A Flora of the Marshes of California*, 1957.

Erythranthe guttata. Plate two. This chromolithographic plate is from volume 19 of *Gartenflora*, 1870; it was erroneously published under the name *Mimulus tilingii*.

Erythranthe nasuta. These illustrations were drawn by Jeanne Janish, the one on the left was published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959, and the other in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic illustration was taken by the author in the outer flats.

Eschscholzia caespitosa. The chromolithographic image, and the details of a stamen, flower bud, pistil and a leaf, were delineated and sculpted by Walter Hood Fitch and published in volume 80 of *Curtis' Botanical Magazine*, 1854. The details of a fruit in the upper left are from volume five of Jaume Saint-Hillaire's *La Flore el al Pomone Francaises*, 1832. The illustration of a plant in the lower left was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944.

Eschscholzia californica. Plate one. The chromolithographic image and the detail of a pistil were delineated by Sarah Ann Drake and published in volume 23 of *Edwards Botanical Register*, 1837. The illustration of a fully mature fruit was delineated by D. Bois and published in volume one of Edward Step's *Favourite Flowers of the Garden and Greenhouse*, 1896. The illustration of a plant in the lower left was drawn by Jeanne Janish and published in Gladys Smith's *Flowers and Ferns of Muir Woods*, 1963. The illustration of a seed in the lower right was published in volume one of Willis Linn Jepson's *A Flora of California*, 1909. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Eschscholzia californica. Plate two. The chromolithographic image was delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The illustration of a pistil in the upper left was also delineated by Sarah Ann Drake, but it was published in volume 23 of *Edwards Botanical Register*, 1837. The illustrations in the lower left were published in volume one of Willis Linn Jepson's *A Flora of California*, 1909. The illustration of a plant in the lower right was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964.

Euphorbia peplus. The main illustration is from the *Geigy Weed Tables, a synoptic presentation of the flora accompanying agricultural crops*, by Ernst Hafliger and Josef Brun-Hoot, 1968-1975. The details of a flower and a fruit to the left were delineated by Ludweg Reichenbach and published in volume five of his *Icones Florae Germanica et Helveticae*, 1841. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson.

Euphorbia spathulata. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The flower and fruit details in the lower left were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The details in the lower right were delineated by J. C. Heyland and published in Edmond Boissier's *Icones Euphorbiarum*, 1866. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Steve Matson.

Eurybia radulina. The illustrations of an inflorescence and a leaf are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The illustration of lower leaves was drawn by D. Hollick and published in volume 17 of the *Bulletin of the Torrey Botanical Club*, 1890. The photographic image of a white rayed flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2002 Margo Bors. The photographic image of a blue rayed flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Steve Matson.

Euthamia occidentalis. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 Steve Matson.

Festuca bromoides. This illustration was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Festuca elmeri. This illustration represents a plate that was included with Charles Piper's *North American Species of Festuca*, which was published in *Contributions from the United States National Herbarium* volume 10 (1), 1906.

Festuca microstachys. The main illustrations, and the numbered and lettered details, were delineated by Theodore Holm and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The lettered and numbered details are: **A** & **B**. Ordinary forms of the species. **C**. Dwarf form. **1**. A spikelet. **2**. A floret, ventral view. **3**. A floral glume unrolled, dorsal view. **4**. A palea. **5** & **6**. A spikelet and enlarged view of floral glume of dwarf form. The details that are marked with a J were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The "var. pauciflora" and "var. confusa" illustrations are from are from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935.

Festuca myuros. This illustration was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Festuca perennis. The main illustration is from volume one Frank Lamson-Scribner's *American Grasses* (U. S. Department of Agriculture Division of Agrostology Bulletin no.

7, 1897. The chromolithographic illustrations of spikelets are from volume one of Otto Thome's *Flora von Deutschland Osterreich und der Schweiz*, 1885. The floret and spikelet illustrations in the upper right are from band one of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1908.

Festuca rubra. The main illustration and the floret and spikelet details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The color illustration of a spikelet is from volume two of Nikolaus Host's *Icones et Descriptiones Graminum Austriacorum*, 1802.

Fragaria vesca. This chromolithographic illustration is from volume two of Amedee Masclef's *Atlas des Plantes de France*, 1893.

Frangula californica subsp. ***californica***. This lithographic plate was delineated by Charles E. Faxon and published in volume two of Charles S. Sargent's *The Silva of North America*, 1891. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. A flower, enlarged. **3**. Vertical section of a pistil, the calyx removed and displayed, enlarged. **4**. A fruiting branch, natural size. **5**. Cross section of a fruit, enlarged. **6**. Vertical section of a nutlet, enlarged. **7**. An embryo, much magnified. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2015 by Steve Matson, the one of a red fruit is © 2015 by John Doyen, and the one with black fruits is © 2007 by Neal Kramer.

Frangula californica subsp. ***tomentella***. The drawing was published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939. The photographic images of upper and lower leaf surfaces are snips from photographs that Keir Morse uploaded to the CalPhotos: Plants website, both are © 2013.

Fraxinus dipetala. This lithographic plate was delineated by Charles E. Faxon and published in volume six of Charles S. Sargent's *The Silva of North America*, 1894. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. A flower, enlarged. **3**. A petal, enlarged. **4**. A vertical section of a flower, the petals removed, enlarged. **5**. A fruiting branch, natural size. **6**. A vertical section of a fruit, enlarged. **7**. A seed, natural size. **8**. An embryo, enlarged. **9**. A leaf, natural size. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Fritillaria affinis. This illustration was delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Terry Dye.

Fritillaria falcata. This illustration was published with Dorothy Beetle's "A Monograph of the North American Species of Fritillaria," in *Madrono* volume seven (5), 1944. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 1981 by Lee Dittmann, and the one of a plant is © 2013 by Aaron Schusteff.

Galium angustifolium. The images of a flowering stem and a flower to the left were published in volume four part two of Willis Linn Jepson's *A Flora of California* (*Rubiaceae* by Lauramay Dempster), 1979. The rest of the figures were drawn by Jeanne Janish and published in volume four of Roxana Ferris' *Illustrated Flora of the Pacific States*, 1960. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Galium aparine. This chromolithographic plate was delineated by Otto Thome and published in volume four of his *Flora von Deutschland Osterreich und der Schweiz*, 1889. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Steve Matson.

Galium californicum complex. The main illustration of *G. californicum* subsp. *californicum*, and the two details of stem segments, were drawn by Jeanne Janish and published in Philip Munz' *Shore Wildflowers of California, Oregon and Washington*, 1964. All of the rest of the figures were published with Lauramay Dempster and G. Ledyard Stebbins' *A Cytotaxonomic Revision of the Fleshy-Fruited Galium Species of the Californias and Southern Oregon* (*Rubiaceae*), which was published in volume 46 of *University of California Publications in Botany*, 1968. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by John Doyen.

Galium clementis. The habit of growth and inflorescence illustrations were drawn by Jeanne Janish and published in volume four of Roxana Ferris' *Illustrated Flora of the Pacific States*, 1960. The illustration of a part of the lower side of a leaf was published with Roxana Ferris' *Notes on the Genus Galium*, in volume four (part 5) of *Contributions from the Dudley Herbarium*, 1955. The illustration of a cross section of a leaf was published in volume 46 of the *University of California Publications in Botany*, 1968.

Galium cliftonsmithii. This illustration was published with Lauramay Dempster and G. Ledyard Stebbins' *A Cytotaxonomic Revision of the Fleshy-Fruited Galium Species of the Californias and Southern Oregon* (*Rubiaceae*), which was published in volume 46 of *University of California Publications in Botany*, 1968.

Galium porrigens. The illustration of *G. p.* var. *porrigens* is from Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939. The illustration of *G. p.* var. *tenue*, and the flower and fruit details below it, were drawn by Jeanne Janish and published in volume four of Roxana Ferris' *Illustrated Flora of the Pacific States*, 1960. The depiction of a pistillate flower in the upper right, and that of a staminate flower and a narrow leaf in the center, were published with Lauramay Dempster and G. Ledyard Stebbins' *A Cytotaxonomic Revision of the Fleshy-Fruited Galium Species of the Californias and Southern Oregon* (*Rubiaceae*), which was published in volume 46 of *University of California Publications in Botany*, 1968. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Garrya flavescens. This illustration is from *Range Plant Handbook* (Dayton, et al), which was published by the United States Forest Service in 1937. It is also included in the collection of drawings that were prepared for United States Forest Service publications that are accessible online via the

Hunt Institute for Botanical Documentation website. The photographic image of part of a catkin is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse. The photographic image of a fruit is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Neal Kramer.

Gastridium phleoides. The main illustrations and the details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The chromolithographic illustration of a spike was delineated by Ludweg Reichenbach and published in the second (color) edition of volume one of his *Icones Florae Germanica et Helveticae*, 1850.

Gayophytum heterozygum. The main illustration was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The flower and fruit details are from Lewis and Szeykowski's *The Genus Gayophytum*, *Brittonia* volume 16, 1964. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Christopher L. Christie.

Genista monspessulana. This illustration was delineated by Matilda Smith and published in volume 142 of *Curtis' Botanical Magazine*, 1916.

Geranium dissectum. The main illustration is from the *Geigy Weed Tables*, 1968-1975. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2019 by John Doyen. The photographic image of a fruit is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Gilia achilleifolia subsp. ***achilleifolia***. The main illustration, and the detail of a flower in the lower right, were delineated and sculpted by Walter Hood Fitch and published in volume 97 of *Curtis' Botanical Magazine*, 1871. The illustration of a purple flower cluster and the corolla laid open figure above it, were delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The photographic images of flower clusters are snips from photographs that were uploaded to the CalPhotos: Plants website; the blue flower one is © 2003 by Barry Breckling, and the white flowered one is © 2010 by Libbi Wu.

Gilia achilleifolia subsp. ***multicaulis***. This illustration and the detail of a calyx and pistil are from volume 62 of *Curtis' Botanical Magazine*, 1835. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Gilia clivorum. The main illustration and the detail of a flower were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; in descending order on the right they are © 2008 by Neal Kramer, © 2015 by John Doyen, © 2009 by Ron Wolf. In descending order on the left they are © 2016 by Keir Morse and © 2009 by Keir Morse.

Githopsis diffusa. The illustration on the left is from the first edition of *The Jepson Manual, Higher Plants of California*, 1993. The illustration on the right is from "Systematics of *Githopsis"* by Nancy Morin, in *Systematic Botany* volume 8, 1983. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Robert Steers.

Githopsis specularioides. The image on the left was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The images of large and small flower in the upper right are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The drawing in the lower right is from "Systematics of *Githopsis*" by Nancy Morin, in *Systematic Botany* volume 8, 1983. The photographic images of a blue flower and a white flower are a snips from photographs that were uploaded to the CalPhotos: Plants website by Keir Morse; © 2006 Keir Morse. The photographic image of a purple flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Steven Perry.

Hazardia squarrosa. This drawing is from Harvey M. Hall's *The Genus Haplopappus*, Carnegie Institution of Washington publication 389, 1928; it was drawn by Helen M. Rearwin. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003, Michael Charters.

Helenium puberulum. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic images of flower heads are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2015 and 2017 by John Doyen.

Heracleum maximum. The main illustration of this species is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The flower details were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a flower is a small snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014, Neal Kramer.

Hesperolinon micranthum. The main illustration and the details were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Hesperoyucca whipplei. This plate was delineated by Harriet Thiselton Dyer and published in volume 125 of *Curtis' Botanical Magazine*, 1899. The explanation of the plate is as follows: **1**. A stamen. **2**. A pistil. **3**. A seed cap-sule. Added to the plate is the habit of grown illustration in the lower center, which was drawn by Jeanne Janish and pub-lished in John Hunter Thomas and Dennis Parnell's *Native Shrubs of the Sierra Nevada*, 1974.

Heterocodon rariflorum. The main illustration and the upper and lower details of a flower were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The illustration of a cross section of a flower was also drawn by Jeanne Janish, but published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a flower is a snip from a photograph that was

uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Heteromeles arbutifolia. This lithographic plate was delineated by Charles E. Faxon and published in volume 4 of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. A fruiting branch, natural size. **3**. Vertical section of a flower, enlarged, with color added by use of image editing software. **4**. A group of flowers, enlarged, with color added by use of image editing software. **5**. Vertical section of a fruit, enlarged. **6**. An embryo, much magnified. **7**. An ovule, much magnified. **8**. A flower bud, enlarged. **9**. A stamen, enlarged. **10**. A pistil, enlarged. **11**. A cross section of a fruit, enlarged. **12**. A seed divided transversely, enlarged. The detail of a leaf is from George Sudworth's *Forest Trees of the Pacific Slope*, 1908. The photographic image of a fruit is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Gary McDonald.

Heterotheca sessiliflora. This illustration was drawn by Marjorie C. Leggett and published in volume 20 of *Flora of North America*, 2006. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005, Michael Charters.

Heuchera micrantha. The chromolithographic images were delineated by M. Hart and published in volume 15 of *Edwards Botanical Register*, 1829. The illustration in the lower left, and the flower above it, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The illustration of an open fruit is from volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The illustrations of a seed and three variations in leaf shape were drawn by Jeanne Janish; the upper three were published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961, and the one in the lower left was published in Gladys Smith's *Flowers and Ferns of Muir Woods*, 1963. The habit of growth illustration in the lower left was published in volume 1898 of *Revue Horticole*, 1898. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Hieracium albiflorum. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010, Keir Morse.

Hieracium argutum. This illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Adonis (Don) Tate.

Hoita macrostachya. The chromolithographic image and the details were delineated by Sarah Ann Drake and published in volume 21 of *Edwards Botanical Register*, 1836. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Neal Kramer.

Hoita orbicularis. The chromolithographic image and the details in the lower left were delineated by Sarah Ann Drake and published in volume 23 of *Edwards Botanical Register*, 1837. The details in the lower right were drawn by Jeanne Janish and published in Roxana Ferris' *Flowers of Point Reyes National Seashore*, 1970. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Barry Breckling. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Doreen L. Smith.

Holodiscus discolor. The chromolithographic image was delineated by M. Hart and published in volume 16 of *Edwards Botanical Register*, 1830. The flower and fruit details were drawn by A. E. Hoyle and published in the U. S. Forest Service's *Range Plant Handbook*, 1937. The leaf details were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of flowers are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Steve Matson.

Hordeum brachyantherum. The main illustration and the spike and spikelet details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The image of a spike is from 24 of *Flora of North America*, 2007.

Hordeum marinum. The chromolithographic illustration was delineated by Ludweg Reichenbach and published in the second (color) edition of volume one of his *Icones Florae Germanica et Helveticae*, 1850. The spikelet details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Hordeum murinum. The chromolithographic illustration was delineated by Ludweg Reichenbach and published in the second (color) edition of volume one of his *Icones Florae Germanica et Helveticae*, 1850. The spikelet details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Horkelia yadonii. This illustration was drawn by Linda Ann Vorobik and published with Barbara Ertter's "A Re-evaluation of the Horkelia bolanderi (Rosaceae) Complex, with the New Species Horkelia yadonii," *Systematic Botany* volume 18 (1), 1993. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Chris Winchell.

Hosackia crassifolia. The chromolithographic image and details were delineated by Sarah Ann Drake and published in volume 23 of *Edwards Botanical Register*, 1837. The detail of a whorl of fruits was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse. The photographic image of a whorl of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Christopher L. Christie.

Hosackia oblongifolia. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a yellow flower is a snip

from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a red flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by George W. Hartwell.

Hosackia stipularis. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Robert Steers-NPS. The photographic image of a group of flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Aaron Schusteff.

Hulsea heterochroma. The main illustration was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The details of flowers and achenes were drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, Roxana Ferris, 1960. The photographic image of a flower head is a modified snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Dylan Neubauer.

Hypericum scouleri. This illustration combines details from three Jeanne Janish drawings. The first was published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951, the second in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961, and the third was published in Philip Munz' *California Mountain Wildflowers*, 1963. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Keir Morse.

Hypochaeris glabra. The main illustration was delineated by Ferdinand Bauer and published in volume nine of *Flora Graeca*, by John Sibthorp and John Lindley, 1840. The images of flower heads were published in volume 5 of *English Botany*, 1866. The illustrations of achenes were published in band six (teil two) of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1928.

Juncus bufonius. The main illustration and the flower and fruit details were delineated by Otto Thome and published in volume one of his *Flora von Deutschland Osterreich und der Schweiz*, 1886. The detail of a flower is from volume nine of J. Sturm's *Deutschlands Flora*, 1814.

Juncus dubius. This illustration was drawn by Mr. W. S. Atkinson and published in volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923. The photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse.

Juncus effusus. The main illustration is from volume three of Nikolaus Host's *Icones et Descriptiones Graminum Austriacorum*, 1805. The illustration of a flower was delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The illustration of a seed capsule in the lower left was delineated by Otto Thome and published in volume one of his *Flora von Deutschland Osterreich und der Schweiz*, 1886. The illustrations of a cross section of a fruit in the lower left, and of seeds in the lower right, are from E. Korsmo's *Unkrauttaflen*, *Planches des Mauvaises Herbes*, 1924-1938.

Juncus patens. The main illustration and the details of a seed and a perianth and capsule were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The details of a close up of part of an inflorescence and the top of a basal sheath are from Herbert Mason's *A Flora of the Marshes of California*, 1957. The photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer.

Juncus rugulosus. The main illustration and the fruit details were drawn by Mr. W. S. Atkinson and published in volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923. The greatly enlarged stem segment illustration is from volume one (part 6) of Willis Linn Jepson's *A Flora of California*, 1922. The photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Neal Kramer.

Keckiella breviflora. The chromolithographic image was delineated by Sarah Ann Drake and published in volume 23 of *Edwards Botanical Register*, 1837. The details of an anther and sterile filament are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The detail of a stigma is from volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a nearly all white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by John Doyen. The photographic image of a more colorful flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Ron Wolf.

Keckiella corymbosa. The illustrations of a flowering stem, a fruiting stem, a flower, a sterile filament and two lover leaves were drawn by Emily Thompson and published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939. The illustration of a sterile filament on the left was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The illustrations of a corolla laid open and a stigma are from the first edition of *The Jepson Manual, Higher Plants of California*, 1993. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Aaron Arthur.

Koeleria macrantha. The chromolithographic illustration, which is from the second edition of volume 13 of *Flora Batava* (Kops et al), 1868, represents the nearly identical *K. cristata*, for which *K. macrantha* was mistaken in botanical literature until the 1950s. The illustration of the upper part of a spike is from George Vasey's *The Agricultural Grasses of the United States*, 1884. The illustration of glumes and florets are from the U. S. Department of Agriculture Division of Agrostology Bulletin no. 12, 1898.

Lactuca serriola. This illustration was delineated by Albert G. Dietrich and published in volume 10 of his *Flora Regni Borussici*, 1842.

Lagophylla ramosissima. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The images of a disk flower and a phyllary were published in teil 5 (4) of *Die Naturlichen Pflanzenfamilien*, 1890. The photographic images of flower heads are snips from photographs

that were uploaded to the CalPhotos: Plants website; © 2005 by Michael Charters.

Lamium amplexicaule. The main illustration is from the *Geigy Weed Tables*, 1968-1975. The illustrations of nutlets are from E. Korsmo's *Unkrauttaflen, Planches des Mauvaises Herbes*, 1934-1938. The image of a cross section of a flower is from volume seven of the third edition of *English Botany*, 1867.

Lasthenia californica. The chromolithographic image and the details were delineated by Sarah Ann Drake and published in volume 21 of *Edwards Botanical Register*, 1836. The habit of growth illustration in the lower left was drawn by Margaret Buck and published in Mary E. Parson's *Wild Flowers of California*, 1897. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Lathyrus vestitus. The main illustration was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a nearly white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Thomas Stoughton. The photographic image of front and side views of a flower are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Neal Kramer.

Layia glandulosa var**. *lutea***. This illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The flower details were delineated by Matilda Smith and published in volume 112 of *Curtis' Botanical Magazine*, 1886. The image of an achene was published in teil 5 (4) of *Die Naturlichen Pflanzenfamilien*, 1890. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Richard Spellenberg.

Lepechinia calycina. The main illustration and the two details were published in *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. As the text for the botany section of this work was written by John Torrey, the delineator of the plates was probably Issac Sprague, who illustrated a number of Torrey's texts. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by John W. Wall. The other photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website by Neal Kramer; © 2015 and 2016.

Lepidium strictum. The drawings are the work of Jeanne Janish and they were published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The photographic image of flowers and young fruits flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Zoya Akulova.

Leptosiphon ciliatus. The main illustration and flower details were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; in descending order they are © 2012 by Jean Pawek, © 2009 by Ron Wolf, © 2009 by Aaron Schusteff, © 2012 by Jason Matthias Mills, © 2008 by Dee E. Warenycia.

Leptosiphon liniflorus. The chromolithographic illustration was published volume 19 of *Gartenflora*, 1870. The habit of growth and the whorled leaves illustrations in the lower right, and the three lobed seed capsule and pistil illustrations in the lower left, were delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The two flower illustrations in the lower right center, and that of an open seed capsule in the lower left, were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one showing the back side of a flower is © 2012 by Neal Kramer. and the one showing the front side of a flower is © 2005 by Anuja Parikh and Nathan Gale.

Leptosiphon parviflorus. The chromolithographic illustration, and the details in the lower right, were delineated and sculpted by Walter Hood Fitch and published in volume 79 of *Curtis' Botanical Magazine*, 1853. The illustration of three small plants on the left were drawn by Jeanne Janish and published in Roxana Ferris' *Flowers of Point Reyes National Seashore*, 1970. The illustration of a cluster of plants in the lower left is from Jim Harter's *The Plant Kingdom Compendium* (1984), which consists of a collection of Victorian era plant illustrations, the original sources of which are not stated. The photographic images of flowers are snips from photographs that Aaron Schusteff uploaded to the CalPhotos: Plants website; the white flowered one is © 2015, the purple one is © 2016, and the yellow flowered one is © 2012.

Lessingia glandulifera. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The detail of a flower was published in teil 5 (4) of *Die Naturlichen Pflanzenfamilien*, 1890. The image of a flower head is from the Jepson e-flora website. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer.

Lessingia pectinata. The images of leaves are from John T. Howell's "A Study of the Genus Lessingia," which was published in volume 16 of *University of California Publications in Botany*, 1929-1932. The images of a flower and a flower head are from the first edition of *The Jepson Manual, Higher Plants of California*, 1993. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Lilium pardalinum. Plate one. The chromolithographic illustration was published in volume 20 of *The Garden*, 1881. The habit of growth and bulb details were delineated by Walter Hood Fitch and published in Henry Elwes' *A Monograph of the Genus Lilium*, 1880.

Lilium pardalinum. Plate two. The photograph in the upper left was taken by the author along Tassajara Creek, upstream from the hot springs. The illustration of a spreading bulb and segments of a blub was published in volume 20 of *The Garden*, 1881. The chromolithographic illustration of middle cauline leaves was delineated by Walter Hood Fitch and published in Henry Elwes' *A Monograph of the Genus*

Lilium, 1880. The other photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper right center is © 2002 by Brad Kelly, the one in the upper right is © 2001 by Lynn Overtree, and the orange flowered one is © 2015 by Julie Kierstead Nelson.

Linanthus dichotomus. The central illustration was published in volume 1894 of *Revue Horticole*, 1894. The illustrations of flowers in the upper left, and of a seed capsule in the right center, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The habit of growth illustration on the right, and an open seed capsule in the lower right, were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the top view photo is © 2009 by Barry Breckling, and the side view image is © 2015 by Debra L. Cook.

Lithophragma affine. The main illustration, and the image of a petal shape variation on the left, are from volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The rest of the illustrations are from Helen Sharsmith's *Spring Wildflowers of the San Francisco Bay Region*, 1965. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one is © 2005 by George W. Hartwell, and the other one is © 2016 by John Doyen.

Lithophragma heterophyllum. The central illustrations, including the detail of a petal, are from volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The leaf variation details in the lower left, and the image of an inflorescence on the right, are from Philip Munz' *California Spring Wildflowers*, 1961. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer.

Lobelia dunnii var. ***serrata***. Most of this plate was delineated by Issac Sprague and published in volume four (Botany) of *Report upon United States Geographical Surveys West of the One Hundredth Meridian*, in charge of First Lieut. Geo. M. Wheeler, 1878. The details of a capsule in the upper left and a seed in the mid right were drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Neal Kramer.

Logfia filaginoides. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Logfia gallica. The chromolithographic images were delineated by Ludweg Reichenbach and published in volume 16 of his *Icones Florae Germanica et Helveticae*, 1854. The photographic image of a flower head is a modified snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013, Keir Morse.

Lomatium dasycarpum. The main illustration and the fruit and leaf segment details are from Willis Linn Jepson's A *Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The detail of a fruiting umbel in the upper left was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a secondary flowering umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 Neal Kramer. The photographic image of a fruit is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Lomatium macrocarpum. The main illustration for this species was drawn by Jeanne Janish and published in Philip Munz's *California Mountain Wildflowers*, 1963. The fruit, root and leaf segment details were also drawn by Jeanne Janish; the fruit and root details were published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961, and the leaf and cross section of a fruit details were published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a small snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 John Doyen.

Lomatium utriculatum. The main illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The fruit details were published in Philip Munz's *California Spring Wildflowers*, 1961, and they are probably the work of Stephen S. Tillett, who was the principal illustrator of this text. The photographic image of a secondary flowering umbel is a small snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007, Lynn Watson.

Lonicera interrupta. This illustration was drawn by Charles E. Faxon and published in volume one of Charles Sprague Sargent's *Trees and Shrubs: Illustrations of New or Little Known Ligneous Plants*, 1905. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. A flower, enlarged. **3**. A corolla laid open, enlarged. **4**. A cluster of three flowers with their bracts and bractlets, the corollas removed. **5**. A fruiting branch, natural size. **6**. A seed, enlarged. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Chris Winchell. The photographic image of fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Lonicera subspicata. This plate is from *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. The text for the botany section was written by John Torrey, and the delineator of the plates was not mentioned, but they were probably drawn by Issac Sprague, who illustrated a number of Torrey's texts. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Neal Kramer. The photographic image of fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Keir Morse.

Lupinus albifrons var. ***abramsii***. The habit of growth illustration is of a similar low growing species; it is from the Botany section of *Report of the Geological Exploration of the*

Fortieth Parallel, 1871. The detail of a leaf was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The detail of leaflet hairiness is from the first edition of *The Jepson Manual, Higher Plants of California*, 1993.

Lupinus albifrons var. ***albifrons***. The chromolithographic illustration, and the details of a fruit and of a flower with the banner removed, were delineated by Sarah Ann Drake and published in volume 19 of *Edwards Botanical Register*, 1833. The habit of growth illustration to the right, and the details of a banner, a calyx, and leaflet hairiness, were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a whorl of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a short inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Debra L. Cook. The photographic image of a long inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a seed is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Jean Pawek.

Lupinus albifrons var. ***collinus***. The habit of growth illustration is of a similar low growing species; it is from the Botany section of *Report of the Geological Exploration of the Fortieth Parallel*, 1871. I failed to keep a record of the source of the illustration of a leaf and its hairiness.

Lupinus benthamii. The chromolithographic image was delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The foliage, flower and fruit details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The upper photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen. The middle photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Steven Perry. The lower photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Barry Rice.

Lupinus bicolor. The main chromolithographic image was delineated by M. Hart and published in volume 13 of *Edwards Botanical Register*, 1827. The illustration of fruits drawn by Jeanne Janish and published in Roxana Ferris' *Flowers of Point Reyes National Seashore*, 1970. The habit of growth illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Brianna Richardson. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Gary A. Monroe.

Lupinus cervinus. The habit of growth illustration and the details are from volume two of Willis Linn Jepson's *A Flora of California*, 1936. The photographic image of a magenta flowered plant was taken by the author of this text. This plant was part of an apparently now extinct population that used to occur along the Pine Ridge Trail a short distance west of Tassajara Road. The photographic image of a dull magenta inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by Aaron Schusteff. The photographic image of a blue inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by Aaron Schusteff.

Lupinus concinnus. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of two flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Gary A. Monroe. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Lupinus formosus. The main illustration was drawn by Rodney Cross and published in Philip Munz' *A Manual of Southern California Botany*, 1935. The upper photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen. The middle photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Barry Breckling. The lower photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Lynn Watson.

Lupinus hirsutissimus. The habit of growth illustration is from volume two of Willis Linn Jepson's *A Flora of California*, 1936. The details of an inflorescence, a flower, leaves and a fruit were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by John Doyen.

Lupinus microcarpus var. ***densiflorus***. The main chromolithographic image and details were delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The chromolithographic image of a yellow flowered inflorescence was delineated by Walter Fitch and published in volume 83 of *Curtis' Botanical Magazine*, 1857. The habit of growth illustration is from volume two of Willis Linn Jepson's *A Flora of California*, 1936. The photographic image of a whorl of white flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Brent Miller. The photographic image of a whorl of reddish flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a whorl of fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 200 by Keir Morse.

Lupinus nanus. The close up chromolithographic image, and the details, were delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. Behind this is another chromolithographic image that was delineated by Sarah Ann Drake, but this one was published in series two, volume one, of *Transactions of the Horticultural Society of London*, 1835. Behind these images is a figure from volume four of Adalbert Schnizlein's *Iconographia Familiarum Naturalium Regni Vegetabilis*, 1856. The photographic images of flowers are snips from photographs that

were uploaded to the CalPhotos: Plants website; © 2008 and 2014 by Gary McDonald.

Lupinus stiversii. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Christopher L. Christie.

Lupinus succulentus. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of part of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson. The photographic image of a blue and white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a blue and purple flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen. The photographic image of fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Ricky Grubb.

Lupinus truncatus. The main illustration and the details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Gary A. Monroe. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a fruit is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Steve Matson.

Luzula comosa. The main illustration, and the details of part of an inflorescence and a perianth and capsule, are from volume one (part 6) of Willis Linn Jepson's *A Flora of California*, 1922. The illustration of a seed was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Lysimachia arvensis. The main illustration was delineated by Albert G. Dietrich and published in volume four of his *Flora Regni Borussici*, 1836. The illustration of a fruit is from band 5, 3 teil, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1926. The photographic image of an orange flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Gary McDonald. The photographic image of a pale orange flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by Carol W. Whitman. The photographic image of a blue flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Lythrum californicum. The main illustration was drawn by Rodney Cross and published in Philip Munz' *A Manual of Southern California Botany*, 1935. The flower details are from Philip Munz' *A California Flora*, 1959. The photographic image of a dark pink flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Ron Wolf. The photographic image of a nearly white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by James M. Andre.

Madia elegans. The chromolithographic image was delineated by Sarah Ann Drake and published in volume 17 of *Edwards Botanical Register*, 1831. The illustration of the lower part of a plant in the lower left was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The photographic image of a flower head without spots on the ray flowers in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Barry Rice; © 2009 by Barry Rice. The photographic image of a flower head with lighter hued corollas in the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Ron Wolf. The photographic image of a darker hued flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Lynn Watson.

Madia exigua. This illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a top view a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer. The photographic image of a side view of a flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Neal Kramer.

Madia gracilis. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*,, Roxana Ferris, 1960. The photographic image of a flower head with spotted ray corollas is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by George W. Hartwell. The photographic image of a flower head with lighter hued corollas is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse. The photographic image of a flower head with darker hued corollas is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by John Doyen.

Malacothrix californica. This illustration was drawn by Yevonn Wilson Ramsey and published in volume 19 of *Flora of North America*, 2006. The photographic image of a flower head with yellow ray corollas is a snip from a photograph that was uploaded to the CalPhotos: Plants website by John Doyen; © 2014 by John Doyen. The photographic image of a flower head with whitish ray corollas is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Malacothrix clevelandii. This illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008, Keir Morse.

Malacothrix floccifera. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M.

Saunders, who was the principal illustrator for this text. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Christopher L. Christie.

Marah fabaceus. The main illustration was delineated by Alf. Riocreux and published in volume 12 of the fourth series of *Annales des Sciences Naturelles, Botanique*, 1859. The details of half of a fruit and the not prickly fruit spines were drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The image of an exposed tuber is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Steve Matson.

Marrubium vulgare. The main illustration represents part of an image that was delineated by Albert G. Dietrich and published in volume three of his *Flora Regni Borussici*, 1835. The details are from volume two of *Kohler's Medizinal Pflanzen*, 1887.

Meconella denticulata. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; both are © 2016 by Keir Morse.

Medicago arabica. The chromolithographic illustration was delineated by Otto Thome and published in volume three of his *Flora von Deutschland Osterreich und der Schweiz*, 1885. The illustrations of petals are from volume three of the third edition of *English Botany*, 1864. The illustrations of a loosely coiled fruit in the upper left and stipules in the lower right were delineated by M. Lisa and published in *Flora Sardoa, Iconographia*, which is the fourth volume of Giuseppe (Josepho) Moris's *Flora Sardoa, seu Historia Plantarum in Sardinia et Adjacentibus Insulis*, 1837-1859. The illustration of a tightly coiled fruit at the bottom was delineated by Ludweg Reichenbach and published in volume 22 of his *Icones Florae Germanica et Helveticae*, 1903 edition.

Medicago lupulina. The chromolithographic illustration was delineated by Otto Thome and published in volume three of his *Flora von Deutschland Osterreich und der Schweiz*, 1885. The illustrations of petals are from volume three of the third edition of *English Botany*, 1864.

Medicago polymorpha. The main illustration and the details of a flower and a tightly coiled fruit are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The details of a leaf and fruits, stipules, and a loosely coiled fruit were delineated by M. Lisa and published in *Flora Sardoa, Iconographia*, which is the fourth volume of Giuseppe (Josepho) Moris's *Flora Sardoa, seu Historia Plantarum in Sardinia et Adjacentibus Insulis*, 1837-1859.

Melica aristata. This illustration was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Melica californica. The habit of growth illustration and details of glumes and florets are from volume two of Frank Lamson-Scribner's *American Grasses* (U. S. Department of Agriculture Division of Agrostology Bulletin no. 17), 1899. The illustration of the upper part of a spike and the detail of a floret to its left are from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935.

Melica geyeri. The main illustration, and the numbered details, were delineated by Theodore Holm and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered details are: **1**. Empty glumes. **2**. A floral glume, dorsal view. **3**. A palea, with the margins infolded. **4**. A spikelet. The remainder of the illustrations were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Melica harfordii. The main illustration, and the numbered details, were delineated by W. Scholl and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered details are: **1**. Floret and awned glume. **2**. A spikelet with the florets spread out. **3**. A floral glume, dorsal view. The remainder of the illustrations were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Melica imperfecta. The main illustration and the detail of a spikelet in the upper right is from George Vasey's *The Agricultural Grasses of the United States*, 1884. The illustration of a panicle and the floret details are from volume three of Carl von Trinius' *Species Graminum, Iconibus et Descriptionibus Illustravit*, 1836. The image of two florets in the lower center are from volume two of Frank Lamson-Scribner's *American Grasses* (U. S. Department of Agriculture Division of Agrostology Bulletin no. 17), 1899. The photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Steve Matson.

Melilotus albus. The main illustration the detail of a flower in the upper right were delineated by Albert G. Dietrich and published in volume 10 of his *Flora Regni Borussici*, 1842. The illustrations of petals are from volume three of the third edition of *English Botany*, 1864. The illustration of a fruit is from band four, teil three, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1923. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Steve Matson.

Mentha spicata. This image is a small part of a plate that was published in volume 10 of Ludwig Reichenbach's *Iconographia Botanica seu Criticae*, 1832. The illustration of a flower is from band 5, 4 teil, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1927. I have lost track of my source for the photographic image, but it was not the CalPhotos: Plants website.

Mentha x ***piperita***. This illustration is part of a plate that was published in volume two of *Kohler's Medizinal Pflanzen*, 1887. The illustrations of flowers are from volume 11 (part 2) of H. E. Baillon's *Histoire des Plantes*, 1891. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Jake Ruygt.

Mentzelia dispersa. The main illustration and the detail of an enlarged flower are from Willis Linn Jepson's *A Manual*

of the Flowering Plants of California, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The illustrations of a seed and a cross section of a seed were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by John Doyen.

Mentzelia micrantha. The main illustration and the details were delineated by Sir William Jackson Hooker and published in *The Botany of Captain Beechey's Voyage*, by William Jackson Hooker and Walker Arnott, 1841. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Vernon Smith.

Micranthes californica. The main illustration was drawn by Margaret Buck and published in Mary Parsons' *The Wild Flowers of California*, 1897. The details of basal leaves and a flower are from volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one is © 2018 by John Doyen, and the other one is © 2016 by Steve Matson.

Micropus californicus. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Microsteris gracilis. The chromolithographic images were delineated by Sir William Jackson Hooker and published in volume 56 of *Curtis' Botanical Magazine*, 1829. The habit of growth illustrations in the lower left and in the right center, and the flower details in the left center and in the upper right, were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The habit of growth illustration in the lower right center, and the seed capsule in the upper right center, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The habit of growth illustration on the right, and the notched petaled flower detail in the left center, are from heft 27 (4/250, *Polemoniaceae*) of *Das Pflanzenreich*, 1907. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper most left corner is © 2007 by Neal Kramer, and the other two are © 2015 by Debra L. Cook.

Mimetanthe pilosa. The illustration in the lower left was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The illustration in the upper right and the image of a corolla laid open were also drawn by Jeanne Janish, but they were published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Steve Matson.

Minuartia douglasii. The main illustration is from Willis Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The flower details were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Keir Morse.

Moehringia macrophylla. This illustration was delineated by Sir William Jackson Hooker and published in volume one of his *Flora Boreali Americana*, 1833. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Monardella macrantha. The chromolithographic image, and the flower details, were delineated and sculpted by Walter Hood Fitch and published in volume 102 of *Curtis' Botanical Magazine*, 1876. The habit of growth illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Aaron Schusteff.

Monardella villosa subsp. ***obispoensis***. This illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a flower cluster is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Chris Winchell.

Monardella villosa subsp. ***villosa***. The main illustration and the flower details were delineated by Sarah Ann Drake and published in George Bentham's *The Botany of the Voyage H. M. S. Sulphur, Under the Command of Captain Sir Edward Belcher, During the Years 1836-1842*, 1844. The photographic image of a blue flower cluster is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Robert Sikora. The photographic image of a pink flower cluster is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer. The photographic image of a lavender flower cluster is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Myriopteris covillei. The main illustration and the details were delineated by Charles E. Faxon and published in volume two of Daniel Cady Eaton's *The Ferns of North America*, 1880. The numbered details are as follows: **1**. An enlargement of a part of a pinna as seen from above. **2**. A pinnule as seen from below. **3**. A pinnule as seen from below but with the scales removed. **4**. An ultimate segment that is partially laid open. **5** & **6**, Scales. **7**. A spore.

Myriopteris gracillima. The main illustration and the details were delineated by Charles E. Faxon and published in volume two of Daniel Cady Eaton's *The Ferns of North A*merica, 1880. The numbered details are as follows: **14**. A pinna as seen from above. **15**. A pinnule as seen from below. **16**. The same but with the hairs removed. **17**. A spore. To the lower left of the main illustration I have added, in order to demonstrate variations in ultimate segment shape, an illustration that was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Myriopteris intertexta. The main illustration and the upper

details were delineated by Charles E. Faxon and published in volume two of Daniel Cady Eaton's *The Ferns of North America*, 1880. The numbered details are as follows: **8. A**n enlargement of a part of a pinna as seen from above. **9**. A pinnule as seen from below. **10**. A pinnule as seen from below but with the scales removed. **11**. An ultimate segment that is partially laid open. **12**. A scale. **13**. A spore.

Navarretia atractyloides. The main illustration and the flower details were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; in descending order they are © 2009 by Neal Kramer, © 2015 by Keir Morse, © 2007 by Laura Ann Eliassen, © 2016 by Christopher Bronny, © 2009 by Keir Morse.

Navarretia intertexta. The illustration of an inflorescence is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The habit of growth, flower and floral bract illustrations are from heft 27 (4/250, *Polemoniaceae*) of *Das Pflanzenreich*, 1907. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Steve Matson.

Navarretia mellita. The main illustration and flower and fruit details were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The flower bract illustrations in the lower left were published in heft 27 (4/250, *Polemoniaceae*) of *Das Pflanzenreich*, 1907. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Aaron Schusteff.

Nemacladus ramosissimus. This plate is from *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. As the text for the botany section was written by John Torrey, the delineator of the plates was probably Issac Sprague, who illustrated a number of Torrey's texts. The description of the plate is as follows: **A**. A young plant with radical leaves. **B**. A full grown plant in fruit, both the natural size. **1**. A flower, considerably magnified. **2**. Another view of a flower. **3**. A petal, more magnified. **4**. The stamineal column, equally magnified. **5**. Part of a stamen, more magnified. **6**. Stigma and part of the style, highly magnified. **7**. Cross section of a capsule, considerably magnified. **8**. A seed, highly magnified. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Keir Morse.

Nemophila heterophylla. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Debra L. Cook. The photographic image of a blue flower is a snip from a photograph that was taken by Gerald and Buff Corsi and uploaded to the CalPhotos: Plants website by the California Academy of Sciences; © 2014 by CAS.

Nemophila menziesii. The chromolithographic image was delineated Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The details were delineated by Edouard Spach and published in volume 23 (the atlas) of his *Histoire Naturelle des Vegetaux*, 1846. The photographic image of a dark blue flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website by; © 2008 by Keir Morse. The photographic image of a medium blue flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by John Doyen.

Nemophila parviflora. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Nemophila pedunculata. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Steve Matson.

Nemophila pulchella var. ***fremontii***. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The image in the lower right was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Notholithocarpus densiflorus. Plate one. The chromolithographic illustration and the details were delineated by Matilda Smith and published in volume 143 of *Curtis' Botanical Magazine*, 1917.

Notholithocarpus densiflorus. Plate two. This plate was delineated by Charles E. Faxon and published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895. The numbered images are: **1**. A flowering branch, natural size. **2**. A fruiting branch, natural size. **3**. A fruiting branch, natural size. **4**. A leaf, natural size. **5**. A winter bud, enlarged. **6**. A pistillate flower, the involucre removed, enlarged. **7**. A portion of an androgynous catkin, enlarged. **8**. A staminate flower, enlarged. **9**. A pistillate flower, enlarged.

Nuttallanthus texanus. The chromolithographic image was delineated by Sir William Jackson Hooker and published in volume 63 of *Curtis' Botanical Magazine*, 1836. The flower, basal leaves and habit of growth illustrations were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; from top to bottom they are © 2013 by Keir Morse, © 2017 by John Doyen, © 2013 by Debra L. Cook.

Oemleria cerasiformis. The upper three images, and that of a flower in the lower left, were delineated by Sir William Jackson Hooker and published in *The Botany of Captain Beechey's Voyage*, by Sir William Jackson Hooker and Walker Arnott, 1841. The lower illustration was published in

volume four of the *Journal of the Horticultural Society of London*, 1849. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of young fruits in the upper right is © 2012 by Steve Matson, the one of two fruits is © 2011 by Zoya Akulova, the one of a yellow fruit is © 2008 by Keir Morse, and the one of a flower is © 2014 by John Doyen.

Osmorhiza berteroi. The main illustration and most of the details were delineated by A. d'Apreval and published in *Resultats du Voyage du S. Belgica, Botanique, les Phanerogames des Terres Magellaniques* by E. de Wilde-man, 1905. The detail of a fruit is from Porter Lowry and Aleut Jones' *Systematics of Osmorhiza Raff.* (*Apiaceae*: *Apioideae*), in volume 71 of *Annals of the Missouri Botanical Garden*, 1984. The detail of a compound leaf blade in the upper right is my own work, and it illustrates the blade of a specimen that I collected in the Tassajara region. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006, Steve Matson.

Osmorhiza brachypoda. The detail of a compound leaf is my own work, and it illustrates the leaf of a specimen that was collected in the Tassajara region. The illustration of a fruiting umbel and the fruit in the upper left are from volume two of Willis Linn Jepson's *A Flora of California*, 1936. The detail of a fruit on the right is from Porter Lowry and Almut Jones' *Systematics of Osmorhiza Raf.* (*Apiaceae*: *Apioideae*), in volume 71 of *Annals of the Missouri Botanical Garden*, 1984. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 205, Keir Morse.

Oxalis corniculata. The main image and the depiction of a seed are from 4 band, 3 teil, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1924. The flower and fruit details were delineated by Albert G. Dietrich and published in volume four of his *Flora Regni Borussici*, 1836.

Oxalis pes-caprae. This illustration was delineated by J. S. Kerner and published in volume 25 of his *Hortus Semper-virens*, 1809. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Aaron E. Simms and CNPS.

Panicum acuminatum. The main illustration and the details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Papaver californicum. The line drawing is from the first edition of *The Jepson Manual, Higher Plants of California*, 1993. The photographic images of a group of plants, and the close up of stamens and a pistil, were taken by the author along Tony's Trail during the first spring after the Basin Complex Fire of 2008. The fruit illustrations were drawn by Mr. F. Ruckert and published in Joachim Kadereit's "*Papaver* Sect. *Californicum* Kadereit, A New Section of the Genus," *Rhodora* volume 90 (861): 7-13, 1988. The photographic image of a darker hued flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Christopher L. Christie.

Parnassia palustris. This illustration was delineated by F. G. Kohl and published in volume 23 of Reichenbach's *Icones Florae Germanica et Helveticae*, 1899. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by John Game.

Pectocarya penicillata. This illustration was drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Steve Matson.

Pectocarya pusilla. The illustrations maturing and mature fruits (to the left), and of an entire plant to the right, were delineated Alf. Riocreux and published in Claude Gay's *Atlas de la Historia Fysica y Politico de Chile*, 1854. The image of an entire plant to the far right, of a flower in the lower right, and the group of four fruits that have a J in the lower right, were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by Jorg Fleige.

Pedicularis densiflora. The main image, and the details of a flower and the lower lip of a corolla in the lower right, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The images of a flower and seed capsule were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a pink inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Michael Charters. The photographic image of a red inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 1997 by Christopher L. Christie. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Steve Matson.

Pellaea andromedifolia. The color illustrations were delineated by James H. Emerton and published in volume one of Daniel Cady Eaton's *The Ferns of North America*, 1879. The illustration depicting the undersides of three ultimate segments was drawn by Rita Whitmore, and it was published in *Ferns and Fern Allies of California* by Steve Grillos, 1962.

Pellaea mucronata. The color illustration and three of the details were delineated by James H. Emerton and published in volume two of Daniel Cady Eaton's *The Ferns of North America*, 1880. The detail depicting one fertile ultimate segment in the lower left was delineated by Walter H. Fitch and published in volume two of Sir William Jackson Hooker's *Species Filicum*, 1858.

Penstemon centranthifolius. The chromolithographic image to the left, and the details of a set of stamens (including the sterile one) on the left, a calyx and pistil in the upper center, a single stamen in the upper right, and an ovary in the lower right, were delineated and sculpted by Walter Hood Fitch and published in volume 85 of *Curtis' Botanical Magazine*, 1859. The chromolithographic image to the right, and the details of a flower and a set of stamen (including the sterile one) in the upper left, were delineated by Sarah Ann Drake and published in volume 20 of *Edwards Botanical Register*, 1835. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Penstemon grinnellii var. ***scrophularioides***. The main illustration, and the details of a sterile stamen and a stigma, were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The upper photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Jean Pawek. The other photographic images of flowers are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Aaron Schusteff.

Penstemon heterophyllus var. ***australis***. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951.

Penstemon heterophyllus var. ***heterophyllus***. The chromolithographic image was delineated by J. R. Guillot and published in volume 1901 of *Revue Horticole*, 1901. The detail of a calyx and lower part of a corolla, with the stamens and pistil, is from volume 67 of *Curtis' Botanical Magazine*, 1841. The anther details were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower in the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Barry Breckling. The photographic image of a flower in the upper right is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Pentagramma triangularis. The illustration of an entire plant, along with the enlarged view of a pinnule to the right, were delineated by Alois Lunzer and published in series two, volume one, of Thomas Meehan's *The Native Flowers and Ferns* of the United States, 1880. The four uppermost details were delineated by Charles E. Faxon and published in volume two of Daniel Cady Eaton's *The Ferns of North America*, 1880. The detail in the lower left was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The details in the lower right were delineated by Dr. Robert K. Greville and published in *Icones Filicum* by William Jackson Hooker and Robert K. Greville, 1831.

Persicaria lapathifolia. The main illustration was delineated by Ludweg Reichenbach and published in volume five of his *Iconographia Botanica seu Plantae Criticae*, 1827. The color flower and fruit details are from 3 band, 1 teil, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1909.

Petasites frigidus var. ***palmatus***. The main illustration was delineated by Ehret and published in volume three of *Hortus Kewensis*, 1789. The details of ray and disk flowers were delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The photographic image of an inflorescence was made by the author of this text, and the photographic image of leaves is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2018 by Neal Kramer.

Phacelia brachyloba. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic illustration of flowers was taken by the author of this text.

Phacelia distans. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Phacelia douglasii. The illustration used here is from Philip Munz' *California Spring Wildflowers*, 1961. It was probably drawn by Steven Tillett, who drew most of the illustrations for this text. The images of a seed and a fruiting branch were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The image of a cross section of a flower was published in heft 59 (IV-251, *Hydrophyllaceae*) of *Das Pflanzenriech*, 1913. The photographic image of a dark flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Dylan Neubauer. The photographic image of a light flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Lynn Watson.

Phacelia egena. The image of an inflorescence is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The remainder of the drawings are the work of Jeanne Janish, which were published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Steve Matson.

Phacelia grisea. The drawings are the work of Jeanne Janish; they were published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a single flower is a snip of a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Aaron Schusteff. The photographic image of a basal rosette was taken by Diane Renshaw, who has given me permission to use it in this text. The rest of the photographic images are the work of the author of this text.

Phacelia imbricata. The main illustration and the detail of a flower were drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The images of a fruiting calyx and a more slender leaf were also drawn by Jeanne Janish, but these were published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Debra L. Cook.

Phacelia malvifolia. The main illustration and the flower and fruit details were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The image of a single leaf with more deeply lobed margins is a Wikipedia Commons item. The photograph of a compound leaf is the work of the author of this text. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Phacelia nemoralis. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of part of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 1995 by Saint Mary's College of California.

Phacelia ramosissima. This illustration was drawn by

Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Aaron Schusteff.

Phacelia viscida. The chromolithographic image, and the images of an ovary and a flower laid open, were delineated by Sarah Ann Drake and published in volume 21 of *Edwards Botanical Register*, 1835. The habit of growth illustration is from volume three of Nicholson's *Illustrated Dictionary of Gardening*, 1888. The details of an open capsule and a stamen are from teil 3(4) of *Naturlichen Pflanzenfamilien*, 1893. I took the photographic images along the Cutoff Trail in the spring of 2009.

Pholistoma auritum. The main chromolithographic image was delineated by Sarah Ann Drake and published in volume 19 of *Edwards Botanical Register*, 1833. The chromolithographic images of a capsule and an open capsule are from volume seven of Sweet's *The British Flower Garden*, 1836. The drawing of a flower was published in heft 59 (IV-251, *Hydrophyllaceae*) of *Das Pflanzenriech*, 1913. The image of a seed was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a blue flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Jason Matthias Mills. The photographic image of a pale purple flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Michael Charters.

Phoradendron leucarpum subsp. ***tomentosum***. The color illustrations were painted by Mary E. Eaton and published in the June edition of volume 31 of the *National Geographic Magazine*, 1917 (with the article "Our State Flowers"). The drawings of a leafy stem and part of an inflorescence (in the lower left) are from volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923. The other two details were drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964.

Pinus coulteri. Plate one. *Pinus coulteri* as illustrated in Franz Antoine's *Die Coniferen*, 1840. The image was delineated and sculpted by the author. **1**. A cone, natural size. **2**. The base of a needle cluster. **3**. A cone scale, side view. **4**. A cone scale, inside view. **5**. A seed.

Pinus coulteri. Plate two. This is plate 571 from volume 11 of Charles Sprague Sargent's *The Silva of North America*, 1897. The image was delineated by Charles E. Faxon. **1**. A branch with staminate flowers, natural size. **2**. An involucre of a staminate flower, enlarged. **3**. Diagram of a staminate flower involucre. **4**. An anther, front view, enlarged. **5**. An anther, side view, enlarged. **6**. An end of a branch with pistillate flowers, natural size. **7**. A scale of a pistillate flower, lower side, with its bract, enlarged. **8**. A scale of a pistillate flower, upper side, with its ovules, enlarged. **9**. A cone, one year old, natural size. **10**. Tip of a leaf, enlarged. **11**. Cross section of a leaf, greatly magnified. **12**. A seedling plant, natural size. **13**. A winter branch-bud, natural size.

Pinus jeffreyi. This plate combines features of plates 562 and 563 that were published in volume 11 of Charles Sprague Sargent's *The Silva of North America*, 1897. The images were delineated by Charles E. Faxon. **1**. A cone, natural size. **2**. A seed. **3**. A cone scale, side view, natural size. **4**. A cone scale, under side, natural size. **5**. The end of a branch with staminate flowers, natural size. **6**. A scale of a pistillate flower, lower side, enlarged. **7**. An end of branch with pistillate flowers, natural size. **8**. A scale of a pistillate flower, upper side, with its ovules, enlarged. **9**. Tip of a leaf, enlarged. **10**. A vertical section of a seed, enlarged. **11**. An embryo, enlarged.

Pinus ponderosa. Plate one. This is plate 561 from volume 11 of Charles Sprague Sargent's *The Silva of North America*, 1897. The image was delineated by Charles E. Faxon. **1**. A branch with cones. **2**. A seed. **3**. Vertical section of seed, enlarged. **4**. An embryo, enlarged. **5**. A cluster of leaves, natural size.

Pinus ponderosa. Plate two. This is plate 560 from volume 11 of Charles Sprague Sargent's *The Silva of North America*, 1897. The image was delineated by Charles E. Faxon. **1**. An end of a branch with staminate flowers, natural size. **2**. Portion of a staminate flower, enlarged. **3**. Diagram of the involucre of staminate flowers. **4**. An anther, front view, enlarged. **5**. An anther, side view, enlarged. **6**. An end of a branch with pistillate flowers, natural size. **7**. A pistillate flower, enlarged. **8**. A scale of a pistillate flower, under side, with its bract, enlarged. **9**. A scale of a pistillate flower, upper side, with its ovules, enlarged. **10**. Tip of a leaf, enlarged. **11**. Cross section of a leaf, greatly magnified. **12**. A seedling plant, natural size.

Pinus ponderosa. Plate three. A large *Pinus ponderosa* tree in Yosemite Valley as illustrated in volume one of *The Garden*, 1872.

Piperia elongata. With the exception of the photographic illustration of this species, this is entirely the work of Jeanne Janish; it was published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Piperia leptopetala. The front view and back view images of a flower were included in Per Axel Rydberg's "The American Species of *Limnorchis* and *Piperia* North of Mexico," which was published in volume 28 (part 11) of the *Bulletin of the Torrey Botanical Club*, 1901 (this species was first named and described in this text). The illustration of an inflorescence was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Piperia transversa. The illustration of a flower was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The photographic images of flowers are snips from photographs that Keir Morse uploaded to the CalPhotos: Plants website; the one of a flower is © 2016, and the one of part of an inflorescence is © 2008.

Piperia unalascensis. The main illustration, and the dissected flower image in the lower left, were delineated by Ludweg Reichenbach and published in volume 13-14 of his *Icones Florae Germanica et Helveticae*, 1851. The illustrations of flowers were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The photographic images of flowers

are snips from a photograph that was uploaded to the CalPhotos: Plants website; it is © 2017 by Timothy Boomer.

Plagiobothrys canescens. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Steve Matson.

Plagiobothrys nothofulvus. The main illustration was drawn by Margaret Buck and published in Mary Parsons' *The Wild Flowers of California*, 1897. The image of a flower and an inflorescence to the right, and a front and back view of a nutlet at the bottom, were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The images of fruiting calyces are from Helen Sharsmith's *Spring Wildflowers of the San Francisco Bay Region*, 1965. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper left is © 2016 by Steve Matson, and the other one is © 2012 by Gary McDonald.

Plagiobothrys tenellus. This illustration was drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Plagiobothrys trachycarpus. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Neal Kramer.

Plantago erecta. The main illustration, and the detail of a flower in the upper left, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The detail of a seed was drawn by Jeanne Janish and published in volume four of Roxana Ferris' *Illustrated Flora of the Pacific States*, 1960. The flower detail in the lower right is from Philip Munz' *California Spring Wildflowers*, 1961. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Steve Matson.

Plantago lanceolata. This illustration was delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Platanus racemosa. Plate one. This plate was delineated by Charles E. Faxon and published in volume seven of Charles Sprague Sargent's *The Silva of North America*, 1895. The numbered details are as follows: **1**. A flowering branch, natural size. **2**. A stamen, enlarged. **3**. A pistil, enlarged. **4**. A fruiting branch, natural size. **5**. A vertical section of an akene, enlarged. **6**. An embryo, enlarged. **7**. A leaf, natural size. **8**. A winter branchlet, natural size.

Platanus racemosa. Plate two. The main illustration is a much reduced photocopy image of a leaf that I collected in the developed area of Tassajara. The details are from Willis Linn Jepson's *The Trees of California*, 1909. The details in the upper left are of a fruiting branchlet, a pistil (left) and a stamen (right). The details in the lower left are of a staminate catkin (left) and a pistillate catkin (right).

Platanus racemosa. Plate three. This is a scan of the fold out illustration of this species that was published in the first edition of George Sudworth's *Forest Trees of the Pacific Slope*, 1908 (in the Dover Publications reproduction of this work [1967] , the image is much reduced and printed on regular page). The illustration of a leaf in the upper left is from Howard McMinn's *An Illustrated Manual of Pacific Coast Trees*, 1937. The photographic image of bark is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Neal Kramer.

Plectritis ciliosa. The habit of growth illustration, and the details of a flower in the upper left and two views of a fruit in the center right, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The illustration of a flower in the upper right, and the two views of a fruit in the lower right, were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper most one is © 2015 by Debra L. Cook, and the other one is © 2009 by Keir Morse.

Plectritis congesta subsp. ***brachystemon***. The chromolithographic illustration is from volume 11 of Benjamin Maund's *The Botanic Garden*, 1846. The habit of growth illustration, the flower illustration to the right, and the side view of a fruit illustration in the lower right, were published in teil 4 (4) of *Die Naturlichen Pflanzenfamilien*, 1897. The other details, of a flower and the front and back side views of a fruit, were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Plectritis macrocera. The habit of growth illustration, the front and back side views of a fruit, and the flower image that farthest to the right, were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The other illustrations, of a flower, and the side view of a fruit in the lower right, are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Poa annua. The central illustration is from band one of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1907. The illustration of a plant at the bottom is from E. Korsmo's *Unkrauttaflen, Planches des Mauvaises Herbes*, 1924-1938. The illustration of a spikelet in the upper left is from Carl Lindman's *Bilder ur Nordens Flora*, 1901-1905. The illustrations of a floret and a spikelet on the right were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Poa bulbosa. The main illustration and the image of an inflorescence of subsp. *vivipara* are from Edward Lowe's *A*

Natural History of British Grasses, 1858. The illustration of a spikelet is from volume two of Nikolaus Host's *Icones et Descriptiones Graminum Austriacorum*, 1802. The illustration of a spikelet of subsp. *vivipara* is from band one of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1907.

Poa howellii. The main illustration, and the numbered details, were delineated by W. Scholl and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The details are: **1**. A floret. **2**. A spikelet. **3**. A mature grain. The illustration of a floret in the upper right was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Poa secunda. The main illustration and all of the details are from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935.

Polygala californica. This illustration is from the botany section of the *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. As the text for the botany section was written by John Torrey, the delineator of the plates was probably Issac Sprague, who illustrated a number of Torrey's texts. The explanation of the plate is as follows: A plant of the natural size. **1**. A flower laid open, enlarged. **2**. Sepals: **a**, the upper odd one; **b**, a lateral upper one; **c**, a wing. **3**. A corolla laid open, showing the stamens, magnified. **4**. An anther, considerably more enlarged. **5**. The pistil, magnified. **6**. A capsule divided longitudinally, showing the pendulous seeds, considerably magnified. **7**. A transverse section of the same. **8**. A seed, more highly magnified. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the blue one is © 2014 by Robert Sikora, the pinkish one is © 2011 by Ron Wolf, and the nearly white one is © 2016 by John Doyen.

Polypodium calirhiza. The color image to the left and the detail in the lower right were delineated by Alois Lunzer and published in series two, volume one, of Thomas Meehan's *The Native Flowers and Ferns of the United States*, 1880. The color image to the right and the drawing in the lower left were delineated by James H. Emerton and published in volume one of Daniel Cady Eaton's *The Ferns of North America*, 1879. The image of a *Polypodium* sporangium was delineated by Francis Bauer and published in Sir William Jackson Hooker's *Genera Filicum*, 1842. The details in the upper left and upper center were drawn by Linda Vorobik and published in volume 38 of *Madrono*, 1991.

Polypodium glycyrrhiza. The main illustration and the image in the upper left were delineated by Alois Lunzer and published in series two, volume one, of Thomas Meehan's *The Native Flowers and Ferns of the United States*, 1880. The details in the upper right, lower left and lower right were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Polypogon interruptus. The upper panicle illustrations and the spikelet and floret details were delineated by Pierre Turpin and published in volume one of Humboldt, Bonpland and Kunth's *Nova Genera et Species Plantarum*, 1816. The lower illustration and details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Polypogon monspeliensis. The main illustration and the details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The photographic image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Polypogon viridis. The main illustration and the details were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The chromolithographic illustration of a panicle was delineated by Ludweg Reichenbach and published in the second (color) edition of volume one of his *Icones Florae Germanica et Helveticae*, 1850.

Polystichum imbricans subsp. ***curtum***. The main illustration is a scan of a frond that was made as soon after I collected it. The illustrations of the habit of growth and a pinnule were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969; these illustrations actually represent features of *Polystichum munitum*, which is nearly identical to *P. imbricans* subsp. *curtum* (the later was originally considered to be a variety of the former; note the lack of scales on the anywhere on the stem).

Polystichum imbricans subsp. ***imbricans***. The color illustration is a scan of a frond that was made soon after I collected it. The black and white illustrations were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The lower color image is a reduction of an illustration of a similar looking *Polystichum* species (in regards to habit of growth) that was published in *Das Pflanzenleben des Schwarzwaldes* by Friedrich Oltsmanns, 1922.

Populus fremontii. Plate one. This lithographic plate was delineated by Charles E. Faxon and published in volume nine of Charles S. Sargent's *The Silva of North America*, 1896. The explanation of the plate is as follows: **1**. A flowering branch of a staminate tree, natural size. **2**. A staminate flower with its scale, enlarged. **3**. A flowering branch of a pistillate tree, natural size. **4**. A pistillate flower, enlarged. **5**. A fruiting branch, natural size. **6**. A winter branch, natural size.

Populus fremontii. Plate two. The illustration in the upper center of leaves and a fruiting catkin was published in George Sudworth's *Forest Trees of the Pacific Slope*, 1908. The illustrations of a leaf and of winter stems (to the left and to the right), showing opening buds and unfolding leaves, were published in Willis Linn Jepson's *The Trees of California*, 1909. The illustration of opening fruits and a seed in the upper left, a group of pistillate flowers in the upper right, and a group of staminate flowers in the lower right, were published in Philip Munz' *A California Flora*, 1959.

Populus trichocarpa. Plate one. This lithographic plate was delineated by Charles E. Faxon and published in volume nine of Charles S. Sargent's *The Silva of North America*, 1896. The explanation of the plate is as follows: **1**. A flowering branch of a staminate tree, natural size. **2**. A staminate flower with its scale, enlarged. **3**. A flowering branch of a pistillate tree, natural size. **4**. A pistillate flower, enlarged. **5**. A fruiting branch, natural size. **6**. A fruit with opening valves, enlarged. **7**. A portion of a branch with a

petiole and stipules, enlarged. **8**. A winter branch, natural size.

Populus trichocarpa. Plate two. The upper illustrations, of a pistillate inflorescence, a pistillate flower and its scale (1), and a detached scale (2), were delineated and sculpted by Walter Hood Fitch and published in volume nine of Sir William Jackson Hooker's *Icones Plantarum*, 1852. The lower illustrations, of typical leaves and the leaf of a vigorous shoot, were published in George Sudworth's *Forest Trees of the Pacific Slope*, 1908. The illustration of pistillate flower in the lower center was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The illustration of a staminate flower in the lower left was published in volume nine of Charles S. Sargent's *The Silva of North America*, 1896.

Primula clevelandii var. ***gracilis***. The illustration of a leaf rosette is from Jim Harter's *The Plant Kingdom Compendium* (1984), which consists of a collection of Victorian era plant illustrations, the original sources of which are not stated. Because the image of the inflorescence of "Dodecatheon clevelandii, Giant American Cowslip," erroneously depicted the flowers as having round anthers that were on long and spreading filaments, I substituted this part of the illustration with the appropriate image from Philip Munz' *A Manual of Southern California Botany*, 1935. The illustration of a pistil and its surrounding ring of stamens is from John Ingram's "Notes on the Cultivated *Primulaceae*, part 2, *Dodecatheon*," which was published in volume 11 (3) of *Baileya, A Journal of Horticultural Taxonomy*, 1963. The illustration of a seed capsule was published in heft 22 (IV-237, *Primulaceae*) of *Das Pflanzenreich*, 1905. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the mostly pink flowered one is © 2009 by Keir Morse, and the mostly white flowered one is © 2015 by Irene Lindsey.

Primula hendersonii. The main illustration was drawn by Margaret Buck and published in Mary Parsons' *The Wild Flowers of California*, 1897. The illustrations of a seed capsule and a fruiting inflorescence were drawn by Jeanne Janish, the former in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951, and the latter in Roxana Ferris' *Flowers of Point Reyes National Seashore*, 1970. The illustration of a pistil and its surrounding ring of stamens is from John Ingram's "Notes on the Cultivated *Primulaceae*, part 2, *Dodecatheon*," which was published in volume 11 (3) of *Baileya, A Journal of Horticultural Taxonomy*, 1963. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the mostly pink flowered one is © 2009 by Barry Rice, and the white flowered one is © 2015 by Debra L. Cook.

Prosartes hookeri. This illustration was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The photographic images of a flower and a fruit are snips from photographs that were uploaded to the CalPhotos: Plants website; both are © 2015 by John Doyen.

Prunus emarginata. This lithographic plate was delineated by Charles E. Faxon and published in volume 4 of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. Vertical section of a flower, enlarged. **3**. A fruiting branch, natural size. **4**. Vertical section of a fruit, enlarged. **5**. A stone, enlarged. **6**. Part of a leafy branch showing stipules, natural size. **7**. A winter branchlet, natural size. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2014 by Julie Keirstead Nelson, and the one of a fruit is © 2007 by Neal Kramer.

Prunus ilicifolia. This lithographic plate was delineated by Charles E. Faxon and published in volume 4 of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. Vertical section of a flower just expanded, enlarged. **3**. A fruiting branch, natural size. **4**. Vertical section of a fruit, natural size. **5**. A stone, enlarged. **6**. An embryo, enlarged. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2018 by Margo Bors, the one of fruit to the left is © 2002 by Charles E. Jones, and the one of a darker fruit to the right is © 2016 by Zoya Akulova.

Prunus virginiana var. ***demissa***. This lithographic plate was delineated by Charles E. Faxon and published in volume 4 of Charles S. Sargent's *The Silva of North America*, 1892. The explanation of the plate is as follows: **1**. A flowering branch, natural size. **2**. Vertical section of a flower, enlarged. **3**. A fruiting branch, natural size. **4**. Vertical section of a fruit, enlarged. **5**. A stone, enlarged. **6**. Part of a leafy branch showing stipules, natural size. **7**. A winter branchlet, natural size. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2013 by Neal Kramer, the one of red fruits is © 2008 by Louis M. Landry, and the one of a black fruit is © 2007 by Mary Winter.

Pseudognaphalium beneolens. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Debra L. Cook.

Pseudognaphalium biolettii. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Steve Matson; © 2006 by Steve Matson. The photographic image of a stem is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Debra L. Cook.

Pseudognaphalium californicum. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a group of closed flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Robert Sikora; © 2014 by Robert Sikora. The photographic image of a group of open flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Pseudognaphalium luteoalbum. The chromolithographic images were delineated by Ludweg Reichenbach and pub-

lished in volume 16 of his *Icones Florae Germanica et Helveticae*, 1854. The enlarged detail of a group of flower heads was delineated by Albert G. Dietrich and published in volume 11 of his *Flora Regni Borussici*, 1843. The photographic image of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by John Doyen.

Pseudognaphalium microcephalum. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 1995 by Saint Mary's College of California.

Pseudognaphalium stramineum. This illustration was drawn by Wanda Coover and published in *Weeds of California* (Robbins et al), which was issued by the California State Board of Agriculture in 1951. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Psilocarphus tenellus. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a group of flower heads is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Pteridium aquilinum var. ***pubescens***. The main illustration is a scan of a shady habitat frond that was made soon after I collected it; the image was then reduced in order to make it fit within the plate. The image of a frond in the upper left and the enlargement of a lower (sorus producing) section of a blade in the lower left were drawn by Ethel H. Hyde and published in *Weeds of California*, which was issued by the California State Board of Agriculture in 1951. The color images in the upper right were delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The images in the lower right were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The image of a portion of a rhizome and lower stipe in the lower center is from *Range Plant Handbook*, which was issued by U. S. Forest Service in 1937.

Pterostegia drymarioides. The habit of growth illustration and the flower and fruit details above it were published in teil 3 (1) of *Die Naturlichen Pflanzenfamilien*, 1893. The three details in the far right were delineated by Sir William Jackson Hooker and published in *The Botany of Captain Beechey's Voyage*, by Sir William Jackson Hooker and Walker Arnott, 1841. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by John Doyen.

Quercus agrifolia. Plate one. This plate was delineated by Charles E. Faxon and published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895. The numbered details are: **1**. A flowering branch, natural size. **2**. A staminate flower, enlarged. **3**. A pistillate flower, enlarged. **4**. A spike of maturing pistillate flowers, natural size. **5**. A fruiting branch, natural size. **6**. End of a sterile branch, natural size. 7. End of a sterile branch, natural size. **8**. A fruit, natural size. **9**. An axillary winter bud, enlarged.

Quercus agrifolia. Plate two. The illustration in the lower left is from Captain Lorenzo Sitgreaves' *Report of an Expedition Down the Zuni and Colorado Rivers*, 1853. The plants described in the botanical section of this text, which was by John Torrey, included plants that were collected along the entire route, which ended at San Diego. The specimen of *Q. agrifolia* was collected at Santa Ysabel, which was a submission of Mission of San Diego. Torrey thought that this specimen represented a new species (which he named *Q. oxyadenia*), for he assumed that *Q. agrifolia* had very small and short acorns; his assumption was based on earliest illustration of this species (in volume four of Sir William Jackson Hooker's *Icones Plantarum*, 1841), which depicts a specimen with immature acorns. A snip from Hooker's illustration, showing the immature acorns, is in the lower left. The illustrations in the upper left and in the lower right are from George B. Sudworth's *Forest Trees of the Pacific Slope*, 1908.

Quercus berberidifolia. The main illustration was delineated by Charles E. Faxon and published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895. Sargent thought that all the shrubby oaks of California were variants of *Q. dumosa*, and this illustration is from one of the two plates in this text that illustrate the varying forms. The acorn and leaf details were drawn by John Myers and published in volume three of *Flora of North America*, 1997.

Quercus chrysolepis. Plate one. This a combination of illustrations from the three nearly full page illustration of this species in George B. Sudworth's *Forest Trees of the Pacific Slope*, 1908 (the illustrators were not credited for their excellent work), and the two plates of this species that were published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895; they were delineated by C. F. Faxon..

Quercus chrysolepis. Plate two. This plate is a combination of illustrations from the two plates of this species that were delineated by Charles E. Faxon, and published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895. The numbered details are: **1**. A flowering branch, natural size. **2**. A fruiting branch, natural size. **3**. An axillary winter bud, enlarged. **4**. A staminate flower, enlarged. **5**. A pistillate flower, enlarged. **6**. A winter bud, natural size. **7**. Three fruits, natural size, showing the wide range in their sizes.

Quercus chrysolepis. Plate three. This a combination of illustrations from the three nearly full page illustration of this species from George B. Sudworth's *Forest Trees of the Pacific Slope*, 1908 (the illustrators were not credited for their excellent work),

Quercus douglasii. Plate one. This plate was delineated by Charles E. Faxon and published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895. The numbered details are: **1**. A flowering branch, natural size. **2**. A staminate flower, enlarged. **3**. A pistillate flower, enlarged. **4**. A fruiting branch, natural size. **5**. A fruiting branch, natural size. **6**. A fruit, natural size. **7**. A fruit, natural size. **8**. A leaf, natural size. **9**. A leaf, natural size. **10**. A winter branchlet, natural size.

Quercus douglasii. Plate two. This plate combines details

from two nearly full page illustrations of this species that were published in George B. Sudworth's *Forest Trees of the Pacific Slope*, 1908 (the illustrators were not credited for their work). The photographic image of a leaf, showing its bluish hue, is a snip from a photograph that was uploaded to the CalPhotos: Plants website; it is © 2015 by Keir Morse.

Quercus kelloggii. Plate one. This plate was delineated by Charles E. Faxon and published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895. The numbered details were described as follows: **1**. A flowering branch, natural size. **2**. A staminate flower, enlarged. **3**. A pistillate flower, enlarged. **4**. A fruiting branch, natural size. **5**. A fruit, natural size. **6**. A winter branchlet, natural size.

Quercus kelloggii. Plate two. This plate is a combination of the three illustrations of leaves of this species that were published in George B. Sudworth's *Forest Trees of the Pacific Slope*, 1908.

Quercus lobata. Plate one. This plate was delineated by Charles E. Faxon and published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895. The numbered details were described as follows: **1**. A flowering branch, natural size. **2**. A staminate flower, enlarged. **3**. A pistillate flower, enlarged. **4**. A fruiting branch, natural size. **5**. A fruiting branch, natural size. **6**. A fruit, natural size. **7**. A cup scale, enlarged. **8**. Upper surface of a portion of a mature leaf showing the stellate pubescence, enlarged. **9**. A winter bud, enlarged

Quercus lobata. Plate two. The watercolor illustration, which is the work of Eugene Murman, was published in P. Victor Peterson's *Native Trees of Southern California*, 1966. According to the Online Archive of California website, the copyright of this image passed into the public domain in 2012. The lower illustration was published in George B. Sudworth's *Forest Trees of the Pacific Slope*, 1908.

Quercus parvula var. ***shrevei***. The color illustrations are scans of the front and back views of leaf that I collected in the Santa Cruz Mountains, where, based on the large number of herbarium specimens from this region that are listed on the Consortium of California Herbaria website, this taxon appears to be locally common.

Quercus wislizenii var. ***frutescens***. The main illustration was drawn by Aida Montier and published in Arthur W. Sampson and Beryl S. Jespersen's *California Range Brushlands and Browse Plants*, 1963. The variations in leaf shapes details were published in Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939.

Quercus wislizenii var. ***wislizenii***. The illustrations in the upper left, and the staminate and pistillate flower details at the bottom of the page, were delineated by Charles E. Faxon and published in volume eight of Charles Sprague Sargent's *The Silva of North America*, 1895.

Rafinesquia californica. The main illustration and the details of a flower and two fruits are from the *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. The text for the botany section was written by John Torrey, and the delineator of the plates was not mentioned, but they were probably the work of Issac Sprague, who illustrated a number of Torrey's texts. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by Keir Morse.

Ranunculus californicus. This illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Gary McDonald.

Ranunculus hebecarpus. The habit of growth illustration to the left, and the flower and fruit details, were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The illustration to the right is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic images are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Steve Matson.

Rhamnus ilicifolia. This lithographic plate was delineated by Charles E. Faxon and published in volume two of Charles S. Sargent's *The Silva of North America*, 1891. The explanation of the plate is as follows: **1**. A flowering branch of a staminate plant, natural size. **2**. A flowering branch of a pistillate plant, natural size. **3**. A staminate flower, enlarged. **4**. Vertical section of a staminate flower, enlarged. **5**. A pistillate flower, enlarged. **6**. Vertical section of a pistillate flower, enlarged. **7**. A fruiting branch, natural size. **8**. Cross section of a fruit, enlarged. **9**. A seed divided transversely, enlarged. **10**. An embryo, much magnified. **11**. Nutlet showing the dehiscence, enlarged. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2014 by Keir Morse, and the one of fruits is © 2013 by Neal Kramer.

Ribes amarum. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen. The photographic image of a fruit is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Neal Kramer.

Ribes divaricatum. The chromolithographic image was delineated by M. Hart and published in volume 16 of *Edwards Botanical Register*, 1829. The flower and fruit details are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer. The photographic image of fruits is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Ribes malvaceum. The chromolithographic image is from volume nine of *Annales de Flore et de Pomone*; *ou Journal des Jardins et des Champs*, 1841. The photographic image of a group of flowers in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by Charles E. Jones. The photographic image of a single flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Lynn Watson. The photographic image of fruits is also a snip from a photograph that was uploaded to the CalPhotos: Plants

website; © 2007 by Ricky Grubb. The photographic image of part of an inflorescence in the lower left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Barry Breckling.

Ribes roezlii. The chromolithographic portion of this plate, and the enlarged flower details to the right, accompanied the first description of this species in volume 28 of *Gartenflora*, 1879. The illustrator was not credited for their work. The illustration of fruits was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic images of a flower and a fruit to the left are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2007 and 2015 by Neal Kramer. The photographic image of a flower to the right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Timothy Boomer.

Ribes sericeum. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Robert Hotaling.

Rigiopappus leptocladus. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic images of a top view and a side view of a flower head are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Rosa californica. The chromolithographic illustration was delineated by Alfred Parsons and published in volume one of Ellen Willmott's *The Genus Rosa*, 1911. The images in the upper right and lower right were drawn by Aida Montier and published in Arthur Sampson and Beryl Jespersen's *California Range Brushlands and Browse Plants*, 1963. The drawing of a leaf in the lower left is from volume one of Camillo Karl Schneider's *Illustriertes Handbuch der Laubholzkunde*, 1905. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower in the upper left is © 2012 by Jason Matthias Mills, the one of a dark pink flower on the right is © 2014 by John Doyen, the one of a light pink flower is © 2009 by Keir Morse, and the one of a fruit is © 2017 by Neal Kramer.

Rosa gymnocarpa. The chromolithographic illustration was delineated by Alfred Parsons and published in volume one of Ellen Willmott's *The Genus Rosa*, 1911. The image in the lower right, and the details of a petal in the upper left, and of a vertical cross section of a flower, a stamen and a pistil in the lower left, were published in the *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. As the text for the botany section was written by John Torrey, the delineator of the plate was probably Issac Sprague, who illustrated a number of Torrey's texts. The photographic image of a flower is a snip from a photograph that I took in the Oakland Hills in 2016.

Rubus armeniacus. The upper illustration was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The lower illustration is posted on the Wikimedia Commons webpage for this species; it is said to be from the Danish State Archives. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a white flower is © 2008 by Thomas Stoughton, the one of a pink flower is © 2011 by Zoya Akulova, and the fruit images are from a photograph that is © 2011 by Robert A. Hamilton.

Rubus parviflorus, plate one. The chromolithographic image was delineated by John Lindley and published in volume 16 of *Edwards Botanical Register*, 1830. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper left is © 2017 by John Doyen, the other three are © 2012 by Zoya Akulova.

Rubus parviflorus, plate two. This illustration is from volume five of *Gentes Herbarum*, 1945. The photographic image of fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Keir Morse. The photographic illustration in the lower left, of the lower side of a detached fruit, was taken by the author. The illustration of a fruit in the lower right is from the Jepson E-Flora web page for this species.

Rubus ursinus. Most of this plate was delineated by Sir William Jackson Hooker and published in volume two of his *Flora Boreali Americana*, 1840. The details of a fruit in the upper left, a three lobed terminal leaf in the lower left, a part of a stem in the lower center, and a pistillate flower in the lower right, were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The image of a staminate flower in the lower center is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a pistillate flower on the left is © 2008 by Gary McDonald, the one of a staminate flower in the lower right is © 2007 by Neal Kramer, and the one of a fruit is © 2013 by Zoya Akulova.

Rumex acetosella. The main illustration is from the *Geigy Weed Tables*, 1968-1975. The flower and fruit details are from 3 band, 1 teil, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1909.

Rumex conglomeratus. The main illustration and most of the flower and fruit details were delineated by Ludweg Reichenbach and published in volume four of his *Iconographia Botanica seu Plantae Criticae*, 1826. The color illustration of a fruiting stem is from volume three of *Svensk Botanik*, 1807. The details of a fruit in the upper center, and a lower leaf in the lower right, were drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964.

Rumex crispus. The chromolithographic illustration of an inflorescence is from volume seven of *Flora Batava* (Kops et al), 1836. The color illustration of a lower leaf is from 3 band, 1 teil, of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1909. The fruit details were delineated by Ludweg Reichenbach and published in volume six of his *Iconographia Botanica seu Plantae Criticae*, 1828.

Rumex salicifolius. The main illustration and most of the details have been adapted from a full page illustration that

was published in Herbert Mason's *A Flora of the Marshes of California*, 1957. The photographic images of fruits are snips from photographs that were uploaded to the CalPhotos: Plants website; the one to the left is © 2009 by Zoya Akulova, and the one to the right is © 2018 by John Doyen.

Rupertia physodes. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of flowers to the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer. The photographic image of flowers in the upper right is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Salix exigua. This illustrations of part of a staminate plant (to the left) and part of a pistillate plant (to the right), were drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The remainder of the flower and fruit illustrations were delineated by Charles E. Faxon and published in volume nine of Charles S. Sargent's *The Silva of North America*, 1896. The illustration of leaves was published in the first edition of *The Jepson Manual, Higher Plants of California*, 1993.

Salix laevigata. Plate one. The illustration of leaves and a pistillate catkin were published in George Sudworth's *Forest Trees of the Pacific Slope*, 1908. The illustrations of budding leaves (to the right) and staminate and pistillate flowers (in the lower right) were published in volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923.

Salix laevigata. Plate two. This lithographic plate was delineated by Charles E. Faxon and published in volume nine of Charles S. Sargent's *The Silva of North America*, 1896. The explanation of the plate is as follows: **1**. A flowering branch of a staminate tree, natural size. **2**. A staminate flower with its scale, front view, enlarged. **3**. A flowering branch of a pistillate tree, natural size. **4**. A pistillate flower with its scale, front view, enlarged. **5**. A fruiting branch, natural size. **6**. A capsule, enlarged. **7**. A winter branch, natural size. **8**. A bud, enlarged.

Salix lasiolepis. Plate one. The illustration of leaves was published in George Sudworth's *Forest Trees of the Pacific Slope*, 1908. The illustration of a pistillate flower was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The illustration of a staminate flower was published in volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923.

Salix lasiolepis. Plate two. This lithographic plate was delineated by Charles E. Faxon and published in volume nine of Charles S. Sargent's *The Silva of North America*, 1896. The explanation of the plate is as follows: **1**. A flowering branch of a staminate plant, natural size. **2**. A staminate flower with its scale, enlarged. **3**. A flowering branch of a pistillate plant, natural size. **4**. A pistillate flower with its scale, enlarged. **5**. A fruiting branch, natural size. **6**. A capsule, enlarged. **7**. A summer branch, natural size. **8**. A winter branch, natural size.

Salix melanopsis. This lithographic plate was delineated by Charles E. Faxon and published in volume nine of Charles S. Sargent's *The Silva of North America*, 1896. The explanation of the plate is as follows: **1**. A flowering branch of a staminate plant, natural size. **2**. A staminate flower with its scale, enlarged. **3**. A flowering branch of a pistillate plant, natural size. **4**. A pistillate flower with its scale, enlarged. **5**. A fruiting branch, natural size. **6**. A capsule, enlarged.

Saltugilia splendens. The chromolithographic illustrations, and the detail of a corolla laid open, were delineated by Sarah Ann Drake and published in volume 22 of *Edwards Botanical Register*, 1836. The illustrations of the lower and upper portions of a plant in the lower left were drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; both are © 2005 by Michael Charters.

Salvia columbariae. The main illustration, and the two enlarged flower details at the top, were delineated by A. Barnard and published in volume 107 of *Curtis' Botanical Magazine*, 1881. The detail of a much lobed leaf is from Mary Parsons' *The Wild Flowers of California*, 1897, and the other detail of a leaf is from volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website. In clock wise order they are copyrighted as follows: © 2010 by Neal Kramer; © 2009 by Keir Morse; © 2012 by Neal Kramer; © 2010 by Dee E. Warenyeia; © 2010 by Steve Matson; © 2016 by Aaron Arthur.

Salvia mellifera. The main illustration was drawn by Jeanne Janish and published in Philip Munz' *Shore Wildflowers of California, Oregon and Washington*, 1964. The detail of a flower was also drawn by Jeanne Janish, but it was published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a pale lavender flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Steve Matson. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Thomas Stoughton. The photographic image of a light blue flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Salvia sonomensis. The upper illustration and flower detail were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The habit of growth illustration was drawn by Alexander Chudom and published in Carl Epling's "The Californian *Salvias*," *Annals of the Missouri Botanical Garden* v. 25, 1938. The photographic image of a flower in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Debra L. Cook. The photographic image of a flower in the mid lower right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Steve Matson. The photographic image of a blue flower in the lower right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by George W. Hartwell.

Salvia spathacea. The main illustration and the two flower details were published in *Report on the United States and Mexican Boundary Survey, made under the direction of the*

Secretary of the Interior, by William H. Emory, 1858. As text for the botany section of this work was written by John Torrey, the delineator of the plates was probably Issac Sprague, who illustrated a number of Torrey's texts. The photographic image of a flower in the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson. The photographic image of flowers to the right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Debra L. Cook.

Sambucus nigra. Plate one. *Sambucus nigra* subsp. *nigra*. The illustrations that are marked by letters were delineated and sculpted by C. F. Schmidt and published in volume one of O. C. Berg and C. F. Schmidt's *Atlas der Officinellen Pflanzen*, 1893. **A**. A flowering stem. **B**. A front view of a flower. **C**. A back view of a flower. **D**. A cross section of a fruit. The illustrations that are marked by numbers were delineated by Otto Thome and published in volume 4 of his *Flora von Deutschland Osterreich und der Schweiz*, 1889. **1**. A side view of a flower. **2**. A front view of a stamen. **3**. A back view of a stamen. **4**. A budding flower. **5**. Two flowers with the petals removed. **6**. A group of mature fruits. **7**. An ovary. **8**. A pistil. **9**. Nutlets, the one to the left enlarged.

Sambucus nigra. Plate two. *Sambucus nigra* subsp. *caerulea*. This lithographic plate was delineated by Charles E. Faxon and published in volume five of Charles Sprague Sargent's *The Silva of North America*, 1893. The numbered features are as follows: **1**. A flowering stem, natural size. **2**. A fruiting stem, natural size. **3**. A winter stem, natural size. **4**. A corolla laid open, with stamens, enlarged. **5**. A flower with the corolla and stamens removed, enlarged. **6**. A vertical section of a flower with the corolla and stamens removed, enlarged. 7. A vertical section of a flower, enlarged. **8**. A stamen. **9**. A cross section of a three seeded fruit, enlarged. **10**. A vertical section of a fruit, enlarged. **11**. A nutlet, enlarged. **12**. A vertical section of a nutlet, enlarged. **13**. An embryo, much enlarged. **14**. An ovule, much enlarged. **15**. A four seeded fruit, divided transversely, enlarged. The photographic illustration of a group of fruits is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by George W. Hartwell. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one in the upper left is © 2016 by John Doyen, and the one in the upper right is © 2012 by Neal Kramer.

Sanicula bipinnata. The main illustration is from heft 61 (IV-228, *Umbelliferae*) of Das *Pflanzenreich*, 1913. Most of the details were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The detail of a leaf in the lower right is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a secondary flowering umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012, Aaron Arthur.

Sanicula crassicaulis. This illustration is an adaptation of a plate that was delineated by Dr. Robert K. Greville and published in volume one of Sir William Jackson Hooker's *Flora Boreali Americana*, 1833.

Sanicula graveolens. This illustration combines features of the Jeanne Janish drawings of this species that were published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951, and in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a secondary flowering umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004, Steve Matson.

Sanicula laciniata. Most of this illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a secondary flowering umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2018 by John Doyen.

Sanicula tuberosa. The main illustration is from heft 61 (IV-228, *Umbelliferae*) of *Das Pflanzenreich*, 1913. The photographic image of a secondary flowering umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Steve Matson; © 2003 by Steve Matson. The photographic image of a secondary fruiting umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013, Steve Matson.

Scirpus microcarpus. This plate was drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957. The numbered details are: **1**. A spikelet. **2**. A young leaf sheath. **3**. An achene scale. **4**. A flower. **5**. A close up view of an inflorescence. **6**. An akene with its subtending bristles. **7**. A cross section of an achene.

Scrophularia californica. The illustration of an upper part of a plant was drawn by Margaret Buck and published in Mary Parsons' *The Wild Flowers of California*, 1897. The illustrations of a flower in the upper left and a fruit in the mid lower left were drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The illustration of fruits in the mid lower left and a leaf in the mid lower right were also drawn by Jeanne Janish, but these were published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The illustration of a vertical section of a flower is from volume nine of H. E. Baillon's *Histoire des Plantes*, 1887. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the red flowered one is © 2013 by Steven Thorsted, the pale and purple flowered ones are © 2016 by John Doyen, and the one showing leaves is © 2004 by Lynn Watson.

Scutellaria tuberosa. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The upper photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Dee E. Warenycia. The lower photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by John Doyen.

Sedum spathulifolium. The color illustration was published in volume 24 of *The Garden*, 1883. The illustration above it was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The drawing of a flower is from volume 21 of

Gartenflora, 1872. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Selaginella bigelovii. The habit of growth illustration was drawn by Rita Whitmore, and it was published in *Ferns and Fern Allies of California* by Steve Grillos, 1962. The enlarged details were drawn by Mr. W. S. Atkinson, and these were published in volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923.

Selaginella hansenii. The illustration was drawn by W. S. Atkinson, and it was published in volume one of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1923.

Senecio flaccidus var. douglasii. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Keir Morse; © 2008 by Keir Morse.

Senecio vulgaris. The main illustration was delineated by Albert G. Dietrich and published in volume 7 of his *Flora Regni Borussici*, 1839. The enlarged details were delineated by Otto Thome and published in volume four of his *Flora von Deutschland Osterreich und der Schweiz*, 1889.

Sidalcea hickmanii subsp. ***hickmanii***. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by CNPS San Luis Obispo Chapter.

Silene antirrhina. This illustration is from part two of volume 14 of Karl von Martius' *Flora Brasiliensis*, 1872. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by James M. Andre.

Silene gallica. The main illustration is from band three of Gustav Hegi's *Illustrierte Flora von Mittel Europa,* 1909. The photographic image of a pink flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a white flower is a snip from a photograph that was also uploaded to the CalPhotos: Plants website; © 2017 by John Doyen.

Silene laciniata subsp. ***californica***. The main illustration was delineated by Sarah Ann Drake and published in volume 17 of *Edwards Botanical Register*, 1831. The illustration on the left was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The detail of a flower in the upper left is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic images of flowers are snips from photographs that have been uploaded to the CalPhotos: Plants website. The one in the upper left is © 2009 by Barry Rice. In clock wise order, the other are © 2016 by John Doyen; © 2015 by Neal Kramer; © 2005 by Steve Matson; © 2015 by John Doyen.

Silene lemmonii. The main illustration is from Philip Munz' *A Manual of Southern California Botany*, 1935. The detail of a flower was published in Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson.

Silene verecunda. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a purple flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Neal Kramer. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse.

Sisymbrium altissimum. The main illustration was delineated by Ludweg Reichenbach and published in volume two of *his Icones Florae Germanica et Helveticae*, 1837-1838. The detail of a flower was published in volume 17 of *Flora Batava*, Kops et al, 1885.

Sisymbrium officinale. The illustration of an inflorescence and a basal leaf was delineated by James Sowerby and published in the various editions of *English Botany*; this being a reproduction from the third edition (John Boswell, ed.), 1877. The enlarged illustrations of a fruit and an opening fruit are from band 4 (teil1) of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1913. The flower and flower cluster details are from volume two of Amedee Masclef's *Atlas des Plantes de France*, 1893. The detail of mid stem leaf in the lower right is from vol. 2 of Ludweg Reichenbach's *Icones Florae Germanica et Helveticae*, 1837-38.

Sisyrinchium bellum. The main drawing is the work of Jeanne Janish; it was published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The rest of the non photographic illustrations actually represent the nearly identical *S. bermudiana*. The upper chromolithographic image, and the lower fruit images, were delineated by Pierre Joseph Redoute and published in volume three of his *Les Liliacees*, 1807. The detail of a fruit laid open is from M. B. Borckhausen's *Illustrato Systematis Sexualis Linnaei*, 1777. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the purple flowered one is © 2002 by Lynn Watson, the pinkish flowered one is © 2007 by Neal Kramer, and the white flowered one is © 2008 by Ron Wolf.

Solanum americanum. The lower and most of the upper part of this plate was delineated by A. L. Clement and published in volume 1910 of *Revue Horticole*, 1910 (the volume numbers of this journal correspond to the year in which they were published). The color illustrations of a cross section of a fruit, the front and side views of a seed, and of a stamen and pistil are from E. Korsmo's *Unkrauttaflen, Planches des Mauvaises Herbes*, 1924-1938. The image of a flower was drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Gary McDonald.

Solanum umbelliferum. The main illustration was drawn by Aida Montier and published in Arthur Sampson and Beryl Jespersen's *California Range Brushlands and Browse Plants*, 1963. The lower illustration of a leaf and flowers is from Willis Linn Jepson's *A Manual of the Flowering Plants of*

California, 1925. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2009 by Keir Morse, the one of a center of a flower is © 2005 by Brianna M. Richardson, and the one of a fruit is © 2017 by Margo Bors.

Solidago velutina subsp. ***californica***. Due to the inaptness of all of the illustrations of this taxon that I have seen, I have taken the liberty to illustrate this entity by combining illustrations of species that share morphological familiarities with this taxon. The illustration of an inflorescence, depicting that of the very similar *S. canadensis*, is from volume two of Edward Step's *Favorite Flowers of Garden and Greenhouse*, 1897. The image of obovate to oblanceolate lower leaves, which are typical of this taxon, are actually those of the very similar *S. virgaurea*; this illustration was delineated by Albert Dietrich and published in volume 12 of his *Flora Regni Borussici*, 1844.

Sonchus oleraceus. This chromolithographic illustration was published in volume one *Flora Londinensis* by William Curtis, 1777. The enlarged details are from E. Korsmo's *Unkrauttaflen, Planches des Mauvaises Herbes*, 1934-1938.

Stachys bullata. The main illustration and the detail of an open calyx and nutlets were drawn by Wanda Coover and published in *Weeds of California* (Robbins et al), which was issued by the California State Board of Agriculture in 1951. The details of an inflorescence, and of a front and side view of a flower, are from Philip Munz' *California Spring Wildflowers*, 1961. They were probably drawn by Steven Tillett, who was the principal illustrator for this text. The photographic image of a flower in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Lynn Watson. The photographic image of a flower to the right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson.

Stachys pycnantha. The main illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Neal Kramer. The photographic image of an inflorescence is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse.

Stachys rigida var. ***quercetorum***. The main illustration was drawn by Jeanne Janish and published in Gladys Smith's *Flowers and Ferns of Muir Woods*, 1963. The flower details were also drawn by Jeanne Janish, but these were published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Keir Morse. The photographic image of a pink flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Stebbinsoseris heterocarpa. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic images of a top view and a side view of a flower head are snips from photographs that were uploaded to the CalPhotos: Plants website; © 2015 by Richard Spellenberg.

Stellaria media. The main illustration is from the *Geigy Weed Tables, a synoptic presentation of the flora accompanying agricultural crops*, by Ernst Hafliger and Josef Brun-Hoot, 1968-1975. The details of a flower and a seed are from Carl Lindman's *Bilder ur Nordens Flora*, 1901-1905. The illustrations of a capsule and cross sections of capsules are from E. Korsmo's *Unkrauttaflen, Planches des Mauvaises Herbes*, 1934-1938. The detail depicting a cluster of seeds is from John Lindley's *The Vegetable Kingdom*, 1846.

Stellaria nitens. This illustration was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Keir Morse.

Stephanomeria elata. This illustration has been adapted from a silhouette image that was included in L. D. Gottlieb's "A Proposal for Classification of the Annual Species of Stephanomeria," *Madrono* 21, 1972. The image of an achene was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by James B. Gratiot.

Stephanomeria exigua subsp. ***coronaria***. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The enlarged details of an achene and a plumose pappus bristle are from a plate that was published in volume five (Botany by Serreno Watson et al) of *Report of the Geological Exploration of the Fortieth Parallel* by Clarence King, 1871. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Robert Sikora.

Stephanomeria virgata subsp. ***pleurocarpa***. The main illustration and the images of a flower head and an achene are from the first edition of *The Jepson Manual, Higher Plants of California*, 1993. The image of lower leaves was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States* by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Stipa cernua. The main illustration was published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The details of a very long awned floret and a much enlarged main body of a floret are from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935.

Stipa coronata. The main illustration and the floret and glumes details were delineated by W. Scholl and published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. Added to this plate is a figure of floret that is from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935.

Stipa lepida. The main illustration, and the numbered details, were published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered details are: **1**. Apex of floral

glume, greatly enlarged. **2**. A palea. **3**. A spikelet. **4**. Empty glumes. **5**. A floret.

Stipa pulchra. The main illustration is from George Vasey's *The Agricultural Grasses of the United States*, 1884. The details of empty glumes in the lower left and a spikelet in the lower right are from George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The image of a greatly enlarged main body of a floret is from Albert Hitchcock's *Manual of the Grasses of the United States*, 1935.

Streptanthus glandulosa. The main illustration was delineated by Sir William Jackson Hooker and published in volume one of his *Icones Plantarum*, 1837. It was in this text that the species was first named and described. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Streptanthus tortuosus. The main illustration was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The photographic image of a purple flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Keir Morse. The photographic image of a yellow flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Steve Matson.

Stylocline gnaphaloides. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The enlarged details are from a plate that was published in part five ("The Botany of the Expedition") of volume four of Reports of Explorations and Surveys, to Ascertain the most Practicable and Economical Route for a Railroad from Mississippi River to the Pacific Ocean, 1856. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Robert Steers/NPS.

Symphoricarpos albus var. ***laevigatus***. The color illustrations are from volume three of *Addisonia*, 1918. The drawings of a cross section of a flower (upper right) and a pair of leaves (lower left) are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The illustration of a flower laid open was drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959.

Symphoricarpos mollis. The main illustration is from Philip Munz' *A Manual of Southern California Botany*, 1935. The illustrations of a flower laid open and a spreading lower stem were drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The illustrations of cross section of a flower and a leafy inflorescence are from Howard McMinn's *An Illustrated Manual of California Shrubs*, 1939. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Gary McDonald. The photographic image of fruits is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Steve Matson.

Systenotheca vortriedei. The main illustration and the details are from volume five of *Flora of North America*, 1989. The photographic images are snips from photographs that were uploaded to the CalPhotos: Plants website; the one of a flower is © 2004 by Aaron Schusteff, and the one of the lower part of a plant is © 2014 by Chris Winchell.

Tauschia hartwegii. Most of this illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was credited as being the principal illustrator of this text. The image of a less densely flowered umbel in the upper left was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic image of a secondary flowering umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Tauschia kelloggii. Most of this illustration is an adaptation of a figure that was published in volume two of Willis Linn Jepson's *A Flora of California*, 1936. The photographic image of a secondary umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Thomas Reyes.

Tetrapteron graciliflorum. The main illustration and the image of a capsule to the left are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The illustration of a flower is from volume four of Sir William Jackson Hooker's *Icones Plantarum*, 1841. The illustration of a capsule in the upper right is from Peter Raven's *A Revision of the Genus Camissonia* (*Onagraceae*), *Contributions from the United States National Herbarium* volume 37 (part 5), 1969. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2997 by Neal Kramer.

Thalictrum fendleri var. ***polycarpum***. This illustration was drawn by Jeanne Janish and published in Philip Munz' *California Mountain Wildflowers*, 1963. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one is © 2009 by Keir Morse, and the lower one is © 2013 by Debra L. Cook.

Thermopsis californica. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of flowers in the upper right is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Matt Below.

Thysanocarpus curvipes subsp. ***curvipes***. This illustration was delineated by Sir William Jackson Hooker and published in volume one of his *Flora Boreali Americana*, 1833. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Thysanocarpus curvipes subsp. ***elegans***. Most of this illustration was delineated by Sir William Jackson Hooker and published in volume one of his *Icones Plantarum*, 1837. The drawing of basal leaves is the work of Jeanne Janish; it is from volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944.

Thysanocarpus laciniatus. This illustration was drawn by

Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The photographic image of a group of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Torilis arvensis. The primary color image and its background image were delineated by Albert G. Dietrich and published in volume 11 of his *Flora Regni Borussici*, 1843. The three images at the top, of a flowering umbel, a fruiting umbel and a flower, were delineated by Ludwig Reichenbach and published in volume 21 of his *Icones Florae Germanica et Helveticae*, 1867.

Toxicodendron diversilobum. Plate One. This lithographic plate was delineated by Sir William Jackson Hooker and published in volume one of his *Flora Boreali Americana*, 1833. The numbered details are: **1**. An outside view of a staminate flower. **2**. A view of the upper side of a staminate flower. **3**. A stamen. **4**. A petal. **5**. Disk from the bottom of the calyx of a staminate flower. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Michael Charters.

Toxicodendron diversilobum. Plate two. The color illustration is an adaptation of a plate that was delineated by Sarah Ann Drake and published in volume 31 of *Edwards Botanical Register*, 1845; the detail of a flower in the lower left is also from this plate. The image of a fruit in the lower left is from volume two of C. K. Schneider's *Illustriertes Handbuch de Laubholzkunde*, 1907. The images in the lower right, of a leafless winter stem with fruits and a winter stem bud, are from *Key to Important Woody plants of Eastern Oregon and Washington* by Doris W. Hayes and George A. Garrison, USDA Agriculture Handbook 148, 1960. The illustration of a leaf with broadly ovate leaflets with slightly lobed margins is from *Principal Poisonous Plants of the United States* by V. K. Chestnut, USDA Division of Botany Bulletin 20, 1898. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Gary McDonald. The photographic image of an autumnal leaf in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Toxicoscordion fremontii. The color illustration and the habit of growth detail in the background were delineated by Margaret Stones and published in volume 173 of *Curtis' Botanical Magazine*, 1960-1962. The details of the central part of a flower with the petals removed, a cross section of an ovary and a pistil are from volume five of *Refrugium Botanicum*, 1880. The drawing of a fruit is from Philip Munz' *A Manual of Southern California Botany*, 1935. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Neal Kramer.

Toxicoscordion venenosum. This illustration was drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Steve Matson.

Trichostema lanatum. The main illustration and the two flower details were published in *Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior*, by William H. Emory, 1858. As the text for the botany section of this work was written by John Torrey, the delineator of the plates was probably Issac Sprague, who illustrated a number of Torrey's texts. The illustration of a nutlet is from Philip Munz' *A California Flora*, 1959. The photographic image of a flower in the upper left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Steve Matson. The photographic image of a flower in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2002 by Lynn Watson. The photographic image of a group of flower buds is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2014 by John Doyen.

Trichostema lanceolatum. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by George W. Hartwell.

Trifolium albopurpureum. The main illustration and detail of a flower were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The details of a calyx and a variation in leaflet shape were also drawn by Jeanne Janish, but these were published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The upper photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Aaron Arthur. The lower photographic image of a flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Zoya Akulova.

Trifolium arvense. The main illustration was delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The photographic images of a flower head and of a flower are snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse.

Trifolium bifidum var. ***decipiens***. The illustration of the typical species was drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The illustration of a leaf of var. decipiens was also drawn by Jeanne Janish, but it was published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic images of an older flower head (with the flowers turning downward), and a younger flower heads (with the flowers erect), are snips from a photographs that were uploaded to the CalPhotos: Plants website; © 2008 (both) by Keir Morse.

Trifolium ciliolatum. The main illustration and the details of a much enlarged flower and a leaflet margin were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The remainder of the details were also drawn by Jeanne Janish, but these were published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The upper photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer. The middle photographic

image of a flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Zoya Akulova. The lower photographic image of an old flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Zoya Akulova.

Trifolium gracilentum. The main illustration the detail of a much enlarged flower were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The details of an involucre laid open and a flower were also drawn by Jeanne Janish, but these were published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The upper photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2006 by Doreen L. Smith. The middle photographic image of a flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Zoya Akulova. The lower photographic image of an old flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Jenifer Buck.

Trifolium microcephalum. The illustration for this species represents a combination of three illustrations that were drawn by Jeanne Janish. The main illustration and the detail of a flower to the right were published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The detail of a flower head in the upper left was published Roxana Ferris' *Flowers of Point Reyes National Seashore*, 1970. The remainder of the images were published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The upper photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2005 by Steve Matson. The lower photographic image of a flower head is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer.

Trifolium microdon. The main illustration and the details of a flower and a side view of an involucre are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. They were probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The details of a flattened involucre and a flower in the lower right were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The upper photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen. The lower photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse.

Trifolium obtusiflorum. The illustrations of the upper part of a plant and an involucre are from volume two of Willis Linn Jepson's *A Flora of California*, 1936. The illustrations of the lower part of a plant and a flower were drawn by Jeanne Janish and published in volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944. The upper photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Ron Wolf. The photographic image of flowers in the upper right is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Aaron Schusteff. The lower photographic images are also snips from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Debra L. Cook.

Trifolium oliganthum. The main illustration and details were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by Aaron Schusteff.

Trifolium variegatum var. ***geminiflorum***. The illustration of this taxon is from the first edition of *The Jepson Manual, Higher Plants of California*, 1993. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2017 by Debra L. Cook.

Trifolium variegatum var. ***major***. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Jean Pawek.

Trifolium variegatum var. ***variegatum***. The main illustration was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Trifolium willdenovii. The illustration for this species represents a combination of images that were drawn by Jeanne Janish, some were published volume two of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1944, and the others were published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Trifolium wormskioldii. The chromolithographic image and the details of flowers were delineated by John Lindley and published in volume 13 of *Edwards Botanical Register*, 1827. The lower lithographic image was delineated by A. Henry and published in part two of volume 14 of *Novorum Actorum Academiae Caesareae Leopoldino Carolinae Naturae Curiosorum*, 1829. The detail of an involucre was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The upper photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2007 by Neal Kramer. The lower photo-graphic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2013 by Vernon Smith.

Triodanis biflora. The main illustration is from volume two of Ruiz Lopez and Pavon's *Flora Peruviana et Chilensis*, 1802. The color illustration of flowers was delineated by Helen Sharp and published in her *Water Color Sketches of American Plants*, 1888-1910. The detail of a flower was drawn by Jeanne Janish and published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2011 by Aaron Schusteff.

Triphysaria eriantha. This illustration was drawn by Jeanne Janish and published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic images of flowers are snip from photographs that were uploaded to the CalPhotos: Plants website; both are © 2005 by Steve Matson.

Trisetum canescens. The main illustration and the numbered details were published in George Vasey's *Illustrations of North American Grasses* volume two, *Grasses of the Pacific Slope*, 1893. The numbered details are: **1**. A palea and internode, side view. **2**. A palea, dorsal view. **3**. Empty glumes. **4**. A spikelet, much enlarged. **5**. Floral glume, dorsal view. The remainder of the illustrations (the ones marked with a J) were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1969.

Triteleia ixioides. The main chromolithographic illustration and the flower detail in the lower left were delineated by Sarah Ann Drake and published in volume 19 of *Edwards Botanical Register*, 1833. The flower and bulb illustrations in the lower right were delineated by Walter Hood Fitch and published in volume 64 of *Curtis' Botanical Magazine*, 1837. The image of a more mature inflorescence in the upper right was published in volume 20 of *The Gardener's Chronicle*, 1896. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the one to the left is © 2015 by John Doyen, and the one to the right is © 2009 by Thomas Stoughton.

Turritis glabra. Most of the chromolithographic images of this species (which is native to the temperate regions of Eurasia and North America) are from volume two (fasc. 4) of William Curtis' *Flora Londinensis*, 1798. The chromolithographic image of an opening fruit is from volume two of Otto Thome's *Flora von Deutschland Osterreich und der Schweiz*, 1886. The detail of a pistil and stamens is from band 4 (teil 1) of Gustav Hegi's *Illustrierte Flora von Mittel Europa*, 1913. The details of an inside view of a fruit and seeds were delineated by Ludweg Reichenbach and published in volume two of his *Icones Florae Germanica et Helveticae*, 1837-1838. The image of merely toothed basal leaves was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964. The upper photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2004 by Thomas Stoughton. The lower photographic image of flowers is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2012 by Debra L. Cook.

Typha angustifolia. The chromolithographic illustration was delineated by Ludweg Reichenbach and published in volume nine of his *Icones Florae Germanica et Helveticae*, 1847. The flower details and the habit of growth illustration were drawn by Mary Barnas Pomeroy and published in Herbert Mason's *A Flora of the Marshes of California*, 1957.

Umbellularia californica. Plate one. The plate was delineated by Charles E. Faxon and published in volume 7 of Charles Sprague Sargent's *The Silva of North America*, 1895. The numbered illustrations are as follows: **1**. A flowering branch, natural size. **2**. Diagram of a flower. **3**. An umbel of flowers with expanding involucre, enlarged. **4**. A flower, enlarged. **5**. Vertical section of a flower, enlarged. **6**. A stamen of the first or second series, front view, enlarged. **7**. A stamen of the third series, front view, enlarged. **8**. A staminodium, enlarged. **9**. A pistil, enlarged. **10**. An ovule, much enlarged. **11**. A fruiting branch, natural size. **12**. A vertical section of a fruit, slightly enlarged. **13**. A seed, natural size.

Umbellularia californica. Plate two. The main illustration and the flower details were delineated Walter H. Fitch and published in volume 88 of *Curtis's Botanical Magazine*, 1862. The details are: **1**. A flower. **2**. A pistil. **3** & **4**. Stamens. The illustrations of fruits (to the left) and leaves (to the right) were published in George Sudworth's *Forest Trees of the Pacific Slope*, 1908. The photographic image of a flower umbel is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Joanna Clines.

Uropappus lindleyi. The main illustration is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. It was probably drawn by Joyce M. Saunders, who was the principal illustrator for this text. The reduced habit of growth image was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2015 by John Doyen.

Urtica dioica. This chromolithographic plate was delineated by Otto Thome and published in volume two of his *Flora von Deutschland Osterreich und der Schweiz*, 1886. **A**. Upper part of a male plant. **1**. Part of a staminate inflorescence, enlarged. **2**. A staminate flower, enlarged. **3**. Part of a pistillate inflorescence, enlarged. **4**. A pistillate flower, enlarged. **5**. A fruiting pistillate flower, enlarged. **6**. A vertical section of a fruit showing the seed, enlarged. **7**. Part of a stem showing prickly hairs and a larger stinging hair.

Urtica urens. The chromolithographic details are from band four of the second edition of J. Sturms' *Flora von Deutschland*, 1905. The habit of growth illustration was drawn by Jeanne Janish and published in part two of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1964.

Verbena lasiostachys. The chromolithographic image, and the details in the upper right (of a flower and its bract, a vertical section of a flower, and four nutlets), were delineated by Ludweg Reichenbach and published in volume one of his *Iconographia Botanica Exotica, sive Hortus Botanicus*, 1825. The details in the upper left and lower right were drawn by Jeanne Janish; the former was published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951, and the later was published in part four of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1959. The detail of a flower spike and a lower leaf is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The detail of a fruiting calyx in the lower left is from *Weeds of California* (Robbins et al), which was issued by the California State Board of Agriculture in 1951. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one to the left is © 2008 by Keir Morse, the upper one to the right is © 2016 by John Doyen, and the lower one is © 2014 by Debra L. Cook.

Veronica persica. This illustration was delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2010 by Ron Wolf.

Vicia americana. The color illustration is the work of Mary Vaux Walcott; it was published in volume three of her *North American Wild Flowers*, 1925. The illustration of a group of fruits is from a collection of drawings that were prepared for United States Forest Service publications (most of which were not published); these are accessible online via the Hunt Institute for Botanical Documentation website. The detail depicting a common variation in leaflet shape was drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The photographic image of a lavender flower to the left is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse. The photographic image of a purple and white flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Neal Kramer. The photographic image of a nearly white flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Steve Matson.

Vicia sativa. The main illustration was delineated by Carl Lindman and published in his *Bilder ur Nordens Flora*, 1901-1905. The upper photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2009 by Neal Kramer. The lower photographic image of a flower is also a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by John Doyen.

Vinca major. This image is a snip from a plate that was delineated by M. Alcalde and published in volume two of Martin de Argenta's *Album de la Flora Medico Farmaceutica*, 1863.

Viola ocellata. The watercolor painting, by F. Schuyler Matthews, was published in Viola Brainerd Baird's *Wild Violets of North America*, 1942. The habit of growth illustration in the lower right is from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The drawing of a leaf in the lower left is from volume four of *Garden and Forest*, 1891. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; the upper one to the right is © 2008 by Ron Wolf, and the rest are © 2015 by John Doyen.

Viola pedunculata. The chromolithographic image and the flower details were delineated and sculpted by Walter Hood Fitch and published in volume 83 of *Curtis' Botanical Magazine*, 1857. The habit of growth illustration and the illustrations of a capsule and a rupturing capsule in the lower left are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2003 by Michael Charters.

Viola purpurea subsp. ***mohavensis***. The drawings of leaf shape variations were published with Milo S. Bakers' "Studies in Western Violets VI," which was published in volume 10 of *Madrono*, 1949.

Viola purpurea subsp. ***purpurea***. The watercolor painting, by F. Schuyler Matthews, was published in Viola Brainerd Baird's *Wild Violets of North America*, 1942. The drawings of leaf shape variations were published with Milo S. Bakers' "Studies in Western Violets VI," which was published in volume 10 of *Madrono*, 1949. The details of a pistil and a cross section of a fruit are from Willis Linn Jepson's *A Manual of the Flowering Plants of California*, 1925. The photographic images of flowers are snips from photographs that were uploaded to the CalPhotos: Plants website; both are © 2012 by Gary A. Monroe.

Viola purpurea subsp. ***quercetorum***. The drawings of leaf shape variations were published with Milo S. Bakers' "Studies in Western Violets VI," which was published in volume 10 of *Madrono*, 1949.

Whipplea modesta. The main illustration and most of the details were published in part four (No. 4), "Descriptions of the General Botanical Collections" by John Torrey, of volume four of *Reports of Explorations and Surveys, to Ascertain the most Practicable and Economical Route for a Railroad from Mississippi River to the Pacific Ocean, Made under the Direction of the Secretary of War, in 1853-1854*, 1856. The delineator of the plate was not mentioned, but it was probably the work of Issac Sprague, who illustrated a number of Torrey's texts. The illustration of an entire ovary as published in teil 3 (2a) of *Die Naturlichen Pflanzenfamilien*, 1891. The photographic image of a flower is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Keir Morse.

Woodwardia fimbriata. The color illustration was delineated by Charles E. Faxon and it was published in volume two of *The Ferns of North America* by Daniel Cady Eaton, 1880. The details of fertile pinna lobes were drawn by Jeanne Janish and published in part one of *Vascular Plants of the Pacific Northwest* (Hitchcock et. al.), 1969.

Wyethia helenioides. The main illustration was drawn by Jeanne Janish and published in volume four of *Illustrated Flora of the Pacific States*, by Roxana Ferris, 1960. The photographic image of a flower head is a snip from a photograph that was uploaded to the CalPhotos: Plants website by Barry Rice; © 2009 by Barry Rice. The photographic habit of growth image is a snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2008 by Brett Stevenson.

Yabea microcarpa. The main illustration and that of a two carpeled fruit were drawn by Jeanne Janish and published in part three of *Vascular Plants of the Pacific Northwest* (Hitchcock et al), 1961. The detail of cross section of a carpel was also drawn by Jeanne Janish, but it was published in volume three of Leroy Abrams' *Illustrated Flora of the Pacific States*, 1951. The photographic inset of a flower is a small snip from a photograph that was uploaded to the CalPhotos: Plants website; © 2016 by Keir Morse.

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