THE VASCULAR PLANTS OF THE SANTA CRUZ MOUNTAINS OF CENTRAL CALIFORNIA

PART I

A DISSERTATION

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DOCTOR OF PHILOSOPHY

By

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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INTRODUCTION

An ideal area for floristic work is one which is sharply delimited or separated from the adjacent terrain by definite discontinuities such as large bodies of water, valleys, or very high mountains. The Santa Cruz Mountains of central California constitute an area which is well defined and forms a distinct geological and phytogeographical unit. For this reason and the fact that to the present no one has dealt with the vascular flora as a whole, the Santa Cruz Mountains appeared to be an ideal area for floristic study.

The rapid increase in human population in central California with its devastating and often irreversible effects on the vegetation made it especially desirable to study the flora of the Santa Cruz Mountains. Much of the vegetation cover has been altered or contaminated by alien plants. Many areas bear but little resemblance to what they were prior to the establishment of the Roman Catholic Missions.

Conservation measures which are beyond the reach of political expediency are as desperately needed in the Santa Cruz Mountains as they are throughout the world. Many people are more apt to conserve the things they know about than the things which are foreign to them. The eventual availability of a local flora will, I hope, acquaint more people with the plants around them and perhaps thus serve as a stimulus, however slight, toward more permanent conservation measures.

Floras are never really finished and most are out of date even before the final draft of the manuscript is typed or the galley sheets come off the press. Among the many reasons for this are the following.

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New plants become established. Previous introductions become more widespread or die out. Bulldozers destroy or eradicate populations of plants and often entire ecological habitats and niches. Additional specimens become available as botanical collecting continues. Evolution takes place today as in the millions of years past. Hybrids are being formed and the rate of their formation is probably increasing with the increased disturbance to the environment. Study of various groups of plants by specialists brings to light previously overlooked names and new biological information, both of which often necessitate changing the name of a taxon. And finally the author of a flora may have missed a species or have misinterpreted one.

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ACKNOWLEDGMENTS

During the preparation of this flora, I have received help, advice, and encouragement from numerous individuals. I would particularly like to express my thanks to Professor Ira L. Wiggins under whose guidance this work was carried out, to Professor Richard W. Holm who has helped me in many ways, and to Mrs. Roxana S. Ferris who has answered many questions. Mr. John Thomas Howell of the California Academy of Sciences has kindly allowed me to examine the collections under his care and has sent me specimens of rare or unusual plants. Miss Vesta F. Hesse of Boulder Creek has made her notes on the flora of Santa Cruz County available to me and has accompanied me on several field trips. The curators of the herbaria which I have utilized and some of my fellow graduate students have kindly helped in many ways. Numerous individuals, the Supervisors of Santa Cruz County, and the members of the State Park Commission have given me permission to collect on the land they own or administer.

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METHODS

The methods employed in this study are briefly as follows. Between 1949 and 1958, I have made over three thousand collections of vascular plants from various parts of the Santa Cruz Mountains and adjacent lowlands. The majority of the plants has come from Santa Cruz County, the county within the Santa Cruz Mountains most poorly represented in the Dudley Herbarium of Stanford University. On the average, each collection contained enough material for three or four standard herbarium sheets. Preparation of the labels for some ten thousand sheets has resulted in an excursion into the field of printing, with the result that about one-half of my collections is accompanied by printed labels. In general, specimens of my collections have been deposited in the Dudley Herbarium only when I felt that they would supplement or complement those already there. Duplicates of my collections will be sent to other herbaria in California.

Although I have not kept an exact count, I estimate that I have personally collected about 60 per cent of the species, subspecies, and varieties of vascular plants that occur in the Santa Cruz Mountains. I have relied primarily upon the Dudley Herbarium and the herbarium of the California Academy of Sciences for specimens of the remaining taxa as well as for additional specimens of those I have collected. In some instances I have used the herbaria of the University of California at Berkeley, the University of California at Davis, the Rancho Santa Ana Botanic Garden, and Pomona College and the Jepson Herbarium at the University of California at Berkeley. In addition to these sources of

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material, I have examined some two thousand collections of unmounted material from the Santa Cruz Mountains which have constituted a "local herbarium" at the Dudley Herbarium. These specimens now have either been incorporated into the Dudley Herbarium or have been prepared for exchange.

As a working guide, I prepared a preliminary list of the species present in the Santa Cruz Mountains based on the distributions given in Abrams' Illustrated Flora of the Pacific States (1940, 1944, 1951), Jepson's Manual of the Flowering Plants of California (1925), and Jepson's Flora of California (1909-1943). Early plant records and distributional notes have been obtained by a systematic search of the following western American journals: Erythea, Madroño, Leaflets of Western Botany, Muhlenbergia, and Pittonia.

In the course of the preparation of the taxonomic portion of this study, I have assembled the local material of a particular genus or group of genera available in the Dudley Herbarium and have carefully identified and/or checked the determinations. Whenever monographs or revisions have been available, they have been used. In other cases, specimens have been named using various floras, by checking them against annotated specimens, or in a few cases by comparison with types. For most genera, I have examined the local material available at the California Academy of Sciences.

For each species or subspecific entity the following information was recorded: 1. the name of the taxon and the place of publication of its original description, 2. the distribution within the Santa Cruz Mountains and the flowering dates, 3. the total or general distribu-

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tion, 4. representative specimens examined, and 5. taxonomic, distributional, or other notes, if any. Flowering dates have been determined from herbarium specimens and my field notes. The general distribution is based on recently published distribution maps, actual specimens, and reliable references. Specimens for citation have been chosen to show the distribution within the Santa Cruz Mountains and the range of variation within the species or subspecific entity. Citation of specimens has been in general from north to south in the following order: San Francisco County, San Mateo County, Santa Clara County, and Santa Cruz County.

All specimens cited without an herbarium abbreviation following the citation are in the Dudley Herbarium. Abbreviations of the names of other herbaria are according to Lanjouw and Stafleu (1956) and are as follows:

California Academy of Sciences, San Francisco.....CAS
University of California at Davis.....DAV
Jepson Herbarium, University of California at Berkeley.....JEPS
Pomona College, Claremont.....POM
Rancho Santa Ana Botanic Garden, Claremont.....RSA
University of California at Berkeley.....UC

In a very few cases, I have cited specimens in my own herbarium.

Synonymy has not been included except in those cases in which it would not otherwise be possible to refer to the same taxon in Abrams' Flora.

I have attempted to make the keys as usable as possible. They are thus artificial and do not necessarily reflect evolutionary relationships. The keys were written using specimens from the Santa Cruz Mountains. Plants from other areas, although perhaps belonging to families

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represented locally, cannot necessarily be determined to the level of family or genus. In many cases, it is essential to have the entire plant, with both flowers and fruit, in order to determine it accurately. Minor variants are discussed, but they do not usually appear in the keys.

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DESCRIPTION OF THE SANTA CRUZ MOUNTAINS

The Santa Cruz Mountains are part of the Outer Coast Range of California. To the north, north of the Golden Gate, lie the North Coast Ranges, to the east lies the Diablo Range, to the southeast the Gabilan Range, and to the south lie the Santa Lucia Mountains. The Gabilan Range and the Mount Diablo Range, which in central California includes Mount Diablo, the Oakland-Berkeley hills, and the Mount Hamilton Range, are part of the Inner Coast Range, while the North Coast Ranges and the Santa Lucia Mountains are part of the Outer Coast Range.

To the north, the Golden Gate sharply separates the North Coast Ranges from the Santa Cruz Mountains. The San Francisco Bay and the Santa Clara Valley separate the Santa Cruz Mountains from the Diablo Range. The Pajaro River and the Pajaro River Valley mark the southern extent of the Santa Cruz Mountains, and on the west the Pacific Ocean forms a distinct boundary.

The eastern terrestrial boundary of the area under study runs from Alviso to the center of San Jose, thence southward through the center of the Santa Clara Valley to Gilroy, and from Gilroy south to the Pajaro River. The area thus outlined is about 1,386 square miles in extent. The descriptive term, the Santa Cruz Mountains, is usually used in this study to include the entire area as outlined above.

The distance from the Golden Gate at the north to the city of Watsonville on the south is about 74 miles. The minimum distance across the Santa Cruz Peninsula is at the latitude of Daly City and is about $5\frac{1}{2}$ miles. The maximum width of the Santa Cruz Mountains is about 29 miles.

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Several counties lie partly or entirely within the Santa Cruz Mountains. San Mateo and Santa Cruz counties lie completely within the Santa Cruz Mountains, as does San Francisco County with the exception of the Farallone Islands, Treasure Island, Alcatraz, and Yerba Buena. About one-third of Santa Clara County lies within the Santa Cruz Mountains. The composite map at the end of this study, based on United States Army Map Service maps NJ 10-8, 10-9, and 10-12, shows the major geographical and political boundaries of the Santa Cruz Mountains.

The main axis of the Santa Cruz Mountains tends in a general northwest-southeast direction. To the north, the hills of San Francisco and San Bruno Mountain are separated from the main body of the Santa Cruz Mountains, but are usually considered to be a part of them by both geologists (Hinds, 1952, p. 164) and botanists (Howell, Raven, & Rubtzoff, 1958, p. 6). From a point along the coast just south of San Francisco to the southern end of Castle Rock Ridge, the crests form an almost straight line for about 46 miles and are parallel to the San Andreas fault. The San Andreas fault forms a rift valley with high ridges on both sides for much of its length from south of San Francisco to the southern end of Castle Rock Ridge. A low gap, about 6 miles south of Los Gatos, separates the northern part of the Santa Cruz Mountains from the southern portion. The northern portion is sometimes called the Sierra Morena and the southern portion the Sierra Azul (Dudley, 1901, p. 159). The elevation of the gap is about 1800 feet. The southern portion of the Santa Cruz Mountains forms a ridge which is about 25 miles long. The southern portion contains the highest point in the Santa Cruz

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Mountains: Loma Prieta, or Mount Bache as it was once called, is a distinctive flat-topped peak 3806 feet tall about 15 miles south of San Jose.

Montara Mountain is a high peak to the west of the San Andreas fault and west of the present city of Hillsborough in San Mateo County. In Santa Cruz County, Ben Lomond Mountain forms a distinct subdivision of the Santa Cruz Mountains. It extends from south of Big Basin to near Santa Cruz and is nearly parallel to the main axis of the Santa Cruz Mountains.

The drainages are for the most part more or less at right angles to the main axis of the Santa Cruz Mountains. The most prominent exception is the San Lorenzo River which has its origin near Saratoga Summit and its mouth at Santa Cruz. The San Lorenzo River drains the region between Ben Lomond Mountain and the main crests to the east. The rivers and creeks on the western slopes of the Santa Cruz Mountains are in most years perennial, while on the eastern slopes, most are dry during the summer and early fall.

The eastern face of the Santa Cruz Mountains is in general steep, the western face slopes gradually to the ocean, dissected by rivers and creeks. On the eastern side of the Mountains there is a series of low rolling foothills.

Among the higher peaks are the following, which are arranged in order of height: Mount Umunhum, 3442 feet; Castle Rock, 3214 feet; Black Mountain, 2810 feet; Ben Lomond Mountain, 2600 feet; Eagle Rock, 2488 feet; Kings Mountain, 2315 feet; Mount Madonna, 1897 feet; and Montara Mountain, 1750 feet.

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Level valleys occur along the major streams near their mouths on the western side of the Santa Cruz Mountains. In southern Santa Cruz County, the Pajaro River has formed an extensive, level valley. On the eastern side of the Santa Cruz Mountains the streams have formed alluvial fans which extend toward the bay and the center of the Santa Clara Valley.

There is a number of small lakes in the Santa Cruz Mountains. San Andreas and Crystal Springs lakes lie along the San Andreas fault and are now part of the San Francisco city water supply. Pilarcitos Lake is also part of the San Francisco water supply system and is partly artificial. The storage capacity of Crystal Springs Lake has been increased by a dam across San Mateo Creek. Searsville and Felt lakes on Stanford University land are artificial and supply irrigation water to the University. Several artificial reservoirs have been built on the eastern slopes of the Santa Cruz Mountains. The largest are on Stevens Creek, Los Gatos Creek, Guadalupe Creek, and Alamitos Creek. In southern Santa Cruz County there are several shallow lakes. Some of them have now been drained for agricultural land. Soda Lake in the southeast corner of Santa Cruz County has no outlet channel and is alkaline. In San Francisco, drifting sands have formed a number of dune lakes, of which Lake Merced is the largest. In addition, there are a number of smaller lakes and ponds in various parts of the Santa Cruz Mountains, some natural and some artificial.

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GEOLOGY

The most conspicuous geological feature in the Santa Cruz Mountains is the San Andreas fault. The fault extends locally from coast just south of San Francisco through the Crystal Springs lakes, Portola Valley, the upper part of Stevens Creek, and then more or less coincides with the Santa Cruz - Santa Clara county line. To the northeast of the fault, the rocks are mainly Cretaceous, Jurassic, and pre-Jurassic in age. To the southwest of the fault, the rocks are mainly Tertiary with some exceptions. Branner, Newsom, and Arnold (1909) have mapped the major formations and have discussed the other faults of the Santa Cruz Quadrangle.

The cores of Montara Mountain and Ben Lomond Mountain (Fitch, 1931, pp. 2-3) are pre-Cretaceous quartz diorite and are the only areas of granitic rock in the Santa Cruz Mountains. There are areas of pre-Cretaceous limestone and schist in the triangle formed by Davenport, Ben Lomond, and Santa Cruz. The majority of the rocks to the southwest of the San Andreas fault is Miocene Monterey shale, a diatomaceous rock, and sandstone of the Purisima formation which is late Miocene and early Pliocene. Small masses of igneous rocks, diabase and basalt, occur parallel to and west of the San Andreas fault in San Mateo County.

To the northeast of the San Andreas fault, the dominant rocks are of the Franciscan formation, which are probably Jurassic. The Franciscan formation consists mainly of sandstone, shale, and some conglomerate interbedded and intruded by various types of igneous rock (Reed, 1951, p. 29). Serpentine outcroppings occur from southeast of Loma Prieta northward to San Francisco, always to the northeast of the San Andreas fault.

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Recent alluviam covers the floors of the Santa Clara and Pajaro River valleys, small coastal stream valleys, and the strip of land bordering San Francisco Bay in San Mateo County. Recent terrace deposits occur along the coast line. The largest sand dunes are in San Francisco, along the coast from Pillar Point to the mouth of Tunitas Creek, at Ano Nuevo Point, and along the coast in southwestern Santa Cruz County.

In addition to the serpentine, the Monterey shale and the Miocene Santa Margarita formation are of distinct importance in respect to plant distribution, and especially in connection with endemism, in the Santa Cruz Mountains. The Monterey shale is most conspicuous in the area west of Big Basin. This area is known as The Chalks. The Santa Margarita formation, or, as it is locally called, the Ben Lomond sand hills, is best developed in the vicinity of Ben Lomond, Eccles, and Felton in Santa Cruz County.

Except for the extensive quicksilver mines in the vicinity of New Almaden (Bailey, 1951, pp. 263-270) and limestone in the vicinity of Ben Lomond Mountain and Permanente Creek, the Santa Cruz Mountains have yielded little in the way of mineral wealth. Small amounts of gold have been found, bituminous beds near Santa Cruz have been the source of paving material, and sandstone, gravel, and sand have been obtained at several localities for building purposes. Oil has been found in a few areas. Drilling has continued intermittently since before the beginning of this century. During the past few years there has been a resurgence of drilling operations.

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CLIMATE

Much of California has a Mediterranean climate. A Mediterranean climate is characterized by at least three times as much rainfall in the wettest winter month as in the driest summer month and by average temperatures for the coolest month ranging between 32° and 64° F. (Russell, 1926, pp. 80-81). The Santa Cruz Mountains have what may be called a cool summer Mediterranean climate, characterized by low average summer temperatures.

The annual average temperature for nine localities in the Santa Cruz Mountains ranges from 55.3° to 59.2° F. (Felton, 1954). The range of temperature is from about 25° to about 102° F. with the extremes occurring rarely. The warmest months are July, August, and September; the coldest are December, January, and February. Table 1 is adapted from Felton (l. c., pp. 316-319) and shows the monthly and annual average temperatures at seven localities in the Santa Cruz Mountains. The localities are arranged from north to south.

Coastal areas have relatively uniform temperatures. In San Francisco, for instance, January is the coldest month of the year and has an average temperature of 50.1° F. September is the hottest month of the year in San Francisco and the average temperature is 61.6° F. The range of average monthly temperatures is 11.5° F. At Los Gatos on the eastern slope of the Santa Cruz Mountains, the coldest month is also January with an average temperature of 47.4° F. The hottest month is July with an average temperature of 68.2° F. The range for Los Gatos is 20.8° F. or nearly twice that of San Francisco.

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Table 2, which is also adapted from Felton (l. c., pp. 319-324), shows the average monthly and yearly precipitation at seven localities. The rainy season begins in October and continues through April and sometimes into the first part of May. June, July, August, and September are usually rainless.

The distribution of rain throughout the Santa Cruz Mountains is not uniform. Rainfall varies from about 15 inches at Palo Alto, to 18 inches at Searsville Lake (6 miles southwest of Palo Alto), to over 60 inches at Big Basin on the western side of the main crest, to about 20-30 inches along the coast. Cooper (1917, p. 186) has given similar figures for a transect across the Santa Cruz Mountains from Palo Alto to Tunitas on the coast.

During the summer months, coastal fogs are common and extend inland to the crests of the Santa Cruz Mountains and often pour through the passes onto the eastern slopes. In summer months the fog often hangs over the Santa Cruz Mountains, usually as far south as Kings Mountain, like a gigantic, billowy blanket with fingers or ribbons extending eastward through the lower gaps. Occasionally updrafts on the eastern side of the mountains cause the formation of towering spires and peaks at the edge of the cloud bank.

Cooper (l. c.) has shown that the limit of well developed redwood forests coincides with the limit of the summer coastal fogs. Local topographical conditions prevent the fog from regularly reaching some of the higher ridges, as for example Black Mountain. Black Mountain does not have a well developed redwood forest except along streams. Kings Mountain, which in many respects is similar to Black Mountain, does have

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a well developed redwood forest (Cooper, l. c., p. 188).

Oberlander (1956) found that the fog drip on Cahill Ridge in northern San Mateo County from July 20 to August 28, 1951, amounted to 58.8 inches under Lithocarpus densiflorus, 17.1 inches under Pseudotsuga menziesii, and 1.8 inches under Sequoia sempervirens. The differences were explained on the basis of the degree of protection from the prevailing winds by the surrounding terrain and other vegetation.

Snow occasionally falls on the higher crests of the Santa Cruz Mountains, but usually melts within a day or less.

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Table 1

Monthly and yearly average temperatures at seven localities in the Santa Cruz Mountains in °F.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
San Francisco	50.1	53.0	54.9	55.7	57.1	59.1	58.9	59.3	61.6	61.0	57.2	56.1	56.7
Half Moon Bay	49.7	-	-	52.7	55.0	57.1	58.2	58.5	51.7	56.4	54.1	51.6	-
Redwood City	47.8	50.8	54.0	57.1	61.1	65.1	67.8	67.2	66.2	61.2	54.3	49.6	58.5
San Jose	49.3	52.8	55.2	57.6	61.4	65.3	67.7	67.2	66.6	62.3	56.0	50.5	59.3
Los Gatos	47.4	50.3	53.1	56.5	60.1	65.1	68.2	67.6	66.1	61.1	54.5	48.5	58.2
Ben Lomond	45.8	47.7	50.8	54.6	50.2	62.0	64.9	64.6	64.3	59.6	52.4	48.1	56.1
Santa Cruz	49.9	51.7	53.7	56.4	58.5	61.8	63.1	63.4	62.8	59.6	54.9	51.1	57.2

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Table 2

Monthly and yearly average rainfall at seven localities in the Santa Cruz Mountains in inches

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
San Francisco	4.03	3.91	2.78	1.49	0.59	0.15	0.01	0.00	0.13	1.07	2.27	4.07	20.51
Half Moon Bay	4.27	4.38	3.34	1.87	0.68	0.20	0.02	0.01	0.11	1.48	2.66	4.34	23.46
Redwood City	4.08	3.76	2.83	1.21	0.45	0.12	0.02	0.03	0.06	0.95	1.74	3.70	18.95
San Jose	2.37	2.53	1.89	1.05	0.43	0.10	0.00	0.02	0.07	0.67	1.17	2.39	12.69
Los Gatos	6.61	5.78	4.75	1.88	0.82	0.10	0.00	0.03	0.40	1.38	2.76	5.60	30.11
Ben Lomond	10.94	11.90	9.70	3.42	1.46	0.24	0.03	0.02	0.13	2.88	5.79	9.93	56.34
Santa Cruz	5.77	5.20	4.14	1.86	0.97	0.22	0.02	0.03	0.47	1.43	2.74	5.40	28.25

THE PLANT COMMUNITIES OF THE SANTA CRUZ MOUNTAINS

The Santa Cruz Mountains lie within two Life Zones (Merriam, 1898), the Upper Sonoran and the Transition. In general, the western slopes of the Santa Cruz Mountains are in the Transition Zone while the eastern slopes and the Pajaro River Valley are in the Upper Sonoran Zone (Grinnell, 1939, pl. 3). In southern San Mateo County the Transition Zone extends onto the eastern slope of the Mountains. To the west of the crests there are pockets of Upper Sonoran Zone on dry ridges and on some south-facing slopes.

Hall and Grinnell (1919) have compiled lists of indicator species for the various Life Zones in California. Of their list of Upper Sonoran Life Zone plant indicator species, 45 per cent occur in the Santa Cruz Mountains. The corresponding figure for the Transition Zone is 48 per cent. Considering the size of California these figures indicate that the two Life Zones can be recognized in the Santa Cruz Mountains. Nevertheless, to attempt to assign the 1612 taxa of vascular plants in the Santa Cruz Mountains to one or another of these two Life Zones would be to ignore obvious characteristic assemblages of plants. On the other hand, it would be of little value to classify the vegetation according to some of the classical ecological categories of formation, association, faciation, and lociation. This would not only be inappropriate, but almost impossible as the vegetation changes so markedly and rapidly from the edge of a stream in the redwood forest to the dry open grassland on the top of a ridge. The transition from stream to crest is marked, furthermore, by an overlapping and intergrading of plant species.

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Characteristic assemblages of plant species or communities do exist. As considered here, communities are the sum of their component taxonomic entities. The community is not an organism, a quasi-organism, or a super-organism, but rather an assemblage of plants with similar or complementary ranges of tolerances to various environmental factors. This view of the community has been discussed at length by Mason (1936) and by Gleason (1939). Oberlander (1953) has come to the same conclusion after studying the vegetation of the Crystal Springs area in San Mateo County.

Munz and Keck (1949, 1950) have recently proposed a system of classification for the vegetation of California. Some of the plant communities as characterized by Munz and Keck are recognizable in the Santa Cruz Mountains. In general, the communities they call chaparral, grassland, and foothill woodland are in the Upper Sonoran Life Zone. The Transition Life Zone consists of the coastal strand, coastal scrub, redwood forest, mixed evergreen forest, and some grassland. The salt and freshwater marshes may occur in either Life Zone. Their distribution is determined primarily by proximity to, and availability of, water rather than by temperature.

Some parts of the Santa Cruz Mountains cannot now be assigned to one community or another due to the serious and continuing disturbance of the vegetation by man and his domesticated animals. Agricultural areas are located on coastal headlands, in streams and river valleys near the coast, and in the Santa Clara and Pajaro River valleys. The latter two valleys are among the best agricultural regions in California. Unfortunately much of the farm land in these valleys is

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being subdivided for housing and industrial sites. In some parts of the Santa Cruz Mountains, some of the more gentle slopes have been cleared for orchards and vineyards. Many orchards and vineyards have been abandoned, and depending upon the location, terrain, surrounding vegetation, and such factors as erosion, have reverted partly or in some cases entirely to the original vegetation. Many disturbed areas in towns, cities, along railroad tracks, road embankments, dumps, etc. now support a flora composed almost entirely of alien plants.

Coastal Strand

The coastal strand consists of the vegetation of sandy beaches and coastal sand dunes. In general, vascular plants on the coastal strand of the Santa Cruz Mountains are not subject to inundation at high tides. The coastal strand is more or less continuous from the Golden Gate to the mouth of the Pajaro River, except for short stretches where the coast line is formed of sheer cliffs and bluffs. Extensive sand dunes once occurred in western San Francisco. Small areas of sand dunes are still to be found, however, in San Francisco and adjacent San Mateo County. Other dunes occur from Pillar Point to the mouth of Tunitas Creek, in the vicinity of San Gregorio and Pescadero creeks, at Ano Nuevo Point, in the vicinity of Waddell Creek, near Davenport, at Santa Cruz, and along most of the coastline from Robroy to the mouth of the Pajaro River. Most of the dunes are now relatively stable and shift little with the wind.

Among the more characteristic coastal strand plants are those in the following list.

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Bromus maritimus
Poa douglasii
Elymus mollis
Ammophila arenaria
Chorizanthe robusta
Eriogonum latifolium
Polygonum paronychia
Atriplex leucophylla
A. californica
Abronia latifolia
A. umbellata
Tetragonia expansa
Mesembryanthemum chilense
Cakile edentula ssp. *californica*
C. maritima
Fragaria chiloensis
Lupinus chamissonis
Lathyrus littoralis
Croton californicus
Oenothera contorta var. *strigulosa*
O. micrantha var. *micrantha*
O. cheiranthifolia
Convolvulus soldanella
Phacelia ramosissima
Amsinckia spectabilis
Castilleja latifolia var. *latifolia*
Haplopappus ericoides ssp. *ericoides*
Franseria chamissonis
Eriophyllum staechadifolium
Achillea borealis ssp. *arenicola*
Artemisia pycnocephala

Salt Marsh

The salt marshes are most common along the margin of San Francisco Bay, in the vicinity of Santa Cruz, and along Watsonville Slough in southern Santa Cruz County. The marshes of San Francisco Bay are rapidly disappearing as more and more land is being filled. They will disappear almost entirely should the current proposals for conversion of large parts of San Francisco Bay into freshwater lakes become realities. The local salt marshes need extensive study and collecting before it is too late. Several salt marsh species are known locally from

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only a few specimens or in a few cases from only one.

The species in the following list are among the more commonly encountered ones in the salt marshes and along their borders.

Triglochin striata
T. maritima
T. concinna
Distichlis spicata var. stolonifera
Spartina foliosa
Monerma cylindrica
Polygonum patulum
Salicornia pacifica
S. depressa
Beta vulgaris
Atriplex patula var. hastata
Echinopsilon hyssopifolium
Suaeda californica
Chenopodium farinosum
Tetragonia expansa
Potentilla egedii var. grandis
Frankenia grandifolia
Limonium californicum
Cuscuta salina var. major
(parasitic on Salicornia spp.)
Cressa truxillensis
Cordylanthus maritimus
Plantago juncoides var. juncoides
Grindelia humilis
G. latifolia
Aster exilis
Jaumea carnosa
Lasthenia glabrata
Cotula coronopifolia
Senecio hydrophilus

Three species of vascular plants occur locally in a marine habitat. They are: Phyllospadix scouleri, P. torreyi, and Zostera marina.

Freshwater Marsh

Numerous small freshwater marshes occur along the edges of lakes, ponds, and streams. Rather extensive freshwater marshes are found along the streams near the coast, as for example at Pescadero Creek, Waddell Creek, Scott Creek, and in the vicinity of Santa Cruz. The

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lower portions of some marshes are brackish and support a flora composed of both freshwater and saltwater marsh species. Freshwater marshes have in many cases suffered the same fate as the salt marshes and mosquito control measures have eliminated many species from some. Roadside drainage ditches and low depressions where water stands during the winter and early spring often present habitats similar to freshwater marshes and some freshwater marsh species are found in them. The following is a list of the more common freshwater marsh species.

Marsilea vestita
Typha latifolia
T. angustifolia
T. domingensis
Sparganium eurycarpum
Potamogeton spp.
Lilaea scillioides
Alisma plantago-aquatica
Echinodorus berteroi
Sagittaria latifolia
Polypogon monspeliensis
Carex spp.
Cyperus eragrostis
Eleocharis macrostachys
Scirpus koilolepis
S. americanus
S. olneyi
S. californicus
S. robustus
Lemna spp.
Juncus effusus
Rumex crispus
R. conglomeratus
Polygonum coccineum
P. natans
P. persicaria
Arenaria paludicola
Ranunculus lobbii
R. aquatilis
R. bloomeri
Rorippa spp.
Lupinus polyphyllus
var. grandifolius
Hypericum anagalloides
Lythrum hyssopifolia

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Jussiaea repens var. *peploides*
Epilobium franciscanum
Epilobium adenocaulon
var. *occidentale*
Boisduvalia densiflora
Hydrocotyle verticillata
Berula erecta
Allocarya chorisiana
Phyla nodiflora var. *rosea*
Bidens laevis
Helenium puberulum
Lasthenia glaberrima

Allied to the freshwater marsh vegetation is that of lakes and ponds. A number of ponds and lakes have fluctuating water levels. In some this is due to evaporation as the season progresses, while in others the fluctuation is due to water use or in some cases deliberate draining. Among the species in freshwaterponds and lakes are the following: *Elodea canadensis*, *Ceratophyllum demersum*, *Ranunculus aquatilis*, *Nymphaea polysepala*, *Myriophyllum exalbescens*, and *Hippuris vulgaris*.

Coastal Scrub

The coastal scrub is a low vegetation cover, usually less than six feet tall, occurring on coastal bluffs, coastal hills, and often on the tops of windswept summits. The growth is often dense and difficult to penetrate. The coastal scrub extends locally from San Francisco southward to the vicinity of Santa Cruz. South of Santa Cruz there are only a very few areas of this vegetation type. Throughout much of the year, the coastal scrub is subject to fog and strong winds.

The more conspicuous coastal scrub species are listed below.

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Polypodium scouleri
Zygadenus fremontii var. minor
Urtica californica
Eriogonum latifolium
Dudleya farinosa
Fragaria chiloensis
Horkelia californica
Potentilla glandulosa
Rubus ursinus
Lupinus variicolor
L. arboreus
L. chamissonis
Rhus diversiloba
Ligusticum apiifolium
Heracleum maximum
Lomatium caruifolium
Armeria maritima var. californica
Phacelia malvaefolia
Scrophularia californica
Diplacus aurantiacus
Orthocarpus purpurascens var. latifolius
Castilleja latifolia var. wightii
Lonicera involucrata
Baccharis pilularis var. consanguinea
Erigeron glaucus
Anaphalis margaritacea
Layia platyglossa ssp. platyglossa
Eriophyllum staechadifolium
Achillea borealis ssp. californica
Artemisia californica

Redwood Forest

The redwoods community extends more or less continuously from the vicinity of Pilarcitos Lake southward to Mount Madonna, mainly west of the Santa Cruz Mountain crests. Heavy stands of redwood do occur, however, on the eastern slopes in areas moistened by summer fogs (Cooper, 1917). Individual trees sometimes occur along streams far removed from the general body of the redwood forest. A good example is the redwood tree along San Francisquito Creek near the railroad tracks between Menlo Park and Palo Alto.

In deeper canyons and ravines, Sequoia sempervirens forms nearly

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pure stands. In somewhat drier areas, it is associated with Pseudotsuga menziesii. The floor of the redwood forest supports relatively few species. The number of species of shrubs in the understory is likewise few.

Much of the redwood forest in the Santa Cruz Mountains has been cut. The first sawmill was located near the present town of Felton and dates back to 1842. Cutting has continued in various parts of the Mountains until the present. A few virgin stands still exist, notably along Butano Creek and in Big Basin. Jensen (1939, p. 25) has published a map showing the locations of sawmills and remaining virgin timber stands as of that date.

The redwood forest is characterized by the following taxa of vascular plants.

Equisetum telmateia var. braunii
Woodwardia fimbriata
Polystichum munitum
Adiantum pedatum var. aleuticum
Torreya californica
Pseudotsuga menziesii
Sequoia sempervirens
Bromus vulgaris
Melica geyeri
Festuca occidentalis
Trisetum canescens
Calamagrostis rubescens
Hierochloe occidentalis
Trillium ovatum
Scoliopus bigelovii
Disporum smithii
D. hookeri
Myrica californica
Lithocarpus densiflora
Asarum caudatum
Montia parvifolia
Anemone quinquefolia var. grayi
Dicentra formosa
Dentaria californica
Boykinia elata

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Heuchera micrantha
Tiarella unifoliata
Whipplea modesta
Oxalis oregana
Euonymus occidentalis
Viola sempervirens
V. glabella
Aralia californica
Hemitomes congestum
Rhododendron occidentale
Gaultheria shallon
Vaccinium ovatum
V. parvifolium
Trientalis latifolia
Myosotis sylvatica
Adenocaulon bicolor
Madia madioides
Petasites frigidus var. *palmatus*

Mixed Evergreen Forest

The mixed evergreen forest usually occurs adjacent to redwood forests, but on drier sites and generally in more inland localities. The mixed evergreen forest occupies a considerable amount of the forested region of the Santa Cruz Mountains. This community could be subdivided into a number of subordinate ones. Among these would be the oak-madrone, oak-buckeye, tanbark oak, madrone, douglas fir-tanbark, etc. These, however, replace one another, often within a very short distance.

The number of species occurring in the mixed evergreen forest is larger than in the redwood forest, due mainly to the greater diversity of habitat. The more common and conspicuous species are enumerated in the following list.

Polypodium californicum
Pityrogramma triangularis
Dryopteris arguta
Pteridium aquilinum var. *pubescens*
Pseudotsuga menziesii

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Elymus glaucus
Zygadenus fremontii var. fremontii
Chlorogalum pomeridianum
Fritillaria lanceolata
Calochortus albus
Corallorhiza maculata
Alnus oregona
Corylus californica
Lithocarpus densiflora
Quercus agrifolia
Q. wislizenii
Q. chrysolepis
Aquilegia formosa var. truncata
Delphinium nudicaule
Ranunculus hebecarpus
Umbellularia californica
Lithophragma affinis
Rubus spectabilis var. franciscanus
Rosa spithamea
R. gymnocarpa
Psoralea physodes
Acer macrophyllum
Aesculus californica
Rhus diversiloba
Rhamnus crocea ssp. crocea
Ceanothus sorediatus
C. thyrsiflorus
Viola ocellata
Dirca occidentalis
Clarkia purpurea ssp. quadrivulnera
C. rubicunda ssp. rubicunda
Osmorhiza chinensis
Arbutus menziesii
Pholistoma auritum
Nemophila heterophylla
Phacelia nemoralis
Cynoglossum grande
Scutellaria tuberosa
Stachys bullata
Solanum umbelliferum
Collinsia heterophylla
Pedicularis densiflora
Galium nuttallii
G. triflorum
G. aparine
Sambucus mexicana
Symphoricarpos albus var. laevigatus
S. mollis
Asyneuma prenanthoides
Hieracium albiflorum
Wyethia glabra

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Chaparral

The largest areas of chaparral lie on the eastern slopes of the Santa Cruz Mountains. On the western slopes it occupies some of the higher ridges and some of the steep, south-facing slopes. The chaparral in the Santa Cruz Mountains is by no means uniform. On the eastern slopes of Mount Umunhum it is composed of a nearly pure stand of Arctostaphylos glauca. On parts of Jasper Ridge Adenostoma fasciculatum forms nearly pure stands. Near Eagle Rock the chaparral consists of Arctostaphylos glutinosa, Dendromecon rigida, Pinus attenuata, and Adenostoma fasciculatum.

Cooper (1922) has studied the chaparral on Jasper Ridge on the Stanford University campus. His paper includes a list of some of the chaparral species occurring locally.

The following list contains the names of some of the more common chaparral species.

Pityrogramma triangularis
Pellaea andromedaefolia
P. mucronata
Pinus attenuatus
Zygadenus fremontii
  var. fremontii
Chlorogalum pomeridianum
Castanopsis chrysophylla
  var. minor
Quercus agrifolia
Q. wislizenii
Q. dumosa
Q. durata
Calandrinia breweri
Clematis lasiantha
Dendromecon rigida
Holodiscus discolor
Cercocarpus betuloides
Adenostoma fasciculatum
Prunus ilicifolia
Photinia arbutifolia

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Pickeringia montana
Lotus scoparius
Rhus diversiloba
Rhamnus californica
R. crocea
Ceanothus sorediatus
C. papillosus
C. cuneatus
Helianthemum scoparium
Zauschneria californica
Garrya elliptica
G. fremontii
Arctostaphylos glauca
A. andersonii
A. canescens
A. glandulosa
A. crustacea
Vaccinium ovatum
Navarretia heterodoxa
N. mellita
Phacelia rattanii
Emmenanthe penduliflora
Eriodictyon californicum
Cryptantha micromeres
C. muricata var. jonesii
Salvia mellifera
Lepechinia calycina
Antirrhinum multiflorum
Diplacus aurantiacus
Castilleja foliolosa
Baccharis pilularis
  var. consanguinea
Haplopappus arborescens
Gnaphalium californicum
Eriophyllum confertiflorum

Grassland

Grasslands occupy large areas mainly on the eastern side of the Santa Cruz Mountains. Much of the former grassland has given way to urban development or has been converted to agricultural lands. Grasslands have been, almost without exception, heavily grazed by cattle and in some cases by sheep. The floristic composition of grasslands consequently has been altered greatly. In many areas, especially those

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which have been heavily overgrazed, few native species are to be found.

Areas of grassland occupy the tops of some ridges and are often adjacent to but sharply delimited from chaparral. The factors responsible for the sharp line of demarcation between grassland and chaparral need study. Scattered throughout the mixed evergreen forests are small areas of grassland. Most of the grassland species also occur in the foothill woodland. Serpentine areas are either covered by grassland or by chaparral. The species occurring on serpentine are discussed in a subsequent section.

The more common native and introduced grassland species are included in the following list.

Briza minor
Bromus carinatus
B. mollis
B. rigidus
Poa unilateralis
P. scabrella
Melica californica
Festuca megalura
F. myuros
F. dertonensis
F. rubra
Hordeum leporinum
H. hystrix
Avena fatua
Aira caryophyllea
Stipa pulchra
Agrostis diegoensis
Juncus bufonius
Allium lacunosum
Dichelostemma pulchellum
Triteleia laxa
Brodiaea terrestris
Calochortus luteus
Sisyrinchium bellum
Delphinium hesperium
Ranunculus californicus
Capsella bursa-pastoris
Lepidium nitidum
Lupinus succulentus

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Lupinus nanus
L. bicolor
Lotus purshianus
L. micranthus
L. subpinnatus
Trifolium amplectens
T. barbigerum
T. grayi
T. microdon
T. microcephalum
T. variegatum
T. dichotomum
Astragalus gambellianus
Geranium molle
G. dissectum
Erodium obtusiplicatum
E. botrys
E. cicutarium
Sidalcea diploscypha
S. malvaeflora
Viola adunca
V. pedunculata
Clarkia unguiculata
C. rubicunda ssp. rubicunda
C. purpurea
Oenothera ovata
Sanicula arctopoides
Lomatium utriculatum
Androsace acuta
Microcala quadrangularis
Convolvulus subacaulis
Phlox gracilis
Linanthus androsaceus
Gilia tricolor
G. clivorum
Nemophila menziesii
N. pedunculata
Amsinckia intermedia
Plagiobothrys nothofulvus
Orthocarpus lithospermoides
O. purpurascens
var. purpurascens
O. densiflorus
O. attenuatus
O. pusillus
Plantago erecta
Microseris douglasii
Agoseris heterophylla
A. apargioides
var. apargioides
Chaetopappa bellidiflora

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Chaetopappa exilis
C. alsinoides
Filago gallica
F. californica
Micropus californicus
Wyethia helenioides
W. angustifolia
Achyrachaena mollis
Lagophylla ramosissima
Hemizonia corymbosa
H. luzulaefolia
Baeria chrysostoma
Soliva sessilis

Foothill Woodland

Foothill woodland occurs as a discontinuous band from the Crystal Springs region southward to Mount Madonna. Most of the foothill woodland occurs to the east of the crests of the Santa Cruz Mountains. It may be relatively dense or rather open and form oak - savannas or oak - parklands. Transitions to grassland and mixed evergreen forest are common. Most grassland species occur in the woodland and will not be listed again. The more common foothill woodland species are included in the following list.

Pinus sabiniana
Stipa lepida
Quercus kelloggii
Q. agrifolia
Q. wislizenii
Q. douglasii
Q. lobata
Q. chrysolepis
Phoradendron villosum
Montia perfoliata
Umbellularia californica
Photinia arbutifolia
Rhus diversiloba
Aesculus californica
Pholistoma auritum
Nemophila heterophylla
Pedicularis densiflora
Galium nuttallii
Wyethia glabra

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Streambank Vegetation

Small streams usually do not have floras conspicuously differing from those on the adjacent slopes. Along the larger streams, however, and especially along the lower portions of their courses a number of species are found which are not common elsewhere. Among the more common are: Populus trichocarpa, Salix spp., Alnus oregona, A. rhombifolia, Platanus racemosa, Acer negundo var. californica, Fraxinus latifolia, Cornus glabrata, C. californica, and Baccharis viminea.

Ponderosa Pine Forest

The ponderosa pine forest in Santa Cruz County is so different from any of the other locally occurring communities that it should be recognized as distinct. In both general localities in which it occurs, the Ben Lomond sand hills and at Bonny Doon, the soil is very sandy. In addition to Pinus ponderosa, P. attenuata, Quercus agrifolia and various chaparral species are common. Some of the features of the ponderosa pine forest are discussed in the next section.

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DISCUSSION OF THE FLORA

The vascular flora of the Santa Cruz Mountains consists of 130 families, 594 genera, and 1612 species, subspecies, varieties, forms, and hybrids. Table 3 is a tabulation of the flora by divisions, classes, and subclasses.

Table 3. Tabulation of the vascular plants

Division Class Subclass	Family	Genus	Species, Subspecies, Varieties, Forms, and Hybrids		
			Total	Native	Introduced
Lepidophyta	2	2	3	3	0
Calamophyta	1	1	5	5	0
Pterophyta					
Filicineae	4	16	24	23	1
Gymnospermae	4	5	9	9	0
Angiospermae					
Monocotyledoneae	20	119	347	254	93
Dicotyledoneae	99	451	1224	898	326
Total	130	594	1612	1292	420

The ten largest families contain 46 per cent of the genera and 58 per cent of the specific and infraspecific taxa. Table 4 is a list of these families.

Table 4. List of the ten largest families of vascular plants in the Santa Cruz Mountains

Family	Number of Genera	Number of Species
Compositae	86	231
Gramineae	65	174
Fabaceae	19	123
Scrophulariaceae	20	73
Brassicaceae	26	59
Cyperaceae	6	58
Umbelliferae	26	45
Onagraceae	8	42
Polygonaceae	7	40
Caryophyllaceae	10	35

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Twenty-four genera contain 10 or more entities each. These genera are listed in Table 5, together with the number of species in each.

Table 5. The 24 largest genera

Genus	Number of Species
Carex	31
Trifolium	29
Lupinus	25
Bromus, Festuca	18
Juncus, Lotus	15
Clarkia, Arctostaphylos, Mimulus	14
Agrostis, Vicia	13
Orthocarpus	12
Scirpus, Rumex, Atriplex, Ranunculus, Ceanothus, Phacelia, Solanum, Galium	11
Poa, Oenothera, Linanthus	10

The vascular flora of the Santa Cruz Mountains is composed of several major floristic elements. These elements may be divided into a series of distributional patterns. Campbell and Wiggins (1947, p. 16) have recognized 16 distinct distribution patterns among the plants which occur in California. In dealing with a smaller area, the number of such patterns can be reduced. I consider that there are five main distribution patterns represented by the plants in the Santa Cruz Mountains. The following is a list of these patterns, together with the percentage of species in each. The figures given by Campbell and Wiggins for California are shown for comparison.

Distribution Pattern	Santa Cruz Mountains	California
California	35%	36%
Pacific Coast	17%	17%
North America	15%	32%
Intercontinental	7%	7%
Introduced	26%	8%

The two sets of percentages agree very closely in three of the

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distribution patterns. In the Santa Cruz Mountains there are fewer plants with widespread distributions in North America than in California as a whole. This difference can be explained on the basis of the lack of such regions as deserts, high mountains, and high arid plateaux in the Santa Cruz Mountains.

Plants with a Pacific Coast distribution are those with ranges from Alaska southward to southern California and northern Baja California, mainly through British Columbia, Washington, and Oregon, but often extending eastward to Idaho and western Montana. Taxa which are typical of the Pacific Coast distribution pattern are: Polypodium glycyrrhiza, Carex phyllomanica, Lysichiton americanum, Tellima grandiflora, Viola glabella, Vaccinium parvifolium, and Galium trifidum var. pacificum. Included within the Pacific Coast distribution pattern are a number of other distinctive distribution patterns. One of the most common includes those plants which occur from southern British Columbia south to central or southern California. Representative examples of taxa with a British Columbia - California distribution are: Polypodium scouleri, Juncus occidentalis, Rosa gymnocarpa, Oxalis oregana, Viola sempervirens, Arbutus menziesii, and Plectritis ciliosa var. ciliosa. Plants with a Pacific Coast distributional pattern represent mainly a northern floristic element, although a few represent a southern floristic element.

Plants with a California distributional pattern are those which are endemic to California or range northward into the southwestern corner of Oregon or extend southward into northern Baja California. This distribution pattern excludes plants of the high Sierra Nevada, the northeastern corner of California, and in general the deserts. Examples

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of species with this distributional pattern are: Lithocarpus densiflora, Delphinium nudicaule, Rosa californica, Linanthus ciliatus, Allocarya bracteata, Microseris douglasii ssp. douglasii, and Baccharis douglasii.

The California distributional pattern includes within it a number of characteristic patterns. One of the more important of these is the one which can be called the Coast Range endemic pattern. Thirty-seven per cent of the plants within the California distributional pattern are restricted to the Coast Ranges from Humboldt County south through San Luis Obispo County. Of these, 27 taxa are endemic within the Santa Cruz Mountains and will be discussed later. Representative plants with a Coast Range distributional pattern are: Carex harfordii, Horkelia californica, Lotus junceus, Navarretia heterodoxa, Stachys chamissonis, Antirrhinum vexillo-calyculatum, and Wyethia glabra.

The distributional pattern which I have called the North American is capable of repeated subdivision. In general, the taxa are widespread in western North America, extend across the United States, or extend southward and eastward to Arizona, New Mexico, Texas, and Mexico. Many plants in this group are of the southern floristic element. A sampling of species with a North American distributional pattern is as follows: Scirpus koilolepis, Corallorhiza maculata, Polygonum coccineum, Sida leprosa var. hederacea, Clarkia rhomboidea, Lycopus americanus, and Filago californica.

Plants with a widespread distributional pattern are those which are cosmopolitan, occur widely in the northern hemisphere, or are common to both North and South America. Many of these are aquatics or plants of very moist areas. Typical examples are: Luzula multiflora, Polygonum

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natans, Tillaea aquatica, Lythrum hyssopifolia, Berula erecta, and Limosella aquatica.

Of the total number of vascular plants in the Santa Cruz Mountains, 420 or 26 per cent are introduced. The majority of the alien plants is of Eurasian or North African origin. Others are from different parts of Africa, notably South Africa, South America, Australia, other parts of North America, and even a few from other parts of California. Many of the introduced species became established at the time of the founding of the Spanish Missions. Some of the introductions were accidental, some were deliberate. The fact that over one quarter of the kinds of plants in the flora today are introduced shows the profound way in which the vegetation has been altered by man and his activities in the course of only about three centuries. Some introductions have been sporadic and have persisted for only short periods. Others have become widespread and have displaced some of the original plant species. A number of species have been introduced recently, for example, Trifolium angustifolium, Ornithopus pinnatus, O. roseus, and Crepis vesicaria ssp. taraxacifolia. Some introductions, as for example Tribulus terrestris, Lavatera arborea, L. cretica, Buddleia davidii, and Kickxia spuria, seem to be spreading rapidly today. Tribulus terrestris is a case in point. In 1954 I examined the herbaria in the San Francisco Bay region for local specimens of this species and found none. In July, 1954, I found Tribulus terrestris among the gravel of a creek bottom near Gilroy. Since then it has been found in San Francisco (Howell, Rubtzoff, & Raven, 1958, p. 98) and during the summer of 1958 I have found it on the Stanford University campus (Thomas 7364) and along the railroad tracks

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in Palo Alto (Thomas 7464). Tribulus terrestris is too noxious a weed to be undetected for long.

Every new garden plant is a potential addition to the flora. Every load of hay, sand, gravel, or fill from other areas is a possible source of new weeds. Keeping track of new introductions and noting their subsequent dispersal is a fascinating study in itself and an important means of learning more about the factors influencing plant migration.

Twenty-six species and infraspecific taxa are considered to be endemic in the Santa Cruz Mountains. The endemics constitute 1.6 per cent of the total number of vascular plants and are listed below.

Pinus X attenuradiata
Cupressus abramsiana
Silene verecunda ssp. verecunda
Erysimum teretifolium
E. franciscanum var. crassifolium
Grossularia senilis
Lupinus latifolius var. dudleyi
Malacothamnus arcuatus
Clarkia franciscana
Arctostaphylos franciscana
A. andersonii var. andersonii
A. andersonii var. imbricata
A. glutinosa
A. silvicola
A. crustacea var. rosei
Allocarya chorisiana var. chorisiana
A. diffusa
Acanthomintha obovata ssp. duttonii
Penstemon rattanii ssp. kleei
Pedicularis dudleyi
Grindelia maritima f. maritima
G. maritima f. anomala
Lessingia ramulosa var. glabrata
L. germanorum var. germanorum
L. hololeuca var. arachnoidea
Cirsium fontinale var. fontinale

Some of the endemics are closely restricted to certain geological formations. Others occur in a number of different habitats. The largest

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group of endemics restricted to a certain soil type are those confined more or less to serpentine and are as follows: Clarkia franciscana, Arctostaphylos franciscana, Acanthomintha obovata ssp. duttonii, Grindelia maritima, Lessingia hololeuca var. arachnoidea, L. ramulosa var. glabrata, and Cirsium fontinale var. fontinale. The Santa Margarita formation in Santa Cruz County is the site of two endemics, Erysimum teretifolium and Arctostaphylos silvicola. Arctostaphylos silvicola does occur occasionally elsewhere, but is most common in the Santa Margarita formation. Arctostaphylos glutinosa is entirely restricted to Monterey Shale and Penstemon rattanii ssp. kleei, although occurring at Aptos and Loma Prieta, is fairly common on soil derived from the Monterey shale. Arctostaphylos crustacea var. rosei and Lessingia germanorum var. germanorum are restricted to the coastal sand dunes in San Francisco and northern San Mateo County. Cupressus abramsiana, the only endemic tree in the Santa Cruz Mountains, is known from only four localities. In each case, the trees are restricted to sandstone or sands derived from the Butano sandstone or Vaqueros sandstone formations. The remaining endemics do not appear to be closely correlated with geological formations.

Numerous taxa have their southern limits of distribution in the Santa Cruz Mountains. There is no absolute correlation between floristic element and southern limit of distribution. Tanacetum camphoratum has its southern limit of distribution in San Francisco, but extends no farther north than Marin County. It is thus a narrowly restricted central California endemic. Ceanothus foliosus, so far as is known, does not occur farther south than Mount Madonna, but extends northward

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to Humboldt County and must thus be considered a California endemic. Epilobium halleanum is not known south of Camp Evers, Santa Cruz County, but ranges northward to British Columbia and eastward to Colorado. Lysichiton americanum also has its southern limit of distribution in the Coast Ranges in Santa Cruz County, but ranges northward to Alaska, and a closely related species, L. camtschatcense (L.) Schott, occurs in eastern Asia. In general, however, taxa with southern limits of distribution do belong to a more northerly floristic element.

It is of interest to compare the number of taxa having southern limits of distribution in the Santa Cruz Mountains with the number reaching their southern limits in adjacent areas. In the Santa Cruz Mountains 173 taxa reach their southern limits of distribution. In Marin County the number is 97 (Howell, 1949, p. 25), on Mount Diablo six (Bowerman, 1944, p. 68), and in the Mount Hamilton Range six (Sharsmith, 1945, p. 313). On the basis of the data in the taxonomic portion of this study, I would estimate that between 175 and 200 taxa reach their southern limits of distribution in the Coast Range in the Santa Lucia Mountains of Monterey County. The northern element becomes progressively less important in the flora from north to south and this element is of less importance in the Inner Coast Ranges than in the Outer Coast Ranges.

The following is a list of species, subspecies, and varieties with southern limits of distribution in the Coast Range in the Santa Cruz Mountains, together with a list of the southernmost stations at which these plants have been collected. In some cases two stations have been listed if they are at the same latitude but separated longitudinally.

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Equisetum hyemale var. californicum	Los Gatos, Boulder Creek
Botrychium silaifolium var. californicum	Camp Evers
Polypodium scouleri	Cahill Ridge
P. californicum	Soquel Valley
Dryopteris dilatata	Butano Creek
Blechnum spicant	Gazos Creek
Cheilanthes intertexta	Loma Prieta
Torreya californica	Loma Prieta, Little Basin
Poa kelloggii	Felton
Melica subulata	Congress Springs
Pleuropogon californicus	Millbrae
Glyceria leptostachya	San Francisco
G. occidentalis	Baden
G. pauciflora	Pilarcitos Creek
Puccinellia grandis	Near Palo Alto
Festuca subliflora	Jamison Creek
F. idahoensis	Empire Grade
Hystrix californica	Santa Cruz
Elymus mollis	Waddell Creek
E. virescens	San Francisco
E. X vancouverensis	Santa Cruz
Trisetum cernuum	Glenwood
Phleum alpinum	San Francisco
Calamagrostis rubescens	Boulder Creek
Agrostis pallens	San Francisco
A. californica	Santa Cruz
Beckmannia syzigachne	Saratoga
Carex simulata	Camp Evers
C. densa	Morgan Hill
C. phyllomanica	Camp Evers
C. leptopoda	Big Basin
C. gracilior	Watsonville
C. salinaeformis	Camp Evers
C. nudata	Near Santa Cruz
C. sitchensis	Boulder Creek
C. lanuginosa	Ben Lomond
C. gynodynama	Empire Grade
C. amplifolia	Boulder Creek
C. exsiccata	Wrights, Big Basin
C. comosa	Santa Cruz County
Eriophorum gracile	San Francisco
Lysichiton americanum	Near Felton
Allium serratum	Morgan Hill
A. breweri	Loma Prieta
Dichelostemma multiflorum	San Juan Hills
D. congestum	Stevens Creek, Glenwood
Brodiaea appendiculata	New Almaden
Calochortus tolmiei	Big Basin, Loma Prieta
C. umbellatus	Kings Mountain
Scoliopus bigelovii	Los Gatos, Santa Cruz
Disporum smithii	Woodside

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Streptopus amplexifolius var. denticulatus	Near Boulder Creek
Iris macrosiphon	Gilroy, Graham Hill
Cypripedium montanum	Corte de Madera
C. fasciculatum	Loma Prieta
Corylus californicus	Stevens Creek, Ben Lomond sand hills
Urtica californica	Santa Cruz
Asarum caudatum	Los Gatos, Zayante
Chorizanthe cuspidata var. cuspidata	Santa Cruz
Eriogonum hirtiflorum	Empire Grade
Rumex persicarioides	Moss Beach
Paronychia franciscana	San Bruno Mountain
Montia sibirica	Mount Hermon
Spraguea umbellata	Ben Lomond sand hills
Stellaria littoralis	San Francisco
Arenaria pusilla	San Francisco
Spergularia marina var. tenuis	Alviso
Silene scouleri ssp. grandis	Pescadero
Delphinium hesperium	San Jose, Big Basin
Anemone quinquefolia var. grayi	Loma Prieta, Aptos
Ranunculus lobbii	Coal Mine Ridge, Aptos
R. pusillus	Coal Mine Ridge, Santa Cruz
R. bloomeri	Alviso
Meconella californica	Big Basin
Dicentra formosa	Big Basin
Erysimum franciscanum var. franciscanum	Crystal Springs
Arabis blepharophylla	Boulder Creek
Dudleya cymosa ssp. cymosa	Loma Prieta, Eagle Rock
Tolmiea menziesii	Boulder Creek
Tiarella unifoliata	Felton
Grossularia leptosma	Loma Prieta, Waddell Creek
Physocarpus capitatus	Permanente Creek, San Lorenzo River
Rubus leucodermis	Big Trees
R. spectabilis var. franciscanus	Liddell Creek
Prunus subcordata	Permanente Creek
Lupinus polyphyllus var. grandifolius	Mount Hermon
L. arboreus var. eximius	Seal Cove
L. pachylobus	Los Gatos
Lotus torreyi	Santa Cruz
Psoralea strobilina	New Almaden
Trifolium depauperatum	Glenwood
T. cyathiferum	Edenvale
T. dichotomum	Gilroy
Astragalus pycnostachyus	San Gregorio
A. nuttallii var. virgatus	Pescadero
Lathyrus torreyi	Mount Hermon
Hesperolinon congestum	Woodside
Ptelea crenulata	Gilroy
Euonymus occidentalis	Felton

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Ceanothus velutinus var. laevigatus	Swanton
C. foliosus	Mount Madonna
Fremontodendron californicum ssp. crassifolium	Loma Prieta, Big Basin
Dirca occidentalis	Searsville
Epilobium halleanum	Camp Evers
Clarkia concinna	Loma Prieta
C. davyi	Ocean View
C. purpurea ssp. viminea	Los Gatos, Locatelli Ranch
Perideridia kelloggii	Aptos
Ligusticum apiifolium	San Mateo
Angelica hendersoni	Pescadero
A. tomentosa	Santa Cruz
Pleuricospora fimbriolata	Big Basin
Ledum glandulosum var. australe	Boulder Creek
Rhododendron macrophyllum	Scott Valley
Arctostaphylos sensitiva	Mount Hermon
A. canescens	Loma Prieta
Vaccinium parvifolium	Big Basin
Dodecatheon hendersonii ssp. cruciatum	Stanford, Jamison Creek
Fraxinus latifolia	San Francisquito Creek
Centaurium floribundum	Waterman Gap
C. muhlenbergii	Palo Alto
C. trichanthum	San Jose
Menyanthes trifoliata	San Francisco
Convolvulus malacophyllus ssp. collinus	Madrone
Linanthus aciculatis	Coal Mine Ridge
Polemonium carneum	Pilarcitos Canyon
Eriastrum abramsii	Black Mountain
Navarretia heterodoxa	Los Gatos
N. viscidula	Searsville
Gilia capitata ssp. capitata	Black Mountain, Alba Grade
G. capitata ssp. chamissonis	San Francisco
Nemophila menziesii var. atomaria	Loma Prieta
Phacelia nemoralis	Loma Prieta, Ben Lomond Mountain
P. californica	Santa Cruz
P. suaveolens	Loma Prieta, Eagle Rock
P. divaricata	Los Gatos
Romanzoffia suksdorfii	San Mateo Canyon
Cryptantha torreyana var. pumila	Stevens Creek, Swanton
Stachys chamissonis	Ano Nuevo Point
Collinsia corymbosa	San Francisco
Tonella tenella	Los Gatos
Mimulus rattanii	Near Santa Cruz
Gratiola ebracteata	Near Woodside
Cordylanthus pilosus	Los Gatos
Orthocarpus lithospermoides	Gilroy
O. floribundus	Belmont
Castilleja latifolia var. wightii	Santa Cruz
Orobanche grayana var. jepsonii	Palo Alto
O. pinorum	Boulder Creek

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Plantago juncoides var. juncoides	Mayfield
Galium triflorum	Near Santa Cruz
Sambucus callicarpa	Near Santa Cruz
Marah oreganus	Saratoga Summit, Blooms Grade
Campanula angustifolia	Boulder Creek
Grindelia humilis	Alviso
Legenere limosa	Coal Mine Ridge
Chrysopsis villosa var. bolanderi	Portola
C. oregona var. rudis	Gilroy
Erigeron foliosus var. hartwegii	Ben Lomond Mountain
E. inornatus var. angustatus	Crystal Springs
Lessingia hololeuca var. hololeuca	Los Gatos
Adenocaulon bicolor	Boulder Creek
Psilocarphus brevissimus var. multiflorus	Near Gilroy
Stylocline amphibola	Near Santa Cruz
Helianthella californica	Black Mountain
Lagophylla congesta	Black Mountain
Hemizonia congesta	Near Colma
Calycadenia multiglandulosa ssp. cephalotes	Emerald Lake
Franseria chamissonis ssp. chamissonis	Pajaro River
Baeria macrantha var. thalassophila	Pescadero
Lasthenia glaberrima	San Jose
Tanacetum camphoratum	San Francisco
Senecio aronicoides	Ben Lomond sand hills
Cirsium andrewsii	Northern San Mateo County

Fifty-eight taxa have their northern limits of distribution in the Coast Range in the Santa Cruz Mountains. For Marin County this figure is 34 (Howell, 1949, p. 25), for Mount Diablo 38 (Bowerman, 1944, pp. 67-68), and for the Mount Hamilton Range 23 (Sharsmith, 1945, p. 317). I have no figures available for the Santa Lucia Mountains of Monterey County, but it is probably a fairly high number. Plants with their northern limits of distribution in the Santa Cruz Mountains in general constitute a southern floristic element. The southern element becomes less important from south to north and is more important in the Inner Coast Ranges than in the Outer Coast Ranges. The following is a list of taxa with northern limits of distribution in the Coast Range in the Santa Cruz Mountains.

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Selaginella bigelovii	Los Gatos
Pinus radiata	New Years Point
Bromus pseudolaevipes	Stanford
Elymus condensatus	Valencia Creek
Carex schottii	Sargents
Anemopsis californica	San Jose
Chorizanthe robusta	San Francisco
C. cuspidata var. marginata	San Francisco
C. pungens var. hartwegii	San Francisco
C. diffusa	Jasper Ridge
Triteleia ixioides	Woodside
Parietaria floridana	Near Santa Cruz
Eriogonum saxatile	Mt. Umunhum
Delphinium parryi ssp. seditosum	Mt. Hermon
Erysimum ammophilum	Sunset Beach
Descurainia pinnata ssp. menziesii	Stanford
Horkelia cuneata ssp. cuneata	San Francisco
H. bolanderi ssp. parryi	San Andreas Valley
Lupinus hirsutissimus	Swanton, Stevens Creek
L. truncatus	Santa Cruz
Lotus salsuginosus	Watsonville
Croton californicus	San Francisco
Ceanothus papillosus	Kings Mountain
C. dentatus	Between Soquel and Watsonville
Malacothamnus hallii	Near Madrone
Clarkia epilobioides	San Francisco
C. prostrata	Santa Cruz
Oenothera hookeri ssp. montereyensis	San Francisco
Osmorhiza brachypoda	Castle Rock Ridge
Sanicula maritima	San Francisco
Tauschia hartwegi	Stanford
Arctostaphylos crustacea var. crustacea	Near San Andreas Lake
Dodecatheon clevelandii ssp. sanctarum	Ano Nuevo Point
Linanthus ambiguus	Crystal Springs
Gilia tenuiflora	Ben Lomond sand hills
Pholistoma membranaceum	San Jose
Phacelia douglasii	San Francisco
Allocarya chorisiana var. hickmanii	Pescadero
Echidocarya californica	Eagle Rock
Salvia mellifera	Los Gatos
Stachys bullata	San Francisco
Antirrhinum multiflorum	Los Gatos
Collinsia bartsiaefolia var. hirsuta	San Francisco
C. multicolor	San Francisco
Cordylanthus rigidus	San Andreas Valley
Castilleja douglasii	San Francisco
Haplopappus venetus ssp. vernonioides	San Francisco
H. ericoides ssp. blakei	Bonny Doon
Chrysopsis villosa var. camphorata	Stevens Creek
Corethrogyne californica	San Francisco
C. leucophylla	Ano Nuevo Point

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Corethrogyne filaginifolia var. filaginifolia	Soda Lake
C. filaginifolia var. rigida	Ben Lomond
Conyza coulteri	Loma Prieta, Felton
Lessingia germanorum var. tenuipes	Searsville
Gnaphalium bicolor	Sunset Beach
Monolopia gracilens	Sawyer Ridge
Senecio breweri	San Mateo

A number of taxa, growing mainly on the eastern slope of the Sierra Azula, show definite Inner Coast Range affinities. Some taxa extend over large areas of the eastern slope of the Sierra Azul. Others are restricted and have been collected only once or twice.

The most common and one of the most conspicuous Inner Coast Range plants in the Santa Cruz Mountains is Arctostaphylos glauca. Pinus sabiniana, another typical Inner Coast Range and Sierra Nevada foothill species, occurs only in a few areas in the Santa Cruz Mountains, mostly in the vicinity of Loma Prieta and Mount Umunhum, usually between 1500 and 3000 feet in elevation. Some plants such as Emmenanthe penduliflora are more widespread in the Santa Cruz Mountains, but nevertheless belong to the Inner Coast Range - Desert element.

Some of the other Inner Coast Range taxa in the Santa Cruz Mountains are presented in the subsequent list.

Selaginella bigelovii
Allium breweri
Arceuthobium campylopodum
Eriogonum argillosum
E. saxatile
Calyptridium parryi var. hesseae
Dudleya cymosa ssp. setchellii
Lewisia rediviva
Arabis breweri
Ptelea crenulata
Rhamnus crocea ssp. ilicifolia
Ceanothus ferrisae
Malacothamnus hallii
Fraxinus dipetala
Mentzelia dispersa

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Mentzelia lindleyi
Clarkia breweri
C. modesta
Emmenanthe penduliflora
Eriastrum abramsii
Allocarya glabra
Galium andrewsii
Microseris elegans
Erigeron petrophilus
Chrysothamnus nauseosus
ssp. *occidentalis*
Helianthella castanea
Layia hieracoides
Calycadenia multiglandulosa
var. *multiglandulosa*
Chaenactis tanacetifolia

Several other areas in the Santa Cruz Mountains are of interest with respect to plant distribution. The serpentine areas support a varied flora and a number of these species are either restricted to serpentine soil or are more common on serpentine soil than on nonserpentine soil. Some of the more obligate local serpentine plants are listed below.

Selaginella bigelovii
Festuca pacifica
F. reflexa
Koeleria gracilis
Allium lacunosum
A. amplectens
A. serratum
A. breweri
Calochortus venustus
Quercus durata
Eriogonum saxatile
E. argillosum
Lewisia rediviva
Arenaria pusilla
Silene californica
Streptanthus glandulosus var. *glandulosus*
Dudleya cymosa ssp. *setchellii*
Psoralea strobilina
Astragalus gambellianus
Hesperolinon micranthum
H. congestum
Clarkia franciscana

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Sanicula bipinnatifida
Arctostaphylos franciscana
Convolvulus malacophyllus ssp. *collinus*
Linanthus liniflorus
L. ambiguus
Acanthomintha obovata ssp. *duttonii*
Grindelia maritima
Lessingia hololeuca var. *arachnoidea*
L. ramulosa var. *glabrata*
Chrysothamnus nauseosus ssp. *occidentalis*
Rigiopappus leptocladus
Cirsium fontinale var. *fontinale*

The Ben Lomond sand hills and the sand deposits near Bonny Doon are of interest because of the endemics and because of several other distributional patterns. *Armeria maritima* var. *californica* and *Horkelia cuneata* ssp. *cuneata*, typical coastal plants, are found inland in the Ben Lomond sand hills. *Spraguea umbellata* reaches its southern limit of distribution in the Coast Range in this area. *Haplopappus ericoides* ssp. *blakei* reaches its northern limit of distribution near Bonny Doon, and *Gilia tenuiflora* reaches its northern limit in the Ben Lomond sand hills. The most distinctive feature is the stand of *Pinus ponderosa*. It is known locally only from near Bonny Doon and the Ben Lomond sand hills. To the north it occurs again in Napa County, to the south at Pio Blanco in the Santa Lucia Mountains, and to the east there is a small stand in the Mount Hamilton Range.

The marsh at Camp Evers is of interest because of the large number of species of *Carex* present and because several species of *Carex* and of other genera have their southern limits of distribution in the Coast Range there. Unfortunately much of the marsh has been drained and other parts have been used as a source of peat. The most extensive stand of *Lupinus polyphyllus* var. *grandifolius* in the Santa Cruz Mountains oc-

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curred here. Among the plants with southern limits of distribution at Camp Evers are the following: Botrychium silaifolium var. californicum, Carex simulata, C. phyllomanica, C. salinaeformis, and Epilobium halleanum.

Some of the marshes in San Francisco were of equal if not of greater interest. Most have been filled or drained. Behr (1891, p. 4) has discussed the plants in some of them. Such species as Eriophorum gracile, Castilleja miniata, and Menyanthes trifoliata once grew in San Francisco marshes and in addition reached their southern limits of distribution there. Others like Arenaria paludicola, Cornus nuttallii, and Lycopus americanus once grew in the marshes of San Francisco. Unfortunately specimens of a number of these no longer exist.

Several taxa with southern limits of distribution in the Santa Cruz Mountains are not encountered to the north for some distance. These taxa would appear to represent a relic element in the Santa Cruz Mountains. The following is a list of these species and the first county to the north in which they occur.

Carex salinaeformis	Humboldt County
Festuca subliflora	Mendocino County
Streptopus amplexifolius var. denticulatus	Humboldt County
Cypripedium fasciculatum	Del Norte County
Spraguea umbellata	Lake County
Tolmiea menziesii	Mendocino County
Rubus leucodermis	Sonoma County
Pleuricospora fimbriata	Humboldt County
Vaccinium parvifolium	Sonoma County
Orobanche pinorum	Siskiyou County

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PREVIOUS FLORISTIC WORK IN THE SANTA CRUZ MOUNTAINS

Although there are three large herbaria in the San Francisco Bay region, no botanist has attempted the preparation of a flora of the vascular plants of the Santa Cruz Mountains and adjacent lowlands until now. Botanists, however, have been active. The list of works which deal with the local flora is a long one.

The following compilation of floristic works treats lists of plants and floras of various parts of the Santa Cruz Mountains and floras, manuals, and lists that cover the area in some detail, but which also include areas outside of the Santa Cruz Mountains. Popular works such as Parson's The Wild Flowers of California (1907) are not included, nor are such manuals as An Illustrated Manual of California Shrubs (McMinn, 1939) which consider only one growth form, except in those cases where these manuals are more or less restricted to central California. Brief, published distributional notes are omitted as are works which are concerned primarily with the description of new taxa. The list is arranged chronologically and the scope of each work is briefly sketched.

1. Bolander (1863). Enumeration of Shrubs and Trees in the Vicinity of the Mouth of San Francisco Bay. About 80 species occurring in San Francisco, the Oakland hills, and southern Marin County are presented in the form of an annotated list.

2. Bolander (1870). A Catalogue of Plants Growing in the Vicinity of San Francisco. This work is mainly an emended and enlarged edition of Bolander's earlier paper.

3. Brewer and Watson (1876). Botany of California, Vol. I. This

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was the first, complete work on the flora of California and remained the only one for nearly half a century. Volume I deals with the Polypetalae and the Gamopetalae, the latter having been written by Asa Gray. Volume I was issued again four years later as a "second (revised) edition" (Brewer & Watson, 1880) at the time of the publication of Volume II.

4. Watson (1880). Botany of California, Vol. II. Volume II contains the Apetalae, Monocotyledoneae, Gymnospermae, vascular cryptogamae, some of the non-vascular cryptogamae, and a long list of additions and corrections to Volume I. Portions of the text of the vascular plants were contributed by Engelmann, Bebb, Boott, Thurber, and D. C. Eaton.

5. Behr (1884). Synopsis of the Genera of Vascular Plants in the Vicinity of San Francisco, with an Attempt to Arrange them According to Evolutionary Principles. The area covered in this work extends from Sonoma County south to Santa Clara County and from Niles westward to the Pacific Ocean. Only genera are listed and no attempt was made to indicate the number of species in each genus. In all, about 45 genera are listed, each with a short diagnosis.

6. Behr (1886). Linnaean Key to the Local Flora. This key was the basis for the one used in Behr's Flora of 1888.

7. Behr (1888). Flora of the Vicinity of San Francisco. The area covered in this flora is the same as in the earlier "Synopsis." Diagnoses of species as well as of genera are included.

8. Rattan (1888[a]). A Popular California Flora. Eight editions of this work appeared between 1879 and 1888 and the eighth edition was reprinted several times, at least as late as 1894. The number of pages varies somewhat from edition to edition. Pages were often inserted and

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labeled 14a, 14b, etc. and frequently page numbers were omitted in glossaries and indices. The seventh and eighth editions contain an Analytical Key to West Coast Botany (1888[b]). The Analytical Key must be considered a separate work as the pagination is separate. The Flora covers the area from Ukiah and Marysville south to Monterey and Visalia, while the Analytical Key was supposed to work from the Puget Sound south to San Diego, west of the Cascade - Sierra Nevada crests. All the editions of these works, as well as all of Rattan's later books, were intended as teaching texts as is shown by a statement on page 3 of the Preface to the Flora: "Plants belonging to the Parsnip, Aster, Willow, Oak, and Pine Families, are not described, being mostly too difficult for beginners, or of little interest to them." Although of a somewhat popular nature, I have included Rattan's works because of their wide use both in his own classes in San Francisco and later at San Jose State Normal School and in the classes of other teachers.

9. Clarke (1890). Catalogue of the Flowering Plants and Ferns of Santa Cruz County. This list of plants was compiled by F. L. Clarke for the Board of Education of Santa Cruz County and was based on collections made by the pupils of the 16 elementary schools then existing in the County. A prize was offered by the newspaper, The Santa Cruz Surf, to the students of the school collecting the largest number of specimens. A total of about 3,500 specimens were thus collected and some of them probably passed into the hands of C. L. Anderson. The title page of this work contains the statement: ".....additions of names to fill out the list have been made by Dr. C. L. Anderson." In all about 700 species were listed. A copy of this rather rare publication is in the

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library of the Jepson Herbarium at the University of California at Berkeley.

10. Greene (1891-1897). Flora Franciscana. Greene's first California flora was not complete in that it contained only the Dicotyledoneae. The area covered extends roughly from Cape Mendocino to Point Conception and eastward to the Nevada border. Short descriptions of the taxa involved are given.

11. Brandegee (1892). Catalogue of the Flowering Plants and Ferns Growing Spontaneously in the City of San Francisco. This is an annotated list of over 600 species. Brandegee's Catalogue was the first reasonably complete and thorough list of plants for any part of the Santa Cruz Mountains.

12. Anderson (1892[a], 1892[b]). Catalogue of Flowering Plants and Ferns of Santa Cruz County and List and Notes of Native and Other Grasses Found Growing Wild in Santa Cruz County. This catalogue is almost identical with the list edited by F. L. Clarke, but with the occasional addition of common names, habitat notes, and localities. In reviewing Clarke's list, Brandegee (1890[b]) wrote: "Although this pamphlet bears on its cover the name of Dr. C. L. Anderson, its contents furnish abundant proof that he had no hand either in its arrangement or in the proofreading." With her characteristic bluntness, Mrs. Brandegee concluded the review as follows: "It is claimed that this is 'The first of its kind published in the State.' Let us hope that it is also the last, and that future Boards of Education who would probably employ a carpenter if they wished to build a house, will show their common sense

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by employing a botanist when they want a local flora."

13. Anderson (1893). The Natural History of Santa Cruz County. This is essentially a private reprinting of Anderson's 1892 lists together with lists of animals and a discussion of the local geology.

14. Greene (1894). Manual of the Botany of the Region of San Francisco Bay. The second California floristic work which Greene attempted covered the counties bordering San Francisco Bay. Short diagnoses of orders (our present families), genera, and species were included. The Manual, like the earlier Flora Franciscana, is not complete and although contributing to knowledge, received some very unfavorable reviews (Brandegee, 1894, p. 417): "The title should have been A Phanerogamic Flora of —— counties in the State of California, omitting Typhaceae, Lemnaceae, Naiadaceae, Alismaceae, Juncaceae Cyperaceae Gramineae, Coniferae and numerous species in the other orders; with thirty 'new species' none of which are new, and nearly all vaguely characterized both as to character and station; and with every change of name which the author's present knowledge admits."

15. Rattan (1898). West Coast Botany. This is an enlargement of Rattan's earlier work.

16. Eastwood (1898). The Plant Inhabitants of Nob Hill. Reprinted as The Flora of the Nob Hill Cobblestones (1950). The reprinted edition contains the following statement in the forward written by Miss Eastwood: "This article was originally published in Erythea, Vol. 6, June 1898. Erythea was a 'Journal of Botany, West American and General,' founded in 1893 by members of the Department of Botany, University of California, Willis L. Jepson, editor. Without consulting

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the author, the editor changed the title, Flora of the Nob Hill Cobblestones, to the Plant Inhabitants of Nob Hill. This title is misleading as it is more suggestive of the plants cultivated in the gardens of the millionaires above than the lowly plants, chiefly weeds, of the cobblestones below." The list contained the names of 65 species of flowering plants growing on Nob Hill in 1898.

17. Jepson (1901, 1911). A Flora of Western Middle California. The area covered extends from the southern boundaries of Mendocino, Lake, and Colusa counties south to the Pajaro River and Pacheco Pass, and from the Sacramento and San Joaquin rivers westward to the Pacific Ocean. The supply of the first edition was largely destroyed in the San Francisco earthquake and fire of 1906. In the second edition the number of species was slightly increased over that in the first. This work reportedly (Anonymous, 1898) was done originally as a Ph.D. dissertation at the University of California.

18. Heller (1907^a). Botanical Exploration in California. Season of 1907. 1 — The Coast Region. This paper is an annotated list of Heller's collections. The area covered includes the Santa Cruz Mountains, the Mount Hamilton Range, and the Monterey Peninsula. The last three pages contain lists of plants common to the Mount Hamilton Range and the Santa Cruz Mountains, plants found only in the Mount Hamilton Range, and plants found only in the Santa Cruz Mountains.

19. Heller (1907^b). The Flora of Santa Clara County, California. This paper is an annotated list of 81 species observed and collected in the vicinity of Los Gatos.

20. Burnham (1907). Notes on the Flora of San Mateo and Santa

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Clara Counties, California. Burnham's paper is an annotated list of nearly 40 species he collected between 1893 and 1895 in the vicinity of Stanford University while a student at the University. At the time of writing the collection was in the author's personal herbarium. It is now probably at Cornell University.

21. Jepson (1909-1943). A Flora of California. This work which was not finished before Jepson's death is complete only from the Pinaceae through a portion of the Solanaceae. It contains descriptions, keys, synonymy, citations of specimens, and often rather extensive notes on geographical range, habitat preference, color variation, etc. Jepson's will provided funds for the maintenance of his herbarium and library and for the completion of the Flora (Constance, 1949).

22. Abrams (1923-1951). Illustrated Flora of the Pacific States, Vols. I-III. Abrams' Flora was patterned after Britton and Brown's Illustrated Flora of the Northern United States, Canada, and the British Possessions (1896-1898). The format of Volume I of Abrams' Flora is strikingly similar to that of Britton and Brown's Flora and, where possible, Abrams used the plates of the line drawings which had previously been used in Britton and Brown's Flora. Pertinent synonymy and a description is given for each species. Specimens, however, are not usually cited. The fourth volume is in preparation.

23. Jepson (1925). A Manual of the Flowering Plants of California. Jepson's Manual is the only recent completed account of the flora of California and still remains today as the standard work. A total of 4038 species and 1311 varieties are treated (Herriott & Noldeke, 1956).

24. Hayward (1931). The Marsh and Aquatic Plants of the Pajaro

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Valley. This thesis is based on collections made along the Pajaro River, adjacent sloughs, and in the numerous small lakes in southern Santa Cruz County. A total of 172 taxa of vascular plants was included. Specimens were not cited, but most of those upon which the thesis was based are in the Dudley Herbarium.

25. Springer (1935). A Floristic and Ecologic Study of Jasper Ridge. The area studied is about 10 square miles in extent. Springer listed 330 species in the form of an annotated list.

26. Daly (1935). A Botanical Survey of San Gregorio Creek. Daly listed 316 species as occurring in the San Gregorio Creek watershed in San Mateo County on the western slope of the Santa Cruz Mountains, an area of approximately 52 square miles.

27. Barry (1940). A Floristic and Ecological Study of Coal Mine Ridge. This paper included a list of over 200 specific and subspecific taxa which occur in an area a little over one square mile in extent, located about 6.5 miles southwest of Palo Alto.

28. Mock (1941). Some Ecological Relationships of the Vegetation of Lagunita Lake Bed. Included in Mock's thesis is a list of about 30 species of vascular plants from the small seasonal lake on Stanford University campus.

29. Orr (1942). A Study of the Birds in the Big Basin Region of California. This paper is included here as it contains detailed lists of the indicator species of the major plant associations in the area between the drainages of Pescadero and Waddell creeks in southern San Mateo and northern Santa Cruz counties.

30. Moeur (1947). An Ecological and Taxonomic Survey of the

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Spermatophytes of Jasper Ridge. Moeur's thesis covered the same area as Springer's but includes a list of only 299 species of spermatophytes.

31. Meadows (1950). A Manual of the History and Biology of the Big Basin Redwoods State Park, California. This mimeographed Manual, prepared by a part-time park naturalist, contains a list of some of the more conspicuous plants and is by no means complete. Earlier parts of the Manual dealing with the early history of Big Basin are more useful than the natural history section.

32. Voss (1950) An Ecologic and Taxonomic Study of the Spermatophytes of the Campus of the College of Notre Dame, Belmont. The plants, both native and introduced, with the exception of annual ornamentals, have been listed. The list is annotated, but specimens are not cited. The campus occupies 69 acres in central San Mateo County. Much of the area has been disturbed. The introduced plant species number 241, the native only 106.

33. Oberlander (1953). The Taxonomy and Ecology of the Flora of the San Francisco Watershed Reserve. The area studied covers about 22 square miles in northern San Mateo County. The appendix contains a list of 563 species, subspecies, and varieties and indicates the distribution of each with respect to the plant communities in tabular form. Specimens are not cited. Unfortunately the collection upon which this work was based was damaged by insects. Only a portion of the collections, therefore, is preserved in the Dudley Herbarium.

34. Kaufeldt (1954). Observations on San Francisco's Last Major Sand Dune, with Notes on its Flora and Insect Fauna. This paper contains a list of 31 kinds of vascular plants occurring on sand dunes in

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the southwestern part of San Francisco, a habitat now nearly destroyed by housing developments.

35. Mallory (1957). A Summer Flora of Big Basin Redwood State Park, California. This flora (p. 27) was intended "for use during the months of June to September, the months of greatest park attendance." Nearly 200 species are listed, many of them with habitat and distributional notes based on the author's own experience. Specimens are not cited. The title contains an error as the name of the park is Big Basin Redwoods State Park. Mallory was for several seasons a summer park naturalist and submitted this work as a master's thesis at Fresno State College.

36. Howell, Raven, and Rubtzoff (1958). A Flora of San Francisco, California. Descriptions and keys are not included by detailed distributional notes and citations of specimens are. The region covered is the City and County of San Francisco, an area of about 45 square miles. In all, 1132 plants are named. As with all floras, it is inevitable that there are omissions (Thomas & Ernst, 1958), but A Flora of San Francisco, California will stand as a model local flora for many years to come.

37. Walther and McClintock (1958). Guide List to Plants in the Strybing Arboretum. This list is mentioned here because it includes native and introduced weeds as well as the arboretum plants. The Strybing Arboretum is located in Golden Gate Park in San Francisco.

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HISTORY OF BOTANICAL COLLECTING IN THE SANTA CRUZ MOUNTAINS

The history of botanical collecting in the Santa Cruz Mountains probably began in 1791. Until about 1850 the men who collected were botanists, naturalists, or the surgeons of scientific or diplomatic expeditions sent from Europe or from the eastern part of the United States. The specimens collected prior to 1850 were sent to such botanical centers as London, Paris, Prague, St. Petersburg, Cambridge, New York, and eventually Washington. Not until after 1850 were there residents in central California who were interested in the study of botany and natural history.

The following account of botanical collecting is divided into two parts, the first from 1791 to 1850 is arranged chronologically, the second from 1850 to the present is arranged alphabetically by collector. The number of men who collected locally prior to 1850 number about 18. It is quite likely that small collections of plants were made by various travellers, but, if so, these collections never reached the leading botanists of the day and did not contribute to the development of California botany. The number of collectors since 1850 probably approaches one thousand. Of these, only those individuals who have made significant contributions are considered below.

1791 to 1850

The distinction of being the first to collect in the Santa Cruz Mountains appears to belong to Thaddeus Haenke. Haenke, who together with Louis Nee was a botanist on the Spanish Malaspina Expedition, spent from September 13-23, 1791, at Monterey. McKelvey (1955, p. 20)

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suggested that Haenke "might well have gotten to Santa Cruz from Monterey in 1791" and collected the coast redwood.

The coast redwood is definitely known to have been collected near Santa Cruz between November 27 and 29 of 1794 by Archibald Menzies, the surgeon and botanist of Vancouver's Expedition of 1790-1794. Menzies had previously visited San Francisco in November of 1792 and in October of 1793, but during the latter visit was not allowed to go ashore (Eastwood, 1939, p. 337).

The next botanist to visit San Francisco was Georg Heinrich von Langsdorff, the surgeon-naturalist of the von Krusenstern Expedition, who spent the better part of April and May of 1806 in San Francisco Bay. Although scientifically trained, von Langsdorff did little or no collecting and in his journals there is mention of only one plant, the plant we know now as Suaeda californica (McKelvey, 1955, p. 95).

The first really extensive collections from central California were those made in October of 1816 by Adalbert von Chamisso and Johann Friedrich Eschscholz, botanist and surgeon respectively of the Russian ship Rurik, commanded by Captain Kotzebue. Chamisso and Eschscholz made most of their collections in San Francisco near the Presidio. An extensive account of the new species obtained in 1816 was given by Mahr (1932, pp. 391-443). Among the best known plants described from the material collected by Chamisso and Eschscholz is Eschscholzia californica, the California poppy.

Alexander Collie, the surgeon on one of Captain Beechey's voyages, was in central California in 1826 and 1827. Collie was in San Francisco and he journied southward on horseback to the Santa Clara Mission and

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then through the Santa Clara Valley to Monterey. Collie's plant material was eventually worked over by Hooker and Arnott (1830-1841) in The Botany of Captain Beechey's Voyage.

The next known collector was Paolo Emilio Botta who collected in California in 1827 and 1828 for the Museum of Natural History of Paris. Botta is known to have been in San Francisco and Santa Cruz (McKelvey, 1955, p. 360) and is commemorated by the plant now known as Clarkia bottae.

The decade from 1830 to 1840 witnessed several famous botanists in California. Among the foremost of these was David Douglas. Douglas collected in the Santa Cruz Mountains and visited San Francisco, Santa Clara, Santa Cruz, and San Jose in 1831 and 1833 (Howell, 1942, p. 161).

Thomas Coulter, the first botanist to cross the Colorado Desert, was in Monterey in 1832, and although McKelvey (1955, pp. 430-441) does not so state, it is quite possible that Coulter did journey northward into the Santa Cruz Mountains.

Thomas Nuttall may have collected in San Francisco in 1836, the evidence, however, is contradictory. Coville (1899, p. 111) stated that Nuttall ".....did not visit the California coast north of Monterey." Pennell (1936), however, suggested that Nuttall stopped briefly in San Francisco enroute from the Sandwich Islands to Monterey and suggested further that he collected Bahia artemisiaefolia (Eriophyllum stachaedifolium) in San Francisco.

Richard Brinsley Hinds, the surgeon-naturalist aboard the British Admiralty survey ship Sulphur, was in central California in October and November of 1837 and again briefly in September of 1839, but on the

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latter occasion apparently did not go ashore due to then prevalent friction between Britain and Russia (McKelvey, 1955, p. 647). Hinds travelled as far south as Santa Clara, but his most important work in California was an expedition up the Sacramento River, during which he discovered the plant that is now known as Juglans californica var. hindsii.

The assistant naturalist of the Wilkes Expedition, William Dunlop Brackenridge, in company with Titian Ramsey Peal and William Rich, both naturalists, travelled overland from Fort Vancouver to Yerba Buena Island, arriving there on October 28, 1841. Brackenridge travelled southward in the Central Valley, eventually crossed the Inner Coast Range, and reached the Mission of San Jose. From there he went to the Santa Clara Mission and thence to Yerba Buena. An annotated transcript of Brackenridge's California journey has recently been published (Maloney, 1945).

A Frenchman, Eugene Duflot de Mofras, travelled in California from 1841 to 1843, mainly in the Coast Ranges and as far north as Fort Ross (McKelvey, 1955, pp. 717-718). He was in San Francisco, San Jose, and Santa Cruz, and presumably collected plants in and between these localities. His published work according to Watson (1880, p. 555) was ".....a catalogue of the principal plants of the Northwest Coast, which enumerates about two hundred and ninety species, without even the usual specific authorities, and with so many errors of one kind or another as to be of little scientific value."

William Gambel, at one time an assistant curator of the Philadelphia Academy of Natural Sciences, collected in California in

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1841 and 1842. According to the published account of his botanical collections (Nuttall, 1848), none was collected north of the rather vaguely defined locality, "near Monterey." Palmer (1928, p. 278) indicated that Gambel collected ".....at various points along the coast chiefly in the vicinity of the Missions, as far north as San Francisco Bay." Although it is unlikely, some of the plants labeled as coming from near Monterey may have come from the Santa Cruz Mountains.

John Charles Fremont reached the central California coast on his third expedition, 1845-1847. During January and February of 1846 he was in San Francisco, New Almaden, San Jose, and crossed the Santa Cruz Mountains from Los Gatos to Santa Cruz. The view from the summit of the Santa Cruz Mountains impressed him for he wrote (Fremont, 1887, pp. 456-457): "The varied character of the woods and shrubbery on this mountain, which lay between my camp and the Santa Cruz shore, was very interesting to me, and I wished to spend some days there, as now the spring season was renewing vegetation, and the accounts of the great trees in the forest on the west slope of the mountains had aroused my curiosity. Always, too, I had before my mind the home I wished to make in this country, and first one place and then another charmed me....."

The collector for the London Horticultural Society, Karl Theodore Hartweg, a German by birth, arrived in California in 1845. During the following two years he travelled extensively in California and in the Santa Cruz Mountains (Jepson, 1897, pp. 34-35). Hartweg's collections were eventually worked up and published upon by Bentham under the title Plantae Hartwegianae (1848-1857). Hartweg's name is commemorated in such plants as Chorizanthe pungens var. hartwegii and Tauschia hartwegi,

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both of which occur locally.

Between 1846 and 1849, Reverend August Fitch collected in California and sent most of his specimens to Dr. Torrey (Watson, 1880, p. 556). Fitch used such localities as "around San Francisco" and "the valley of San Jose" in his published papers (McKelvey, 1955, p. 1089).

To Albert Kellogg belongs the distinction of being the first resident California botanist (Greene, 1887, p. 145). Kellogg arrived in California in August of 1849, but as I have no record to indicate that he collected plants in the Santa Cruz Mountains prior to 1867, I will defer discussion of him until the second part of this account.

1850 to the Present

LeRoy Abrams (1874-1956) was a member of the faculty of Stanford University from 1906 until his retirement in 1940. He collected in many parts of the Santa Cruz Mountains and his collections, next to those of Dudley, are probably the most important local ones in the Dudley Herbarium. Abrams' first local collections, about 1898, date from his student days at Stanford and his last were made about 1940. A number of his local collections were made in company with Wiggins. A short biographical sketch of his life was recently written (Wiggins, 1957, pp. 61-63). Cupressus abramsiana, a local endemic, is named for Dr. Abrams.

Charles Lewis Anderson (1827-1910) was a physician who lived in Santa Cruz from 1864 until his death (Jepson, 1929, pp. 214-215). Although he is better known for his Nevada and Sierra Nevada collections, Anderson did collect in Santa Cruz County. His grass collection is in the Dudley Herbarium. Anderson's name is commemorated in Arctostaphylos andersonii, one of the more handsome local species of this genus.

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Nils Johan Andersson (1821-1880), the Scandinavian willow expert, was in San Francisco and environs in 1852 during a visit of the ship Eugenie. Most of Andersson's collections are in Sweden but recently a small set of duplicates has been returned to California and is in the herbarium of the California Academy of Sciences in San Francisco.

Elmer I. Applegate collected locally in 1895 as a student at Stanford University and in the 1930's while an honorary curator in the Dudley Herbarium. He is best known, however, for his botanical work in northern California and Oregon. His herbarium of about 15,000 sheets was presented to Stanford in about 1929.

William Sackston Atkinson collected extensively in the vicinity of Stanford in 1900 and 1901. In 1913 he was a scientific illustrator at Stanford University, and continued in this activity until shortly before his death in the middle '20's.

Rimo Charles Bacigalupi, now the curator of the Jepson Herbarium at the University of California at Berkeley, has collected in the Santa Cruz Mountains since about 1922. Most of his early collections are in the Dudley Herbarium.

Charles Fuller Baker (1872-1927), at one time a member of the faculty of Pomona College, collected extensively during the years 1902 and 1903 in the Santa Cruz Mountains. At that time, he was working for a master's degree at Stanford University. Many of his plants were identified by E. L. Greene and some of them were described as new species.

Margaret Alice Barry collected on Coal Mine Ridge near Stanford in 1937 and 1938 in connection with her floristic work in that area. Her specimens are at Stanford.

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Hans Herman Behr (1818-1904), a physician and from 1854 until his death a prominent member of the California Academy of Sciences, collected in many parts of the Santa Cruz Mountains. Of his local collections, many were destroyed in the 1906 fire, but he sent specimens to Hamburg, St. Petersburg, and elsewhere (Ewan, 1957, p. 46). A full account of Behr's life has been written by Gutzkow, Chismore, and Eastwood (1905).

John Milton Bigelow (1804-1878), the botanist and surgeon of the Whipple Expedition (Jepson, 1938), collected in San Francisco in 1854. A few of his collections are at Stanford, but most are in eastern herbaria.

Frederic Theodore Bioletti (1865-1939), a horticulturalist and viticulturalist in the University of California and a member of its faculty from 1891 until his retirement, collected locally in the years 1891-1898. Most of his collections were from San Francisco and many of them were collected with C. Michener. Bioletti studied under Jepson (Cantelow & Cantelow, 1957, p. 85) and wrote a thesis on the genus Nemophila.

Hiram G. Bloomer (1821-1874) was an early member of the California Academy of Sciences. From 1858-1873 he served successively as curator and director. His herbarium was given to the Academy but was lost some time prior to 1906 (Jepson, 1899). A few of his specimens remain in other institutions.

Henry N. Bolander (1831-1897), for many years the State Botanist, collected extensively in the Santa Cruz Mountains and in 1870 published his Catalogue of Plants Growing in the Vicinity of San Francisco (1870). A number of his specimens are in the Dudley Herbarium.

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Mary Katharine (Layne) (Curran) Brandegee (1844-1920), the curator of botany at the California Academy of Sciences from 1883-1894, collected actively in many parts of the Santa Cruz Mountains and especially in San Francisco. In 1892 she was the author of the first catalogue of plants of San Francisco. Most of her collections are now at the University of California at Berkeley, but many duplicates are to be found elsehwere. Ewan (1942) has published a detailed guide to the collections of Mrs. Brandegee and those of her husband, Townshend Stith Brandegee.

Townshend Stith Brandegee (1843-1925), a civil engineer by training and profession, is best known for his botanical exploration of Colorado and Baja California. He resided in San Francisco from 1889-1894 and in Berkeley from 1906 until his death. During these periods he collected in the Santa Cruz Mountains. His major collections are now at Berkeley with those of his wife. A number of specimens distributed from the California Academy of Sciences bear only the name Brandegee. It is thus often difficult to determine whether they were collected by Brandegee or by his wife. A biographical account of Mr. and Mrs. Brandegee was written by Setchell (1926).

William Henry Brewer (1828-1910), for many years the occupant of a chair of geology at Harvard University, was the first botanist of the California State Geological Survey. He collected in many parts of the Santa Cruz Mountains in the 1860's and is the author of part of the first comprehensive state flora (Brewer & Watson, 1876). A good account of his travels is contained in his journal (Farquhar, 1949).

Thomas Bridges (1807-1865) came to California in 1856 (Dall, 1866)

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and collected on the coast for a number of years. Many of the plants he collected were sent to his countryman, W. J. Hooker. After his death his herbarium was acquired by the Smithsonian Institution.

Stewart Henry Burnham (1870-1943) collected in the vicinity of Stanford between 1893 and 1895 and later published a paper upon certain aspects of the local flora (Burnham, 1907). For many years he was a botanist at Cornell University.

Joseph Burtt-Davy (1870-1940) was a botanist in the Experiment Station at the University of California from 1893-1902. During this time he collected a number of plants in the Santa Cruz Mountains. Most of his specimens are now at the herbarium in Berkeley. After leaving the University of California he spent some years in South Africa and eventually became a lecturer in tropical botany at Oxford University. Some of Burtt-Davy's specimens bear only the name Davy.

Evelina Cannon collected extensively in San Francisco, Los Gatos, and other areas in the 1880's and 1890's. A number of her plants have been cited by Brandegee (1892). Miss Cannon's herbarium was given to the California Academy of Sciences after the 1906 fire by a niece, a Miss Carrington (Eastwood, 1947, p. 45; Cantelow & Cantelow, 1957, p. 88). Miss Cannon was for a time employed as an assistant in the herbarium of the Academy.

Joseph Whipple Congdon (1834-1910) is best known for his collections from Mariposa County where he practiced law from 1882-1905. Specimens in the Dudley Herbarium indicate that he collected at various times in San Francisco and in other parts of the Santa Cruz Mountains from 1881-1897. Many of his duplicates are in the Dudley Herbarium and

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his own herbarium was acquired by the University of Minnesota some time after 1910 (Jepson, 1928[b], p. 176).

Horace Davis, who died in 1916, was a lawyer, at one time a judge, and one of the initial trustees of Stanford University. For a number of years Judge Davis had a summer home in the Santa Cruz Mountains near Glenwood. His collections from there date from 1900 to 1914 and were sent both to Dudley at Stanford and to Miss Eastwood at the California Academy of Sciences.

William Russel Dudley (1849-1911) was the first professor of systematic botany at Stanford University. From 1893-1910, Dudley collected in many parts of the Santa Cruz Mountains. Without doubt, he must be considered the most important local collector. There were few plants which he did not collect, or few localities he did not visit. His collections were not widely distributed until recently, despite the wealth of duplicate material. One of the most restricted local endemics, Pedicularis dudleyi, was named for him. A memorial volume, the Dudley Memorial Volume (Branner, et al., 1913), was published by Stanford University shortly after his death.

Harry Arnold Dutton (1873?-1957) collected extensively on the Woodside serpentine in 1900 and graduated with a degree in botany during that year. Although he was in the building supply business, Dutton maintained an interest in botany throughout his life. In September of 1949 Dutton relocated the stand of Cupressus abramsiana on Butano Ridge in southern San Mateo County, a stand which had been "lost" for nearly 50 years. His name is commemorated in an endemic member of the mint family, a plant which is probably now extinct, Acanthomintha obovata

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ssp. duttonii.

Alice Eastwood (1859-1953), curator of the herbarium at the California Academy of Sciences from 1894 to 1949, collected extensively in many parts of the Santa Cruz Mountains. Many of her collections were made with John Thomas Howell, and a few, especially those of Carex, with Howell and J. W. Stacey. Most of Miss Eastwood's specimens are at the California Academy. Numerous biographical sketches have been written of Miss Eastwood. A recent one by Howell (1954) relates important events in her life.

Adolph Daniel Edward Elmer (1870-1942) collected in many parts of the Santa Cruz Mountains during and prior to 1903, the year in which he received an M.A. from Stanford University. Elmer published a number of new species from central California in the early numbers of the Botanical Gazette, among them Pedicularis dudleyi. In 1904, Elmer went to the Philippines and collected in many areas in the far east. He was editor and the chief contributor to Leaflets of Philippine Botany.

Roxana Judkins Stinchfield Ferris came to Stanford as a student in the fall of 1912, received an A.B. in 1915, and an M.A. in 1916. Since then she has been successively an assistant and an assistant curator in the Dudley Herbarium. Her collections from many parts of the Santa Cruz Mountains are in the Dudley Herbarium and duplicates have been distributed elsewhere. Several species, such as Eriogonum saxosa and Chrysothamnus nauseosus, are not known locally except from her collections. Mrs. Ferris is the author of the forthcoming Volume IV of Abrams' Illustrated Flora and a contributor to, and editor of, substantial portions of the other volumes.

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Edward Lee Greene (1843-1915), the first professor of taxonomic botany at the University of California, collected in the Santa Cruz Mountains in the 1880's and 1890's. In 1895 he left Berkeley to go to the Catholic University of America in Washington, D. C. His personal herbarium is now at the University of Notre Dame. Much to the annoyance of other botanists, he stipulated in his will that specimens should never leave his herbarium. Many of his duplicates, among them many isotypes, are fortunately in California herbaria.

Stella Duffield Halsey received a bachelor's degree from Stanford in 1909 and for a time following graduation taught high school in San Diego. She married Harvey Dwight Allen and for many years lived in Los Angeles. Miss Halsey's contribution was a season of intensive collecting in the salt marshes near Palo Alto in 1908. Many of her specimens have not been incorporated into the Dudley Herbarium until recently.

Ida R. Hayward taught biology in Watsonville High School for many years. She collected in the marshes and ponds in southern Santa Cruz County and northern Monterey County from 1929-1931. The results of her work were submitted as a master's thesis at Stanford in 1931 (Hayward, 1931). Miss Hayward deposited one set of her plants at Stanford and for a number of years maintained a small herbarium at Watsonville High School.

Amos Arthur Heller (1867-1944) lived in Los Gatos from about 1904-1909. During this time he collected extensively in the Santa Cruz Mountains. He published the results of his explorations in his own handset and handprinted journal, Muhlenbergia (Heller, 1907[a], 1907[b]). Heller's specimens are among the most widely distributed that were ever

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collected in the Santa Cruz Mountains. Almost every major United States and European herbarium has a set of his California plants. His original herbarium is now part of that of the Brooklyn Botanic Garden.

Vesta F. Hesse has been a resident of Boulder Creek, Santa Cruz County, for many years. She became interested in the local flora and started sending plants to Jepson in the 1930's. After Jepson's death she sent her finds to Stanford, the California Academy, and to the herbarium at Berkeley. Miss Hesse is one of the most astute nonprofessional collectors who has ever dealt with the flora of the Santa Cruz Mountains. Her name is commemorated in Calyptridium parryi var. hesseae, a plant which she found in the Santa Cruz County and which is known elsewhere only from the Mount Hamilton Range.

John Thomas Howell has collected in many parts of the Santa Cruz Mountains since about 1925. Since 1930 he has been on the staff of the California Academy of Sciences. Within the last three years he has collected extensively in San Francisco in preparation for the recently published flora of that city (Howell, Raven, & Rubtzoff, 1958).

Willis Linn Jepson (1867-1946), a now almost legendary figure in California botany and for many years on the faculty of the University of California at Berkeley, collected in many sections of the Santa Cruz Mountains before 1890 to about 1940. Most of his specimens are in the Jepson Herbarium (Constance, 1949) and are important primarily because his published works were based largely on the specimens in his personal collection. Of the several biographical notes and sketches which have appeared, the one by Mason (1947) is among the more succinct.

Beryl Schreiber Jespersen was a systematic botanist at the California

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Forest and Range Experiment Station of the United States Forest Service at Berkeley from 1936-1942 and 1948-1950. During this time she collected in the Santa Cruz Mountains. Most of her specimens are now at the University of California at Berkeley. One of the facets of her work was a detailed study of the genus Arctostaphylos in the Coast Ranges, resulting in the description of two new endemic species of this genus from Santa Cruz County, A. glutinosa and A. silvicola. Mrs. Jespersen is now the research botanist on the editorial staff of the Lane Publishing Company in Menlo Park.

Marcus Eugene Jones (1852-1934), for most of his life a professional botanical collector, botanized in the Santa Cruz Mountains in 1881 and 1882. His specimens were widely distributed and a good set is in the Dudley Herbarium. The biographical sketch by Jepson (1934) relates the major events in Jones' life.

Albert Kellogg (1813-1887) spent several years in Sacramento after arriving in California in 1849, eventually moving to San Francisco. In April of 1853 he was one of the original seven founders of the California Academy of Sciences (Ewan, 1953, pp. 43-46). He collected widely from Alaska south to Baja California. In the Santa Cruz Mountains, Kellogg collected from about 1867-1880. Although many of Kellogg's plants were destroyed in 1906, some duplicates exist elsewhere, some at Stanford, and some in various eastern herbaria. Kellogg often collected with Brannon, Harford, or McLean.

Christian Ferdinand Leithold, a student at Stanford who received an A.B. in physiology in 1896, collected many specimens of flowering plants and ferns in the vicinity of Stanford in 1893 and 1894.

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Herbert Louis Mason, professor of botany and director of the University of California herbarium, collected extensively in the Santa Cruz Mountains between 1917 and 1922 and since then has collected occasionally in this area. His early collections are, for the most part, at Stanford.

James Ira Wilson McMurphy (1871-1943), a member of the Stanford University botany faculty from 1912-1936, collected in many parts of the Santa Cruz Mountains, much of his collecting having been done prior to 1912 while a student.

George Thomas Oberlander, a member of the faculty at San Francisco State College, collected in northern San Mateo County from about 1949 to 1952 in connection with his ecological studies in the Crystal Springs area (Oberlander, 1953).

Samuel Bonsall Parish (1838-1938), one of the pioneer southern California botanists (Cantelow & Cantelow, 1957, p. 97), collected in San Francisco in 1881. His herbarium is now part of the Dudley Herbarium.

Charles Christopher Parry (1823-1890), best known for his botanical collecting in the Rocky Mountains (Ewan, 1950, pp. 34-44), collected briefly in the Santa Cruz Mountains in the 1880's.

R. L. Pendleton collected in the vicinity of Big Basin and elsewhere from about 1907 to 1909. Most of his specimens are at the University of California.

Cyrus Guernsey Pringle (1838-1911), best known as a collector in Mexico, botanized locally in 1882, 1883, and 1884. The herbarium of the University of Vermont is named in his honor and many of his collections are housed there (Davis, 1936, p. 7).

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Josephine Louise Dows Randall graduated from Stanford University in 1909 and received a master's degree in zoology in 1913. For a time, subsequent to her formal training, she was an assistant in the herbarium at Stanford. Later she entered the field of public administration and having retired now lives in Palo Alto. In 1907 and 1908 she collected many plants in the vicinity of Stanford.

Volney Rattan (1840-1915) taught high school in Santa Cruz for many years and later became a professor of botany at the California State Normal School at San Jose (1889-1906). He collected in many parts of the central California area and in 1904 his herbarium of about 2000 sheets was acquired by Stanford University. Unfortunately many of his collections lack even the place and date of collection. Among his plants are a number of specimens collected by H. A. Bolander, but these, too, often lack sufficient data. Of Rattan's local collections, the most valuable are probably those from the serpentine hills south of San Jose. These hills are the type locality of Gilia ambigua Rattan. Rattan's name is commemorated in two species which occur locally, Penstemon rattanii var. kleei and Mimulus rattanii. Jepson (1928[a]) has written a biographical sketch of Rattan.

Peter Raven, currently a graduate student at the University of California at Los Angeles, has collected extensively in San Francisco and is one of the junior authors of the recently published flora of San Francisco (Howell, Raven, & Rubtzoff, 1958).

C. A. Reed, a resident of Santa Cruz, has collected in Santa Cruz County since about 1930. Many of his specimens were sent to Jepson.

Willis Horton Rich, an ichthyologist and for many years a member

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of the faculty of Stanford University, collected in the vicinity of Swanton in the spring and early summer of 1912 while working there on a fisheries research problem. His collection, which is in the Dudley Herbarium, is probably the most complete from that part of the Santa Cruz Mountains.

Lewis Samuel Rose, a research associate in botany at the California Academy of Sciences, has collected in many parts of the Santa Cruz Mountains and has carried on a voluminous exchange program with botanical institutions in other countries and at home. As a result, about 70,000 of the 400,000 specimens in the California Academy herbarium have been obtained through Mr. Rose's efforts (Cantelow & Cantelow, 1957, p. 98).

Everett Winder Rust, a graduate of Stanford University and an entomologist, collected locally while a student at the University. Most of his collections are dated 1906, 1907, or 1908. Some of his collections in the Dudley Herbarium bear the date 1887, but this is probably in error.

Charles Piper Smith (1877-1955) was for many years a high school instructor in San Jose and was an authority on the genus Lupinus. He collected locally from about 1914 until his death. His lupine herbarium, presented to Stanford in 1955 by Mrs. C. P. Smith, is valuable because of the large number of type specimens it contains (Thomas, 1956). His name is commemorated in the combination Lupinus pipersmithii, the type locality of which is Stanford University.

Wilhelm Nikolaus Suksdorf (1850-1932) is best known for his botanical exploration of the Pacific northwest. He was in central California from 1874-1876, but I have no records to indicate that he collected in

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the Santa Cruz Mountains. In June of 1913 he was at Crystal Springs Lake, San Mateo, and San Bruno and in August of that year at Lake Merced (Weber, 1944, p. 74). Suksdorf's 1913 trip to California was made at the bequest of Dr. Franz Petrak, the Czeck botanist who for many years was a leading authority on the genus Cirsium. Of his trip, Suksdorf wrote (l. c., p. 57): "When I went to California in 1913, collecting thistles for a European botanist, I had very little time to spare.....It is the only botanical trip I ever made with the help of another. I did not make money at it, yet it gave me a chance to see other regions and their floras, and I was enabled to add over 700 specimens to my own collection."

Ira Loren Wiggins, director of the Natural History Museum at Stanford, has collected in many parts of the Santa Cruz Mountains, often with Abrams, and has added many valuable specimens to the herbarium. Most of Professor Wiggins' local collections are subsequent to 1930.

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TAXONOMY

Keys to the Divisions, Classes, Subclasses, and Families

Plants herbaceous, reproducing by spores; sporangia borne adaxially (in Selaginella borne on very small sporophylls arranged in a 4-ranked strobilus; in Isoetes borne at the base of long, linear-subulate sporophylls); plants small, the stems not longitudinally grooved; not producing flowers or seeds..I. DIVISION LEPIDOPHYTA.

Plants herbaceous, reproducing by spores; sporangia borne on sporangiophores, the sporangiophores aggregated into a terminal strobilus; plants small or to 1.5 m. tall, the stems longitudinally grooved and often with verticillate branches; plants not producing flowers or seeds.....II. DIVISION CALAMOPHYTA.

Plants herbaceous or woody, reproducing by spores or seeds (if by spores the spores in sporangia on the abaxial surfaces of frond-like sporophylls or in sporocarps in Azolla, Marsilea, and Pilularia); plants small or very large, leaves or fronds usually present.
III. DIVISION PTEROPHYTA.

I. DIVISION LEPIDOPHYTA

Stems elongate, densely clothed with leaves; leaves ovate, under 1 cm. long.....1. **Selaginellaceae.**
Stems very short, corm-like; leaves appearing basal, linear, over 5 cm. long.....2. **Isoetaceae.**

II. DIVISION CALAMOPHYTA

One family.....1. **Equisetaceae.**

III. DIVISION PTEROPHYTA

Plants herbaceous (the rhizomes sometimes woody), sometimes free-floating or submerged aquatics; not reproducing by seeds; without flowers and cones; fronds or sporophylls with abaxial sori or the sori borne in sporocarps.....1. Class **Filicinae.**
Trees, shrubs, or herbs (often aquatic); reproducing by seeds; flowers or cones present.
  Plants woody, trees or shrubs; flowers none; seeds borne on the adaxial surface of naked scales, the scales forming a cone (or in Taxus a fleshy berry-like fruit); leaves linear, needle-like or decussate and scale-like.....2. Class **Gymnospermae.**
  Plants woody or herbaceous; flowers present; seeds enclosed in an ovary; leaves various, rarely needle-like.
3. Class **Angiospermae.**

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1. Class Filicinae

Plants small, free-floating, aquatic; leaves small, imbricate. 1. Salviniaceae.

Plants not small, free-floating and aquatic, if aquatic then rooting on the bottom.

Leaves filiform or quadrifoliolate; sori borne in sporocarps; plants of shallow water or muddy banks.....2. Marsiliaceae.

Leaves neither filiform or quadrifoliolate; sori not borne in sporocarps; plants of moist or dry situations.

Fertile and sterile leaves seemingly dimorphic; plants fleshy; leaves not circinate in vernation; sporangia lacking an annulus.....3. Ophioglossaceae.

Fertile and sterile leaves not dimorphic; plants not fleshy; leaves circinate in vernation; sporangia with an annulus. 4. Polypodiaceae.

2. Class Gymnospermae

Leaves decussate, scale-like; cones globose, the scales more or less peltate.....3. Cupressaceae.

Leaves alternate, needle-like; cones ovoid or elongate, not globose, the scales usually distinctly flattened.

Leaves in bundles; cones usually over 7 cm. long, often asymmetrical at least at the base.....2. Pinaceae.

Leaves solitary; cones usually under 7 cm. long, symmetrical.

Leaves not decurrent on the stems; cones 4-7 cm. long, the bracts subtending the ovuliferous scales conspicuous and exceeding the scales.....2. Pinaceae.

Leaves not decurrent on the stems; cones under 3.5 cm. long; bracts not conspicuous.

Leaves falling separately; cone modified into a fleshy, 1-seeded, drupe-like "fruit".....1. Taxaceae.

Small twigs deciduous with several leaves attached; cone many-seeded, not fleshy.....4. Taxodiaceae.

3. Class Angiospermae

Flowers usually 3-merous; leaves usually with parallel veins; plants herbaceous; cotyledon 1.....1. Subclass Monocotyledoneae.

Flowers usually 4- or 5-merous; leaves usually net-veined; plants herbaceous or woody; cotyledons usually 2. 2. Subclass Dicotyledoneae.

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1. Subclass Monocotyledoneae

Plants aquatic.
- Marine plants.....5. Zosteraceae.
- Fresh or brackish water plants.
  - Plants minute, leafless, thallose, under 5 mm. long. 14. Lemnaceae.
  - Plants larger, leaves present, not thallose, over 5 mm. long.
    - Perianth present, conspicuously petaloid.
      - Perianth segment 1; flowers in spikes; leaves basal, over 6 cm. long.....6. Aponogetonaceae.
      - Perianth segments 3 or 6; flowers solitary in the axils of leaves; leaves cauline, under 1.5 cm. long. 10. Hydrocharitaceae.
    - Perianth absent or, if present, not conspicuous.
      - Flowers solitary in the leaf axils; leaves minutely toothed. 4. Naiadaceae.
      - Flowers not solitary, in spikes or clusters; leaves not toothed.
        - Leaves fleshy, terete in cross section, linear-subulate. 7. Lilaeaceae.
        - Leaves not fleshy, not terete, usually with a blade (if linear, then filiform).....3. Potamogetonaceae.

Plants terrestrial, often growing in water, but the major portion of the plant aerial.
- Perianth present, petaloid or fleshy in part, never scale-like or bract-like.
  - Perianth segments small, fleshy, green, 2-3 mm. long. Plants of salt marshes.....8. Juncaginaceae.
  - Perianth segments usually larger, usually colored or white.
    - Carpels many, becoming achenes.....9. Alismaceae.
    - Carpels 3, not becoming achenes.
      - Ovary superior.
        - Fruit a capsule; plants with bulbs or rootstocks.
          - Styles 3, distinct.....16. Melanthaceae.
          - Style 1, entire to 3-lobed or -parted. 17. Liliaceae.
        - Fruit usually a berry; plants with rootstocks. 18. Convallariaceae.
      - Ovary inferior.
        - Corollas actinomorphic; stamens 3..19. Iridaceae.
        - Corollas zygomorphic; stamen usually 1. 20. Orchidaceae.
- Perianth present or absent, not petaloid, not fleshy, often scale-like or bract-like.
  - Plants with a large spathe subtending the spadix. 13. Araceae.
  - Plants without a spathe.
    - Inflorescences of two types, one of single, basal, sessile pistillate flowers, the other scapose, of numerous, staminate, pistillate or perfect flowers; leaves terete, fleshy. 7. Lilaeaceae.

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Inflorescences of one type; leaves various.
Flowers without conspicuous bractlets; inflorescences large, compact, the flowers unisexual.
Pistillate inflorescences elongate, cylindric.
1. Typhaceae.
Pistillate inflorescences of globose heads.
2. Sparganiaceae.
Flowers with conspicuous, often scarious bractlets; inflorescences large or small, usually not conspicuously compact, the flowers perfect or unisexual.
Flowers not in the axils of dry chaffy bracts; perianth of 6 parts; fruit a capsule..15. Juncaceae.
Flowers in the axils of dry chaffy bracts; perianth none; fruit an achene or caryopsis.
Culms commonly round in cross section, hollow; flowers subtended by 2 bracts.....11. Poaceae.
Culms commonly triangular in cross section, solid; flowers subtended by 1 bract.
12. Cyperaceae.

2. Subclass Dicotyledoneae

Calyx and corolla fused to form a woody, deciduous calyptra; stamens numerous; trees; leaves aromatic; fruit a woody capsule; ovary inferior.....84. Myrtaceae.
Plants not as above in all respects.

A. Corollas absent; calyx present or absent

Either the staminate or the pistillate flowers or both in catkins; plants dioecious or monoecious; trees or shrubs.
Both staminate and pistillate flowers in catkins; fruit not a nut, less than 1 cm. long.
Leaves opposite. Chaparral plants.....90. Garryaceae.
Leaves alternate. Not chaparral plants.
Pistillate catkins herbaceous; leaves linear, lanceolate, elliptic, or deltoid, rarely ovate, rarely sharply serrate.
Plants dioecious; leaves deciduous; seeds comose; fruit not covered with a white waxy coating.
22. Salicaceae.
Plants monoecious; leaves evergreen; seeds not comose; fruit covered with a white waxy coating.
23. Myricaceae.
Pistillate catkins woody, falling apart when mature; leaves ovate, sharply serrate.....24. Betulaceae.
Only the staminate flowers in catkins; pistillate flowers sometimes clustered; fruit a nut, 1-4 cm. long.
Fruit surrounded by a scaly cup or a spiny bur; trees, or if shrubs the mature leaves coriaceous...26. Fagaceae.

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Fruit surrounded by an herbaceous, tubular involucre; shrubs, the leaves never coriaceous.....27. Corylaceae.

Flowers not in catkins; plants dioecious or monoecious or the flowers perfect; herbs, occasionally trees or shrubs.

Ovary superior.

Flowers hypogynous.

Calyx lacking; pistil 1.

Plants with perfect flowers; inflorescences subtended by a petaloid involucre.....21. Saururaceae.

Plants monoecious; involucre present or absent, if present not petaloid or only partly so.

Plants aquatic.

Leaves opposite, entire; ovary 4-celled, winged, smooth.....66. Callitrichaceae.

Leaves whorled, finely dissected; fruit 1-celled, sometimes winged, usually spiny or tuberculate. 39. Ceratophyllaceae.

Plants terrestrial.

Trees; juice not milky; flowers in capitate clusters arranged along a naked axis. 51. Platanaceae.

Herbs; juice milky; flowers not in capitate clusters. 65. Euphorbiaceae.

Calyx present; pistils 1 to many.

Pistils several to many, distinct.....40. Ranunculaceae.

Pistil 1.

Ovary 1-celled.

Fruit a capsule, dehiscent.

Leaves alternate, stellate-pubescent. 65. Euphorbiaceae.

Leaves opposite, not stellate-pubescent.

Calyx synsepalous.

Stipules lacking; plants erect. 95. Primulaceae.

Stipules present; plants prostrate. 35. Aizoaceae.

Calyx of distinct sepals..37. Caryophyllaceae.

Fruit various, indehiscent or occasionally circumscissile.

Fruit of achenes or utricles, dry.

Herbage often with stinging hairs; calyx 4-parted; stamens 4; stigmas often tufted. 27. Urticaceae.

Herbage never with stinging hairs; calyx variously lobed or rarely absent in pistillate flowers; stamens 1-9; stigmas not tufted.

Plants usually scurfy; flowers perfect or unisexual, when unisexual the pistillate lacking a calyx, but enclosed within 2 bracts..31. Chenopodiaceae.

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Plants not scurfy; flowers various.
Calyx nut tubular, usually not corolla-like; leaves alternate, opposite, or basal: stipules present or not.
Fruit an achene, these trigonous or lenticular; calyx herbaceous or often colored; stipules present or lacking.
30. Polygonaceae.
Fruit an utricle; calyx never colored, scarious; stipules lacking.
32. Amaranthaceae.
Calyx tubular, simulating the corolla; leaves opposite; stipules lacking.
33. Nyctaginaceae.
Fruit a berry or a drupe, fleshy.
Leaves compound; perennial herbs; fruit a berry.
40. Ranunculaceae.
Leaves simple; trees; fruit a drupe.
42. Lauraceae.
Ovary 2-5-celled.
Shrubs or trees.
Fruit a capsule; calyx showy; herbage stellate-pubescent; leaves simple.
74. Sterculiaceae.
Fruit a samara; calyx not showy; herbage not stellate-pubescent; leaves simple or compound.
Styles 2; fruit a double samara.
70. Aceraceae.
Style 1; fruit a single samara.
97. Oleaceae.
Herbs or occasionally somewhat woody perennial herbs.
Plants usually with milky juice; flowers monoecious.
65. Euphorbiaceae.
Plants without milky juice; flowers perfect.
35. Aizoaceae.
Flowers perigynous.
Flowers in umbels.....72. Rhamnaceae.
Flowers solitary or clustered, but not in umbels.
Stipules present.
Fruit an achene; erect herbs or shrubs.
52. Rosaceae.
Fruit an utricle; prostrate herbs..34. Illecebraceae.
Stipules absent.
Leaves alternate; shrubs; stamens 8.
82. Thymelaeaceae.
Leaves opposite; prostrate herbs; stamens 5.
33. Nyctaginaceae.
Ovary inferior.
Plants parasitic on various trees, mainly members of the Pinaceae and Fagaceae; leaves or scales opposite.
28. Loranthaceae.

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Plants not parasitic; leaves opposite or alternate.
Leaves alternate; plants terrestrial.
Leaves divided; ovary 1-celled.....81. Datiscaceae.
Leaves entire; ovary with more than 1 cell.
Leaves succulent, deltoid-ovate....35. Aizoaceae.
Leaves not succulent, cordate at the base.
29. Aristolochiaceae.
Leaves opposite or whorled; plants aquatic or of very wet habitats.
Leaves opposite, entire; fruit a 4-celled capsule.
85. Onagraceae.
Leaves whorled, entire or dissected; fruit of 1-4 nutlets.
86. Haloragidaceae.

A. Corollas present; calyx present

B. Petals distinct

Ovary superior.
Stamens hypogynous.
Stamens 10 or more.
Pistils 2 or more.....40. Ranunculaceae.
Pistil 1.
Leaves opposite, simple.
Stamens united into groups; fruit a capsule.
75. Hypericaceae.
Stamens all distinct; fruit separating into separate carpels.....43. Papaveraceae.
Leaves alternate or basal, simple or compound.
Ovary 1-celled.
Sepals caducous.....43. Papaveraceae.
Sepals persistent.
Petals 13-15; leaves basal, succulent.
36. Portulacaceae.
Petals 1, 2, or 5; leaves cauline, succulent or not.
Leaves compound.
Fruit a legume; petals 5; shrubs or trees.
55. Mimosaceae.
Fruit a berry; petals 1-2; perennial herbs.
40. Ranunculaceae.
Leaves simple.
Sepals 2; plants herbaceous.
36. Portulacaceae.
Sepals 5; plants woody.
78. Cistaceae.
Ovary with 5 or more cells.
Plants aquatic; stamens distinct; petals 10-20.
38. Nymphaeaceae.
Plants terrestrial; stamens united into a tube around the gynoecium; petals 5...73. Malvaceae.

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Stamens less than 10.
Pistils more than 1.
Pistils several times as many as the sepals; leaves usually dissected, not fleshy.....40. Ranunculaceae.
Pistils 4 or 5; leaves entire, fleshy.
47. Crassulaceae.
Pistil 1.
Flowers zygomorphic.
Flowers papilionaceous.....56. Fabaceae.
Flowers not papilionaceous.
One petal spurred; stamens regularly 5.
79. Violaceae.
Petals not spurred; stamens 6 or from 3-40.
Leaves compound; stamens regularly 6, united into 2 sets.....44. Fumariaceae.
Leaves simple; stamens 3-40, separate.
46. Resedaceae.
Flowers actinomorphic.
Flowers cruciferous.....45. Brassicaceae.
Flowers not cruciferous..
Leaves palmately compound or trifoliolate.
Sepals 5; stamens 5; leaves with an acid taste.
58. Oxalidaceae.
Sepals 6; stamens 10; leaves lacking an acid taste.
41. Berberidaceae.
Leaves not palmately compound.
Ovary 1-celled.
Leaves pinnately compound, prickly.
41. Berberidaceae.
Leaves simple, not prickly.
Calyx of 2 sepals.....36. Portulacaceae.
Calyx of more than 2 sepals, distinct or not.
Leaves opposite.
Leaves not succulent; plants of various habitats...37. Caryophyllaceae.
Leaves succulent; plants of saline soils along the coast.
77. Frankeniaceae.
Leaves alternate or basal.
Leaves basal; plants not saprophytic.
96. Plumbaginaceae.
Leaves much reduced, cauline; plants saprophytic.
92. Monotropaceae.
Ovary with 2 or more cells.
Stipules present.
Leaves simple, entire; plants aquatic or growing in very wet areas; stamens 2-5.
76. Elatinaceae.

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Leaves simple or compound, if simple the margins not entire; plants terrestrial; stamens 10 (occasionally some sterile).
Leaves simple or variously dissected, rarely compound; petals white to pink, or lavender; fruit not spiny; styles 5.....57. Geraniaceae.
Leaves compound; petals yellow; fruit spiny; style 1.
61. Zygophyllaceae.
Stipules lacking.
Leaves compound; fruit a samara.
97. Oleaceae.
Leaves simple; fruit not a samara.
Styles 2-5; flowers 5-merous; petals readily deciduous.
60. Linaceae.
Style 1; flowers 4- or 5-merous.
Plants woody; leaves at most toothed; fruit a capsule.
Leaves not reduced, resinous-dotted.
93. Ericaceae.
Leaves reduced, not resinous-dotted.
91. Pyrolaceae.
Plants herbaceous; leaves dissected; fruit separating into carpels.
67. Limnanthaceae.

Stamens perigynous.
Stamens borne on a disk lining the calyx at the base.
Trees and shrubs.
Fruit a samara.....70. Aceraceae.
Fruit not a samara.
Leaves palmately compound.....71. Hippocastanaceae.
Leaves not palmately compound.
Petals hooded; stamens opposite the petals.
72. Rhamnaceae.
Petals not hooded; stamens alternate with the petals.
Leaves opposite; seeds bright orange, with an aril.
69. Celastraceae.
Leaves alternate; seeds not orange, not with an aril.
Leaves glandular-dotted...62. Rutaceae.
Leaves not glandular-dotted.
Leaves pinnately compound.
63. Simaroubaceae.
Leaves simple or trifoliolate.
68. Anacardiaceae.
Stamens borne on the calyx, or hypanthium.
Stipules lacking; leaves simple; pistil 1.
Style and stigma 1.....83. Lythraceae.
Styles and stigmas more than 1.....48. Saxifragaceae.

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Stipules usually present; leaves simple or compound; pistil 1 to several.
Fruit not a drupe.....52. Rosaceae.
Fruit a drupe.....53. Amygdalaceae.
Ovary inferior or partly so.
Trees and shrubs.
Stamens 8-12, 10 or 20.
Leaves alternate; fruit a pome.....54. Malaceae.
Leaves opposite; fruit a capsule.....49. Hydrangeaceae.
Stamens 4 or 5.
Petals hooded; stamens opposite the petals.
72. Rhamnaceae.
Petals not hooded; stamens alternate with the petals.
Leaves opposite; style 1.....39. Cornaceae.
Leaves alternate; styles 2.....50. Grossulariaceae.
Herbs.
Petals numerous; plants very fleshy.....35. Aizoaceae.
Petals not more than 5; plants not fleshy (except in the Portulacaceae).
Inflorescences umbellate.
Fruit not a berry, breaking into 2, 1-seeded carpels; styles 2.....88. Umbelliferae.
Fruit a berry, black at maturity; styles 5.
87. Araliaceae.
Inflorescences not umbellate.
Styles 2-5.....48. Saxifragaceae.
Style 1 or none.
Style none; plants aquatic; leaves whorled.
86. Haloragidaceae.
Style 1; plants rarely aquatic; leaves not whorled.
Sepals 2; plants fleshy.....36. Portulacaceae.
Sepals 4 or 5; plants not fleshy.
Herbage rough-hairy (sticking readily to cloth); flowers 5-merous; fruit 1-celled.
80. Loasaceae.
Herbage not rough-hairy (not sticking readily to cloth); flowers usually 4-merous; fruit usually 4-celled.....85. Onagraceae.

B. Petals united at least at the base

Stamens more than 5.
Petals united at the base, not tubular, urceolate, or campanulate.
Pistils 4 or 5; herbage succulent.....47. Crassulaceae.
Pistil 1; herbage not usually succulent.
Corollas zygomorphic.
Flowers papilionaceous; petals 3 or 5.
Leaves compound; fruit a legume; petals 5.
56. Fabaceae.
Leaves simple; fruit a capsule; petals 3.
64. Polygalaceae.

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Flowers not papilionaceous; petals 4, in 2 dissimilar sets. 44. Fumariaceae.
Corollas actinomorphic.
Leaves trifoliolate; stamens 10.....58. Oxalidaceae.
Leaves simple; stamens numerous.....73. Malvaceae.
Corollas tubular, urceolate, or campanulate....93. Ericaceae.
Stamens 5 or less, epipetalous.
Ovary superior.
Corollas actinomorphic.
Pistils 2, the stigmas united; plants with milky juice.
Stamens united with the stigmas; the column with hood-like appendages.....100. Asclepiadaceae.
Stamens not united with the stigmas; hoods lacking. 99. Apocynaceae.
Pistil 1; plants without milky juice.
Stamens opposite the corolla-lobes, equalling them in number. 95. Primulaceae.
Stamens alternate with the corolla-lobes, equalling them in number or fewer.
Corollas dry-scarious; inflorescences scapose, spike-like. 111. Plantaginaceae.
Corollas colored; inflorescences various.
Ovary 4-celled, usually 4-lobed, splitting into 4 nutlets; inflorescence scorpioid. 104. Boraginaceae.
Ovary 1, 2, or 3-celled, usually not lobed not splitting into 4 nutlets; inflorescence scorpioid or not.
Ovary 3-celled; style 3-cleft. 102. Polemoniaceae.
Ovary 1-2 celled; style not 3-cleft.
Sepals distinct or united only at the base, 5.
Plants not trailing or twining; plants not parasitic; flowers often in scorpioid inflorescences..103. Hydrophyllaceae.
Plants trailing or twining; plants sometimes parasitic; flowers not in scorpioid inflorescences....101. Convolvulaceae.
Calyx 4-5-toothed.
Leaves alternate; ovary 2-celled. 107. Solanaceae.
Leaves opposite; ovary 1-celled. 98. Gentianaceae.
Corollas zygomorphic, usually 2-lipped.
Fertile stamens 5.....108. Scrophulariaceae.
Fertile stamens 2 or 4.
Fruit of 2 or 4 nutlets; leaves opposite.
Ovary 4-lobed; plants with a mint-like odor; stamens 4. 104. Menthaceae.
Ovary not lobed; plants lacking mint-like odor; stamens 2 or 4.....105. Verbenaceae.

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Fruit a capsule; leaves opposite or alternate.
Ovary 2-celled.....108. Scrophulariaceae.
Ovary 1-celled.
Plants aquatic, not parasitic; stamens 2; leaves green, finely dissected.....109. Lentibulariaceae.
Plants terrestrial, parasitic; stamens 4; leaves not green, entire.....110. Orobanchaceae.

Ovary inferior.
Stamens distinct.
Leaves alternate; flowers actinomorphic.
117. Campanulaceae.
Leaves opposite or whorled; flowers actinomorphic or zygomorphic.
Stamens 1-3; flowers zygomorphic; fruit 1-celled; slender herbs.....115. Valerianaceae.
Stamens 4-5; flowers zygomorphic or actinomorphic; fruit 1-5-celled; herbs or shrubs.
Ovary 1-celled; flowers in dense involucrate heads.
114. Dipsacaceae.
Ovary 2-5-celled; flowers not in dense heads, not involucrate.
Flowers actinomorphic; leaves opposite or whorled; ovary 2-celled; plants herbaceous or woody; stems often with retrorse hairs.
112. Rubiaceae.
Flowers actinomorphic or zygomorphic; leaves opposite; ovary 2-5-celled; plants woody, shrubs, trees, or vines; stems without retrorse hairs.
113. Caprifoliaceae.
Stamens united into a tube around the style.
Flowers not in heads.
Stamens 3; plants with tendrils, vine-like; leaves palmately veined.....116. Cucurbitaceae.
Stamens 5; plants without tendrils, not vine-like; leaves pinnately veined.....118. Lobeliaceae.
Flowers in involucrate heads.....119. Compositae.

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I. DIVISION LEPIDOPHYTA

1. SELAGINELLACEAE

1. Selaginella Beauv. Prod. Aethog. 101. 1805.

1. Selaginella bigelovii Underw. Bull. Torr. Bot. Club 25: 130. 1898.

Local distribution: Vicinity of Mount Umunhum and Los Gatos where it commonly grows on serpentine and other rock outcroppings. It is especially common under Pinus sabiniana.

General distribution: Santa Clara and Contra Costa counties south through the Coast Ranges and the mountains of southern California to northern Baja California, also in the cape region of Baja California.

Specimens examined: Little Los Gatos Creek, Wooley-Dod 193 (CAS); Los Gatos Creek near dam, Abrams 3052; Sierra Azula Ridge, Ferris 2090; Mt. Umunhum, Thomas 3966.

2. ISOETACEAE

1. Isoetes L. Sp. Pl. 1100. 1753.

Both species of Isoetes, listed below, have been poorly collected, probably due to their habitats and the lack of conspicuous features.

Plants terrestrial; velum complete; corm 3-lobed.....1. I. nuttallii.
Plants amphibious; velum incomplete; corm 2-lobed.....2. I. howellii.

1. Isoetes nuttallii A. Br. Amer. Nat. 8: 215. 1874.

Local distribution: To be expected occasionally in moist shaded areas along or near streams and in moist meadows.

General distribution: Washington south to southern California.

Specimens examined: Foot of Blooms Grade, Hesse 589, 597; Near Boulder Creek, Thomas 7000.

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2. Isoetes howellii Engelm. Trans. St. Louis Acad. 4: 385. 1882.

Local distribution: Occasional in ponds and ditches.

General distribution: Southern British Columbia and Montana south to southern California.

Specimens examined: Woodside Valley Pond, Dudley, Oct. 31, 1909; Menlo Park, Abrams 10108; Coal Mine Ridge, McMurphy, July 28, 1906.

II. DIVISION CALAMOPHYTA

1. EQUISETACEAE

1. Equisetum L. Sp. Pl. 1061. 1753.

Strobili blunt or slightly acute; stems annual.
- Stems dimorphic, the fertile ones brown, lacking chlorophyll, usually unbranched.
  - Sterile stems very slender, usually 4 mm. or less in diameter, often with the lateral branches asymmetrically arranged; strobili 0.5-3.5 cm. long, rarely found locally. 1. E. arvense.
  - Sterile stems stout, usually over 5 mm. in diameter, usually with the lateral branches symmetrically arranged; strobili 4-9.5 cm. long, usually present..2. E. telmateia var. braunii.
- Stems not dimorphic, the fertile ones green. 3. E. funstoni.

Strobili distinctly apiculate.
- Sheaths longer than broad; the lower ones sometimes with a dark band. 4. E. laevigatum.
- Sheaths about as long as broad; all with two dark bands. 5. E. hyemale var. californicum.

1. Equisetum arvense L. Sp. Pl. 1061. 1753.

Local distribution: Occasional in moist, often sandy soil along streams, rarely producing fertile shoots in the Santa Cruz Mountains.

General distribution: Circumpolar in arctic and north temperate regions.

Specimens examined: Rancho del Oso, Thomas 2752; Boulder Creek, Hesse 552; La Selva Beach, Thomas 3041; Pajaro River, Thomas 1533.

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2. Equisetum telmateia Ehrh. var. braunii (Milde) Milde, Monog. Equis. 246. 1865.

Local distribution: Probably our most common horsetail, growing along streams in moist soil, often with Woodwardia fimbriata and Asarum caudatum in redwood - douglas fir forests.

General distribution: British Columbia south to southern California and on the Keweenaw Peninsula of Michigan.

Specimens examined: Cemeteries, northern San Mateo Co., Elmer 4602; San Francisco Watershed Reserve, Oberlander 568; Between Skyline Blvd. and La Honda, Wiggins 5103; Coal Mine Ridge, Barry 263; Glenwood, Davis, Sept. 1907; Near Santa Cruz, Thomas 2904; Smith Grade, Thomas 2806.

3. Equisetum funstoni Eaton, Fern Bull. 11: 10. 1903.

Local distribution: Santa Cruz and southern Santa Clara counties, usually in sandy soil along river bottoms, especially common along the Pajaro River.

General distribution: Southern Washington south to northern Baja California through the Coast Ranges and the Sierra Nevada.

Specimens examined: Near Gilroy, Dudley, May 29, 1899; Felton, Hesse 280, 259; Pajaro River, Thomas 2583; Pajaro River at Watsonville, Dudley, Sept. 19, 1909; Thomas 1571.

4. Equisetum laevigatum A. Br. Amer. Journ. Sci. 46: 87. 1844.

Local distribution: Occasional in the Santa Cruz Mountains usually in moist situations along streams.

General distribution: British Columbia south to southern California, east to New York and Texas.

Specimens examined: Los Gatos, McMurphy, May 1, 1906; Santa Cruz, Hesse 281.

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5. Equisetum hyemale L. var. californicum Milde, Nov. Act. Acad. Caes. Leop. Carol. 32: 517. 1867.

Local distribution: Occasional along creeks and streams, San Francisco south to Santa Clara and Santa Cruz counties.

General distribution: Alaska south to Santa Clara and Santa Cruz counties, California, Arizona, and New Mexico.

Specimens examined: San Francisco, Congdon, Apr. 27, 1881; Pescadero Creek, Dudley, June 6, 1895; Black Mt., Dudley, Jan. 24, 1904; Los Gatos, Dudley, Oct. 11, 1902; Waddell Creek, Dudley, Sept. 23, 1901; Boulder Creek, Hesse 325.

III. DIVISION PTEROPHYTA

1. Class Filicinae

1. SALVINIACEAE

1. Azolla Lam. Encycl. 1: 343. 1783.

1. Azolla filiculoides Lam. Encycl. 1: 343. 1783.

Local distribution: Fairly common in small ponds, stagnant pools along streams, and in temporary puddles.

General distribution: Alaska south to California and Arizona, then south through central America to the tip of South America.

Specimens examined: San Francisco (DS - 94241); Millbrae, Rattan, Mar. 1883; Searsville Lake, Blake 9944; Coal Mine Ridge, Ferris 2102; Davenport Landing, Thomas 3649; Camp Evers, Hesse 554; Aptos, Abrams 3044.

2. MARSILEACEAE

Leaves with a 4-foliolate blade.....1. Marsilea.
Leaves filiform.....2. Pilularia.

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1. Marsilea L. Sp. Pl. 1099. 1753.

1. Marsilea vestita Hook. & Grev. Icon. Fil. 2: pl. 159. 1831.

Local distribution: Known from Lake Lagunita, Stanford University campus, and from the San Francisco Watershed Reserve (Oberlander, 1953, p. 124).

General distribution: British Columbia south to Baja California.

Specimens examined: Lake Lagunita, Wolf 3749; Thomas 4732.

Marsilea vestita, as considered here, excludes M. mucronata A. Br. Marsilea vestita occurs west of the Great Basin and the Rocky Mountains while M. mucronata occurs in them and eastward (see Weatherby, 1943, p. 325).

Sporocarps of M. vestita were introduced into Lake Lagunita by Professor Douglas H. Campbell. Wolf's specimen, cited above, was collected in 1929. Mine was collected in 1955. This species has maintained itself for over a quarter of a century. It must therefore be considered as part of our flora. It grows in shallow water, 4-6 inches deep, along the shore of the lake. Lake Lagunita is drained yearly during the latter part of May when it begins to become stagnant. Recently, about 1955, M. vestita was introduced into a small artificial pond at the Stanford University Experimental Garden and has spread rapidly.

2. Pilularia L. Sp. Pl. 1100. 1753.

1. Pilularia americana A. Br. Monatsb. Kön. Acad. Wiss. Berlin 1863: 435. 1863.

Local distribution: Known only from a seasonal pond near Morgan Hill.

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General distribution: Central Oregon south to northern Baja California, also in Kansas, Arkansas, Texas, and Georgia.

Specimen examined: Morgan Hill, Howell 5195 (CAS).

Careful collecting in the Santa Clara Valley and elsewhere would probably reveal the existence of additional localities for this species.

3. OPHIOGLOSSACEAE

1. Botrychium Swartz, Journ. Bot. Schrad. 1800: 110. 1801.

1. Botrychium silaifolium Pres. var. californicum (Underw.) Jepson, Man. Fl. Pl. Calif. 26. 1925.

Local distribution: Known locally only from bogs near Camp Evers in Santa Cruz County.

General distribution: Coast Ranges of southern Oregon south through the California Coast Ranges to Santa Cruz County, and in the Sierra Nevada from Plumas County to Tulare County.

Specimen examined: Camp Evers, Hesse 575.

4. POLYPODIACEAE

Sori not marginal, but rather on the abaxial surface of the frond.
- Indusium lacking.
  - Fronds not golden-yellow on the abaxial surface; fronds once-pinnate.....1. Polypodium.
  - Fronds golden yellow on the abaxial surface; at least the basal pinnae 2-pinnate.....2. Pityrogramma.
- Indusium present.
  - Sori linear, in two parallel rows, one on either side of the mid-vein; fronds 1-3 m. tall.....3. Woodwardia.
  - Sori not linear, not in definite rows; fronds usually under 1.5 m. tall.
    - Indusium peltate, orbicular.....4. Polystichum.
    - Indusium not peltate.
      - Stipe scaly below the blade, occasionally above; fronds annual; indusium inconspicuous when sporangia are mature.

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Fronds commonly under 2.5 dm. long, 1-2-pinnate; indusium attached at the base.....5. Cystopteris.
Fronds commonly over 5 dm. long, 2-3-pinnate; indusium attached along one side.....6. Athyrium.
Stipe scaly both above and below the blade; fronds usually perennial; indusium conspicuous.....7. Dryopteris.
Sori marginal or submarginal.
Fronds dimorphic, segments of fertile fronds narrowly linear. 8. Blechnum.
Fronds not dimorphic.
Pinnae very thin, fragile, finely veined; sporangia partly hidden by the reflexed lobes.....9. Adiantum.
Pinnae thick, often dry and brittle.
Large coarse ferns, often to 2 m. tall; fronds arising singly. 10. Pteridium.
Small ferns, usually under 2.5 dm. tall; fronds clustered.
Abaxial surface of blade densely hairy and scaly; indusium present.....11. Cheilanthes.
Abaxial surface of blade glabrous; indusium lacking. 12. Pellaea.

1. Polypodium L. Sp. Pl. 1082. 1753.

Fronds very coriaceous, segments rounded at the tips. 1. P. scouleri.
Fronds not coriaceous, segments rounded to acute.
Segments acute to obtuse or rounded. Common....2. P. californicum.
Segments attenuate, acute. Rare.....3. P. glycyrrhiza.

1. Polypodium scouleri Hook. & Grev. Icon. Fil. 1: pl. 56. 1829.

Local distribution: Rock crevices on exposed hills along the coast in San Francisco and northern San Mateo counties.

General distribution: Along or near the coast from Vancouver Island, British Columbia, south to northern San Mateo County, also on Santa Cruz Island, Santa Barbara County, and Guadalupe Island.

Specimens examined: Sunset Heights, Congdon, Apr. 25, 1893; San Bruno Hills, Heller 8370; Abrams, May 26, 1926; Cayhill Ridge, Oberlander 305.

2. Polypodium californicum Kaulf. Enum. Fil. 102. 1824.

Local distribution: The most common species of Polypodium locally,

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growing in a variety of habitats from wind swept grassy summits to rocky slopes and shaded canyon areas.

General distribution: Coast Ranges from Mendocino County (and perhaps Siskiyou County) south to northern Baja California, in the Sierra Nevada foothills from Butte County southward, and on most of the Channel Islands and on Guadalupe Island.

Specimens examined: Mission Hills, Congdon, Apr. 27, 1893; Bakers Beach, Dudley, Mar. 29, 1902; Twin Peaks, Thomas 4860; San Bruno Hills, Rollins 3014; Pedro Pt., Dudley, Mar. 10, 1903; Pilarcitos Canyon, Oberlander 1157; Kings Mt., Baker 235; Butano Creek, Dudley, Jan. 1, 1897; Stanford, Dudley, May 1893; Stevens Creek, Dudley, Apr. 2, 1904; Foothills west of Los Gatos, Heller 7255; Waddell Creek, Thomas 2753; 1 mile south of Davenport, Hesse 1434; Boulder Creek, Hesse 287; Soquel Valley, Thomas 1400.

Plants with smaller, thicker blades have been called P. californicum Kaulf. var. kaulfussii Eaton (Ferns N. Amer. 1: 244. 1879).

3. Polypodium glycyrrhiza Eaton, Amer. Journ. Sci. 22: 138. 1856.

Local distribution: Rare, known only from Kings Mountain.

General distribution: Alaska south to Monterey County and in the Sierra Nevada foothills.

Specimen examined: Kings Mt., Dudley, Mar. 5, 1898.

2. Pityrogramma Link, Handb. Gewachs. 3: 19. 1833.

1. Pityrogramma triangularis (Kaulf.) Maxon, Contr. U. S. Nat. Herb. 17: 173. 1913.

Local distribution: Shaded slopes in oak - madrone woods, at the edges of redwood forests, and common along moist road banks, throughout the Santa Cruz Mountains in suitable habitats.

General distribution: British Columbia south through the Cascades,

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the Coast Ranges, and the Sierra Nevada to northern Baja California, also in western Idaho and on the Channel Islands.

Specimens examined: Pilarcitos Canyon, Oberlander 400; Coal Mine Ridge, Barry 84; 10 miles west of Mayfield, Wiggins 6653; Saratoga Canyon, Pendleton 1407; Rancho del Oso, Thomas 2754; Near Bielawski Lookout, Thomas 2822; Santa Cruz, Jones 2206; Soquel Valley, Thomas 1398; Near Mt. Madona, Thomas 1281.

3. Woodwardia J. E. Smith, Mem. Acad. Sci. Turin 5: 411. 1793.

1. Woodwardia fimbriata Smith, Rees Cycl. 38: no. 6. 1818.

Local distribution: Shaded stream banks, usually in the redwood - douglas fir forests from Crystal Springs Lake southward.

General distribution: British Columbia south through western Washington and Oregon, the Coast Ranges, and Sierra Nevada to northern Baja California, also in northeastern and southern Nevada and in the mountains of southeastern Arizona.

Specimens examined: Pilarcitos Canyon, Oberlander 399; Kings Mt., Abrams 2270; Black Mt., Dudley, Feb. 16, 1896; Los Gatos Canyon, Leithold, July 22, 1893; Waterman Gap, Thomas 1369; Big Basin, Thomas 2429.

4. Polystichum Roth, Röm. Arch. Bot. 2: 106. 1799.

Blades simply pinnate, the pinnae not pinnately lobed or pinnatifid. Common.....1. P. munitum.
Blades more than simply pinnate, the pinnae lobed or divided to near the base. Rare.
Pinnae divided to near the base, but not pinnate.2. P. californicum.
Pinnae pinnate.....3. P. dudleyi.

1. Polystichum munitum (Kaulf.) Presl, Tent. Pter. 83. 1836.

Local distribution: The most common Polystichum in the Santa Cruz Mountains, growing in moist shaded places in redwood forests and along streams.

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General distribution: Alaska south to northern Idaho, western Montana, and southern California.

Specimens examined: Cahill Ridge, Oberlander 211; Kings Mt., Baker 321; Coal Mine Ridge, Barry 267; Los Gatos Canyon, Dudley, July 22, 1893; Foothills west of Los Gatos, Heller 7224; Waddell Creek, Dudley, Sept. 23, 1901; 6 miles north of Boulder Creek, Thomas 1370; Alba Road, Thomas 1335; Casserly Creek, Thomas 1277.

Plants with fronds in which the pinnae are short, imbricate, and ascending may be referred to P. munitum (Kaulf.) Presl var. imbricans (Eaton) Maxon (Fern Bull. 8: 30. 1900). The typical variety is much the more common of the two locally.

2. Polystichum californicum (Eaton) Underw. Nat. Ferns 116. 1900.

Local distribution: Fairly rare in moist shaded areas along creeks and streams.

General distribution: Humboldt County south through the Coast Ranges to Santa Cruz and Santa Clara counties, also isolated in western Washington.

Specimens examined: Pescadero Creek, Dudley, June 19, 1905; Los Trancos Creek, Henderson, May 1920; Foothills west of Los Gatos, Heller 7225; Jamison Creek Canyon, Hesse 772, 774; Near Santa Cruz, Rattan, May 1867.

3. Polystichum dudleyi Maxon, Journ. Wash. Acad. Sci. 8: 620. 1918.

Local distribution: Rare in the Santa Cruz Mountains, in moist shaded areas along streams.

General distribution: Coast Ranges from southern Mendocino County south to Monterey County.

Specimens examined: Pilarcitos Canyon, Oberlander 1026; San Mateo, Kellogg & Brannon, May 3, 1870; Peters Creek, Dudley, May 2, 1903 (isotype); Kings Mt., Dudley, Mar. 5, 1898; Gazos Creek, Dudley, Jan. 1, 1902; Stevens Creek, Abrams 3021; Los Gatos Canyon, Dudley, July 22,

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1895; Foothills west of Los Gatos, Heller 7226; Waddell Creek, Dudley, Sept. 23, 1901; Boulder Creek, Hesse 771; Rincon, Hesse 759; Santa Cruz, Anderson, no date; Aptos Creek, Rattan, Nov. 1883.

5. Cystopteris Bernh. Schrad. Neues Journ. Bot. 1: 27. 1806.

1. Cystopteris fragilis (L.) Bernh. Schrad. Neues Journ. Bot. 1: 27. 1806.

Local distribution: Rare in the Santa Cruz Mountains, known only from Big Basin and Llagas Creek, usually in partial shade of oaks.

General distribution: A widespread species, found in North America, Eurasia, tropical America, and parts of South America.

Specimens examined: California Redwood Park, Shockley, June 7-8, 1919; Llagas Creek, Dudley, June 7, 1909.

6. Athyrium Roth, Röm. Arch. Bot. 2: 105. 1799.

1. Athyrium filix-femina (L.) Roth, Röm. Arch. Bot. 2: 106. 1799.

Local distribution: Occasional in moist woods, commonly along streams, San Mateo County southward.

General distribution: Widespread in the northern hemisphere.

Specimens examined: Pescadero Creek, Dudley, June 6, 1895; Waddell Creek, Dudley, Sept. 23, 1901; Big Basin, Dudley, Aug. 24, 1900.

7. Dryopteris Adans. Fam. Pl. 2: 20, 550. 1763.

Fronds 2-pinnate. Common.....1. D. arguta.
Fronds 3-pinnate. Rare.....2. D. dilatata.

1. Dryopteris arguta (Kaulf.) Watt, Canad. Nat. 3: 159. 1866.

Local distribution: A common fern on wooded slopes, but not in dense redwood forests.

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General distribution: Southern Washington south to northern Baja California.

Specimens examined: Kings Mt., Abrams 2273; Coal Mine Ridge, Barry 102; Stanford, Dudley, June 30, 1894; 5 miles west of Mayfield, Wiggins 6652; Foothills west of Los Gatos, Heller 7217; Llagas Creek, Dudley, June 8, 1909; Below Saratoga Summit, Thomas 3528; Waddell Creek, Ferris 2123; Ben Lomond sand hills, Thomas 6037; Soquel Valley, Thomas 1401.

2. Dryopteris dilatata (Hoffm.) Gray, Man. 631. 1848.

Local distribution: Rare, mainly in moist areas in redwood - douglas fir forests, known as far south as Butano Creek.

General distribution: Circumpolar, as far south in California as San Mateo County.

Specimens examined: San Francisco Watershed Reserve, Oberlander 581; Butano Creek, Dudley, Jan. 1, 1897.

8. Blechnum L. Sp. Pl. 1077. 1753.

1. Blechnum spicant (L.) Smith, Mem. Acad. Sci. Turin 5: 411. 1793.

Local distribution: Occasional in southern San Mateo County, usually in very moist places in the redwoods.

General distribution: Aleutian Islands, southern Alaska, and southward mainly near the coast to San Mateo County; also in Eurasia.

Specimens examined: Butano Creek, Dudley, Jan. 1, 1897; Mason, July 1921; Abrams 5000; Gazos Creek, Dudley, Dec. 31, 1901.

9. Adiantum L. Sp. Pl. 1094. 1753.

Rachis of frond continuous; ultimate pinnules symmetrical, attached at the center.....1. A. jordani.
Rachis of frond dichotomous; ultimate pinnules asymmetrical, attached laterally.....2. A. pedatum var. aleuticum.

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1. Adiantum jordani Mull. Bot. Zeit. 1864: 26. 1864.

Local distribution: Rocky soil on moist shaded slopes and in shaded ravines, often under Arbutus menziesii, Lithocarpus densiflora, Umbellularia californica, and Quercus spp.

General distribution: Curry and Josephine counties, Oregon, south through the Coast Ranges to northern Baja California and in the Sierra Nevada from Amador to Butte counties.

Specimens examined: Pilarcitos Canyon, Oberlander 512; Coal Mine Ridge, Barry 139; Near Stanford, Dudley, Apr. 28, 1902; Tuff Hill, Cannon, Feb. 8, 1900; Bear Creek, Thomas 1434; Waddell Creek, Dudley, June 4, 1897; Santa Cruz, Jones 2240; Soquel Valley, Thomas 1399.

2. Adiantum pedatum L. var. aleuticum Rupr. Beitr. Pflanzenk. Russ. Reich. 3: 49. 1845.

Local distribution: Moist shaded canyons and slopes throughout the Santa Cruz Mountains, commonly in shade of Sequoia sempervirens, Pseudotsuga menziesii, Umbellularia californica, and Alnus rhombifolia.

General distribution: Aleutian Islands and southern Alaska south to San Bernardino County, Montana, and Utah, also at scattered localities in northeastern United States and Canada from Ontario to Newfoundland.

Specimens examined: Pilarcitos Canyon, Oberlander 440; Pescadero Creek, Dudley, Apr. 18, 1896; Los Gatos Canyon, Dudley, July 22, 1893; Castle Rock Ridge, Pendleton, June 1910; Waddell Creek, Thomas 1754; Boulder Creek, Thomas 1465; Santa Cruz, Thompson, June 16, 1903; Hester Creek, Thomas 2846.

10. Pteridium Gled. ex Scop. Fl. Carn. 169. 1760.

1. Pteridium aquilinum (L.) Kuhn var. pubescens Underw. Nat. Ferns 91. 1900.

Local distribution: Oak - madrone woods, margins of grasslands,

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roadsides, and fallow fields.

General distribution: Southern Alaska south to Mexico, east to Wyoming, Colorado, and Texas, also at isolated localities from South Dakota to Quebec.

Specimens examined: San Francisco, Heller 5663; Coal Mine Ridge, Barry 103; Foothills west of Los Gatos, Heller 7496; About 3 miles below Saratoga Summit, Thomas 6838; About 2 miles west of Santa Cruz, Thomas 1495.

Pteridium aquilinum var. pubescens is the commonest local fern. Most reproduction is probably vegetative as sporophylls are rarely found.

11. Cheilanthes Schwarts, Syn. Fil. 126. 1806.

1. Cheilanthes intertexta (Maxon) Maxon in Abrams, Ill. Fl. Pacif. States 1: 28. 1923.

Local distribution: Rocky slopes of Black Mountain and Mount Umunhum in Santa Clara County.

General distribution: Mendocino County south to Santa Clara County, also in western Nevada.

Specimens examined: Black Mt., Dudley, June 6, 1903 (type); Loma Prieta, Dudley, May 29, 1894, Nov. 1, 1903.

Only one species of Cheilanthes is known from the Santa Cruz Mountains. This is somewhat surprising as C. gracillima Eaton, C. siliquosa Maxon, and C. californica (Hook.) Matt. are known from Monterey County to the south and from Marin County to the north. Careful examination of the slopes of Mount Umunhum and Loma Prieta may reveal one or more of these species.

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12. Pellaea Link, Fil. Hort. Berol. 59. 1841.

Ultimate pinnae obtuse to retuse; stipes flesh-colored.
1. P. andromedaefolia.
Ultimate pinnae acute, apiculate; stipes purplish-brown.
2. P. mucronata.

1. Pellaea andromedaefolia (Kaulf.) Fee, Gen. Fil. 129. 1850-1852.

Local distribution: Dry, open or shaded habitats, usually among rock outcroppings, often in chaparral; in suitable habitats throughout the Santa Cruz Mountains.

General distribution: Southwestern part of Oregon south to northern Baja California, in the Sierra Nevada as far south as Tulare County, and on the Channel Islands.

Specimens examined: San Andreas Valley, Oberlander, May 24, 1949; Coal Mine Ridge, Barry 39; Coyote Creek, Dudley, May 31, 1895; Guadalupe Canyon, Mason & Borthwick, Mar. 20, 1921; Loma Prieta, Dudley, Apr. 20, 1895; Barrocal Canyon, Ferris 2098; Below Saratoga Summit, Thomas 1314; Rancho del Oso, Thomas 2762; Near Soquel, Thompson, Mar. 8, 1902.

2. Pellaea mucronata (Eaton) Eaton in Torr. Bot. Mex. Bound. 233. 1859.

Local distribution: Dry rock outcroppings from southern San Mateo County southward, often on serpentine.

General distribution: Humboldt County south through the Coast Ranges and Sierra Nevada to northern Baja California, also on some of the Channel Islands, and Guadalupe Island.

Specimens examined: Searsville Ridge, Abrams 5588; Stanford, Abrams 2379; Loma Prieta, Dudley, Nov. 1, 1903, May 28, 1894; Near Boulder Creek, Thomas 1802; Bonny Doon, Thompson, Apr. 14, 1902.

2. Class Gymnospermae

1. TAXACEAE

1. Torreya Arn. Ann. Hist. 1: 130. 1838.

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1. Torreya californica Torr. N. Y. Journ. Pharm. 3: 49. 1853.

Local distribution: Widespread in the Santa Cruz Mountains from central San Mateo County southward, but nowhere common, occupying a wide range of habitats from chaparral to the shade of redwood - douglas fir forests.

General distribution: Mendocino County south to Santa Cruz and Santa Clara counties in the Coast Ranges and from Tehama County south to Tulare County in the Sierra Nevada.

Specimens examined: La Honda Creek, Wiggins 11160, 11161; Stevens Creek, McMurphy 77; Alma Soda Springs, Heller 8634; Mt. Umunhum, Dudley, Sept. 11, 1906; Loma Prieta, Dudley, Sept. 23, 1901; Swanton, Rich, Apr. 26, 1912; Big Basin, Dudley, Sept. 23, 1901; Little Basin, Thomas 1828; Below Saratoga Summit, Thomas 1612.

Both Jepson (1909, p. 64) and Abrams (1923, p. 51) attribute Taxus brevifolia Nutt. to the Santa Cruz Mountains. Jepson's report is based upon that of Anderson (1892, p. 126), who reported Taxus brevifolia from Laguna Creek, in Santa Cruz County. No specimens of this species from the Santa Cruz Mountains exist in the herbaria of Stanford University, the University of California at Berkeley, and the California Academy of Sciences. I must conclude that Anderson was either in error, or found an isolated tree or two which no longer exist. To the north, Taxus brevifolia is known from Marin County (Howell, 1949, p. 56).

2. PINACEAE

Needle leaves in fascicles, in ours usually in 3's, over 8 cm. long; bracts of mature cones not evident, fused to the ovuliferous scales. 1. Pinus.

Leaves not in fascicles, separate, 2-3 cm. long; bracts of the mature cones evident, longer than and not fused to the scales. 2. Pseudotsuga.

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1. Pinus L. Sp. Pl. 1000. 1753.

Cones very large, usually at least 20 cm. long, the scales with stout spines.....1. P. sabiniana.
Cones smaller, usually under 15 cm. long, the scales with slender prickles.
  Cones symmetrical, falling within 2-3 years; basal scales not distally tuberculate or mammillate; trunk of mature trees usually over 1 m. in diameter at breast height; bark separated into large plates.....2. P. ponderosa.
  Cones asymmetrical, remaining closed and on the trees for many years; at least the basal scales distally either tuberculate or mammillate; trunk of mature trees under 1 m. in diameter; bark in narrow ridges.
    Basal cone scales mammillate distally; cones broadly ovoid, deflexed, the axis of the cone not parallel to that of the branch.....3. P. radiata.
    Basal cone scales tuberculate distally; cones narrowly ovoid, sharply recurved, the axis of the cone parallel to that of the branch.....4. P. attenuata.

1. Pinus sabiniana Dougl. Trans. Linn. Soc. 16: 747. 1833.

Local distribution: Eastern slope of the Santa Cruz Mountains, known from Forest Grove above Los Gatos and the slopes of Mount Umunhum and Loma Prieta, growing in chaparral, trees usually widely spaced, rarely forming dense stands.

General distribution: Northern California south through the Coast Ranges and the Sierra Nevada foothills to Los Angeles County.

Specimens examined: Near Forest Grove, above Los Gatos, Dudley, Apr. 2, 1895; Mt. Umunhum, Ferris 2081; Thomas 3953; Loma Prieta Ridge, Thomas 3953.

Many trees are infested with Arceuthobium campylopodum.

2. Pinus ponderosa Dougl. ex Lawson, Agric. Man. 354. 1836.

Local distribution: Found isolated from its general range in Santa Cruz County in the vicinity of Bonny Doon and Ben Lomond on inland marine sand deposits, commonly growing with Arctostaphylos spp.,

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Pinus attenuata, and various species of oaks.

General distribution: Widely distributed in western United States from southern Canada south to Mexico and east to the Dakotas, Colorado, and western Texas. In the South Coast Ranges of California, P. ponderosa is not continuous in its distribution, but occurs in isolated stands.

Specimens examined: Bonny Doon, Dudley, Mar. 30, 1899; Zayante Creek, Dudley, May 7, 1893; Ben Lomond, Elmer 4821; Quail Hollow Road, Thomas 4900.

In the Ben Lomond sand hills the trees are very large and have in the past been cut for lumber.

3. Pinus radiata Don, Trans. Linn. Soc. 17: 442. 1836.

Local distribution: In the Santa Cruz Mountains this species is known natively only from the vicinity of Ano Nuevo Point and Waddell Creek, elsewhere it is commonly planted.

General distribution: Known from three general regions along the California coast; 1. from near the San Mateo - Santa Cruz county line, 2. the Monterey Peninsula, and 3. near Cambria in San Luis Obispo County.

Specimens examined: New Years Pt., Dudley, Jan. 3, 1898; Mouth of Waddell Creek, Thomas 2774.

4. Pinus attenuata Lemmon ex Sarg. Gard. & Forest 5: 65. 1892.

Local distribution: Common on dry rocky outcropping, in poor soil, and on the inland marine sand deposits, usually associated with various chaparral species; both slopes of the Santa Cruz Mountains from southern San Mateo County southward, but much more common west of the crests.

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General distribution: Southwestern Oregon south through the Coast Ranges and Sierra Nevada foothills to the San Bernardino Mountains of southern California, and in northern Baja California.

Specimens examined: Butano Creek, Dudley, Jan. 1, 1897; Mt. Umunhum, Ferris 2082; Loma Prieta, Dudley, May 30, 1894; Waddell Creek, Dudley, Sept. 23, 1907; Bonny Doon, Wolf 6238; Ben Lomond sand hills, Thomas 1248; Mt. Madona Rd., Thomas 2744.

Pinus X attenuradiata Stockwell & Righter (Madroño 8: 160. 1946) is a hybrid between P. attenuata and P. radiata which is found occasionally where these two species overlap in the vicinity of the San Mateo - Santa Clara county line near the coast. It is found in nature only in the above locality and is intermediate between the two parents in its characters. The type was described from artificial hybrids grown at Placerville, California.

2. Pseudotsuga Carr. Trait. Conif. 256. 1867.

1. Pseudotsuga menziesii (Mirb.) Franco, Bol. Soc. Broteriana 24: 74. 1950.

(P. taxifolia (Lamb.) Britt. Trans. N. Y. Acad. 8: 74. 1889.)

Local distribution: One of the most common trees in the Santa Cruz Mountains, growing from near sea level to about 3000 feet elevation, commonly associated with Sequoia sempervirens, Lithocarpus densiflora, Arbutus menziesii, and Umbellularia californica, from the vicinity of the Crystal Springs Lakes southward.

General distribution: Central British Columbia and southwestern Alberta south through Washington and Oregon to the Santa Lucia Mountains and to Fresno County, also in the Rocky Mountains as far south as Texas and Mexico.

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Specimens examined: Cahill Ridge, Oberlander 1100; Pescadero Creek, Dudley, May 24, 1894; Kings Mt., Elmer 4562; Below Saratoga Summit, Thomas 4706; Rancho Del Oso, Thomas 2759; Big Basin, Dudley, Sept. 23, 1905.

3. CUPRESSACEAE

1. Cupressus L. Sp. Pl. 1002. 1753.

1. Cupressus abramsiana Wolf, El Aliso 1: 215. 1948.

Local distribution: Known from only four groves; 1. Butano Ridge in San Mateo County, 2. Eagle Rock in Santa Cruz County, 3. Bracken Brae, Santa Cruz County, and 4. Bonny Doon in Santa Cruz County; growing on sandstone outcroppings or in marine sand deposits as at Bonny Doon, usually with Pinus attenuata, various species of Arctostaphylos, Adenostoma fasciculatum, and occasionally with Vaccinium ovatum.

General distribution: Endemic in the Santa Cruz Mountains.

Specimens examined: Butano Ridge, McMillan 1620; Dudley, no date; Jenkins, July 27, 1903; Dutton, Sept. 1949; Eagle Rock, McMillan 1619; Hesse 1020, 715; Thomas 1225; Bracken Brae, Hesse 727; Thomas 1767, 3365; Bonny Doon, Wolf 2185 (isotype); Thomas 1221; Dudley, Mar. 30, 1899; Ferris 2002.

4. TAXODIACEAE

1. Sequoia Endl. Syn. Conif. 197. 1847.

1. Sequoia sempervirens (Lamb.) Endl. Syn. Con. 198. 1847.

Local distribution: Canyon bottoms and moist slopes, central San Mateo County southward, more common on the western slopes of the Santa Cruz Mountains than on the eastern, rarely more than 20 miles from the coast, in general confined to the fog belt; often in pure dense stands with very few plants in the understory.

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General distribution: Along or near the coast from Curry County, Oregon, south to Salmon Creek in Monterey County, also in the Oakland - Berkeley Hills on the eastern side of San Francisco Bay.

Specimens examined: Iversons, Dudley, Dec. 1, 1902; Butano Creek, Dudley, Jan. 1, 1897; Kings Mt., Baker 319; Black Mt., Dudley, Feb. 9, 1902; Big Basin, Dudley, Dec. 1, 1899; Jamison Creek, Thomas 3697; Near Glenwood, Dudley, June 20, 1909; Boulder Creek, Eastwood, Mar. 1895.

3. Class Angiospermae

1. Subclass Monocotyledoneae

1. TYPHACEAE

1. Typha L. Sp. Pl. 971. 1753.

Staminate and pistillate portions of the inflorescence usually contiguous; compound pedicels bristle-like, over 1.5 mm. long; pollen grains in 4's.....1. T. latifolia.

Staminate and pistillate portions of the inflorescence not contiguous, separated; compound pedicels pappilate, under 1.5 mm. long; pollen grains single.

Inflorescence dark brown at maturity, overtopped by the upper leaves; leaves usually less than 10; plants to 1.5 m. tall. 2. T. angustifolia.

Inflorescence light brown at maturity, exceeding the upper leaves; leaves usually more than 10; plants usually over 2.5 m. tall. 3. T. domingensis.

1. Typha latifolia L. Sp. Pl. 971. 1753.

Local distribution: Widespread in ditches, in quiet water along streams, in coastal fresh or slightly brackish water marshes, and along the margins of ponds and lakes. June through October.

General distribution: Common in North America, Eurasia, North Africa, and introduced into other continents.

Specimens examined: Mt. Lake, San Francisco, Eastwood, June 1917 (CAS); San Andreas Lake, Oberlander 1070; Searsville Lake, Abrams 7347; Stanford, Dudley, June 25, 1897; Alviso, Elmer 4946; 6 miles north of Boulder Creek, Thomas 4313; Between Santa Cruz and Scott Valley, Thomas 3610.

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2. Typha angustifolia L. Sp. Pl. 971. 1753.

Local distribution: Fairly common in ponds, ditches, and brackish water sloughs. June through August.

General distribution: Widespread in the northern hemisphere, in South America, and introduced elsewhere.

Specimens examined: San Francisco, Eastwood, July 5, 1916 (CAS); Goodman, July 14, 1922 (CAS); Emerald Lake, Lang, May 25, 1922; Pescadero Beach, Wiggins 3803; Ano Nuevo Pt., Abrams & Wiggins 434; Stevens Creek, Thomas 4311; Alviso, Thomas 5314.

3. Typha domingensis Pers. Syn. Plant. 2: 532. 1807.

Local distribution: Lakes, roadside ditches, and somewhat brackish sloughs, often confused with the preceding species. July through November.

General distribution: California, east through Nevada, Utah, and Kansas to Delaware, south to Central America.

Specimens examined: San Francisco, Raven 3917 (CAS); Felt Lake, Abrams 2242; Alviso, Elmer 4967; Mt. View - Alviso Rd., Dudley, July 18, 1903 (CAS).

2. SPARGANIACEAE

1. Sparganium L. Sp. Pl. 971. 1753.

1. Sparganium eurycarpum Engelm. in Gray, Man. 430. 1856.

Local distribution: Marshes, drainage ditches, pot holes in drying river and stream channels, and lake margins. June through October.

General distribution: Throughout most of the United States, southern Canada, and northern Mexico.

Specimens examined: Near Moss Beach, Wiggins 8160; Searsville Lake, Abrams 7346; Lake Lagunita, Thomas 5235; Stanford, Ross 46219 (CAS); Alviso, Abrams, Oct. 20, 1906; Guadalupe Creek, Cannon, July 7,

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1896 (CAS); Santa Cruz, Hesse 985; Watsonville, Hayward, Aug. 21, 1927.

Sparganium eurycarpum is a widespread species. Two segregates have been proposed in the Pacific States: S. californicum Greene (Bull. Calif. Acad. 1: 11. 1884) and S. greenei Morong (Bull. Torr. Bot. Club 15: 77. 1888). Both of these differ from S. eurycarpum in having nutlets which are longer than broad and rounded at the apex. Local specimens are all more or less rounded at the apex to truncate and are either longer than wide or about equally as long as wide. Considering the three proposed species together, they appear as a graded series in which there are no sharp discontinuities. Vegetative characters do not appear to be correlated with nutlet characters. In view of the above, I prefer to call all the local specimens S. eurycarpum. Careful study of S. eurycarpum sensu latu throughout its range is necessary.

Eastwood (1899, p. 76) reported what she called S. greenei from Lake Merced and indicated that it was abundant.

3. POTAMOGETONACEAE

Flowers perfect; stamens more than 1; leaves alternate.
  Peduncles not coiled; stamens 4.....1. Potamogeton.
  Peduncles coiled; stamens 2.....2. Ruppia.
Flowers monoecious; stamen 1; leaves opposite.....3. Zannichellia.

1. Potamogeton L. Sp. Pl. 126. 1753.

Leaves dimorphic, the floating ones with a distinct, dilated blade; the submerged ones narrower.
  Submerged leaves less than 3 mm. wide, very narrowly linear, floating leaves ovate to elliptic or oblong, rounded or truncate at the base.....1. P. natans.
  Submerged leaves usually over 5 mm. wide.
    Submerged leaves long-petiolate; fruit 3.5-4 mm. long, reddish, keel more or less muricate....2. P. nodosus.
    Submerged leaves short-petiolate; fruit 1.7-3.5 mm. long, greenish, keel usually not muricate.

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Submerged leaves usually over 1.5 cm. wide, when dry appearing distinctly rugose.....3. P. illinoensis.
Submerged leaves usually under 1.5 cm. wide, when dry not distinctly rugose.....4. P. gramineus.
Leaves not dimorphic, all submerged, none with a distinct, dilated blade.
Stipules adnate to the leaf blades, free only at the tips.
5. P. pectinatus.
Stipules completely free from the leaf blades.
Peduncles usually more than 1 cm. long, filiform.
Leaves 1-3 mm. wide.....6a. P. pusillus var. pusillus.
Leaves under 1 mm. wide.....6b. P. pusillus var. minor.
Peduncles usually under 1 cm. long, thick.
7. P. foliosus var. macellus.

1. Potamogeton natans L. Sp. Pl. 126. 1753.

Local distribution: Occasional in freshwater ponds and sloughs. July through September.

General distribution: Widely distributed in the temperate parts of North America and Eurasia.

Specimens examined: Coal Mine Ridge, Ferris 2043; Harkins Slough, Hayward, July 1, 1929.

2. Potamogeton nodosus Poir. in Lam. Encycl. Suppl. 4: 535. 1816.

(P. americanus Cham. & Schlecht. Linnaea 2: 226. 1827.)

Local distribution: Probably fairly common, but poorly collected. May through August.

General distribution: Nearly cosmopolitan in distribution.

Specimens examined: Ano Nuevo Pt., Mason, May 28, 1921; Wiggins & Abrams 435.

Both of the specimens cited above came from shallow ponds among the sand dunes at Ano Nuevo Point.

3. Potamogeton illinoensis Morong, Bot. Gaz. 5: 50. 1880.

Local distribution: Probably the most common local species of the

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broad-leaved potamogetons, found at Lake Merced, Mountain Lake, San Andreas Lake, Felt Lake, and in the lakes in southern Santa Cruz County. May through October.

General distribution: Southern Canada south to Central America and in the West Indies.

Specimens examined: Mt. Lake, Abrams 2200; Lake Merced, Dudley, Oct. 25, 1908 (annotated as P. gramineus L. X P. illinoensis Morong by E. C. Ogden in 1943); San Francisco, Kellogg, no date; San Andreas Lake, Oberlander 386; Pilarcitos Lake, Ting, Aug. 28, 1939 (CAS); Felt Lake, Duncan, July 1924; College Lake, Dudley, Oct. 11, 1908; Kellys Lake, Dudley, Oct. 11, 1908.

4. Potamogeton gramineus L. Sp. Pl. 127. 1753.

Local distribution: Known locally only from Coal Mine Ridge. May through August.

General distribution: Alaska east to Greenland, south to California, New Mexico, Iowa, and New Jersey; also in Eurasia.

Specimen examined: Coal Mine Ridge, Dudley, May 26, 1910.

5. Potamogeton pectinatus L. Sp. Pl. 127. 1753.

Local distribution: Fairly common in reservoirs, lakes, ponds, and quiet pools along streams, the most common narrow-leaved species locally. May through October.

General distribution: Cosmopolitan.

Specimens examined: Pilarcitos Lake, Ting, Aug. 28, 1939 (CAS); Belmont, Dudley, Sept. 21, 1902; Mussel Rock, Dudley, Oct. 4, 1909; Pescadero Creek, Wiggins 8051; San Andreas Lake, Oberlander 1074; Ano Nuevo Pt., Wiggins & Ferris 9293; Menlo Park Reservoir, Dudley, Oct. 31, 1909; Stanford, Abrams 2206; Morgan Hill, Clemens, July 4, 1921 (CAS); Near Raymonds, Dudley, Sept. 1, 1906; Kelleys Lake, Dudley, Oct. 11, 1908; Soda Lake, Hayward, July 17, 1929.

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6a. Potamogeton pusillus L. var. pusillus, Sp. Pl. 127. 1753.

Local distribution: San Francisco and northern San Mateo County. May through October.

General distribution: Widely distributed in the northern hemisphere.

Specimen examined: Crystal Springs Reservoir, Dudley, Oct. 10, 1909.

This variety has been collected in San Francisco by Blankinship (Fernald, 1932, p. 64). Blankinship's specimen is in the Gray Herbarium.

6b. Potamogeton pusillus L. var. minor (Biv.) Fern. & Schub. Rhodora 50: 154. 1948.

Local distribution: Occasional in ponds and reservoirs in San Mateo County. June through October.

General distribution: Widely found in the northern hemisphere.

Specimens examined: Mt. Lake, Cannon, no date (CAS); Searsville, Dudley, July 1893 (UC).

7. Potamogeton foliosus Raf. var. macellus Fern. Mem. Amer. Acad. 17: 46. 1932.

Local distribution: Occasional in reservoirs, ponds, and streams. May through August.

General distribution: Widely distributed in North America, north of Mexico, and in the Hawaiian Islands.

Specimens examined: San Francisco, Vasey, 1876; 2 miles east of Half Moon Bay, Wiggins 8159A; Searsville Lake, Dudley, July 1893.

2. Ruppia L. Sp. Pl. 127. 1753.

1. Ruppia maritima L. Sp. Pl. 127. 1753.

Local distribution: Common in brackish water ponds and sloughs,

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San Francisco southward. June through November.

General distribution: Cosmopolitan in the northern hemisphere.

Specimens examined: Granada, Rose 36724 (CAS); Laguna Salada, Dudley, Sept. 1908. ½ mile north of Redwood City, Wiggins 11199; Pebble Beach, Mason, June 2, 1921; Alviso, Dudley, July 18, 1903; Wood Lagoon, Dudley, Nov. 27, 1908; Seabright, Dudley, July 1893; Chittenden Pond, Dudley, Oct. 10, 1908; Soda Lake, Thomas 3299.

3. Zannichellia L. Sp. Pl. 969. 1753.

1. Zannichellia palustris L. Sp. Pl. 969. 1753.

Local distribution: Ditches, slow-moving creeks and streams, and along the margins of lakes and reservoirs, poorly collected. September through December.

General distribution: A nearly cosmopolitan species.

Specimens examined: Near Lake Merced, Dudley, Oct. 3, 1897; Lake Pilarcitos, Howell 30011 (CAS); Redwood City, Ferris 2073; Crystal Springs Reservoir, Dudley, Oct. 10, 1909; Near Santa Clara, Dudley, Dec. 1903.

4. NAIADACEAE

1. Naias L. Sp. Pl. 1015. 1753.

1. Naias guadalupensis (Spreng.) Morong, Mem. Torr. Bot. Club 3: 60. 1893.

Local distribution: Occasional in freshwater ponds and lakes.

General distribution: Widespread in the United States, south to Central America, and on Guadalupe Island, the type locality.

Specimens examined: Mt. Lake, San Francisco, Eastwood, Aug. 22, 1920 (CAS); July 15, 1926 (CAS); Pinto Lake, Watsonville, July 13, 1929.

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5. ZOSTERACEAE

Flowers monoecious; leaves usually over 5 mm. wide. Plants of muddy sandy bottoms.....1. Zostera.
Flowers dioecious; leaves usually under 2 mm. wide. Plants of rocks and reefs.....2. Phyllospadix.

1. Zostera L. Sp. Pl. 968. 1753.

1. Zostera marina L. Sp. Pl. 968. 1753.

Local distribution: To be expected along the coast where the bottom is muddy or sandy, so far known definitely only from San Francisco.

General distribution: Along the shores of both the Atlantic and Pacific Oceans.

Specimen examined: San Francisco, Anderson, 1852 (CAS).

2. Phyllospadix Hook. Fl. Bor. Amer. 2: 171. 1838.

Spadices several, cauline; peduncle over 10 cm. long...1. P. torreyi.
Spadix usually 1, basal; peduncle usually under 6 cm. long. 2. P. scouleri.

1. Phyllospadix torreyi Wats. Proc. Amer. Acad. 14: 303. 1879.

Local distribution: Along the coast, growing on rocks and reefs in the surf.

General distribution: Along the coast from Oregon south to at least San Bartolome Bay, Baja California (Moran 4188).

Specimens examined: Pt. Lobos, San Francisco, Setchell, Aug. 8, 1896 (UC); Santa Cruz, Dudley, July 13, 1893.

2. Phyllospadix scouleri Hook. Fl. Bor. Amer. 2: 171. 1838.

Local distribution: There are no specimens in the herbaria of the California Academy of Sciences, the University of California at Berkeley,

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or Stanford University of this species from along the coasts of San Francisco, San Mateo, and Santa Cruz counties, but it has been collected in northern Monterey County and in Marin County as is to be expected locally on rocks in the surf.

General distribution: Along the coast of western North America from Vancouver Island south to about Santa Barbara County; also in Japan.

6. APONOGETONACEAE

1. Aponogeton L. f. Suppl. 32. 1781.

1. Aponogeton distachyus L. f. Suppl. 215. 1781.

Local distribution: Known from a small pond on the east side of State Highway 5 south of its junction with the Chinese Cemetery Road in northern San Mateo County. February through April.

General distribution: Native of South Africa, often used as an ornamental, rarely found as an escape.

Specimens examined: Sky Line Blvd., Rubtzoff 1451, 1767 (CAS).

7. LILAEACEAE

1. Lilaea Humb. & Bonpl. Pl. Aequin. 1: 222. 1808.

1. Lilaea scillioides (Poir.) Haum. Fac. Filos. Letras Buenos Aires, Publ. Inst. Invest. Geogr. 10: 26. 1925.

Local distribution: Shallow ponds, along the edges of lakes, slow-moving streams, and irrigation ditches. March through November.

General distribution: British Columbia south through the Pacific States and Idaho to Mexico; also in South America.

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Specimens examined: Presidio, Bioletti, Aug. 1891; Cannon, Nov. 17, 1894 (CAS); Crystal Springs, Abrams, Apr. 27, 1909; Pigeon Pt., Mason, Mar. 28, 1922; Coal Mine Ridge, Barry, April 14, 1938; Black Mt., Dudley, Mar. 26, 1893; Morgan Hill, Howell 5194 (CAS); Camp Evers, Thomas 3348; Watsonville, Hayward, Aug. 9, 1928.

8. JUNCAGINACEAE

1. Triglochin L. Sp. Pl. 338. 1753.

Fertile carpels 3; fruit nearly spherical.....1. T. striata.
Fertile carpels 6; fruit elongate.
Plants usually over 3 dm. tall; rhizomes stout, short; ligules entire. 2. T. maritima.
Plants usually under 3 dm. tall; rhizomes slender, elongate; ligules 2-parted.....3. T. concinna.

1. Triglochin striata Ruiz & Pav. Fl. Per. 3: 72. 1802.

Local distribution: Occasional in salt marshes along the coast. July through November.

General distribution: Along the Pacific Coast from Lincoln County, Oregon, south to San Diego County, along the Atlantic Coast from Delaware to Louisiana, and in South America, Africa, and Australia.

Specimens examined: Santa Cruz, Dudley, Nov. 27, 1908; Aptos, Abrams 3048.

2. Triglochin maritima L. Sp. Pl. 339. 1753.

Local distribution: Salt marshes along the San Francisco Bay and along the coast. April through October.

General distribution: Alaska to Labrador, south through much of the United States, except the South, to northern Mexico; also in Patagonia, Eurasia, and North Africa.

Specimens examined: Alviso, Dudley, July 7, 1903; Mountain View, Bacigalupi, Apr. 24, 1924.

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3. Triglochin concinna Davy, Erythea 3: 117. 1895.

Local distribution: Salt marshes and areas of brackish water along San Francisco Bay. March through July.

General distribution: Southern British Columbia south along the coast to middle Baja California.

Specimens examined: San Mateo, Wiggins 11200; Palo Alto, Dudley, May 26, 1906; Mayfield, McMurphy, May 5, 1906.

Howell (1947) after careful study has reached the conclusion that T. concinna and T. maritima, despite the fact that they are sympatric in central California, should be considered as separate species on the basis of differences in size of both the aerial portion of the plant and of its rhizomes.

9. ALISMACEAE

Carpels in one whorl.....1. Alisma.
Carpels in several series.
  Flowers perfect; leaves truncate to cordate at the base.
    2. Echinodorus.
  Lower flowers pistillate; the upper usually staminate; leaves sagittate at base.....3. Sagittaria.

1. Alisma L. Sp. Pl. 342. 1753.

1. Alisma plantago-aquatica L. Sp. Pl. 342. 1753.

Local distribution: Lakes and ponds throughout the Santa Cruz Mountains which are regularly subjected to a fluctuating water level. June through September.

General distribution: World-wide.

Specimens examined: San Andreas Lake, Howell 2219 (CAS); Lake Lagunita, Dudley, Aug. 1904; Searsville Lake, Abrams 6865; Coal Mine Ridge, Ferris 2045; Near Watsonville, Hayward, Aug. 4, 1928.

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According to Hendricks (1957, pp. 477-484) two varieties of Alisma plantago-aquatica occur in central California. The two varieties may be distinguished with the aid of the following key:

Mature fruits in a whorl 4.5 mm. or more in diameter; petals white, often purple-tipped.....A. plantago-aquatica L. var. michaletii (Aschers. & Graebner) Buchenau, Pflanzenreich 4(15): 13. 1903.

Mature fruits in a whorl 4 mm. in diameter; petals white, not purple-tipped.....A. plantago-aquatica L. var. americanum Schult. & Schult. Syst. Veg. 7: 1598. 1830.

The latter variety is more common in the Santa Cruz Mountains.

2. Echinodorus Rich. ex Engelm. in Gray, Man. 460. 1848.

1. Echinodorus berteroi (Spreng.) Fassett, Rhodora 57: 139. 1955.

(E. cordifolius (L.) Griseb. of California references.)

Local distribution: Shores of dry lake beds. June through September.

General distribution: Lake County, California, and Kansas south through most of Mexico to Central America, also on the islands of the Caribbean.

Specimens examined: Lake Lagunita, Abrams 7331; Felt Lake, Thompson, Aug. 28, 1902; Abrams, Oct. 5, 1908 (CAS).

3. Sagittaria L. Sp. Pl. 993. 1753.

1. Sagittaria latifolia Willd. Sp. Pl. 4: 409. 1806.

Local distribution: Shallow water of lakes, ponds, and streams which border the Santa Cruz Mountains. July through October.

General distribution: Throughout the United States and southern Canada, south into Mexico.

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Specimens examined: Alviso, Abrams, Oct. 20, 1906; Campbell Creek, Ferris 2062; Near Santa Cruz, Hesse 1011; Harkins Slough, Hayward, July 5, 1929.

10. HYDROCHARITACEAE

1. Elodea Michx. Fl. Bor. Amer. 1: 20. 1803.

1. Elodea canadensis Michx. Fl. Bor. Amer. 1: 20. 1803.

Local distribution: Occasionally found in shallow ponds and in slowly moving water of irrigation ditches. Rarely flowering.

General distribution: Washington south to central California, east to Quebec, North Carolina, and Alabama; introduced into Europe.

Specimen examined: Coyote Creek, Wiggins 11165.

Shinners (1956) has recently shown that Elodea is the correct name for this genus under the current rules of botanical nomenclature.

11. POACEAE

Spikelets 1 to several flowered; sterile or imperfect florets almost always above the fertile florets.
- Plants woody.....1. Bambuseae.
- Plants herbaceous.
  - Spikelets pedicellate, rarely subsessile.
    - Spikelets 2 to several flowered.
      - Glumes shorter than the first florets; lemmas awned or not, if awned, usually from a bifid apex.2. Festuceae.
      - Glumes usually longer than the first florets; lemmas awned or not, if awned, the awn usually inserted on the back of the lemma.....4. Aveneae.
    - Spikelets 1-flowered.....5. Agrostideae.
  - Spikelets sessile.
    - Spikelets on opposite sides of the rachis; spikes terminal, solitary.....3. Hordeae.
    - Spikelets all on one side of the rachis; spikes 1 to several, racemosely or digitately arranged.....6. Chlorideae.

Spikelets with 1 perfect, terminal floret; sterile or staminate florets below the perfect floret, or rarely lacking.
- Spikelets not paired, or if paired, both with fertile florets; fertile lemmas indurate.
  - Glumes usually about equal in length.....7. Phalarideae.

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Glumes not equal in length, the lower glume shorter than the upper, the upper about equalling the sterile lemma.
8. Paniceae.
Spikelets paired, the lower sessile and with a perfect floret, the upper pedicellate and with a sterile or staminate floret; fertile lemmas hyaline.....9. Andropogoneae.

1. Bambuseae

One genus.....1. Pseudosasa.

2. Festuceae

Tall, reed-like grasses, usually 2 m. or more tall.
Leaves mainly at the base of the culms.....2. Cortaderia.
Leaves more or less evenly distributed along the culms.
3. Phragmites.
Grasses not reed-like, rarely over 1.5 m. tall.
Plants dioecious. Plants of salt marshes and alkaline areas.
4. Distichlis.
Plants not dioecious (or if dioecious, not of salt marshes or alkaline areas). Plants of various habitats.
Inflorescences with fertile and sterile spikelets.
Fertile spikelets 2-3-flowered.....5. Cynosurus.
Fertile spikelets 1-flowered.....6. Lamarckia.
Inflorescences with only fertile spikelets.
Lemmas 3-nerved.....7. Eragrostis.
Lemmas 5 or more nerved.
Lemmas as broad as long; florets spreading at right angles to the rachis, closely imbricate.....8. Briza.
Lemmas much longer than broad; florets not spreading at right angles to the rachis, closely imbricate or not.
Lemmas keeled on the back.
Spikelets in 1-sided clusters, the clusters scattered along the axis of the inflorescence or on short lateral branches.....9. Dactylis.
Spikelets not in 1-sided clusters.
Lemmas awned from a bifid apex..10. Bromus.
Lemmas awnless.....11. Poa.
Lemmas rounded on the back.
Glumes papery; upper florets usually reduced to a clavate rudiment; spikelets commonly purple-tinged.
12. Melica.
Glumes not papery; upper florets reduced in size or not, but not reduced to a clavate rudiment; spikelets usually green.
Nerves of the lemmas parallel.
Spikelets in racemes.....13. Pleuropogon.

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Spikelets in panicles.
Nerves of the lemmas conspicuous. Plants of very moist freshwater habitats.
14. Glyceria.
Nerves of the lemmas very inconspicuous. Plants of saline habitats.
15. Puccinellia.
Nerves of the lemmas converging at the apex.
Lemmas awned from a bifid apex.
10. Bromus.
Lemmas entire, awned or not (rarely minutely bifid in Festuca elmeri).
Lemmas awned, long attenuate, very gradually narrowed distally...16. Festuca.
Lemmas not awned, rather abruptly narrowed distally.
Pedicels of the spikelets thick, short; plants annual; panicles stiff.
17. Scleropoa.
Pedicels of the spikelets slender, usually long; plants annual or more usually perennial; panicles not stiff.
11. Poa.

3. Hordeae

Spikelets 2 to several at each node of the rachis (occasionally only 1 in Elymus).
Rachis disarticulating at maturity.
Spikelets 3 per node, the central one fertile, the lateral ones sterile, often much reduced (in H. vulgare all the spikelets are fertile).....18. Hordeum.
Spikelets 2 per node, both fertile.....19. Sitanion.
Rachis continuous, not disarticulating at maturity.
Glumes much reduced or lacking; spikes not dense, the spikelets spreading.....20. Hystrix.
Glumes present, conspicuous; spikes dense, the spikelets usually appressed or ascending.
Plants annual, coarse, 6-12 dm. tall; spikelets always 3 per node, 1-flowered.....18. Hordeum.
Plants annual or perennial (if annual, slender and usually under 5 dm. tall); spikelets 1 to many per node, 2 to several flowered.....21. Elymus.
Spikelets 1 per node of the rachis.
Spikelets 2 to several flowered; rachis not disarticulating at maturity; spikelets not sunken into cavities in the rachis.
Spikelets situated distinctly edgewise to the rachis; glumes 1 except in the terminal spikelet.....22. Lolium.
Spikelets situated sidewise to the rachis (or sometimes somewhat edgewise; glumes 2.

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Plants perennial.
Rachilla distorted at the base; spikelets more or less edgewise to the rachis.....21. Elymus.
Rachilla not distorted; spikelets situated sidewise to the rachis.....23. Agropyron.
Plants annual.
Glumes ovate, 3-nerved.....24. Triticum.
Glumes subulate, 1-nerved.....25. Secale.
Spikelets 1-flowered; rachis disarticulating at maturity; spikelets sunken into cavities in the rachis.
Lemmas awnless.
Glume 1 per spikelet.....26. Monerma.
Glumes 2 per spikelet.....27. Parapholis.
Lemmas awned.....28. Scribneria.

4. Aveneae

Glumes 1 cm. long or longer.
Plants annual; lemmas awned on the back or the awns occasionally lacking; awns rounded in cross section; panicles many-flowered. 29. Avena.
Plants perennial; lemmas awned from between 2 terminal teeth; awns flattened; panicles few-flowered.....30. Danthonia.
Glumes less than 1 cm. long.
Lemmas entire, not toothed or bifid at the apex.
Spikelets 7-9 mm. long; awns about 2 times as long as the lemmas. 31. Arrhenatherum.
Spikelets 3-6 mm. long; awns rarely longer than the lemmas or none.
Glumes not exceeding the upper floret, scabrous, glabrous, or papillate-hirsute.....32. Koeleria.
Glumes exceeding the upper floret, villous...33. Holcus.
Lemmas variously toothed at the apex.
Lemmas 4-toothed at the apex.....34. Deschampsia.
Lemmas bifid at the apex.
Plants annual; spikelets 1.8-4 mm. long.....35. Aira.
Plants perennial; spikelets 6-8 mm. long.....36. Trisetum.

5. Agrostideae

Articulation below the glumes, the spikelets falling entire.
Plants prostrate; inflorescences capitate, partly hidden by the bract-like upper leaves.....37. Crypsis.
Plants erect or ascending; inflorescences spike-like, narrowly cylindric or variously lobed, not capitate, not partly hidden by the upper leaves.
Glumes not awned; spikelets strongly compressed.38. Alopecurus.
Glumes long awned; spikelets not strongly compressed. 39. Polypogon.

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Articulation above the glumes, the spikelets not falling entire.
Fruit indurate; lemmas awned; callus conspicuous.
Awns several times as long as the lemmas, persistent; glumes 6-20 mm. long.....40. Stipa.
Awns about twice as long as the lemmas, deciduous; glumes 3 mm. long.....41. Oryzopsis.
Fruit not indurate; lemmas awned or not; callus inconspicuous.
Glumes longer than the lemmas.
Glumes plumose.....42. Lagurus.
Glumes not plumose.
Spikelets strongly compressed laterally; glumes keeled, the keels ciliate; inflorescences dense, cylindric or ellipsoid.....43. Phleum.
Spikelets not compressed laterally; glumes not keeled, not ciliate; inflorescences various.
Glumes very unequal in length, saccate at the base; lemmas about $\frac{1}{4}$ as long as the longest glume. 44. Gastridium.
Glumes subequal in length, not saccate at the base; lemmas at least $\frac{1}{2}$ as long as the glumes.
Spikelets 4-20 mm. long; paleae well developed; rachilla prolonged behind the palea; plants perennial.....45. Calamagrostis.
Spikelets rarely over 4 mm. long; paleae well developed or not; rachilla not prolonged behind the palea (except in A. avenacea); plants annual or perennial.....46. Agrostis.
Glumes shorter than the lemmas or about equalling them.
Spikelets 1-1.5 cm. long.....47. Ammophila.
Spikelets about 2 mm. long.....48. Sporobolus.

6. Chlorideae

Plants annual; inflorescences paniculate.
Spikelets nearly circular, 1-flowered.....49. Beckmannia.
Spikelets elongate, 7-11-flowered.....50. Leptochloa.
Plants perennial; inflorescences digitate or spike-like.
Stems prostrate, rooting at the nodes; spikes usually 4-5, digitately spreading from the top of the culm; spikelets about 2 mm. long.
Plants of disturbed areas.....51. Cynodon.
Stems erect, occasionally rooting from the lower nodes; spikes numerous, in spike-like racemes; spikelets about 12 mm. long.
Plants of salt marshes.....52. Spartina.

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7. Phalarideae

Sterile lemmas awned; glumes unequal.....53. Anthoxanthum.
Sterile lemmas not awned (lacking in 1 species of Phalaris); glumes subequal.
  Panicles open; sterile lemmas as long as or longer than the fertile ones; spikelets not compressed laterally....54. Hierochloe.
  Panicles dense, spike-like; sterile lemmas at most ½ as long as the fertile ones or rarely lacking; spikelets compressed laterally. 55. Phalaris.

8. Paniceae

Spikelets subtended by bristles or enclosed in a spiny bur.
  Spikelets enclosed in a spiny bur.....56. Cenchrus.
  Spikelets subtended by bristles.
    Bristles persistent, not plumose; inflorescences not hidden. 57. Setaria.
    Bristles not persistent, falling with the spikelets, plumose (or if not plumose, the inflorescences hidden by the upper sheaths); inflorescences hidden or not...58. Pennisetum.
Spikelets not subtended by bristles or enclosed in a spiny bur.
  Spikelets pedicellate; inflorescences paniculate; spikelets not arranged on one side of the rachis.....59. Panicum.
  Spikelets sessile or short pedicellate; inflorescences various; spikelets arranged on one side of the rachis.
    Inflorescences simple, the rachis very broad and flattened. 60. Stenotaphrum.
    Inflorescences of 2 or more branches (occasionally 1 in Paspalum); rachis not broad and flattened.
      Rachis narrowly winged; inflorescences usually of 2 to several racemosely or digitately arranged branches.
        Branches of the inflorescence digitate...61. Digitaria.
        Branches of the inflorescence racemose...62. Paspalum.
      Rachis not winged; inflorescences paniculate. 63. Echinochloa.

9. Andropogoneae

Outer glumes pectinate.....64. Eremochloa.
Glumes not pectinate.....65. Sorghum.

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1. Pseudosasa Makino, Jap. Journ. Bot. 2: 15. 1920.

1. Pseudosasa japonica (Sieb. & Zucc.) Makino, Jap. Journ. Bot. 2: 15. 1920.

Local distribution: Well established in Golden Gate Park in San Francisco, spreading by runners, but also flowering. Summer months.

General distribution: Native of Asia, widely grown as an ornamental and naturalized in several areas in the United States.

Specimen examined: Golden Gate Park, Raven 6554 (CAS).

2. Cortaderia Stapf, Gard. Chron. 22: 396. 1897.

1. Cortaderia selloana (Schult.) Aschers. & Graebn. Syn. Mitteleur. Fl. 2: 325. 1900.

Local distribution: Commonly planted as an ornamental and becoming established in moist habitats. June through October.

General distribution: Native of South America, widely cultivated in California and the southern states, occasionally becoming established.

Specimen examined: Hilton Airport, Thomas 3618.

At several places between Saratoga Summit and Santa Cruz plants of this species occur on very steep, inaccessible road embankments, sites in which they certainly were not planted.

3. Phragmites Trin. Fund Agrost. 134. 1820.

1. Phragmites communis Trin. Fund. Agrost. 134. 1820.

Local distribution: Known locally only from San Francisco where it is probably now extinct, but to be expected elsewhere in marshy areas

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and along streams and ponds. April through October.

General distribution: A nearly cosmopolitan species of tropical, temperate, and subarctic areas.

Specimen cited: This species was cited from San Francisco by Watson (1880, p. 300).

4. Distichlis Raf. Journ. Phys. 89: 104. 1819.

Spikelets congested; flowers uniformly 5-9 per spikelet; culms prostrate to decumbent; plants stoloniferous; leaf-blades 1-2 dm. long. ..... 1a. D. spicata var. stolonifera.

Spikelets not conspicuously congested; flowers 3-14 per spikelet, variable in number; culms erect; plants not stoloniferous; leaf-blades under 0.5 dm. long.....1b. D. spicata var. nana.

1a. Distichlis spicata (L.) Greene var. stolonifera Beetle, Bull. Torr. Bot. Club 70: 644. 1943.

Local distribution: Salt marshes along the coast and along the shores of San Francisco Bay. May through October.

General distribution: Tillamook County, Oregon, south along the coast and along the margins of bays to San Diego County.

Specimens examined: San Francisco, Howell 31661 (CAS); Near Alviso, Dudley, July 18, 1903; Alviso, Thomas 5304; Davenport Landing, Thomas 3645; Santa Cruz, Thompson, June 20, 1903; Hesse 1170; Near mouth of Pajaro River, Thomas 2401.

1b. Distichlis spicata (L.) Greene var. nana Beetle, Bull. Torr. Bot. Club 70: 647. 1943.

Local distribution: Known locally only from near Soda Lake in southern Santa Cruz County. May through July.

General distribution: Widespread in alkaline areas in California, perhaps extending as far east as Utah.

Specimen examined: Soda Lake, Thomas 3301.

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5. Cynosurus L. Sp. Pl. 72. 1753.

Plants annual; awns of the lemmas inconspicuous; panicles narrow, more or less linear.....1. C. cristatus.
Plants perennial; awns of the lemmas about equalling the spikelets; panicles ovoid to subcapitate.....2. C. echinatus.

1. Cynosurus cristatus L. Sp. Pl. 72. 1753.

Local distribution: Known locally only from San Francisco as a lawn weed. June through July.

General distribution: Native of Europe, introduced into the United States and southern Canada.

Specimen examined: San Francisco, Bacigalupi 2785.

2. Cynosurus echinatus L. Sp. Pl. 72. 1753.

Local distribution: Known locally only from roadsides in Santa Cruz County, but to be expected elsewhere eventually. June through August.

General distribution: Native of Europe, widely introduced into the United States and Canada.

Specimens examined: 2 miles from Skyline Blvd., on road to Big Basin, Howell, Aug. 11, 1954; Kings Creek Canyon, Hesse 622.

6. Lamarckia Moench, Meth. Pl. 201. 1794.

1. Lamarckia aurea (L.) Moench, Meth. Pl. 201. 1794.

Local distribution: Occasional, but apparently spreading, growing in dry or rocky soils in disturbed areas. March through May.

General distribution: Native of the Mediterranean region, widely introduced into North America from central California to Texas, thence southward, and into other temperate regions.

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Specimens examined: West of Redwood City, Dudley, May 19, 1906; Near Stanford, Dudley, 1904; Stanford, Elmer 2394 (CAS); Near Almaden Canyon, Thomas 3940; Guadalupe Mines, Parks, Apr. 1927; Edenvale, Abrams 5182.

7. Eragrostis Host, Icon. Gram. Austr. 4: 14. 1809.

Midveins of the lemmas with conspicuous glands; spikelets about 3 mm. ..... 1. E. cilianensis.
Midveins of the lemmas lacking glands; spikelets about 1-1.5 mm. wide.
  Spikelets about 1 mm. wide, linear; plants usually 6-10 dm. tall. ..... 2. E. orcuttiana.
  Spikelets about 1.5 mm. wide, broadly linear; plants usually 3-5 dm. tall ..... 3. E. diffusa.

1. Eragrostis cilianensis (All.) Lutati, Malpighia 18: 386. 1904.

Local distribution: Known locally from San Francisco (Brandegee, 1891, p. 381) and from Stanford, usually growing as a garden weed. June and July.

General distribution: Native of Eurasia, widely introduced into the western hemisphere.

Specimen examined: Stanford, Abrams 12180.

2. Eragrostis orcuttiana Vasey, Contr. U. S. Nat. Herb. 1: 269. 1893.

Local distribution: Occasional as a weed in gardens and in planted areas, probably more common than the number of local collections would indicate. August and September.

General distribution: Native of the southwestern United States, introduced into the Santa Cruz Mountains.

Specimens examined: Golden Gate Park, Howell 32863 (CAS); Los Gatos, Bacigalupi, Aug. 22, 1941; Near Raymonds, Dudley, Sept. 7, 1906; Gilroy, Howell 30915 (CAS).

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3. Eragrostis diffusa Buckl. Proc. Acad. Phila. 1862: 97. 1862.

Local distribution: Fairly common as a weed in gardens, lawns, and disturbed areas, but rarely collected locally. June through October.

General distribution: Native in many of the western states, introduced locally, in the eastern states, and in Mexico.

Specimens examined: Near Islais Creek, San Francisco, Howell 32649 (CAS); Stanford, Ferris 3635; Thomas 7359; Boulder Creek, Hesse 141.

8. Briza L. Sp. Pl. 70. 1753.

Spikelets at least 10 mm. across at anthesis; panicles drooping. 1. B. maxima.
Spikelets under 5 mm. across at anthesis; panicles erect..2. B. minor.

1. Briza maxima L. Sp. Pl. 70. 1753.

Local distribution: Disturbed habitats, often in shade, throughout the Santa Cruz Mountains. April and May.

General distribution: Native of Europe, established as an escape in various parts of the United States.

Specimens examined: Golden Gate Park, Howell 32573 (CAS); Near San Mateo - Santa Cruz Co. line along ocean, Thomas 1710; 1½ miles south of Felton, Thomas 1895; Summit of Los Gatos - Santa Cruz highway, Thomas 3207.

2. Briza minor L. Sp. Pl. 70. 1753.

Local distribution: Widely distributed in grasslands and often in disturbed habitats. January through June.

General distribution: Native of Europe, widely established in the United States, South America, South Africa, and Australia.

Specimens examined: Lobos Creek, San Francisco, Raven 6943 (CAS); Crystal Springs Lake, Copeland 3257; Woodside, Dudley, May 16, 1900; Coal Mine Ridge, Barry 125; Stanford, Abrams 1546; Hilton Airport, Thomas 4217; Santa Cruz, Anderson, no date.

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9. Dactylis L. Sp. Pl. 71. 1753.

1. Dactylis glomerata L. Sp. Pl. 71. 1753.

Local distribution: Fairly common in disturbed areas, along roads, and in overgrazed pastures. May through August.

General distribution: Native of Europe, widely grown and naturalized in North America and on other continents.

Specimens examined: Near 3rd St., San Francisco, Howell 31373 (CAS); Golden Gate Park, Thomas 7457; Lake Merced, Thomas 7323; Vicinity of Baden, Dudley, May 14, 1899; Cahill Ridge, Oberlander 960; Ben Lomond Mt., Hesse 188; Glenwood, Thomas 3195.

10. Bromus L. Sp. Pl. 76. 1753.

Awns of the lemmas distinctly geniculate.....1. B. trinii.
Awns of the lemmas straight or lacking.
  Lemmas distinctly keel-compressed.
    Lemmas awnless or the awns under 2.5 mm. long.
      2. B. catharticus.
    Lemmas awned, the awns over 3 mm. long.
      Leaf-blades about 2 mm. wide, often involute, densely canescent.
        3. B. breviaristatus.
      Leaf-blades usually over 5 mm. wide, usually flat, glabrous or variously pubescent.
        Awns 7 mm. long or longer.....4. B. carinatus.
        Awns under 7 mm. long.
          Panicles very narrow, the branches short, erect. Plants of coastal sand dunes.....5. B. maritimus.
          Panicles broad, the branches longer, spreading. Plants of various habitats, but not found on coastal sand dunes.
            Lower glumes usually 5-nerved...6. B. stamineus.
            Lower glumes 1 or 3 nerved.....7. B. marginatus.
  Lemmas not keel-compressed.
    Plants perennial.
      Lower glumes 1-nerved; plants dark green.8. B. vulgaris.
      Lower glumes 3-nerved; plants pale green.
        Glumes glabrous.....9. B. laevipes.
        Glumes pubescent.....10. B. pseudolaevipes.
    Plants annual.
      Lemmas rounded at the top, the teeth rarely over 1 mm. long; awns under 15 mm. long.
        Panicles dense, contracted, the branches erect to ascending.

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Lemmas glabrous or rarely minutely scabrous.
11. B. racemosus.
Lemmas distinctly pubescent.....12. B. mollis.
Panicles open, not contracted, the branches spreading.
Lemmas glabrous.....13. B. commutatus.
Lemmas pubescent.....14. B. arenarius.
Lemmas acute at the top, the teeth usually 2-5 mm. long; awns 12-50 mm. long.
Panicles contracted, the pedicels short, erect to ascending; awns of the lemmas 16-22 mm. long.
Culms densely puberulent below the panicles.
15. B. rubens.
Culms glabrous or sparsely scabrous below the panicles.
16. B. madritensis.
Panicles open, the pedicels often long, spreading; awns of the lemmas 12-50 mm. long.
Upper glumes under 1 cm. long; spikelets pubescent; awns of the lemmas 12-14 mm. long.
17. B. tectorum.
Upper glumes 2.5-3 cm. long; spikelets glabrous; awns of the lemmas 30-50 mm. long...18. B. rigidus.

1. Bromus trinii Desv. in Gay, Fl. Chil. 6: 441. 1853.

Local distribution: Occasional on serpentine areas and as a weed. March through May.

General distribution: Native of Chile, introduced into Oregon, California, and Baja California, occasionally eastward to Colorado.

Specimens examined: San Francisco, Howell 31340 (CAS); Woodside, Abrams 2409; Stanford, Cannon, Mar. 15, 1900; Atkinson, Mar. 1900.

2. Bromus catharticus Vahl, Sym. Bot. 2: 22. 1791.

Local distribution: Occasional as a weed in disturbed areas. March through September.

General distribution: Native of South America, widely introduced into North America and Eurasia.

Specimens examined: 3rd and Davidson Streets, San Francisco, Howell 32658 (CAS); Golden Gate Park, Abrams 12910; Thomas 7454; Near San Bruno, Howell 30010 (CAS); Santa Clara, Dudley 4028.

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3. Bromus breviaristatus Buckl. Proc. Acad. Phila. 1862: 98. 1862.

Local distribution: Occasional in southern San Mateo County and northern Santa Clara County. May through June.

General distribution: British Columbia south to southern California, east to western Montana, Wyoming, and Nevada.

Specimens examined: Hills west of San Mateo, Rose 56115 (CAS); Near Stanford, Dudley, May 4, 1901; Palo Alto, Vestal, June 13, 1925.

4. Bromus carinatus Hook. & Arn. Bot. Beechey 403. 1840.

Local distribution: Common on grassy slopes and in brush-covered areas, San Francisco southward. March through July.

General distribution: British Columbia south to northern Baja California, east to Idaho and New Mexico.

Specimens examined: San Francisco, Dudley, Mar. 29, 1902; Twin Peaks, Raven 10647 (CAS); Montara Mt., Dudley, Mar. 17, 1900; Moss Beach, Wiggins 2946; Crystal Springs, Abrams 2462; Near La Honda, Dudley, July 30, 1894; Coal Mine Ridge, Barry 99; Stanford, Mason 38; Black Mt., Dudley, June 3, 1900; Permanente Creek, Abrams 6329; Foothills west of Los Gatos, Heller 7381; Near Saratoga Summit, Thomas 2995; Glenwood, Dudley, no date; Big Basin, Dudley, June 14, 1905.

It is often very difficult to assign individual specimens to this species or to B. marginatus.

5. Bromus maritimus (Piper) Hitchc. in Jepson, Fl. Calif. 1: 177. 1912.

Local distribution: Stabilized coastal sand dunes. April and May.

General distribution: Coastal, Lane County, Oregon, south to northern Monterey County.

Specimens examined: Pt. Lobos, San Francisco, Howell 32923 (CAS); Lake Merced, Dudley, May 11, 1901; Ano Nuevo Pt., Ferris 189.

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6. Bromus stamineus Desv. in Gay, Fl. Chil. 6: 440. 1853.

Local distribution: Occasional as a weed in disturbed areas. April and May.

General distribution: Native of Chile, introduced into central California.

Specimens examined: Lone Mt., San Francisco, Howell 32580 (CAS); Waterfront, San Francisco, Howell 31380 (CAS); Belmont, Beltz, May 23, 1958 (CAS); Menlo Park, Howell 31446 (CAS).

7. Bromus marginatus Nees in Steud. Syn. Pl. Glum. 1: 322. 1854.

Local distribution: Open slopes and coastal bluffs, San Francisco southward. May through October.

General distribution: British Columbia south to southern California, east to Alberta, South Dakota, Colorado, and New Mexico, introduced farther east.

Specimens examined: Between Colma & Lake Merced, Dudley, May 11, 1901; San Francisco - San Mateo Co. line, Bacigalupi 2746; Crystal Springs Lake, Dudley, May 1894; Pigeon Pt., Wiggins 3672; Near Santa Cruz, Anderson, no date.

8. Bromus vulgaris (Hook.) Shear, U. S. Dept. Agric. Div. Agrost. Bull. 23: 43. 1900.

Local distribution: Shaded areas in redwoods and redwood - douglas fir forests, often along streams. May through July.

General distribution: British Columbia south to southern California, east to western Montana and Wyoming.

Specimens examined: La Honda, Dudley, July 29, 1896; Between Pescadero and Butano Creeks, Dudley, June 7, 1895; Kings Mt., Abrams 5562; Saratoga - Big Basin Rd., Abrams 5277; Black Mt., Dudley, June 8, 1895; Big Basin, Dudley, Sept. 23, 1905.

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9. Bromus laevipes Shear, U. S. Dept. Agric. Div. Agrost. Bull. 23: 45. 1900.

Local distribution: Occasional in shaded woods, San Mateo County southward. May through July.

General distribution: Washington south to southern California and on some of the Channel Islands.

Specimens examined: Back of San Mateo, Heller 8566; Portola Valley, Randall 155; Coal Mine Ridge, Barry 207; Black Mt., Dudley, June 3, 1900; Foothills west of Los Gatos, Heller 7470; Near Madrone Springs, Dudley 4082.

10. Bromus pseudolaevipes Wagnon, Leafl. West. Bot. 6: 64. 1950.

Local distribution: Occasional in woods in Santa Clara and Santa Cruz counties. March through June.

General distribution: Coast Ranges from Alameda and Santa Cruz counties south to San Diego County and on some of the Channel Islands.

Specimens examined: Stanford, Dudley, Mar. 7, 1901; Permanente Creek, Dudley, Apr. 23, 1899; Near Boulder Creek, Hesse 1113.

11. Bromus racemosus L. Sp. Pl. 114. 1762.

Local distribution: Occasional in grasslands and in disturbed areas. April through June.

General distribution: Native of Europe, widely established in North America.

Specimens examined: San Francisco, Abrams 13403; San Andreas Valley, Oberlander 767; Near Saratoga Summit, Thomas 1618a; Hilton Airport, Thomas 3141.

12. Bromus mollis L. Sp. Pl. 112. 1762.

Local distribution: The most common annual Bromus locally, growing in open grassland, edges of chaparral, in woodland, and as a weed

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in disturbed areas. March through June.

General distribution: Introduced from Europe, now widespread in North America.

Specimens examined: Near Lake Merced, Dudley, May 11, 1901; Western end of Golden Gate Park, Thomas 7192; San Francisco Watershed Reserve, Oberlander 1000; Near Millbrae, Dudley, May 14, 1899; Woodside serpentine, Dutton, Apr. 17, 1900; Stanford, Dudley, Apr. 13, 1899; Foothills west of Los Gatos, Heller 7425; Near Saratoga Summit, Thomas 1834; Near Glenwood, Thomas 3202; Watsonville Slough, Thomas 1575; Sunset Beach State Park, Thomas 3099.

13. Bromus commutatus Schrad. Fl. Germ. 353. 1806.

Local distribution: Occasional in disturbed areas, roadsides, and occasionally in grassland. May through June.

General distribution: Introduced from Europe, widely naturalized in western North America.

Specimens examined: San Francisco, Howell 31412 (CAS); Ben Lomond, Hesse 266; Basin Way, Hesse 1611.

14. Bromus arenarius Labill. Nov. Holl. Pl. 1: 23. 1804.

Local distribution: Known locally only from near Boulder Creek in Santa Cruz County, but to be expected elsewhere in disturbed habitats. May and June.

General distribution: Native of Australia, introduced into Oregon, California, Arizona, New Mexico, and Pennsylvania.

Specimen examined: Bear Creek, Hesse 452.

15. Bromus rubens L. Cent. Pl. 1: 5. 1755.

Local distribution: Common as a weed in disturbed areas and occasionally on dry grassy slopes. March through May.

General distribution: Introduced from Europe, well established as

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a weed in the western states, occasionally so in some of the eastern states.

Specimens examined: San Francisco, Howell 31415 (CAS); Bayview Hills, Raven 6665 (CAS); Palo Alto, Demaree 9141; Montebello Rd., Dudley, Apr. 20, 1901; Morgan Hill, Ferris 802; Near Saratoga Summit, Thomas 4710; Bear Creek Rd., Thomas 1848; Pajaro R., Thomas 1537.

16. Bromus madritensis L. Cent. Pl. 1: 5. 1755.

Local distribution: Disturbed areas and dry open slopes, San Francisco, southward. April and May.

General distribution: Introduced from Europe, now common in Oregon and California.

Specimens examined: Golden Gate Park, Howell 28315 (CAS); Crystal Springs Lake, Oberlander 766; Palo Alto, Ferris 9160; Stanford, Abrams 14408; Black Mt., Hichborn 169; Permanente Creek, Dudley, Apr. 30, 1899; Foothills west of Los Gatos, Heller 7352; 3 miles northwest of Los Altos, Raven 5515 (CAS); Near Los Altos, Pringle, May 23, 1948 (CAS).

17. Bromus tectorum L. Sp. Pl. 77. 1753.

Local distribution: Occasional in disturbed areas and in sandy soil. April through June.

General distribution: Native of Europe, well established in the western states.

Specimens examined: San Francisco, Howell 31414 (CAS); Ben Lomond sand hills, Hesse 424; Graham Hill, Hesse 467.

Plants with glabrous spikelets have been called B. tectorum var. glabratus Spenner (Fl. Friburg. 1: 152. 1825).

18. Bromus rigidus Roth, Mag. Bot. Roem. & Ust. 10: 21. 1790.

Local distribution: Disturbed areas, chaparral, and grasslands, a very common introduced grass. April through July.

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General distribution: Introduced from the Mediterranean region, now common in the western states, occasionally found in some of the eastern states.

Specimens examined: Southeast of Lake Merced, Dudley, May 11, 1901; Bayview Hills, Howell 32276 (CAS); San Andreas Valley, Oberlander 188; Stanford, Randall 156; Santa Clara, Leeds, May 2, 1888; San Jose, Knoche, Apr. 1898; Hilton Airport, Thomas 4063; Boulder Creek, Thomas 1786; Santa Cruz, Thomas 1483; Pajaro R., Thomas 1545; Sunset Beach State Park, Thomas 3270.

Brachypodium distachyon (L.) Beauv. (Ess. Agrost. 101. 1812) is well established from Marin County north to Humboldt County and is to be expected eventually in the Santa Cruz Mountains. It may be distinguished from Bromus by its very strict raceme and nearly sessile spikelets.

11. Poa L. Sp. Pl. 67. 1753.

Plants annual.
- Plants rarely more than 2 dm. tall; sheaths of the leaves smooth; lemmas not webbed at the base.....1. P. annua.
- Plants over 2 dm. tall; sheaths roughened; lemmas webbed at the base. 2. P. howellii.

Plants perennial.
- Rhizomes present.
  - Culms flattened, 2-edged.....3. P. compressa.
  - Culms round in cross section.
    - Plants dioecious; panicles very dense; lemmas not conspicuously webbed.....4. P. douglasii.
    - Plants not dioecious; panicles open; lemmas conspicuously webbed.
      - Lemmas glabrous except for the web at the base. 5. P. kelloggii.
      - Lemmas pubescent above the web.....6. P. pratensis.
- Rhizomes absent.
  - Web conspicuous.
    - Lemmas glabrous.....7. P. trivialis.
    - Lemmas pubescent on the keels and nerves..8. P. nemoralis.
  - Web lacking.
    - Lemmas distinctly keeled, usually also compressed. 9. P. unilateralis.
    - Lemmas obscurely keeled, rounded on the back. 10. P. scabrella.

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1. Poa annua L. Sp. Pl. 68. 1753.

Local distribution: A very common grass of gardens, moist disturbed areas, and cultivated fields. February through September.

General distribution: Native of Europe, now nearly cosmopolitan as a weed.

Specimens examined: Lone Mt., San Francisco, Howell 32601 (CAS); Golden Gate Park, Thomas 7456; Bayview Hills, Howell 32281 (CAS); Sawyer Ridge, Oberlander 112; Moss Beach, Wiggins 2944; Between Pescadero and San Gregorio, Dudley, Mar. 26, 1894; Woodside to Crystal Springs, Dudley, May 1894; Stanford, Randall 162; San Jose, Knoche, Mar. 1899; 3 miles south of San Jose, Thomas 4805; Loma Prieta, Thomas 2548; Near Saratoga Summit, Thomas 4701; Santa Cruz, Anderson 39; Between Watsonville and Santa Cruz, Thomas 2722; Pajaro R., Thomas 1536.

Plants growing in the open rarely attain a height of more than 2 dm., however, when growing in competition with other plants, as in a dense bed of annual ornamental plants, Poa annua may grow to a height of 3 or even 4 dm.

2. Poa howellii Vasey & Scribn. U. S. Dept. Agric. Div. Bot. Bull. 13: pl. 78. 1893.

Local distribution: Wooded areas, San Mateo County southward. March through June.

General distribution: Vancouver Island, British Columbia, south to southern California through the Coast Ranges; also in the central Sierra Nevada.

Specimens examined: Cahill Ridge, Oberlander 850; Seal Cove, Dudley, Mar. 17, 1900; Near Pescadero Creek, Ferris 2175; Coal Mine Ridge, Barry 93; Page Mill Rd., Dudley, Apr. 14, 1900; Permanente Creek, Dudley, Apr. 23, 1894; Saratoga - Big Basin Rd., Abrams 5262; Near Eagle Rock, Thomas 5021; Near Boulder Creek, Hesse 249; Ben Lomond sand hills, Thomas 4909; Santa Cruz, Anderson 47.

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3. Poa compressa L. Sp. Pl. 69. 1753.

Local distribution: Occasional as a weed. May and June.

General distribution: Native of Europe, widely cultivated and established in the United States.

Specimens examined: Golden Gate Park, Raven 6937 (CAS); San Bruno Mts., Raven 1812 (CAS).

4. Poa douglasii Nees, Ann. Nat. Hist. 1: 284. 1838.

Local distribution: Coastal sand dunes, San Francisco southward. March through May.

General distribution: Coastal dunes, Humboldt County south to northern Monterey County.

Specimens examined: San Francisco, Bolander 1528; Curran, May 1884; Lake Merced, Dudley, May 11, 1901; San Pedro, Dudley, Mar. 18, 1900; Santa Cruz, Anderson, no date.

5. Poa kelloggii Vasey, U. S. Dept. Agric. Div. Bot. Bull. 13: pl. 79. 1893.

Local distribution: Occasional in shaded woods. April through May.

General distribution: Corvallis, Oregon, south to Santa Cruz County through the Coast Ranges.

Specimens examined: Pescadero Creek, Ferris 1963; Boulder Creek, Hesse 257; Felton, Elmer 5029.

6. Poa pratensis L. Sp. Pl. 67. 1753.

Local distribution: Lawns, disturbed areas, and open hills, San Francisco southward. April through June.

General distribution: Widespread in North America and Eurasia, local collections from near habitations may be escapes from introduced European strains.

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Specimens examined: San Francisco, Howell 11214; Cahill Ridge, Oberlander 880; Near Millbrae, Dudley, May 14, 1899; Santa Cruz, Anderson, no date.

7. Poa trivialis L. Sp. Pl. 67. 1753.

Local distribution: Occasional as garden and lawn weeds in San Francisco. May and June.

General distribution: Native of Europe, widely established in North America.

Specimens examined: Golden Gate Park, Howell 31672 (CAS); Pacific Heights, San Francisco, Howell 24296 (CAS).

8. Poa nemoralis L. Sp. Pl. 69. 1753.

Local distribution: Rare as a garden weed in Golden Gate Park in San Francisco. June.

General distribution: Native of Europe, widely introduced into North America.

Specimen examined: Golden Gate Park, Walther, June 1922 (CAS).

9. Poa unilateralis Scribn. in Vasey, U. S. Dept. Agric. Div. Bot. Bull. 13: pl. 85. 1893.

Local distribution: Fairly common in rocky areas in exposed locations, San Francisco southward. March through May.

General distribution: Washington south to Monterey County, usually near the coast.

Specimens examined: San Francisco, Jones, May 1882 (isotype); Bakers Beach, Dudley, May 29, 1902; Bayview Hills, Howell 32311 (CAS); Montara Mt., Dudley, Mar. 17, 1900; Near Millbrae, Keck 1477; Near Pescadero, Mason, May 28, 1921; Santa Cruz, Anderson, no date.

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10. Poa scabrella (Thurb.) Benth. ex Vasey, Grasses U. S. 42. 1883.

Local distribution: Rocky grassland and serpentine soils, San Francisco southward. February through May.

General distribution: British Columbia south to Baja California, east to western Montana and Utah.

Specimens examined: 1 mile south of Lake Merced, Dudley, May 11, 1901; San Andreas Lake, Dudley, Mar. 18, 1900; Cahill Ridge, Oberlander 653; Woodside, Abrams 2408; Searsville, Davis, Apr. 10, 1903; Page Mill Rd., Ferris 773; Stevens Creek, Ferris 2159; 3 miles south of San Jose, Thomas 4962; Guadalupe Creek, Thomas 5573; Almaden Canyon, Bacigalupi 1329; Loma Prieta, Davy 569; Edenvale, Thomas 4762; Kings Creek Canyon, Hesse 925; Deer Creek, Thomas 1525; Little Basin, Ferris 1999.

12. Melica L. Sp. Pl. 66. 1753.

Culms bulbous at the base.
  Lemmas tapering gradually, acuminate, pubescent on the nerves. 1. M. subulata.
  Lemmas tapering abruptly, acute to obtuse, glabrous.
    Spikelets usually over 15 mm. long; first and second florets about 2.5 mm. apart at the base; glumes much shorter than the spikelets.....2. M. geyeri.
    Spikelets usually under 15 mm. long; first and second florets about 2 mm. apart; glumes nearly as long as the spikelets. 3. M. californica.

Culms not bulbous at the base.
  Fertile florets 1 or rarely 2 per spikelet.
    Rudimentary florets about 1 mm. long, on stipes about 2-2.5 mm. long; lemmas pubescent near the apex....4. M. torreyana.
    Rudimentary florets about 2 mm. long, on stipes about 0.5 mm. long; lemmas at most scabrous.....5. M. imperfecta.
  Fertile florets 2 or more.
    Glumes much shorter than the spikelets; lemmas pilose-ciliate on the margins basally.....6. M. harfordii.
    Glumes nearly as long as the spikelets; lemmas at most scabrous. 3. M. californica.

1. Melica subulata (Griseb.) Scribn. Proc. Acad. Phila. 37: 47. 1885.

Local distribution: Occasional on open wooded slopes, southern San Mateo County southward to Santa Clara County. March through July.

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General distribution: Alaska south to Santa Clara County in the Coast Ranges and to Fresno County in the Sierra Nevada, east to western Montana and northwestern Wyoming.

Specimens examined: La Honda Stage Rd., Dudley, May 19, 1900; Kings Mt. Rd., Abrams 5560; El Corte Madera, Dudley, Apr. 24, 1898; Congress Springs, Dudley, Mar. 31, 1899.

2. Melica geyeri Munro ex Bolander, Proc. Calif. Acad. 4: 103. 1870.

Local distribution: Usually growing in shade in redwoods or in redwood - douglas fir forests, less frequent in oak - woodland. March through May.

General distribution: Northwestern Oregon south through the Coast Ranges to northern Monterey County and in the Sierra Nevada from Nevada County south to Mariposa County.

Specimens examined: San Francisco Watershed Reserve, Oberlander 867; Hidden Villa, near Stanford, Dudley, May 21, 1898; Stevens Creek, Ferris 2154.

3. Melica californica Scribn. Proc. Acad. Phila. 37: 46. 1885.

Local distribution: Fairly common in rocky areas in grassland and occasionally in open areas in oak - woodland. March through June.

General distribution: Humboldt and Trinity counties south through the Coast Ranges to Riverside County and in the Sierra Nevada foothills from Shasta County south to Kern County.

Specimens examined: Mt. Davidson, San Francisco, Raven 9300 (CAS); Bayview Hills, Howell 32280 (CAS); Sawyer Ridge, Oberlander 808; Near Crystal Springs, Dudley, Apr. 4, 1896; Near San Mateo, Dudley, May 13, 1906; Woodside, Abrams 1568; Near Stanford, Dudley, May 4, 1901; Permanente Creek, Dudley, Apr. 23, 18991; Black Mt., Dudley, Apr. 14, 1900; Mt. Umunhum, Thomas 3964; Mt. Charlie Rd., Thomas 3327; Santa Cruz, Anderson, no date.

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4. Melica torreyana Scribn. Proc. Acad. Phila. 37: 43. 1885.

Local distribution: Fairly common in a wide range of habitats, rocky serpentine, grasslands, oak - woodland, brush-covered slopes, and redwood forests, San Francisco southward. March through July.

General distribution: Coast Ranges from Humboldt County south to San Luis Obispo County and in the Sierra Nevada from Butte County south to Mariposa County.

Specimens examined: Hunters Pt., Howell 32196 (CAS); Laurel Hill Cemetery, Eastwood 233 (CAS); Jersey Farm, Dudley, Mar. 18, 1900; San Andreas Reservoir, Dudley, May 1899; San Francisco Watershed Reserve, Oberlander 185; Near La Honda, Dudley, May 19, 1900; Kings Mt., Dudley, Mar. 16, 1900; Coal Mine Ridge, Barry 209; Stanford, Dudley, May 8, 1902; Permanente Creek, Dudley, May 21, 1898; 3 miles south of Los Gatos, Boyle 1068; South of San Jose, Ferris 844; Bear Creek Canyon, Hesse 1579; Near Felton, Thomas 1687; Santa Cruz, Jones, June 28. 1881.

5. Melica imperfecta Trin. Mem. Acad. St. Petersb. 2: 59. 1836.

Local distribution: Fairly common on brush-covered hillsides, open woods, sandy coastal bluffs, and along the edges of chaparral. March through June.

General distribution: Coast Ranges and Sierra Nevada foothills from Lake and Sutter counties south to northern Baja California.

Specimens examined: Lake Merced, Rubtzoff 2291 (CAS); Montara Mt., Dudley, Mar. 17, 1900; Searsville Ridge, Davis, Apr. 5, 1903; Stanford, Dudley, May 12, 1899; Stevens Creek, Pendleton 778; Stevens Creek Reservoir, Thomas 5710; Foothills west of Los Gatos, Heller 7353; Loma Prieta, Elmer 3710; Near Saratoga Summit, Thomas 1617; Ben Lomond sand hills, Thomas 4912; Santa Cruz, Anderson, no date.

Hybrids between M. imperfecta and M. californica occur occasionally, as for example Congdon, Apr. 25, 1880, from San Francisco.

Plants with spreading panicles have been called M. imperfecta var. refracta Thurb. (in Wats. Bot. Calif. 2: 303. 1880).

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6. Melica harfordii Bolander, Proc. Calif. Acad. Sci. 4: 102. 1870.

Local distribution: Rare in the Santa Cruz Mountains. May and June.

General distribution: British Columbia south to northern Monterey County in the Coast Ranges and to Fresno County in the Sierra Nevada.

Specimen examined: Near Lexington, Bolander 53 (CAS - type).

13. Pleuropogon R. Br. Bot. App. Parry's Voy. 289. 1824.

1. Pleuropogon californicus (Nees) Benth. ex Vasey, Grasses U. S. 40. 1883.

Local distribution: Known locally from marshy areas around the Crystal Springs Lakes and from San Francisco (Jepson, 1901, p. 63). May and June.

General distribution: Humboldt County south to San Mateo County, eastward to Sacramento and eastern Stanislaus counties.

Specimens examined: San Francisco Watershed Reserve, Oberlander 614; Crystal Springs Lake, McMurphy, May 8, 1906; Crystal Lake, Nohara, May 9, 1906; Millbrae, Elmer 4848.

14. Glyceria R. Br. Prod. Fl. Nov. Holl. 179. 1810.

Spikelets linear, 1-1.5 cm. long; branches of the panicles rigid, erect.
Lemmas 2.5-4 mm. long.....1. G. leptostachya.
Lemmas 4-5.5 mm. long.....2. G. occidentalis.
Spikelets ovate to oblong, about 0.5 cm. long; branches of the panicles nodding, not rigid.....3. G. pauciflora.

1. Glyceria leptostachys Buckl. Proc. Acad. Phila. 1862: 95. 1862.

Local distribution: Known locally only from San Francisco where it was collected in 1852. To the north, this species grows in very wet areas along streams, marshes and springs. May through June.

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General distribution: Washington southward to San Francisco, nowhere common.

Specimen examined: San Francisco, Andersson, 1852 (CAS).

2. Glyceria occidentalis (Piper) Nels. Torreya 19: 224. 1919.

Local distribution: Known locally only from one specimen collected in a pond near Baden in northern San Mateo County. June and July.

General distribution: British Columbia south to San Mateo County in the Coast Ranges and in Nevada and Idaho.

Specimen examined: Near Baden, Dudley, June 19, 1908.

3. Glyceria pauciflora Presl, Rel. Haenk. 1: 257. 1830.

(Torreyochloa pauciflora (Presl) Church, Amer. Journ. Bot. 36: 163. 1949; Puccinellia pauciflora (Presl) Munz, Aliso 4: 87. 1958.)

Local distribution: Occasional in very wet areas, swampy ground, and along the edges of reservoirs. July.

General distribution: Alaska south to southern California, east to South Dakota, Colorado, and New Mexico. In the California Coast Ranges, this species probably does not extend south of San Mateo County.

Specimen examined: Pilarcitos Stone Dam, Elmer 4692.

This species was also collected in San Francisco by Davy (Jepson, 1912, p. 161).

15. Puccinellia Parl. Fl. Ital. 1: 366. 1848.

Anthers 0.7-0.8 mm. long; lemmas 1.5-3 mm. long; spikelets 4-7 mm. long, 3-6 flowered.
  Lemmas 2-3 mm. long; lower branches of the panicles ascending. 1. P. airoides.
  Lemmas 1.5-2 mm. long; lower branches of the panicles drooping or eventually reflexed.....2. P. distans.
Anthers 1.3-1.5 mm. long; lemmas 3-4 mm. long; spikelets 8-15 mm. long, 5-12 flowered.....3. P. grandis.

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1. Puccinellia airoides (Nutt.) Wats. & Coult. in Gray, Man. 668. 1890.

(P. nuttalliana (Schult.) Hitchc. in Jepson, Fl. Calif. 1: 162. 1912.)

Local distribution: Known locally only from Soda Lake in southeastern Santa Cruz County. July.

General distribution: Widespread in alkaline soils from British Columbia east to Wisconsin, south to southern California, Arizona, New Mexico, and Kansas, introduced into Maine and Vermont.

Specimen examined: Soda Lake, Hayward, July 17, 1929.

2. Puccinellia distans (L.) Parl. Fl. Ital. 1: 367. 1848.

Local distribution: Occasional as a weed in San Francisco and to be expected elsewhere. June.

General distribution: Native of Europe, widely introduced at scattered localities across the United States.

Specimens examined: Russian Hill, San Francisco, Howell 32574 (CAS); Near Islais Creek, San Francisco, Howell 32647 (CAS).

3. Puccinellia grandis Swallen, Journ. Wash. Acad. Sci. 34: 18. 1944.

(P. nutkaensis of California authors.)

Local distribution: Levees and salt marshes along the edges of San Francisco Bay. May through August.

General distribution: Along the coast and the margins of bays from the Aleutian Islands to San Mateo County.

Specimens examined: Margin of San Francisco Bay, Brown, May 3, 1947; Salt marshes near Palo Alto, Hackley, Aug. 1920.

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16. Festuca L. Sp. Pl. 73. 1753.

Plants annual.
- Glumes pubescent.
  - Lemmas glabrous.....1. F. confusa.
  - Lemmas pubescent.
    - Pedicels closely appressed to the rachis. 2. F. grayi.
    - Pedicels at least eventually all spreading or reflexed. 3. F. eastwoodae.
- Glumes glabrous.
  - Glumes very unequal, the lower one 0.5-2 mm. long, less than ½ as long as the upper.
    - Lemmas ciliate.....4. F. megalura.
    - Lemmas not ciliata.....5. F. myuros.
  - Glumes not very unequal, the lower one over 2 mm. long, at least ½ as long as the upper.
    - Lemmas glabrous.
      - Lower branches of the inflorescence erect or ascending, not reflexed; florets often 6 or more per spikelet.
        - Florets usually 6 or more per spikelet; plants low, much tufted; lemmas 3-5 mm. long, the awns rarely over 5 mm. long, usually shorter than the lemmas. 6. F. octoflora var. hirtella.
        - Florets usually less than 6 per spikelet; plants tall, usually not tufted; lemmas 5-7 mm. long, the awns over 5 mm. long.....7. F. dertonensis.
      - Lower branches of the inflorescence reflexed at maturity; florets 5 or fewer per spikelet.
        - Florets 3-5 per spikelet; upper pedicels remaining appressed.....8. F. pacifica.
        - Florets usually 1-2 per spikelet; all the pedicels at length reflexed.....9. F. reflexa.
    - Lemmas pubescent.
      - Lower branches of the inflorescence erect or ascending; plants usually low, tufted. 6. F. octoflora var. hirtella.
      - Lower branches of the inflorescence reflexed at maturity; plants usually tall, not much tufted.
        - Pedicels appressed.....2. F. grayi.
        - Pedicels eventually spreading or reflexed. 10. F. microstachys.

Plants perennial.
- Florets long stipitate.....11. F. subuliflora.
- Florets sessile.
  - Leaf-blades over 3 mm. wide, not involute.
    - Lemmas with awns 2-8 mm. long..12. F. elmeri.
    - Lemmas without awns, rarely slightly attenuate.
      - Lemmas 5-7 mm. long; plants with rhizomes. 13. F. elatior.
      - Lemmas 7-10 mm. long; plants without rhizomes. 14. F. arundinacea.

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Leaf-blades involute (rarely flat in F. californica).
Leaves villous at the junction between the sheath and blade.
15. F. californica.
Leaves glabrous at the junction between the sheath and blade.
Awns longer than the lemmas.16. F. occidentalis.
Awns shorter than the lemmas or nearly lacking.
Culms decumbent at the base, loosely tufted; leaf-blades smooth; basal sheaths brownish.
17. F. rubra.
Culms erect, densely tufted; leaf-blades usually scabrous; basal sheaths straw-colored.
18. F. idahoensis.

1. Festuca confusa Piper, Contr. U. S. Nat. Herb. 10: 13. 1906.

Local distribution: Rare on the eastern slopes of the Santa Cruz Mountains from northern Santa Clara County southward. April and May.

General distribution: Washington south to Monterey County in the Coast Ranges and to southern California through the Sierra Nevada.

Specimens examined: Near Stanford, Dudley, May 7, 1898; Permanente Creek, Dudley, Apr. 30, 1899; Madrone Springs, Dudley 4079.

2. Festuca grayi (Abrams) Piper, Contr. U. S. Nat. Herb. 10: 14. 1906.

Local distribution: Known locally from the hills south of San Jose and from Coyote. April and May.

General distribution: Washington south to southern California, east to southern Arizona.

Specimens examined: 4 miles south of San Jose, Rattan, May 1, 1887; Coyote, Eastwood & Howell 3841A (CAS).

3. Festuca eastwoodae Piper, Contr. U. S. Nat. Herb. 10: 16. 1906.

Local distribution: Rare in the Santa Cruz Mountains, known from Eagle Rock, Coyote, and from near Madrone Springs. April and May.

General distribution: Southern Oregon south to southern California, east to Arizona.

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Specimens examined: Coyote, Eastwood & Howell 3841 (CAS); West of Madrone Springs, Dudley 4079 (CAS); Near Eagle Rock, Hesse 1894.

4. Festuca megalura Nutt. Journ. Acad. Phila. 1: 188. 1848.

Local distribution: A common annual of open grassy slopes, coastal bluffs, inland sand deposits, edges of chaparral, and sometimes in disturbed areas. March through May.

General distribution: British Columbia south to northern Baja California, east to western Montana, Nevada, and southern Arizona, in South America, and introduced at scattered localities from Texas to Maine.

Specimens examined: Presidio, Rubtzoff 2206 (CAS); Bayview Hills, Howell 32272 (CAS); San Andreas Lake, Oberlander 942; Arroyo de los Frijoles, Ferris 2186; Summit, La Honda State Rd., Dudley, May 19, 1900; Los Gatos, Leeds, Apr. 16, 1888; Near Eagle Rock, Thomas 5020; Hilton Airport, Thomas 7021; Sand hills east of Ben Lomond, Thomas 4897; La Selva Beach, Thomas 3051; Soda Lake, Thomas 3309.

5. Festuca myuros L. Sp. Pl. 74. 1753.

Local distribution: A very common grass of open slopes, clearings in chaparral, and occasionally in disturbed areas, rarely collected. March through May.

General distribution: Native of Europe, widely introduced into both North America and South America.

Specimens examined: Russian Hill, San Francisco, Rose 57041 (CAS); Pilarcitos Creek Rd., Thomas 3838; Stanford, Abrams 1136; Coal Mine Ridge, Barry 95; Monte Bello Ridge, Thomas 5704; La Selva Beach, Thomas 3051A.

6. Festuca octoflora Walt. var. hirtella Piper, Contr. U. S. Nat. Herb. 10: 12. 1906.

Local distribution: Chaparral, fire burns, and in sandy soils of

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inland marine sand deposits, probably fairly common but rarely collected. April and May.

General distribution: British Columbia south to Baja California, east to Kansas and Texas, also in Florida.

Specimens examined: Bakers Beach, Rubtzoff 2207 (CAS); Butano Ridge, Ferris 1958; Big Basin, Lang, May 26, 1923; Ben Lomond sand hills, Thomas 1475, 1884.

7. Festuca dertonensis (All.) Aschers. & Graebn. Syn. Mitteleur. Fl. 2: 588. 1900.

Local distribution: A common grass of open slopes, edges of chaparral, brush-covered areas, coastal and inland sands, and in disturbed habitats. March through May.

General distribution: Native of Europe, commonly established from British Columbia south to northern Baja California, in Arizona and Texas, and occasionally found in the eastern states.

Specimens examined: Twin Peaks, San Francisco, Thomas 4862; Lake Merced, Dudley, May 11, 1901; Ocean View, Abrams 1578; Near Colma, Dudley, May 11, 1901; San Andreas Dam, Oberlander 138; Woodside to Crystal Springs, Dudley, May 1894; Stanford, Dudley, May 5, 1902; Hilton Airport, Thomas 1923; Santa Cruz, Anderson, no date; Sunset Beach State Park, Thomas 3083.

8. Festuca pacifica Piper, Contr. U. S. Nat. Herb. 10: 12. 1906.

Local distribution: Common in rocky grassland and on serpentine, San Francisco southward, rare to the west of the crests of the Santa Cruz Mountains.

General distribution: British Columbia south to northern Baja California, east to western Montana, Utah, and New Mexico.

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Specimens examined: Hunters Pt., Howell 32232 (CAS); Bayview Hills, Howell 32271 (CAS); Sawyer Ridge, Oberlander 942; Jasper Ridge, Vestal, May 7, 1923; Thomas 6654; Alamitos Creek, Lang, May 12, 1923; Monte Bello Ridge, Thomas 5734; Almaden Canyon, Bacigalupi 1336; 3 miles southeast of San Jose, Thomas 4964; 4 miles south of San Jose, Rattan, May 1, 1887; Santa Cruz, Anderson, no date.

9. Festuca reflexa Buckl. Proc. Acad. Phila. 1862: 98. 1862.

Local distribution: Serpentine soils and outcroppings, San Francisco southward. April and May.

General distribution: Washington south to northern Baja California, east to Idaho, Utah, and Arizona.

Specimens examined: Hunters Pt., Howell 32212 (CAS); Near San Mateo, Dudley, May 13, 1906; Woodside serpentine, Dutton, Mar. 11, 1900; Stanford, Dudley, May 5, 1902; Permanente Creek, Abrams 6332.

10. Festuca microstachys Nutt. Journ. Acad. Phila. 1: 187. 1848.

Local distribution: Rare, usually on grassy slopes or in chaparral. March through May.

General distribution: Washington south to southern California.

Specimens examined: Stanford, Atkinson, Mar. 31, 1900; 7 miles north of Madrone, Raven 1620A (CAS); Near Eagle Rock, Hesse 1918; Blooms Grade, Thomas 1809.

11. Festuca subuliflora Scribn. in Macoun, Cat. Can. Pl. 2: 396. 1890.

Local distribution: Rare in the Santa Cruz Mountains, known only from near Jamison Creek in Santa Cruz County. May through July.

General distribution: Vancouver Island, British Columbia, south to Mendocino County and in Santa Cruz County.

Specimens examined: Near Jamison Creek, Hesse 970, 1104.

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12. Festuca elmeri Scribn. & Merr. Bull. Torr. Bot. Club 29: 468. 1902.

Local distribution: Occasional in wooded areas, Santa Clara and Santa Cruz counties. May and June.

General distribution: Oregon south through the Coast Ranges to San Luis Obispo County and in Butte County.

Specimens examined: Stanford, Abrams 1646; Black Mt., Dudley, June 3, 1900; Near Los Gatos, Heller 7471; Bear Creek Canyon, Hesse 1920.

13. Festuca elatior L. Sp. Pl. 75. 1753.

Local distribution: Disturbed areas, lawns and garden, probably common, but poorly collected locally. June and July.

General distribution: Native of Eurasia, widely introduced and naturalized in temperate North America.

Specimens examined: Lone Mt., San Francisco, Howell 32615 (CAS); Palo Alto, Dudley, June 24, 1909; Basin Way, Hesse 1590; Watsonville, (DS 184338).

14. Festuca arundinacea Schreb. Spic. Fl. Lips. 57. 1771

Local distribution: Occasional in disturbed areas and along roadsides. May and June.

General distribution: Native of Europe, widely introduced into the Pacific States.

Specimens examined: Near Islais Creek, San Francisco, Howell 31325 (CAS); Crystal Springs Lake, Howell 30254 (CAS).

15. Festuca californica Vasey, Contr. U. S. Nat. Herb. 1: 277. 1893.

Local distribution: Open woods and brush-covered slopes, San Francisco southward, but most common to the east of the crests of the Santa Cruz Mountains. March through May.

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General distribution: Western Oregon south through the Coast Ranges to San Luis Obispo County, eastward to Mount Shasta.

Specimens examined: Bayview Hills, Howell 31573 (CAS); Seal Cove, Dudley, Mar. 17, 1900; Crystal Springs, Abrams 2461; Kings Mt., Dudley, May 16, 1900; Permanente Creek, Dudley, Apr. 23, 1899.

16. Festuca occidentalis Hook. Fl. Bor. Amer. 2: 249. 1840.

Local distribution: Moist areas in redwoods and redwood - douglas fir forest. April through July.

General distribution: British Columbia south to Monterey County in the Coast Ranges and to Tulare County in the Sierra Nevada, east to western Montana and Wyoming, also in Minnesota, Michigan, and Ontario.

Specimens examined: Pescadero Creek, Dudley, July 1898; Near La Honda, Dudley, May 19, 1900; Searsville, Rattan, no date; Basin Way, Hesse 1654; Big Basin, Dudley, June 7, 1895.

17. Festuca rubra L. Sp. Pl. 74. 1753.

Local distribution: Common on grassy hillsides, brushy areas, and on coastal and inland sand deposits, San Francisco southward. May and June.

General distribution: Circumpolar and extending southward along mountain ranges, in California extending to Monterey County in the Coast Ranges and to the San Bernardino Mountains of southern California through the Sierra Nevada.

Specimens examined: San Francisco, Jones 3251; Lake Merced, Dudley, May 11, 1901; Lone Mt., San Francisco, Howell 11211; San Bruno Mt., Vestal, May 19, 1926; Boulder Creek, Hesse 318, 2230; Ben Lomond sand hills, Hesse 314.

18. Festuca idahoensis Elmer, Bot. Gaz. 36: 53. 1903.

Local distribution: Open meadows, grassy slopes, and occasionally

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in brush-covered areas. April and June.

General distribution: British Columbia south to Santa Cruz County in the Coast Ranges and to Plumas County in the Sierra Nevada, east to Alberta, western Montana, Wyoming, and Colorado, thence south to Arizona and New Mexico.

Specimens examined: Hunters Pt., Howell 32203 (CAS); San Francisco Watershed Reserve, Oberlander 799; Crystal Springs, Abrams 2450; Empire Grade, Hesse 1618.

17. Scleropoa Griseb. Spic. Fl. Rum. 2: 431. 1844.

1. Scleropoa rigida (L.) Griseb. Spic. Fl. Rum. 2: 431. 1844.

Local distribution: Known definitely only from San Francisco, but to be expected elsewhere as a weed in urban areas. April and May.

General distribution: Native of Europe, sparingly introduced into the United States.

Specimen examined: Russian Hill, San Francisco, Howell 30111 (CAS).

18. Hordeum L. Sp. Pl. 84. 1753.

Plants perennial; auricles lacking at the base of the leaf-blades.
  Awns 2-5 cm. long.....1. H. jubatum var. caespitosum.
  Awns under 1 cm. long.
    Leaf-blades 3-8 mm. wide; spikes 6-10 mm. in diameter; anthers usually 1-1.5 mm. long.....2. H. brachyantherum.
    Leaf-blades 2-3 mm. wide; spikes about 5 mm. in diameter; anthers usually 1.5-3 mm. long.....3. H. californicum.
Plants annual; auricles present or not.
  Rachis of the spike continuous, not disarticulating; spikelets all sessile; auricles present.....4. H. vulgare.
  Rachis of the spike disarticulating; lateral spikelets pedicellate; auricles present or not.
    Glumes of the central spikelets ciliate; auricles present.
      Internodes of the rachis 2-3 mm. long; florets of the lateral spikelets longer than the floret of the central spikelet. 5. H. leporinum.

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Internodes of the rachis 1.8-2 mm. long; florets of the lateral spikelets not longer than the floret of the central spikelet.....6. H. glaucum.
Glumes of the central spikelets not ciliate; auricles lacking.
Glumes thick, rigid; florets of the lateral spikelets awned. 7. H. hystrix.
Glumes slender, not rigid; florets of the lateral spikelets awnless.....8. H. depressum.

1. Hordeum jubatum L. var. caespitosum (Scribn.) Hitchc. Proc. Biol. Soc. Wash. 41: 160. 1928.

Local distribution: Rare locally, known as a weed only from San Francisco, but to be expected occasionally elsewhere. June through August.

General distribution: Widespread from Alaska to North Dakota, south to northern Mexico, but probably introduced locally.

Specimen examined: Islais Creek, San Francisco, Howell 32847 (CAS).

2. Hordeum brachyantherum Nevski, Acta Inst. Bot. Acad. Sci. URSS 2: 61. 1936.

Local distribution: Grassy slopes, edges of streams, and in partly wooded areas, San Francisco southward. April through June.

General distribution: Widespread, Alaska east to Labrador, south to southern California and New Mexico, introduced into some of the eastern states.

Specimens examined: Presidio, Rubtzoff 2389 (CAS); Bayview Hills, Howell 31492 (CAS); San Bruno Mt., Borthwick, Apr. 7, 1921; Crystal Springs Lake, Elmer 4851; San Andreas Lake, Oberlander 718; Pescadero Beach, Wiggins 12352A; Stanford, Dudley, May 7, 1901; Near Gilroy, Dudley, May 29, 1899; Swanton, Ferris 1992; 3.5 miles north of Boulder Creek, Thomas 1641.

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3. Hordeum californicum Covas & Stebbins, Madroño 10: 5. 1949.

Local distribution: Rare in the Santa Cruz Mountains. May and June.

General distribution: Coast Ranges from Mendocino County south to San Diego County and in the Sierra Nevada foothills from Sacramento County south to Tuolumne County.

Specimens examined: West of San Mateo, Rose 56070 (CAS); Mt. View, Knoche, Apr. 1897.

This species has also been collected at Spring Valley and at Saratoga (Covas, 1949, p. 8).

4. Hordeum vulgare L. Sp. Pl. 84. 1753.

Local distribution: Occasionally persisting in disturbed areas and in fallow fields, widely planted locally. April through June.

General distribution: Native of Eurasia, widely cultivated and occasionally persisting.

Specimens examined: Near Islais Creek, San Francisco, Howell 31329 (CAS); Upper Crystal Springs Lake, Oberlander 1041; Crystal Springs, Dudley, Apr. 4, 1896; Pescadero, Nelson 150; Stanford, Thomas 4749; La Selva Beach, Thomas 3052; Pajaro R., Thomas 3249.

5. Hordeum leporinum Link, Linnaea 9: 133. 1835.

Local distribution: Common on grassy slopes and in disturbed areas, San Francisco southward. February through July.

General distribution: Native of southern Europe, widely introduced into the United States and into other temperate regions.

Specimens examined: Lone Mt., San Francisco, Howell 32417 (CAS); Bayview Hills, Howell 31604; Stanford, Abrams 1137; Randall 160; San Jose, Knoche, Apr. 1893; Edenvale, Thomas 4787; Sunset Beach State Park, Thomas 3098; Pajaro River, Thomas 1546; Soda Lake, Thomas 3300.

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6. Hordeum glaucum Steud. Syn. Pl. Glum. 1: 352. 1854.

(H. stebbinsii Covas, Madroño 10: 17. 1949.)

Local distribution: Occasional as a weed and on grassy slopes and pastures. April.

General distribution: Native of Eurasia, widely introduced into North America.

Specimens examined: Near Islais Creek, San Francisco, Howell 32657 (CAS); Bayview Hills, Howell 31603; Woodside, Dutton, Apr. 19, 1900; Palo Alto, Wiggins 3390.

7. Hordeum hystrix Roth, Cat. Bot. 1: 23. 1797.

Local distribution: Common on grassy slopes and in disturbed areas. May through July.

General distribution: Native of Europe, widely introduced into temperate regions.

Specimens examined: Holliday Hill, San Francisco, Rattan, May 1887; Cahill Ridge, Oberlander 1040; Woodside to Crystal Springs Lakes, Dudley, May 1894; Jasper Ridge, Thomas 4982; Cooleys Landing, Abrams 1651; Stanford, Abrams 1633; Near Gilroy, Dudley, May 29, 1899; Hilton Airport, Thomas 1925; Santa Cruz, Anderson, no date.

8. Hordeum depressum (Scribn. & Smith) Rydb. Bull. Torr. Bot. Club 36: 539. 1909.

Local distribution: Low ground near tidal sloughs at Redwood City. May and June.

General distribution: Washington south to southern California, east to Idaho.

Specimen examined: Redwood City, Howell 28969 (CAS).

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19. Sitanion Raf. Journ. Phys. 89: 103. 1819.

Glumes entire or occasionally bi- or tri-lobed; spikes narrow, several times as long as broad.....1. S. hanseni.
Glumes divided into 3 or more awns; spikes about as long as broad.
2. S. jubatum.

1. Sitanion hanseni (Scribn.) Smith, U. S. Dept. Agric. Div. Agrost. Bull. 18: 20. 1899.

Local distribution: Occasional in open exposed grasslands. May and June.

General distribution: Washington south to central California, east to Idaho, western Wyoming, and Utah.

Specimens examined: Bayview Hills, Howell 31619 (CAS); Near Redwood City, Abrams 7492.

It has been shown that Sitanion hanseni is a sterile hybrid between Elymus glaucus and Sitanion jubatum (Stebbins, Valencia, and Valencia, 1946, pp. 340-341).

2. Sitanion jubatum Smith, U. S. Dept. Agric. Div. Agrost. Bull. 18: 10. 1899.

Local distribution: Occasional in rocky soils and on open grassy slopes, San Francisco southward. April through July.

General distribution: Widespread from Washington south to northern Baja California, east to Idaho, Utah, and Arizona.

Specimens examined: Bayview Hills, Howell 31488 (CAS); San Bruno Hills, Abrams 7077; San Andreas Lake, Oberlander 1015; Woodside, Abrams 1566; Black Mt., Elmer 5047; Near Eagle Rock, Hesse 1319.

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20. Hystrix Moench, Meth. Pl. 294. 1794.

1. Hystrix californica (Bolander) Kuntze, Rev. Gen. Pl. 2: 778. 1891.

Local distribution: Wooded slopes near the coast, usually in redwood or redwood - douglas fir forests. May through July.

General distribution: Near the coast, Sonoma County south to Santa Cruz County.

Specimens examined: Toward Crystal Springs Lake, Elmer 4700; San Mateo, Kellogg, no date.

21. Elymus L. Sp. Pl. 83. 1753.

Plants annual; lemmas awned, the awns at least 10 times as long as the lemmas.....1. E. caput-medusae.
Plants perennial; lemmas awned or not, if awned the awns less than 3 times as long as the lemmas.
Lemmas awned, the awns 1-2 times as long as the lemmas; glumes usually strongly 3-4-nerved, scabrous abaxially.
2. E. glaucus.
Lemmas not awned or with only very short awns; glumes nerved or not.
Glumes distinctly nerved, villous; rhizomes present. Plants of coastal sand dunes.....3. E. mollis.
Glumes nerved or not, glabrous to sparsely pubescent, but not villous; rhizomes present or not. Plants of various habitats.
Spikelets usually 3, 5, or more per node; inflorescences commonly branched; leaf-blades 1.5-3.5 cm. broad; glumes subulate, obscurely nerved.....4. E. condensatus.
Spikelets 1-2 per node; inflorescences not branched; leaf-blades under 1.5 cm. broad; glumes lanceolate to subulate, nerved or not.
Plants without rhizomes; glumes more or less flat, strongly nerved, the nerves usually 5-7; spikelets 2 per node.
5. E. virescens.
Plants with rhizomes; glumes usually somewhat folded, nerveless or the nerves 1-3; spikelets 1-2 per node.
Spikelets usually 2 per node; culms usually at least 6 dm. tall.
Culms finely pubescent below the spike. Plants of dunes and sandy beaches.6. E. vancouverensis.
Culms glabrous below the spike or at most minutely scabrous. Plants of inland habitats.
7. E. triticoides.
Spikelets usually 1 per node; culms usually 1-2 dm. tall.
8. E. pacificus.

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1. Elymus caput-medusae L. Sp. Pl. 84. 1753.

Local distribution: Known locally only as a weed at Los Gatos. June.

General distribution: Native of Europe, occasional as a weed in the western part of the United States.

Specimen cited: Los Gatos, Hitchcock 2631 (Jepson, 1912, p. 185).

2. Elymus glaucus Buckl. Proc. Acad. Phila. 1862: 99. 1862.

Local distribution: A common grass of wooded and brush-covered slopes. April through June.

General distribution: Southern Alaska eastward to Michigan, south to northern Mexico, New Mexico, and Arkansas.

Specimens examined: Mt. Davidson, San Francisco, Raven 9286 (CAS); Pilarcitos Canyon, Oberlander 931; Montara Mt., Dudley, May 17, 1900; West of Redwood City, Clausen 1529; Woodside to Crystal Springs Lake, Dudley, May 1894; Coal Mine Ridge, Barry 178; Stanford, Dudley, May 7, 1901; Permanente Creek, Dudley, Apr. 23, 1899; Almaden Reservoir, Rose 58023; Mt. Charlie Rd., Thomas 3328; Glenwood, Dudley, June 20, 1909; Near Big Basin, Dudley, June 7, 1895; Thomas 1935; Big Basin, Dudley, June 14, 1905; Empire Grade, Thomas 4320; Santa Cruz, Thompson, June 16, 1903.

Plants with pubescent leaf-blades and sheaths have been called E. glaucus var. jepsonii Davy (in Jepson, Fl. W. Mid. Calif. 79. 1901). Considerable variation with respect to the amount of pubescence often exists, however, even among the plants of one collection.

Occasional plants have awnless lemmas, as for example Hoover, June 1918, from Waddell Creek.

3. Elymus mollis Trin. in Spreng. Neu. Entd. 2: 72. 1821.

Local distribution: Sand dunes along the coast, San Francisco south to at least the vicinity of Waddell Creek. May through October.

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General distribution: Sand dunes along the coasts of North America from Alaska to Greenland, south to Santa Cruz County on the west coast and to New York on the east coast, in the Great Lakes region, and in eastern Asia. Local plants according to Bowden (1957, pp. 964-969) are referable to E. mollis ssp. mollis var. mollis f. mollis.

Specimens examined: San Francisco, Rau, 1921 (CAS); 2 miles south of Pescadero, Bently 82; Waddell Creek, Hesse 1153; Thomas 3639.

4. Elymus condensatus Presl, Rel. Haenk. 1: 265. 1830.

Local distribution: Occasional on slopes near the coast. May through October.

General distribution: Alameda and San Mateo counties south to San Diego County, usually near the coast.

Specimens examined: Valencia Creek, Dudley, Oct. 2, 1902; New Years Creek, Dudley, June 3, 1898; Coastal slope, 1 mile north of Santa Cruz Co. line, Morgan, Aug. 1, 1955 (CAS); Watsonville, Hayward, July 1929; Chittenden, Gillespie, May 10, 1925.

5. Elymus virescens Piper, Erythea 7: 101. 1899.

Local distribution: Occasional on grassy or brush-covered slopes. June through August.

General distribution: Southeastern Alaska south, usually near the coast, to the vicinity of San Francisco.

Specimens examined: Presidio, Raven 8238 (CAS); Lone Mt., Howell 32519 (CAS); Bayview Hills, Howell 31480 (CAS).

6. Elymus X vancouverensis Vasey, Bull. Torr. Bot. Club 15: 48. 1888.

Local distribution: Known locally from San Francisco and from Santa Cruz, but to be expected elsewhere in coastal sand dunes and sandy flats. June through August.

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General distribution: British Columbia south along the coast to Santa Cruz County.

Specimens examined: Lake Merced, Rubtzoff 2468 (CAS); Santa Cruz, Thompson, June 1903.

Elymus X vancouverensis is apparently the hybrid between E. mollis and E. triticoides (Bowden, 1958, p. 990).

7. Elymus triticoides Buckl. Proc. Acad. Phila. 1862: 99. 1862.

Local distribution: Woods, brush-covered areas, and as a weed along roads, San Francisco southward. May through July.

General distribution: Washington south to northern Baja California, east to western Montana, Wyoming, Colorado, New Mexico, and western Texas.

Specimens examined: Lake Merced, Heller 5667; Rubtzoff 1552 (CAS); Bayview Hills, Howell 31714 (CAS); Woodside to Crystal Springs Lake, Dudley, May 1894; Glenwood, Dudley, June 20, 1909; Basin Way, Hesse 1652; Santa Cruz, Hesse 1591; Watsonville Slough, Hayward, June 27, 1929.

Plants with several spikelets at the node have been called E. triticoides var. multiflorus Gould (Madroño 8: 46. 1945), as for example Dudley 272, from Stanford.

8. Elymus pacificus Gould, Madroño 9: 127. 1947.

(Agropyron arenicola Davy in Jepson, Fl. W. Mid. Calif. 76. 1901.)

Local distribution: Sandy soils, known locally only from San Francisco. May through June.

General distribution: Coastal, Fort Bragg, Mendocino County, south to Point Sur, Monterey County.

Specimens examined: Bakers Beach, Raven 4167 (CAS); Pt. Lobos, Howell 32927 (CAS).

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22. Lolium L. Sp. Pl. 83. 1753.

Glumes as long as or longer than the spikelets; lemmas awned (except in the variety); awns usually about 2-3 times as long as the lemmas; plants annual.....1. L. temulentum.
Glumes shorter than the spikelets; lemmas awned or not, if awned the awns usually about as long as the lemmas; plants annual or perennial.
Plants perennial; lemmas usually awnless; culms subcompressed. 2. L. perenne.
Plants annual or short-lived perennials; lemmas awned (except in one variety); culms cylindric.....3. L. multiflorum.

1. Lolium temulentum L. Sp. Pl. 83. 1753.

Local distribution: Occasional in disturbed areas and on overgrazed slopes. April through June.

General distribution: Native of Europe, introduced into most other temperate regions.

Specimens examined: Near Baden, Dudley, May 14, 1899; Summit of La Honda State Rd., Dudley, May 19, 1900; Stanford, Dudley, May 7, 1901; Palo Alto, Knoche, May 20, 1897; 3 miles southeast of San Jose, Thomas 4960; Blooms Grade, Thomas 1823; Santa Cruz, Thompson, June 6, 1903.

Plants in which the lemmas are awnless or have awns which do not exceed the lemmas may be referred to L. temulentum var. leptochaeton A. Br. (Flora 1: 252. 1834), as for example Anderson, no date, from Santa Cruz.

2. Lolium perenne L. Sp. Pl. 83. 1753.

Local distribution: Fairly common as a weed in urban areas, lawns, disturbed areas, and occasionally on grassy slopes. March through July.

General distribution: Native of Europe, widely introduced into other parts of the world.

Specimens examined: 1 mile south of Lake Merced, Dudley, May 11, 1901; Montara Mt., Dudley, Mar. 17, 1900; Sawyer Ridge, Oberlander 249; Stanford, Randall 161; Hilton Airport, Thomas 1924.

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Plants in which the spikelets are crowded together to form an ovoid spike have been called L. perenne var. cristatum Pers. (Syn. Pl. 1: 110. 1805). An example of this variety is Dudley, June 1903, from Stanford.

The lemmas of L. perenne are usually awnless, but occasionally individuals are encountered in which short awns are present.

3. Lolium multiflorum Lam. Fl. Franc. 3: 621. 1778.

Local distribution: A very common grass of disturbed areas, grassy slopes, and along the edges of salt marshes. April through October.

General distribution: Native of Europe, widely introduced into other parts of the world.

Specimens examined: Mt. Sutro, San Francisco, Thomas 7356; 3 miles west of Redwood City, Tilden, May 29, 1946; Woodside, Dudley, June 12, 1906; Palo Alto, Abrams, Oct. 1900; Knoche, May 20, 1897; 3 miles south of San Jose, Thomas 4791; Near Olympia, Thomas 1886; Santa Cruz, Anderson, 1880; Watsonville, Thomas 1974; Pajaro River, Thomas 3250.

Plants with branched panicles have been called L. multiflorum var. ramosum Guss. ex Agcang. (Comp. Fl. Ital. 799. 1882), as for example Thomas 7182, from San Francisco.

Occasionally awnless plants are found growing with awned ones, as for example Thomas 1576A, from Palm Beach, and may be called L. multiflorum var. muticum DC. (Fl. Franc. 5: 286. 1816).

23. Agropyron Gaertn. Nov. Comm. Acad. Sci. Petrop. 14: 539. 1770.

Plants with creeping rhizomes. Introduced.
  Spikelets 1-1.5 cm. long; lemmas minutely scabrous on the abaxial surface, 8-10 mm. long, 3-7-nerved.....1. A. repens.
  Spikelets 1.5-2 cm. long; lemmas smooth on the abaxial surface, 10-15 mm. long, 9-nerved.....2. A. junceum.
Plants without creeping rhizomes. Native.....3. A. trachycaulum.

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1. Agropyron repens (L.) Beauv. Ess. Agrost. 102. 1812.

Local distribution: Occasional as a weed in gardens and in disturbed areas. June through August.

General distribution: Native of Eurasia, widely introduced into other temperate and subtemperate regions.

Specimens examined: Golden Gate Park, Howell 24183 (CAS); Sutro Heights, San Francisco, Howell 32925 (CAS).

2. Agropyron junceum (L.) Beauv. Ess. Agrost. 102. 1812.

Local distribution: Known only as a weed from sand dunes in San Francisco. May through September.

General distribution: Native of Europe, sparingly introduced into the Pacific States.

Specimens examined: San Francisco, Abrams 13721; Tilden, Sept. 15, 1933.

3. Agropyron trachycaulum (Link) Malte, Ann. Rep. Can. Nat. Mus. 68: 42. 1932.

(A. tenerum Vasey, Bot. Gaz. 10: 258. 1885; A. pauciflorum (Schwein.) Hitchc. Amer. Journ. Bot. 21: 132. 1934.)

Local distribution: Rare in the Santa Cruz Mountains, known definitely only from San Mateo County. April and May.

General distribution: Widespread, Alaska to Labrador, south to northern Mexico, Missouri, and West Virginia.

Specimen examined: Crystal Springs, Abrams 2452.

24. Triticum L. Sp. Pl. 85. 1753.

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1. Triticum aestivum L. Sp. Pl. 85. 1753.

Local distribution: Widely grown locally and occasionally spontaneous in disturbed areas and in fallow fields. April through July.

General distribution: Not known outside of cultivation or as an escape from cultivation, presumably this species originated in Asia Minor, now grown throughout much of the world.

Specimens examined: Presidio, Rubtzoff 3104 (CAS); Near Islais Creek, San Francisco, Howell 31376 (CAS); Stanford, Dudley, July 1893; Santa Cruz, Anderson, no date; Pajaro R., Thomas 1543.

For a discussion of the names which have been applied to the various cultivated races of wheat, see Hitchcock (1950, pp. 243-245).

25. Secale L. Sp. Pl. 84. 1753.

1. Secale cereale L. Sp. Pl. 84. 1753.

Local distribution: Occasional as an escape from cultivation or growing from seed which has been scattered about during the transportation of hay. May.

General distribution: Widely cultivated, probably derived from wild populations which are native in southwestern Asia.

Specimens examined: Near Islais Creek, San Francisco, Howell 31395 (CAS); Stanford, Bacigalupi, May 1924; 3 miles north of Santa Cruz, Keck 4556.

26. Monerma Beauv. Ess. Agrost. 116. 1812.

1. Monerma cylindrica (Willd.) Coss. & Dur. Expl. Sci. Alger. 2: 214. 1855.

(Lepturus cylindricus (Willd.) Trin. Fund. Agrost. 123. 1820.)

Local distribution: Salt marshes, coastal bluffs, and spreading

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into grasslands and open serpentine areas, San Francisco southward. May and June.

General distribution: Native of Eurasia, introduced into California.

Specimens examined: Lobos Creek, Raven 6953 (CAS); Bayview Hills, Howell 32282 (CAS); San Pedro Pt., Vestal, May 1926; Stanford University Campus, Thomas 5732.

27. Parapholis C. E. Hubb. Blumea Suppl. 3: 14. 1946.

1. Parapholis incurva (L.) C. E. Hubb. Blumea Suppl. 3: 14. 1946.

(Pholiurus incurvus (L.) Schinz & Thell. Viertel. Nat. Gesel. Zurich 66: 265. 1921.)

Local distribution: Sea beaches, sand dunes, and along the edges of salt marshes. May and June.

General distribution: Native of Europe, widely introduced into the coastal regions of the United States.

Specimens examined: Pt. Lobos, Howell 32928 (CAS); Islais Creek, San Francisco, Howell 31369 (CAS); Santa Cruz, Thompson, June 9, 1903; Near Capitola, Keck 5912.

28. Scribneria Hack. Bot. Gaz. 11: 105. 1886.

1. Scribneria bolanderi (Thurb.) Hack. Bot. Gaz. 11: 105. 1886.

Local distribution: Rare in the Santa Cruz Mountains, growing in poor soil in rocky areas which are very wet in the late winter and early spring. March and April.

General distribution: Southern Washington south to San Luis Obispo County and the central Sierra Nevada.

Specimen examined: Jamison Creek Rd., Thomas 2992A.

The specimen cited above consists of one small plant, about 3.5 cm.

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tall, and is in my herbarium. This species rare and inconspicuous, and probably often overlooked by collectors.

29. Avena L. Sp. Pl. 79. 1753.

Lemmas hairy.
  Lemmas with awn-tipped teeth, the awns usually about 4 mm. long; pedicels capillary.....1. A. barbata.
  Lemmas without awn-tipped teeth; pedicels stout.
    2a. A. fatua var. fatua.
Lemmas glabrous.
  Awns well developed, strongly geniculate; spikelets usually 3-flowered.....2b. A. fatua var. glabrata.
  Awns usually lacking, if present more or less straight; spikelets usually 2-flowered.....3. A. sativa.

1. Avena barbata Brot. Fl. Lusit. 1: 108. 1804.

Local distribution: A common annual grass of fields, orchards, open grassy slopes, and disturbed areas. February through June.

General distribution: Native of the Mediterranean region, widely introduced into the western states and in other temperate regions.

Specimens examined: Lone Mt., San Francisco, Howell 15480 (CAS); Bayview Hills, Howell 31598 (CAS); San Bruno Mt., Thomas 7048; 3.5 miles northeast of Halfmoon Bay, Thomas 3836; Alamitos Creek, Lang, May 12, 1923; Palo Alto, Borthwick 115; Stanford, Dudley, Apr. 29, 1902; Alma, Hichborn 207 (in part); San Jose, Brainard, May 17, 1896; Hilton Airport, Thomas 4222; Soda Lake, Thomas 3310.

Avena barbata commonly grows with A. fatua and herbarium sheets often contain plants of both species.

2a. Avena fatua L. var. fatua, Sp. Pl. 80. 1753.

Local distribution: A common grass of fields, pastures, open slopes, and disturbed areas. February through July.

General distribution: Native of Europe, widely introduced into other temperate regions.

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Specimens examined: Lake Merced, Merkel 58 (CAS); Bayview Hills, Howell 31615 (CAS); San Andreas Valley, Oberlander 862; Stanford, Mason 11; Alma, Hichborn 207 (in part); San Jose, Knoche, Apr. 9, 1893; Boulder Creek, Thomas 1773; Santa Cruz, Anderson, 1885; La Selva Beach, Thomas 3053; Along Pajaro R., Thomas 1544.

Avena brevis Roth (Bot. Abh. 42. 1787) has been collected as a weed in Belmont, Howell 30003 (CAS). It may be distinguished from A. fatua by the size of the glumes. The glumes are less than 1.5 cm. long; in A. fatua they are 2.5 cm. long. Avena brevis is not known outside of cultivation or as an occasional escape from cultivation.

This specimen bears an annotation by Jason Swallen as follows: "The plant looks almost exactly like A. brevis, but the spikelets are not right. In A. brevis the rachilla and lemmas are glabrous, while in your specimen they are rather conspicuously hairy." In the treatment of this species by Ascherson and Graebner (1898-1902, p. 237) the lemmas are described as being either glabrous or sparsely bristly. Pending further study, I am referring Howell's specimen to A. brevis.

2b. Avena fatua L. var. glabrata Peterm. Fl. Bienitz 13. 1841.

Local distribution: Occasional as a weed. March through June.

General distribution: Native of Europe, introduced into other temperate regions.

Specimen examined: Near Crystal Springs Lake Dam, Howell 31293 (CAS).

3. Avena sativa L. Sp. Pl. 79. 1753.

Local distribution: Occasional as an escape from cultivation, often not persisting. April through June.

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General distribution: Native of Eurasia, widely cultivated and occasionally becoming established.

Specimens examined: Third St. near Bay Bridge, San Francisco, Howell 31327 (CAS); Golden Gate Park, Raven 5542 (CAS); Near Edenvale, Thomas 4950.

30. Danthonia Lam. & DC. Fl. Franc. 3: 32. 1805.

1. Danthonia californica Bolander, Proc. Calif. Acad. 2: 182. 1863.

(D. americana Scribn. U. S. Dept. Agric. Div. Agrost. Circ. 30: 5. 1901.)

Local distribution: Fairly common on coastal bluffs, in grasslands, and occasionally in serpentine soils. Latter part of April through June.

General distribution: British Columbia south to northern Mexico, east to western Montana, Wyoming, Colorado, and New Mexico.

Specimens examined: San Francisco, Rattan, May 15, 1887; San Bruno Mt., Vestal, May 26, 1926; San Francisco Watershed Reserve, Oberlander 915; Crystal Springs Lake, Elmer 4707; Abrams 2451; Woodside to Crystal Springs, Dudley, May 1894; Moss Beach, Quayle 214; Near Pescadero, Ferris 2189; Pigeon Pt., Wiggins 3673; Near Menlo Park, Vestal, May 20, 1924; Hilton Airport, Thomas 3142; Near Eagle Rock, Thomas 4097; Santa Cruz, Anderson 339.

31. Arrhenatherum Beauv. Ess. Agrost. 55. 1812.

1. Arrhenatherum elatius (L.) Presl, Fl. Cech. 17. 1819.

Local distribution: Occasional as a weed in disturbed areas and on grassy slopes, known definitely from Santa Cruz County, but to be expected elsewhere. June and July.

General distribution: Native of Europe, widely introduced into the United States and southern Canada.

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Specimens examined: Near Boulder Creek, Hesse 1610, 1649; Slope of Loma Prieta, Hesse 1306.

32. Koeleria Pers. Syn. Pl. 1: 97. 1805.

Plants annual, introduced; spikelets 2-4 mm. long; lemmas short-awned. 1. K. gerardi.
Plants perennial, native; spikelets 4-6 mm. long; lemmas usually awnless. 2. K. gracilis.

1. Koeleria gerardi (Vill.) Shinners, Rhodora 58: 95. 1956.

(K. phleoides (Vill.) Pers. Syn. Pl. 1: 97. 1805.)

Local distribution: Known definitely from dry rocky areas in grasslands in San Francisco and to be expected in similar habitats elsewhere. April and May.

General distribution: Native of Europe, becoming widely established in California and Oregon and in various other parts of the United States.

Specimens examined: McLaren Park, Raven 9251 (CAS); Bayview Hills, Howell 31628 (CAS).

2. Koeleria gracilis Pers. Syn. Pl. 1: 97. 1805.

(K. cristata (L.) Pers. Syn. Pl. 1: 97. 1805.)

Local distribution: Occasional on dry grassy slopes, serpentine outcroppings, and on brush-covered slopes. April through June.

General distribution: A widespread species of North America and Eurasia.

Specimens examined: San Francisco, Congdon, Apr. 25, 1893; Laguna Honda, Raven 6840 (CAS); Sweeney Ridge, Oberlander 914; Crystal Springs Lake, Dudley, Apr. 4, 1896; Stanford, Dudley, Apr. 17, 1900; Permanente Creek, Dudley, Apr. 30, 1899; Stevens Creek, Ferris, May 1921; Foothills west of Los Gatos, Heller 7443; Mt. Umunhum, Ferris 2089; Near Saratoga Summit, Thomas 1835; Near Eccles, Dudley, June 26, 1897; Near Boulder Creek, Hesse 1075, 1112; Ben Lomond sand hills, Thomas 1885; Santa Cruz, Anderson 29.

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33. Holcus L. Sp. Pl. 1047. 1753.

1. Holcus lanatus L. Sp. Pl. 1048. 1753.

Local distribution: Common in moist areas such as drainage ditches, along seeps and springs, and on grassy slopes. Latter part of March through October.

General distribution: Native of Europe, widely introduced into other temperate regions.

Specimens examined: Mt. Sutro, San Francisco, Thomas 7354; Near Crystal Springs Lake, Randall 158; Near Pescadero, Dudley, July 28, 1894; Portola Valley, Randall 159; Searsville, Abrams 1014; Santa Clara, Leeds, no date; 6 miles north of Boulder Creek, Thomas 4314; Hilton Airport, Thomas 4216; Near Felton, Cunningham 2; Camp Evers, Thomas 3343; Santa Cruz, Thompson, June 20, 1903.

34. Deschampsia Beauv. Ess. Agrost. 91. 1812.

Plants annual; glumes usually 6-7 mm. long; leaves few, not tufted at the base of the culms.....1. D. danthonioides.
Plants perennial; glumes 3.5-6 mm. long; leaves numerous, tufted at the base of the culms.
  Leaf-blades filiform; panicles narrow, the branches usually appressed; glumes usually 3.5-4 mm. long.
    2. D. elongata.
  Leaf-blades not filiform; panicles wider, the branches ascending; glumes usually 4-6 mm. long.3. D. caespitosa ssp. holciformis.

1. Deschampsia danthonioides (Trin.) Munro ex Benth. Pl. Hartw. 342. 1857.

Local distribution: Low moist areas where water has stood during the winter and early spring, occasional from San Francisco southward. April through June.

General distribution: Alaska to Baja California, east to Montana, Utah, and Arizona.

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Specimens examined: Lone Mt., San Francisco, Howell 32515 (CAS); Bayview Hills, Howell 31505 (CAS); Woodside, Dutton, Apr. 25, 1900; Jasper Ridge, Mason, May 13, 1921; Near Coyote, Ferris 815; Camp Evers, Hesse 1103; Santa Cruz, Anderson, May 23, 1886.

2. Deschampsia elongata (Hook.) Munro ex Benth. Pl. Hartw. 342. 1857.

Local distribution: Moist, shaded areas, usually in woods or on brush-covered slopes. May through July.

General distribution: Widespread from Alaska southeast to Washington, Montana, and Wyoming, thence south to northern Mexico; also in Chile.

Specimens examined: Twin Peaks, San Francisco, Raven 10639 (CAS); Pescadero Creek, Dudley, June 6, 1895; Jasper Ridge, Mason, May 13, 1921; Coal Mine Ridge, Lang, May 1923; Stevens Creek, Ferris 2169; Foothills west of Los Gatos, Heller 7472; Big Basin, Shockley, June 7-8, 1919; Near Summit of Los Gatos - Santa Cruz Highway, Thomas 3176; San Vicente Rd., Hesse 1634; Near Felton, Cunningham 3; Santa Cruz, Anderson 48.

A depauperate form has been collected along San Vicente Road by Miss Hesse. The plants are less than 1 dm. tall. Some show signs of having been grazed, perhaps accounting for the small size; in other respects the plants are typical.

3. Deschampsia caespitosa (L.) Beauv. ssp. holciformis (Presl) Lawr. Amer. Journ. Bot. 32: 302. 1945.

Local distribution: Most common along the coast in marshy areas or on coastal bluffs, occasionally inland on grassy slopes or under douglas firs. April through July.

General distribution: Mainly near the coast, Lincoln County, Oregon, south to northern Monterey County.

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Specimens examined: Presidio, Heller 5712; Bayview Hills, Howell 31491 (CAS); Cahill Ridge, Oberlander 724; Pebble Beach, Mason, May 28, 1921; Arroyo de los Frijoles, Mason, May 29, 1921; Near Burlingame, Wieser, May 25, 1932; Santa Cruz, Anderson, no date.

Deschampsia caespitosa (L.) Beauv. (Ess. Agrost. 91. 1812) was reported from San Francisco by Behr (1888, p. 304). Behr's reference may refer to D. caespitosa ssp. caespitosa, as Raven (1957, p. 199) has assumed, but today this subspecies is not known south of Sonoma County (Lawrence, 1945, p. 301).

35. Aira L. Sp. Pl. 63. 1753.

1. Aira caryophyllea L. Sp. Pl. 66. 1753.

Local distribution: A very common grass of open slopes, sandy soils, and in poor soil in chaparral, and occasionally in disturbed habitats. March through June.

General distribution: Native of Europe, naturalized in the eastern states and on the Pacific Coast.

Specimens examined: Twin Peaks, San Francisco, Rose 33118; San Bruno Mt., Thomas 7050; Crystal Springs, Elmer 4705; Arroyo de los Frijoles, Mason, May 29, 1921; Near San Mateo, Dudley, May 13, 1906; Near Redwood City, Borthwick, June 1, 1920; Woodside, Abrams 2405; Coal Mine Ridge, Barry 105; Near Eagle Rock, Thomas 4026; Near Boulder Creek, Thomas 1771; Ben Lomond sand hills, Thomas 1882; Camp Evers, Thomas 3341; Near Watsonville, Thomas 3100.

Aira elegans Willd. ex Gaudin (Agrost. Helv. 1: 130. 1811) (A. capillaris Host, Icon. Gram. Aust. 4: 20. 1809) and A. praecox L. (Sp. Pl. 65. 1753) are known from Marin County. Both are introduced European weeds and are to be expected eventually in the Santa Cruz Mountains. The following key will serve to distinguish these two species from A. caryophyllea.

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Panicles contracted, spike-like; spikelets 3.5-4 mm. long.
A. praecox.
Panicles diffuse, not spike-like; spikelets 1.8-3 mm. long.
Spikelets 1.8-2 mm. long; lower florets awnless or very short-awned, the awn not exceeding the glumes, upper florets long-awned.
A. elegans.
Spikelets 2.3-3 mm. long; both florets long-awned...A. caryophyllea.

36. Trisetum Pers. Syn. Pl. 1: 97. 1805.

Panicles loose, the lower branches filiform; spikelets usually with 3 flowers, the florets distant; leaf-blades 6-12 mm. wide.
1. T. cernuum.
Panicles rather dense, the lower branches not filiform; spikelets 2-3-flowered, the florets usually close together; leaf-blades 2-7 mm. wide.....2. T. canescens.

1. Trisetum cernuum Trin. Mem. Acad. St. Petersb. 1: 61. 1830.

Local distribution: Moist areas in woods and forests. April through June.

General distribution: Southern coastal Alaska south to Humboldt County, east to Alberta, Idaho, and western Montana, and in the Santa Cruz Mountains.

Specimens examined: Cahill Ridge, Oberlander 1018; Kings Mt., Abrams 5561; Coal Mine Ridge, Dudley, May 26, 1910; Stanford, Dudley, May 7, 1901; Stevens Creek, Ferris, May 1921; Big Basin, Dudley, June 14, 1905; Glenwood, Dudley, June 20, 1909.

2. Trisetum canescens Buckl. Proc. Acad. Phila. 1862: 100. 1862.

Local distribution: Redwood forests, stream banks, and in moist wooded areas, probably more common than the number of collections cited below would indicate. May through August.

General distribution: British Columbia south to Monterey and Tulare counties, east to Nevada and western Montana.

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Specimens examined: Laguna Honda, San Francisco, Raven 6831 (CAS); San Francisco Watershed Reserve, Oberlander 989; Woodside - Crystal Springs Lake, Dudley, May 1894; Kings Mt., Abrams 5559; Alamitos School, Lang, May 12, 1923; Black Mt., Leitholt, Aug. 1894; Near Boulder Creek, Hesse 1684; Santa Cruz, Anderson 53.

37. Crypsis Ait. Hort. Kew. 1: 48. 1789.

1. Crypsis niliaca Fig. & DeNot. Mem. Acad. Torino 14: 322. 1854.

(C. aculeata (L.) Ait. Hort. Kew. 1: 48. 1789.)

Known locally only from the dry lake bed of Lagunita on the Stanford University campus and from between Gilroy and Morgan Hill, but to be expected elsewhere in vernal pools. June through October.

General distribution: Native of Egypt and southwestern Asia, introduced into California at scattered localities and apparently spreading (Munz & Roos, 1955, p. 111).

Specimens examined: Lagunita, Wiggins 3316; Sharsmith, Oct. 12, 1951; Thomas 7385; Between Gilroy and Morgan Hill, Abrams 5662.

38. Alopecurus L. Sp. Pl. 60. 1753.

Spikelets 5-6 mm. long; plants perennial.....1. A. pratensis.
Spikelets 3-3.5 mm. long; plants annual.....2. A. howellii.

1. Alopecurus pratensis L. Sp. Pl. 60. 1753.

Local distribution: Known only from Golden Gate Park, but to be expected occasionally elsewhere. March and April.

General distribution: Native of Eurasia, widely established in North America.

Specimen examined: Golden Gate Park, Abrams 12913.

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2. Alopecurus howellii Vasey, Bull. Torr. Bot. Club 15: 12. 1888.

Local distribution: Occasionally found along the edges of ponds. May through June.

General distribution: Wet areas, Oregon south to southern California.

Specimens examined: Crystal Springs Lake, McMurphy, May 8, 1906; San Mateo County, Dudley, May 8, 1910; Coal Mine Ridge, Dudley, June 26, 1908.

Alopecurus geniculatus L. (Sp. Pl. 60. 1753) is known in California from Humboldt County south to Marin County and in San Diego County and is to be expected locally. It may be distinguished from A. howellii with the aid of the following key.

Spikelets about 2.5 mm. long; anthers about 1.5 mm. long; plants perennial.....A. geniculatus.
Spikelets 3-3.5 mm. long; anthers about 1 mm. long; plants annual. A. howellii.

39. Polypogon Desf. Fl. Atlant. 1: 66. 1798.

Panicles spike-like; plants annual; glumes both scabrous and pubescent. 1. P. monspeliensis.
Panicles with distinct branches; plants perennial; glumes scabrous. 2. P. interruptus.

1. Polypogon monspeliensis (L.) Desf. Fl. Atlant. 1: 67. 1798.

Local distribution: A common weed of wet areas, drainage ditches, creek bottoms, and along the edges of puddles and ponds. April through November.

General distribution: Native of Europe, now nearly cosmopolitan as a weed.

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Specimens examined: Laguna Honda, San Francisco, Rubtzoff 3467 (CAS); Pilarcitos Canyon, Oberlander 312; Ano Nuevo Pt., Abrams & Wiggins 432; Coal Mine Ridge, Barry 176; Jasper Ridge, Abrams 1639; Stanford, Clark, Oct. 18, 1909; Davenport, Hesse 1151; Santa Cruz, Thomas 1177; Pajaro River Valley, Thomas 1550.

2. Polypogon interruptus H. B. K. Nov. Gen. & Sp. 1: 134. 1815.

Local distribution: Common in ditches, low wet areas, and depressions where water has stood during the spring. April through August.

General distribution: Widespread in western North America from British Columbia southward to Central and South America, east to Oklahoma and Louisiana.

Specimens examined: Lands End, San Francisco, Rubtzoff 3531 (CAS); Near South San Francisco, Abrams 12190; Pilarcitos Stone Dam, Elmer 4694; Near Redwood City, Borthwick 203; Woodside serpentine, Dutton, Apr. 29, 1900; Stanford, Thomas 5742; Stevens Creek Road, Randall 151; Big Basin, Thomas 3538; Near Boulder Creek, Hesse 1365; Santa Cruz, Anderson 34; Pajaro R., Thomas 3251.

40. Stipa L. Sp. Pl. 78. 1753.

Spikelets (excluding the awns) 6-10 mm. long.....1. S. lepida.
Spikelets (excluding the awns) 15-25 mm. long.
  Awns about 7-9 times as long as the lemmas; leaves green.
    2. S. pulchra.
  Awns 9-12 times as long as the lemmas; leaves somewhat glaucous.
    3. S. cernua.

1. Stipa lepida Hitchc. Amer. Journ. Bot. 2: 302. 1915.

(S. lepida var. andersonii (Vasey) Hitchc. Amer. Journ. Bot. 2: 303. 1915.)

Local distribution: Oak woodlands, edges of chaparral, grassland, and occasionally in serpentine and rocky outcroppings. April through June.

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General distribution: Shasta and Trinity counties south through the Coast Ranges to Baja California.

Specimens examined: Lone Mt., San Francisco, Howell 32518 (CAS); Bayview Hills, Howell 31538 (CAS); San Andreas Valley, Oberlander 774; Near Stanford, Dudley, May 4, 1901; Clarita vineyard, Elmer 4430; Near Los Altos, Hesse 265; Saratoga - Big Basin Rd., Abrams 5259; San Vicente Rd., Hesse 1514; Santa Cruz, Thompson, June 16, 1903.

2. Stipa pulchra Hitchc. Amer. Journ. Bot. 2: 301. 1915.

Local distribution: Rocky outcroppings, grassy slopes, and sometimes in serpentine soil, San Francisco southward, but most common to the east of the crests of the Santa Cruz Mountains. March through June.

General distribution: Coast Ranges from Humboldt County south to northern Baja California and in the foothills of the Sierra Nevada from Butte County south to Tulare County.

Specimens examined: Presidio, Rubtzoff 2280 (CAS); Bayview Hills, Howell 31541 (CAS); San Bruno Mt., Thomas 7047; Montara Mt., Dudley, Mar. 17, 1900; Crystal Springs Lake, Elmer 4712; Redwood City, Borthwick, June 1, 1920; Woodside to Crystal Springs Lake, Dudley, May 1894; Jasper Ridge, Thomas 4995; Stanford, Dudley, May 4, 1900; Mouth of Almaden Canyon, Bacigalupi, Apr. 18, 1926; Santa Cruz, Thompson, June 22, 1903.

3. Stipa cernua Stebbins & Love, Madroño 6: 137. 1941.

Local distribution: Grasslands and rocky outcroppings. April and May.

General distribution: Tehama County southward through the Inner North Coast Ranges, the South Coast Ranges, and the Sierra Nevada foothills to San Diego County.

Specimen examined: Bayview Hills, Howell 31622 (CAS).

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41. Oryzopsis Michx. Fl. Bor. Amer. 1: 51. 1803.

1. Oryzopsis miliacea (L.) Benth. & Hook. ex Aschers. & Schweinf. Mem. Inst. Egypt. 2: 169. 1887.

Local distribution: Occasional as a weed in disturbed areas, especially urban. April through November.

General distribution: Native of the Mediterranean region, introduced into the United States at scattered localities.

Specimens examined: Near Islais Creek, San Francisco, Howell 31419 (CAS); Near Bayview Hills, Howell 31914 (CAS); Palo Alto, Howell 30023; Santa Cruz, Hesse 282.

42. Lagurus L. Sp. Pl. 81. 1753.

1. Lagurus ovatus L. Sp. Pl. 81. 1753.

Local distribution: Well established on sand dunes and as a weed in San Francisco. May through July.

General distribution: Native of the Mediterranean region, introduced into California and in some of the eastern states.

Specimens examined: San Francisco, probably collected by Brandegee, 1891; Pt. Lobos, Raven 6922 (CAS); Lake Merced, Rubtzoff 2249 (CAS).

43. Phleum L. Sp. Pl. 59. 1753.

Spikes linear-cylindric.....1. P. pratense.
Spikes ovate-cylindric.....2. P. alpinum.

1. Phleum pratense L. Sp. Pl. 59. 1753.

Local distribution: Occasional as a weed in lawns and in disturbed areas. June through July.

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General distribution: Native of Eurasia, widely introduced into North America and other continents.

Specimens examined: Golden Gate Park, Howell 32892 (CAS); Stanford, Dudley, July 17, 1897; Santa Cruz, Anderson, no date; Near Woodwardia, Hesse 189.

2. Phleum alpinum L. Sp. Pl. 59. 1753.

Local distribution: Known only from one specimen collected at Fort Point in San Francisco in 1862 and not subsequently recollected. July and August.

General distribution: Circumpolar in the northern hemisphere, extending southward to the tropics along high mountain chains; also in the southern hemisphere.

Specimen cited: Jepson (1901, p. 40) cited a Bolander collection made in 1862 at Fort Point in San Francisco.

44. Gastridium Beauv. Ess. Agrost. 21. 1812.

1. Gastridium ventricosum (Gouan) Schinz & Thell. Mitt. Bot. Mus. Univ. Zurich 58: 39. 1913.

Local distribution: Fairly common as a garden weed and in grasslands. May through August.

General distribution: Native of Europe, introduced into Oregon, California, Baja California, and Texas, and occasionally found in some of the eastern states.

Specimens examined: Golden Gate Park, Raven 7102 (CAS); San Francisco Watershed Reserve, Oberlander 263; La Honda, Leitholt, July 30, 1894; Palo Alto, Dudley, June 20, 1905; Foothills west of Los Gatos, Heller 7452; Near Hilton Airport, Thomas 3561; Near Eccles, Dudley, June 26, 1897; Santa Cruz, Anderson, 1886.

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45. Calamagrostis Adans. Fam. Pl. 2: 31. 1763.

Glumes 3-5 mm. long; sheaths pubescent on the collars; plants with long, creeping rhizomes.....1. C. rubescens.
Glumes 5-7 mm. long; sheaths glabrous on the collars; plants without long, creeping rhizomes.
Plants 10-15 dm. tall; awns of the lemmas not equalling the glumes; callus hairs about ½ as long as the lemmas. 2. C. nutkaensis.
Plants 4-8 dm. tall; awns of the lemmas about equalling the glumes; callus hairs about ¼-1/3 as long as the lemmas. 3. C. koelerioides.

1. Calamagrostis rubescens Buckl. Proc. Acad. Phila. 1862: 92. 1862.

Local distribution: Usually growing in redwood forests, occasionally in shaded woods, central San Mateo County southward. June through September.

General distribution: British Columbia south to Santa Cruz and Santa Clara counties, east to Montana, Wyoming, and Colorado.

Specimens examined: Tunitas Creek Rd., Lampe, July 8, 1939; Kings Mt., Dudley, June 12, 1906; Big Basin, Dudley, Sept. 23, 1905; Near Boulder Creek, Hesse 629; Boulder Creek, Hesse 964.

2. Calamagrostis nutkaensis (Presl) Steud. Syn. Pl. Glum. 1: 190. 1854.

Local distribution: Usually along or near the coast at the edges of marshes and in moist areas farther inland. May through June.

General distribution: Aleutian Islands, the south coast of Alaska southward along or near the coast to Monterey County.

Specimens examined: Twin Peaks, San Francisco, Raven, 1957 (CAS); San Pedro, Elmer 4693, 5040; Arroyo de Los Frijoles, Mason, May 29, 1921.

3. Calamagrostis koelerioides Vasey, Bot. Gaz. 16: 147. 1891.

Local distribution: Open areas in redwood - douglas fir forests,

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edges of brush-covered slopes, and in rocky grasslands, central San Mateo County and Santa Cruz County. June through September.

General distribution: Washington south to southern California, east to Montana and Wyoming.

Specimens examined: La Honda Rd., Dudley, July 28, 1894; Saratoga - Big Basin Rd., Abrams 5272; North of Big Basin, Carlson 54; Big Basin, Thomas 3539; Between Felton & Empire Grade, Hesse 993; Near Davenport, Hesse 1667.

46. Agrostis L. Sp. Pl. 61. 1753.

Paleae nearly as long as the lemmas or at least ½ as long. Introduced grasses.
  Rachilla prolonged behind the palea; lemmas pubescent, awned from the back.....1. A. avenacea.
  Rachilla not prolonged; lemmas not pubescent, rarely awned.
    Glumes scabrous both on the midribs and on the abaxial surface. 2. A. semiverticillata.
    Glumes scabrous only on the midribs, glabrous on the rest of the abaxial surface.
      Ligules 1-2 mm. long.....3. A. tenuis.
      Ligules 3-6 mm. long.
        Rhizomes lacking; culms more or less decumbent at the base. 4. A. stolonifera.
        Rhizomes present; culms usually erect. 5. A. alba.
Paleae never more than ½ as long as the lemmas or lacking. Native or introduced grasses.
  Plants with long creeping rhizomes.
    Panicles spike-like, contracted.....6. A. pallens.
    Panicles open.
      Lemmas about 3 mm. long, the hairs at the base 1 mm. long or longer; spikelets 3.5-4.5 mm. long. 7. A. hallii.
      Lemmas about 2-2.5 mm. long, the hairs at the base less than 1 mm. long; spikelets usually under 3.5 mm. long. 8. A. diegoensis.
  Plants without long creeping rhizomes.
    Panicles very diffuse, with long filiform branches, the branches branched distally.....9. A. scabra.
    Panicles contracted, often spike-like to moderately diffuse, the branches not filiform; the branches branched below the middle.
      Lemmas not awned, or if awned the awns not exceeding the glumes.

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Panicles spike-like, usually partly hidden by the uppermost sheaths; palea about 0.5 mm. long.
10. A. californica.
Panicles spike-like or diffuse, much exserted beyond the uppermost sheaths; palea less than 0.5 mm. long.
11a. A. exarata var. exarata.
Lemmas awned, the awn exserted beyond the glumes.
Plants perennial, 2-12 dm. tall.
11b. A. exarata var. pacifica.
Plants annual, 1-4 dm. tall....12. A. microphylla.

Many specimens of Agrostis in herbaria lack the basal portions of the plant, thus making it impossible to tell whether the plant is annual or perennial or has stolons or rhizomes. It is essential that the entire plant be available for accurate identification.

1. Agrostis avenacea Gmel. Syst. Nat. 2: 171. 1791.

(A. retrofracta Willd. Enum. Pl. 1: 94. 1809.)

Local distribution: Occasional as a weed, probably often overlooked by collectors. May through July.

General distribution: Introduced into California, Texas, and Ohio, native in the Hawaiian Islands and in Polynesia.

Specimens examined: Islais Creek, San Francisco, Howell 32643 (CAS); Near Burlingame, Wieser, June 4, 1932; Upper Crystal Springs Lake, Oberlander 923; Crystal Springs Lake, Hayward, July 4, 1927; Pulgas Water Temple, Howell, June 1, 1954.

2. Agrostis semiverticillata (Forsk.) Christ. Dansk Bot. Arkiv 4: 12. 1922.

(A. verticillata Vill. Prosp. Pl. Dauph. 16. 1779.)

Local distribution: A common weed of drainage ditches, moist areas in gardens, and in other wet disturbed habitats, San Francisco southward. June through September.

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General distribution: Native of Europe, widely introduced into the United States and South America.

Specimens examined: San Francisco, Bacigalupi, June 7, 1924; Golden Gate Park, Rubtzoff 3076 (CAS); Upper Crystal Springs Lake, Oberlander 1028; Near Stanford, Randall 152; Mt. View - Alviso Rd., Ferris 2065; Near Boulder Creek, Hesse 1366; Near Santa Cruz, Dudley, June 5, 1898; Seabright, Dudley, June 5, 1898; Seabright, Dudley, June 29, 1909; Watsonville, Thomas 1975; Pajaro R., Dudley, Sept. 19, 1909.

3. Agrostis tenuis Sibth. Fl. Oxon. 36. 1794.

Local distribution: Occasional as a weed in gardens and in moist disturbed areas. May through July.

General distribution: Native of Europe, widely introduced into temperate North America.

Specimens examined: Lone Mt., San Francisco, Howell 32576 (CAS); San Francisco waterfront, Howell 31730 (CAS); Stanford, Thomas 7460.

4. Agrostis stolonifera L. Sp. Pl. 62. 1753.

Local distribution: A weed of disturbed areas and brush-covered slopes. May and June.

General distribution: Native of Europe and perhaps in the northern portion of the North American continent, introduced farther south.

Specimens examined: Mt. Lake, San Francisco, Howell 31931 (CAS); Bayview Hills, Howell 32827 (CAS).

5. Agrostis alba L. Sp. Pl. 63. 1753.

Local distribution: Occasional as a weed of gardens and lawns and in moist areas in either disturbed or undisturbed habitats. June through September.

General distribution: Native of Europe, widely introduced into North America.

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Specimens examined: Golden Gate Park, San Francisco, Howell 32890 (CAS); Stanford, Ferris 2027; Thomas 7360; Loma Prieta, Ferris 2094.

6. Agrostis pallens Trin. Mem. Acad. St. Petersb. 4: 328. 1841.

Local distribution: Known locally only from Lands End in San Francisco. June and July.

General distribution: Usually along or near the coast from Washington south to San Francisco.

Specimen cited: Lands End, Davy (Jepson, 1912, p. 118).

7. Agrostis hallii Vasey, Contr. U. S. Nat. Herb. 3: 74. 1892.

Local distribution: Occasional in wooded areas, San Francisco southward. June through July.

General distribution: Coastal region, Oregon south to Santa Barbara County.

Specimens examined: Lone Mt., San Francisco, Howell 32526 (CAS); Bayview Hills, Howell 31489 (CAS); Coal Mine Ridge, Barry 177; Alpine School House, Elmer 4264 (CAS).

8. Agrostis diegoensis Vasey, Bull. Torr. Bot. Club 13: 55. 1886.

Local distribution: Fairly common on open grassy slopes, brush-covered areas, and along the margins of chaparral, San Francisco southward. June through August.

General distribution: British Columbia south to northern Baja California, east to western Montana and Nevada.

Specimens examined: Lake Merced, Raven 2624 (CAS); Hunters Pt., Howell 32793 (CAS); Hillsborough Hills, Wieser, June 4, 1932; Alpine School House, Elmer 4264; Saratoga - Big Basin Rd., Abrams 5283; Glenwood, Dudley, June 20, 1909; Ben Lomond sand hills, Hesse 1688; Santa Cruz, Thompson, June 27, 1903.

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9. Agrostis scabra Willd. Sp. Pl. 1: 370. 1797.

Local distribution: Known locally only from near Ben Lomond and Mill Creek in Santa Cruz County, but to be expected elsewhere in moist open woods. July and August.

General distribution: Alaska east to Newfoundland, south to southern California, Texas, and Florida.

Specimens examined: Mill Creek, Hesse 1329; Near Ben Lomond, Hesse 558.

10. Agrostis californica Trin. Mem. Acad. St. Petersb. 4: 359. 1841.

Local distribution: Occasional on coastal bluffs, San Francisco south to Santa Cruz. June and July.

General distribution: Along the coast from northern Humboldt County south to the vicinity of Santa Cruz.

Specimens examined: Pt. Lobos, San Francisco, Raven 8186 (CAS); Near Waddell Creek, Hesse 1155; Santa Cruz, Anderson 6.

11a. Agrostis exarata Trin. var. exarata, Gram. Unifl. 207. 1824.

Local distribution: Occasional in low moist areas where water has stood. July and August.

General distribution: Alaska south to southern California, east to Alberta, South Dakota, Nebraska, and western Texas.

Specimens examined: Lake Merced, Howell 31834 (CAS); Searsville Lake, Dudley, 1903; Near Boulder Creek, Hesse 1373; Watsonville, Hayward, July 10, 1929.

11b. Agrostis exarata Trin. var. pacifica Vasey, U. S. Dept. Agric. Div. Bot. Spec. Bull. 1889: 107. 1889.

Local distribution: Fairly common along streams, occasionally in

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bogs, and in other moist areas. May through August.

General distribution: Widespread from Alaska south to southern California, east to Idaho, Nebraska, and Arizona.

Specimens examined: Lone Mt., San Francisco, Howell 32448 (CAS); Lake Merced, Raven 6901 (CAS); Pescadero, Vestal, June 15, 1937; Stanford, Abrams 1640; Near Boulder Creek, Hesse 1375; Boulder Creek, Hesse 1128; 1.5 miles north of Felton, Howell 19598 (CAS); Camp Evers, Thomas 3355; Santa Cruz, Anderson, 1886.

12. Agrostis microphylla Steud. Syn. Pl. Glum. 1: 164. 1854.

Local distribution: Occasional in serpentine areas, along the coast, and in very wet areas where water has stood during the spring. May through July.

General distribution: Vancouver Island, British Columbia, south to San Diego County, mainly through the Coast Ranges.

Specimens examined: Presidio, Raven 2118 (CAS); Mt. Sutro, San Francisco, Thomas 7355; Crystal Springs Lake, Abrams 2458; Jasper Ridge, Vestal, May 7, 1923; Santa Cruz, Thompson, June 27, 1903; Anderson 33 (CAS).

47. Ammophila Host, Icon. Gram. Austr. 4: 24. 1809.

Ligules 10-30 mm. long, thin.....1. A. breviligulata.
Ligules 1-3 mm. long, firm.....2. A. arenaria.

1. Ammophila breviligulata Fernald, Rhodora 22: 71. 1920.

Local distribution: Known locally only from sand dunes near the mouth of Gazos Creek. June through August.

General distribution: Native on the east coast of North America and in the Great Lakes region, sparingly introduced into California.

Specimen examined: Mouth of Gazos Creek, Bacigalupi, Mar. 27, 1922.

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2. Ammophila arenaria (L.) Link, Hert. Berol. 1: 105. 1827.

Local distribution: Sand dunes along the coast, once planted to stabilize the dunes, now well established. June through October.

General distribution: Native of Europe, introduced on sand dunes from Washington south to southern California as a sand-binder and now naturalized.

Specimens examined: Cliff House, San Francisco, Dudley, July 30, 1899; Heller 5670; ½ mile south of Lake Merced, Dudley, May 11, 1901; Mouth of Waddell Creek, Hesse 1152; Thomas 3640; Santa Cruz, Thompson, June 1903; Near mouth of Pajaro River, Thomas 2409.

The sand dunes which once covered much of the western portion of San Francisco and what is now Golden Gate Park were planted with A. arenaria prior to other reclamation efforts.

48. Sporobolus R. Br. Prod. 169. 1810.

1. Sporobolus poiretii (Roem. & Schult.) Hitchc. Bartonia 14: 32. 1932.

Local distribution: Known as a weed of lawns in San Francisco and probably elsewhere. May through December.

General distribution: Native in tropical Asia, widely introduced into the southeastern part of the United States, Central America, South America, and occasionally in Oregon and California.

Specimens examined: Golden Gate Park, Howell 32859 (CAS); Raven 2715 (CAS).

49. Beckmannia Host, Icon. Gram. Austr. 3: 5. 1805.

1. Beckmannia syzigachme (Steud.) Fernald, Rhodora 30: 27. 1928.

Local distribution: Known definitely from the southern part of

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Cahill Ridge. June and July.

General distribution: Widespread in North America from Alaska east to New York, south to the Santa Cruz Mountains, New Mexico, and Kansas; also in Asia.

Specimen examined: Cahill Ridge, Dudley, June 10, 1906.

This species was reported from near Saratoga as B. erucaeformis by Leeds (1891, p. 128).

50. Leptochloa Beauv. Ess. Agrost. 71. 1812.

1. Leptochloa fascicularis (Lam.) Gray, Man. 588. 1848.

Local distribution: Known locally only as a rare weed in San Francisco. August and October.

General distribution: Widespread throughout much of the United States, southward through Central America to Argentina, undoubtedly introduced locally.

Specimen examined: San Francisco, Howell 11697.

51. Cynodon Rich. in Pers. Syn. Pl. 1: 85. 1805.

1. Cynodon dactylon (L.) Pers. Syn. Pl. 1: 85. 1805.

Local distribution: A very common weed of drainage ditches, lawns, roadsides, and other disturbed habitats. May through October.

General distribution: Native of Europe, now widespread throughout the world as a weed.

Specimens examined: Lone Mt., San Francisco, Howell 32604 (CAS); Palo Alto, Thomas 5213; Between Coyote Creek and Alviso, Dudley, Oct. 24, 1909; Almaden Reservoir, Rose 58025; 1 mile south of Gilroy, Thomas 4360.

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52. Spartina Schreb. Gen. Pl. 43. 1789.

1. Spartina foliosa Trin. Mem. Acad. St. Petersb. Sci. Nat. 6: 114. 1840.

Local distribution: Salt marshes bordering San Francisco Bay. October and November.

General distribution: Humboldt Bay south along the coast to the region of Magdalena Island, Baja California.

Specimens examined: Dumbarton Bridge approach, Wiggins 9213; Cooleys Landing, Abrams 1015; Salt marshes below Palo Alto, Dale, Oct. 1919.

53. Anthoxanthum L. Sp. Pl. 28. 1753.

1. Anthoxanthum odoratum L. Sp. Pl. 28. 1753.

Local distribution: Occasional as a weed in lawns and in moist disturbed areas, known from San Francisco and to be expected elsewhere. March through May.

General distribution: Native of Eurasia, widely introduced into temperate North America and into other temperate regions.

Specimens examined: Golden Gate Park, Abrams 12914; Laurel Hill, San Francisco, Howell 19628 (CAS); McLaren Park, San Francisco, Howell 31731 (CAS).

54. Hierochloe R. Br. Prod. 208. 1810.

1. Hierochloe occidentalis Buckl. Proc. Acad. Phila. 1862: 100. 1862.

(H. macrophylla Thurb. ex Bolander, Trans. Calif. Agric. Soc. 1864-65. 132. 1866.)

Local distribution: A common grass in redwoods and redwood -

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douglas fir forests, northern San Mateo County southward. January through May.

General distribution: Southwestern Oregon south through the Coast Ranges to Monterey County.

Specimens examined: Pescadero Creek, Dudley, May 2, 1903; San Gregorio Creek, Thomas 3820; La Honda, Dudley, May 24, 1894; Kings Mt., Abrams 2258; Baker 247; Santa Cruz Mts., Anderson, 1885; Searsville, Rattan, Mar. 1867; Near Stanford, Applegate 815; Wrights, Elmer 4742; Near Felton, Thomas 1505; Near Mt. Madona, Thomas 1278.

55. Phalaris L. Sp. Pl. 54. 1753.

Each fertile spikelet subtended by 6 sterile spikelets; sterile lemmas none.
  Upper sterile spikelets long pedicellate.
    1a. P. paradoxa var. paradoxa.
  All spikelets short pedicellate....1b. P. paradoxa var. praemorsa.
All spikelets usually fertile; sterile lemmas 1 or 2.
  Plants perennial.
    Sterile lemmas 2 per spikelet; glumes 6-8 mm. long; panicles 2-5 cm. long, 2-2.5 cm. in diameter.
      2. P. californica.
    Sterile lemmas 1 per spikelet; glumes 5-6 mm. long; panicles 5-15 cm. long, about 1.5 cm. in diameter.
      3. P. tuberosa var. stenoptera.
  Plants annual.
    Sterile lemma 1 per spikelet.....4. P. minor.
    Sterile lemmas 2 per spikelet.
      Glumes conspicuously and broadly winged, 7-8 mm. long; sterile lemmas about $\frac{1}{2}$ the length of the fertile ones.
        5. P. canariensis.
      Glumes narrowly winged or not, 3.5-4 mm. long; sterile lemmas about 1/3 the length of the fertile ones.
        Glumes not winged.....6. P. lemmoni.
        Glumes narrowly winged.....7. P. angusta.

1a. Phalaris paradoxa L. var. paradoxa, Sp. Pl. 1665. 1763.

Local distribution: Occasional as a weed in cultivated fields and disturbed areas. April through June.

General distribution: Native of the Mediterranean region, introduced into various parts of the United States.

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Specimens examined: San Francisco, Howell 31371 (CAS); Stanford, Dudley, May 9, 1906, May 14, 1896; Thomas 5728.

1b. Phalaris paradoxa L. var. praemorsa (Lam.) Coss. & Dur. Expl. Sci. Alger. 2: 25. 1854.

Local distribution: Occasional as a weed in disturbed areas. June and July.

General distribution: Native of the Mediterranean region, introduced into the Pacific States and Arizona.

Specimens examined: Golden Gate Park, Howell 32908 (CAS); San Francisco, Raven 9316 (CAS); Palo Alto, Dudley, June 24, 1909.

2. Phalaris californica Hook. & Arn. Bot. Beechey 161. 1841.

Local distribution: Along streams, springs, coastal bluffs, and other moist areas. April through June.

General distribution: Southwestern Oregon south through the Coast Ranges to San Luis Obispo County.

Specimens examined: Pt. Lobos, Raven 8263 (CAS); Near Crystal Springs, Dudley, Apr. 4, 1896; Cahill Ridge, Oberlander 27; Moss Beach, Wiggins 2943; Along the coast near San Mateo - Santa Cruz Co. line, Thomas 1711; Black Mt., Dudley, June 19, 1905; Saratoga, Pendleton, May 1908; foothills west of Los Gatos, Heller 8568; Near Gilroy, Ferris, May 6, 1922.

3. Phalaris tuberosa L. var. stenoptera (Hack.) Hitchc. Journ. Wash. Acad. Sci. 24: 292. 1934.

Local distribution: Known locally from disturbed areas in San Francisco and as an escape from grain fields along the coast. June through August.

General distribution: Introduced and widely grown as a forage grass, the origin uncertain.

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Specimens examined: Lake Merced, Howell 32815 (CAS); San Francisco, Howell 31323 (CAS); Near San Bruno, Howell 30009 (CAS); Near mouth of San Gregorio Creek, Thomas 7375.

4. Phalaris minor Retz. Obs. Bot. 3: 8. 1783.

Local distribution: Disturbed areas throughout the Santa Cruz Mountains, probably fairly common but poorly collected. April through October.

General distribution: Native of the Mediterranean region, widely introduced into North America.

Specimens examined: San Francisco, Howell 31469 (CAS); Crystal Springs, Elmer 4427; Redwood City, Howell 13099 (CAS); Gilroy, Dudley, May 29, 1899; Watsonville, Hayward, May 15, 1927; Palm Beach, Thomas 2421.

5. Phalaris canariensis L. Sp. Pl. 54. 1753.

Local distribution: Occasional as a weed in gardens and disturbed areas.

General distribution: Native of the Mediterranean region, widely introduced into temperate regions.

Specimens examined: Lake Merced, Rubtzoff 3020 (CAS); Bayview Hills, Howell 32398 (CAS); Palo Alto, Ferris 3617; Santa Cruz, Anderson, no date.

6. Phalaris lemmoni Vasey, Contr. U. S. Nat. Herb. 3: 42. 1892.

Local distribution: Occasional in Santa Clara and Santa Cruz counties, usually in low moist areas. May.

General distribution: Colusa and Butte counties south to southern California through the Sacramento Valley and the Coast Ranges.

Specimens examined: Saratoga, Pendleton 355; Camp Evers, Hesse 456.

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7. Phalaris angusta Nees ex Trin. Gram. Icon. 1: pl. 78. 1827.

Local distribution: Occasional in low wet ground or along the edges of ponds. April through June.

General distribution: Central California south to Mexico, east to Louisiana; also in South America.

Specimens examined: Santa Cruz, Anderson, 1886; Watsonville, Hayward, July 10, 1929.

56. Cenchrus L. Sp. Pl. 1049. 1753.

1. Cenchrus pauciflorus Benth. Bot. Sulph. 56. 1840.

Local distribution: Known locally from Stanford and Gilroy. July through September.

General distribution: Widespread throughout much of the United States, Central America, and South America, perhaps introduced locally.

This species was reported, without citation of specimens, by Hitchcock (Abrams, 1940, p. 119) from Stanford and Gilroy.

57. Setaria Beauv. Ess. Agrost. 51. 1812.

Each spikelet subtended by 5 or more bristles; plants annual or perennial.
Plants annual; spikelets 3 mm. long.....1. S. glauca.
Plants perennial; spikelets 2-2.5 mm. long.....2. S. geniculata.
Each spikelet subtended by 1-3 bristles; plants annual.
3. S. viridis.

1. Setaria glauca (L.) Beauv. Ess. Agrost. 51. 1812.

Local distribution: Lawn weeds and in disturbed areas. August through October.

General distribution: Native of Europe, widely established in North America and in other temperate regions.

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Specimens examined: San Francisco, Howell 32989 (CAS); Raven 10511 (CAS).

2. Setaria geniculata (L.) Beauv. Ess. Agrost. 51. 1812.

Local distribution: Known locally as a weed in lawns in San Francisco and probably elsewhere. June through September.

General distribution: Introduced into California, native in the eastern portion of the United States and in South America.

Specimen examined: Golden Gate Park, San Francisco, Howell 32898 (CAS).

3. Setaria viridis (L.) Beauv. Ess. Agrost. 51. 1812.

Local distribution: Occasional in disturbed areas, known definitely from San Francisco, Stanford, and San Jose. July and August.

General distribution: Native of Europe, widely introduced into North America.

Specimens examined: San Francisco, Howell 32942 (CAS); Stanford, Abrams 7333; San Jose, Tilden, Aug. 1946.

58. Pennisetum Rich. in Pers. Syn. Pl. 1: 72. 1805.

Culms erect; panicles long exserted beyond the upper sheaths.
1. P. villosum.
Culms creeping; panicles partly hidden by the upper sheaths.
2. P. clandestinum.

1. Pennisetum villosum R. Br. in Salt, Voy. Abyss. App. 62. 1814.

Local distribution: Known locally as a weed in San Francisco and Santa Cruz. August through October.

General distribution: Native in Africa, occasionally cultivated as an ornamental and locally established in Michigan, Texas, and California.

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Specimens examined: Lake Merced, Bush, no date (CAS); Santa Cruz, Hesse 587.

2. Pennisetum clandestinum Hochst. ex Chiov. Ann. Inst. Bot. Roma 8: 41. 1903.

Local distribution: A weed of lawns, gardens, and disturbed areas, San Francisco and probably elsewhere. August through October.

General distribution: Native in Africa, common as a weed in southern California northward to central California.

Specimens examined: San Francisco, Howell 32947 (CAS), 32945 (CAS).

59. Panicum L. Sp. Pl. 55. 1753.

Spikelets 4.5-5 mm. long; plants annual.....1. P. miliaceum.
Spikelets about 2 mm. long; plants annual or perennial.
  Plants annual; mature panicles usually at least 20 cm. long.
    2. P. capillare.
  Plants perennial; mature panicles rarely over 8 cm. long.
    3. P. pacificum.

1. Panicum miliaceum L. Sp. Pl. 58. 1753.

Local distribution: Occasional as a weed in San Francisco and probably also in other urban areas. July through October.

General distribution: Native of Eurasia, widely introduced into temperate North America.

Specimens examined: San Francisco, Raven 8145 (CAS); Howell 31694 (CAS).

2. Panicum capillare L. Sp. Pl. 58. 1753.

Local distribution: Rare as a weed in San Francisco, to be expected occasionally elsewhere. July through September.

General distribution: Widespread from Montana east to Maine,

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south to Texas and Florida, occasional as an introduced weed in the other states.

Specimen examined: Golden Gate Park, Howell 32868 (CAS).

3. Panicum pacificum Hitchc. & Chase, Contr. U. S. Nat. Herb. 15: 229. 1910.

Local distribution: Occasional in the Santa Cruz Mountains in meadows where water seeps in the spring and early summer. May through July.

General distribution: British Columbia and Montana southward to southern California, eastward to Arizona and Nevada.

Specimens examined: Hilton Airport, Thomas 1926; Between Felton and Santa Cruz, Hesse 256.

60. Stenotaphrum Trin. Fund. Agrost. 175. 1820.

1. Stenotaphrum secundatum (Walt.) Kuntze, Rev. Gen. Pl. 2: 794. 1891.

Local distribution: Known locally only as a weed in Golden Gate Park. July and August.

General distribution: Native in the southeastern part of the United States and in the American tropics, widely used as a lawn grass and occasionally escaped in California.

Specimen examined: Golden Gate Park, Howell 32946 (CAS).

61. Digitaria Heist. ex Adans. Fam. 2: 38. 1763.

Sheaths glabrous; spikelets about 2 mm. long.....1. D. ischaemum.
Sheaths pilose; spikelets about 3 mm. long.....2. D. sanguinalis.

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1. Digitaria ischaemum (Schreb.) Schreb. ex Muhl. Descr. Gram. 131. 1817.

Local distribution: Common as a lawn weed, but rarely collected. September through October.

General distribution: Native of Eurasia, widely established as a weed throughout most of the world.

Specimens examined: San Francisco, Howell 32971 (CAS); Palo Alto, Ferris 9033; Thomas 6437; Between Scott Valley and Santa Cruz, Thomas 3612.

2. Digitaria sanguinalis (L.) Scop. Fl. Carn. 1: 52. 1772.

Local distribution: A common weed of lawns, gardens, and disturbed areas, rarely collected. May through September.

General distribution: Native of Europe, now nearly cosmopolitan as a weed.

Specimens examined: San Francisco, Raven 8146 (CAS); Stanford, Randall 157; Palo Alto, Dudley, June 24, 1909; San Jose, Knoche, Sept. 4, 1929.

62. Paspalum L. Syst. Nat. 2: 855. 1759.

Culms tufted, erect or geniculate at the base; racemes usually 3-5. 1. P. dilatatum.
Culms from creeping rhizomes, erect; racemes commonly 2 (rarely 1 or 3). 2. P. distichum.

1. Paspalum dilatatum Poir. in Lam. Encycl. 5: 35. 1804.

Local distribution: Occasional as lawn weeds and along the edges of sloughs. July through September.

General distribution: Native of South America, widely established northward to Oregon, Colorado, and New Jersey.

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Specimens examined: Golden Gate Park, Howell 32887 (CAS); Stanford, Bacigalupi 2846; Watsonville, Hayward, Aug. 9, 1928.

2. Paspalum distichum L. Syst. Nat. 2: 855. 1759.

Local distribution: Edges of salt marshes, along the edges of ponds, streams, and lakes, and in lawns, often growing in water to about 1½ feet deep. July through October.

General distribution: Widespread in the western hemisphere from Washington and New Jersey south to Argentina.

Specimens examined: San Francisco, Howell 31462 (CAS); Searsville Lake, Dudley, 1903; Abrams 5117; Palo Alto, Dudley, Sept. 14, 1901; Near Alviso, Dudley, July 18, 1903; Campbell Creek, Dudley, July 18, 1903; Near Coyote, Wiggins 11164; Santa Cruz, Anderson, Aug. 18, 1900; Near Watsonville, Dudley, Oct. 10, 1908; Hayward, August 21, 1927; Pajaro R., Dudley, Sept. 19, 1909.

63. Echinochloa Beauv. Ess. Agrost. 53. 1812.

1. Echinochloa cruz-galli (L.) Beauv. Ess. Agrost. 53. 1812.

Local distribution: Common as a weed in moist soil, often along drainage ditches. July through December.

General distribution: Widespread in both North America and Eurasia.

Specimens examined: San Francisco, Howell 32645 (CAS); Crystal Springs Lake, Oberlander 393, 394; Palo Alto, Thomas 6435; Stanford, Dudley, Nov. 16, 1897; Felt Lake, Dudley, Oct. 5, 1895; Near Alviso, Dudley, Oct. 24, 1909; Wrights, Elmer 5008; Santa Cruz - Watsonville Rd., Dudley, Sept. 18, 1909; Watsonville, Hayward, July 27, 1928.

64. Eremochloa Buese in Miq. Pl. Jungh. 357. 1851-1855.

1. Eremochloa ciliaris (L.) Merrill, Philippine Journ. Sci. 1: 331. 1906.

Local distribution: This species was collected in San Francisco

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as a weed by Bolander and has not been recollected.

General distribution: Native of southeastern Asia.

This species was recorded as Ischaemum leersioides Munro (Watson, 1880, p. 262).

65. Sorghum Moench, Meth. Pl. 207. 1794.

Sessile spikelets 4.5-5.5 mm. long; awns readily deciduous. 1. S. halepense.
Sessile spikelets 6-7 mm. long; awns persistent.....2. S. sudanense.

1. Sorghum halepense (L.) Pers. Syn. Pl. 1: 101. 1805.

Local distribution: Occasional as a weed, usually in such moist areas as ditches and cultivated fields, probably more common than indicated by the number of specimens cited below. June through October.

General distribution: Native of the Mediterranean region, widely cultivated for forage and becoming a serious weed in temperate, subtemperate, and tropical climates.

Specimen examined: San Francisco, Howell 31638 (CAS).

2. Sorghum sudanense (Piper) Stapf in Prain, Fl. Trop. Afr. 9: 113. 1917.

Local distribution: Known definitely only from the waterfront in San Francisco, but to be expected occasionally elsewhere. May through July.

General distribution: Native of the Anglo - Egyptian Sudan, widely cultivated for forage and becoming established in many parts of the United States.

Specimen examined: Near Islais Creek, San Francisco, Howell 31396 (CAS).

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Andropogon glomeratus (Walt.) B. S. P. (Prel. Cat. N. Y. 67. 1888) is native from southern California east to the Atlantic, southward to Central America, and is introduced into Sonoma and Marin counties. It is to be expected eventually in the Santa Cruz Mountains. The glumes of Andropogon are not pectinate and it may be distinguished from Sorghum with the aid of the following key.

Axis of the inflorescence with many internodes, villous.....Andropogon.
Axis of the inflorescence with 1-5 internodes, short-pubescent.
Sorghum.

12. CYPERACEAE

Each pistillate flower enclosed within a sack-like bract, the perigynium.
1. Carex.
Each pistillate flower not enclosed within a perigynium.
Scales of the spikelets 2-ranked; spikelets laterally flattened; bristles none.....2. Cyperus.
Scales of the spikelets spirally arranged; spikelets not laterally flattened; bristles present or not.
Spikes terminal, solitary, bractless; base of the style persistent as a tubercle.....3. Eleocharis.
Spikes terminal or lateral, solitary or not, subtended by one or more bracts; base of the style not persistent as a tubercle.
Base of the style swollen; bristles lacking..4. Fimbristylis.
Base of the style not swollen; bristles usually present.
Bristles many, several times as long as the achene.
5. Eriophorum.
Bristles few, usually about as long as the achene.
6. Scirpus.

1. Carex L. Sp. Pl. 972. 1753.

Stigmas 2; achenes lenticular.
Lateral spikelets sessile.
Culms solitary or a few from long creeping rhizomes.
Beaks of the perigynia 1/3-1/5 the length of the bodies; perigynia chestnut-colored; lower sheaths light brown.
1. C. simulata.
Beaks of the perigynia ½-1/3 as long as the bodies; perigynia blackish in age; lower sheaths dark brown to black.
Beaks of the perigynia hyaline at the orifice; scales light brown.....2. C. praegracilis.
Beaks of the perigynia not hyaline at the orifice; scales dark brown.....3. C. pansa.

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Culms several to many, more or less caespitose; rhizomes if present not long creeping.
Spikes androgynous.
Spikes few, few-flowered; inflorescences slender, not congested.....4. C. tumulicola.
Spikes numerous, many-flowered; inflorescences usually not slender, usually congested.
Perigynia blackish-brown at maturity, more or less biconvex; inflorescences loosely branched at least below. Rare.....5. C. cusickii.
Perigynia yellowish or tinged with brown in age, planoconvex; inflorescences congested. Common. 6. C. densa.
At least the upper spikelet gynaecandrous.
Perigynia essentially wingless, the lower portion spongy-thickened.
Perigynia spreading at maturity....7. C. phyllomanica.
Perigynia appressed at maturity.
Beaks of the perigynia deeply bidentate; bodies of the perigynia hidden by the scale. 8. C. bolanderi.
Beaks of the perigynia shallowly bidentate; upper part of the bodies of the perigynia exposed. 9. C. leptopoda.
Mature perigynia winged, the lower portion not spongy-thickened.
Perigynia 3.5 mm. long or less.
The adaxial surface of the perigynia nerved; perigynia about 3 mm. long.....10. C. montereyensis.
The adaxial surface of the perigynia not nerved; perigynia 3.2-3.5 mm. long...11. C. subfusca.
Perigynia 3.5-5 mm. long.
The adaxial surface of the perigynia not nerved or obscurely so toward the base.
Spikelets with 10-20 perigynia, congested; inflorescences usually capitate; leaf-blades 2.5-4 mm. wide.....12. C. subbracteata.
Spikelets with 4-12 perigynia, not conspicuously congested; inflorescences not strongly capitate; leaf-blades 1-2 mm. wide. 13. C. gracilior.
The adaxial surface of the perigynia definitely nerved.....14. C. harfordii.
Lateral spikelets pedicellate.
Lowest bract of the inflorescence sheathing; perigynia essentially beakless; pistillate spikes usually few-flowered.
Scales with a distinct awn.....15. C. salinaeformis.
Scales awnless.....16. C. hassei.
Lowest bract of the inflorescence not sheathing; perigynia at least short-beaked; pistillate spikes many-flowered.

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Scales 1-2 times as long as the mature perigynia.
17. C. obnupta.
Scales not awned, about equalling the perigynia or shorter than them.
Flowering culms arising laterally, not surrounded by the bases of the leaves of the previous year.
18. C. nudata.
Flowering culms not arising laterally, surrounded at the base by the leaves of the previous year.
Lower sheaths of the culms not becoming filamentose.
19. C. sitchensis.
Lower sheaths breaking and becoming filamentose.
Beaks of the perigynia bidentate.
20. C. barbarae.
Beaks of the perigynia not bidentate.
Leaf-blades 6-12 mm. wide; lower sheaths keeled; plants 10-15 dm. tall.21. C. schottii.
Leaf-blades 3-5 mm. wide; lower sheaths not keeled; plants 3-10 dm. tall..22. C. senta.

Stigmas 3; achenes trigonous.
Bodies of the perigynia pubescent.
Lowest pistillate spikelet arising from among the basal leaves.
Perigynia with several nerves between the lateral ribs.
23. C. globosa.
Perigynia without nerves between the lateral ribs.
24. C. brevicaulis.
Lowest pistillate spikelets not arising from among the basal leaves.
Perigynia densely pubescent, the beaks prominently bidentate; scales acute, prolonged into a short awn.
25. C. lanuginosa.
Perigynia sparingly pubescent, the beaks minutely bidentate; scales rounded, rarely apiculate..26. C. gynodynama.
Bodies of the perigynia glabrous (the beaks rarely pubescent).
Perigynia rarely over 4 mm. long including the beaks.
Leaves usually about 1.5 cm. wide.....27. C. amplifolia.
Leaves about 0.5 cm. wide.....28. C. serratodens.
Perigynia 6-10 mm. long including the beaks.
Beaks of the perigynia about 1.5 mm. long, the teeth about 0.5 mm. long.....29. C. rostrata.
Beaks of the perigynia 2-3 mm. long, the teeth 1-1.5 mm. long.
Perigynia 7-10 mm. long, 2-3 mm. wide at the widest part.
30. C. exsiccata.
Perigynia 6-7 mm. long, 1.5 mm. wide at the widest part.
31. C. comosa.

1. Carex simulata MacKenzie, Bull. Torr. Bot. Club 34: 604. 1908.

Local distribution: Known from bogs near Camp Evers and from near Ben Lomond, Santa Cruz County. April through August.

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General distribution: Washington south to the Santa Cruz Mountains in the Coast Ranges and to Tulare County in the Sierra Nevada, east to Montana, Colorado, and New Mexico.

Specimens examined: Camp Evers, Hesse 312, 419, 446; Near Ben Lomond, Hesse 559, 572.

2. Carex praegracilis Boott, Bot. Gaz. 9: 87. 1884.

Local distribution: Boggy areas and along the edges of salt marshes, San Francisco southward. April through July.

General distribution: Yukon south to Mexico, east to Manitoba, Iowa, and Kansas; also in Central and South America.

Specimens examined: San Francisco, Jones 3268 (CAS); Woodside, Dudley, June 12, 1906; Mayfield, Dudley, Apr. 4, 1905, May 11, 1902; Camp Evers, Hesse 540.

3. Carex pansa Bailey, Bot. Gaz. 13: 82. 1888.

Local distribution: Known locally only from sand dunes in San Francisco where it is probably now extinct. March through June.

General distribution: Pacific County, Washington, south along the coast to northern Monterey County.

Specimen examined: San Francisco, Olsson-Seffer, 1904.

Howell, Raven, and Rubtzoff (1958, p. 46) suggested that this specimen may actually have come from Pacific Grove where Olsson-Seffer also collected C. pansa in 1904. I am inclined to believe that Olsson-Seffer did collect C. pansa in San Francisco as there are in the Dudley Herbarium several collections of other species made in San Francisco by him in 1904, among them Croton californicus.

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4. Carex tumulicola MacKenzie, Bull. Torr. Bot. Club 34: 154. 1907.

Local distribution: Open grassy areas and occasionally in marshes, San Francisco southward. March through June.

General distribution: Southwestern Washington south through the Coast Ranges to Monterey County.

Specimens examined: Presidio, Howell 13011; Mt. Davison, San Francisco, Raven 9303 (CAS); San Francisco, Bolander 6195; San Bruno Hills, Howell 13777 (CAS); Pilarcitos Lake, Oberlander 967; Crystal Springs, Suksdorf 377 (CAS); Southwest of San Mateo, Dudley, May 13, 1906; El Corte Madera, Dudley, Apr. 24, 1898; Coal Mine Ridge, Dudley, May 26, 1910; Stanford, Dudley, May 4, 1907; Permanente Ravine, Dudley, Apr. 23, 1899; Foothills west of Los Gatos, Heller 7309; Near Boulder Creek, Hesse 502; Soquel Valley, Thomas 1408.

5. Carex cusickii MacKenzie in Piper & Beattie, Fl. N. W. Coast 72. 1915.

Local distribution: Known from San Francisco and from central Santa Cruz County, growing in swamps and bogs. May through July.

General distribution: British Columbia south to San Luis Obispo County in the Coast Ranges, and to Tuolumne County in the Sierra Nevada, east to Montana and Utah.

Specimens examined: San Francisco, Bolander, no date (CAS); Camp Evers, Hesse 569; Near Ben Lomond, Hesse 573.

6. Carex densa Bailey, Mem. Torr. Bot. Club 1: 50. 1889.

Local distribution: One of the more common species of Carex locally, occurring in marshes, moist grassland, boggy ground, and occasionally in roadside ditches. March through June.

General distribution: Southern Oregon south to Santa Clara and Santa Cruz counties in the Coast Ranges and to Fresno County in the Sierra Nevada.

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Specimens examined: Presidio, Howell 32685 (CAS); Bayview Hills, Howell 31531 (CAS); Visitacion Valley, Eastwood & Howell 4328; Seal Cove, Dudley, Mar. 17, 1900; Pilarcitos Creek, Oberlander 817; Crystal Springs Lake, Abrams 2444; Elmer 4428; Emerald Lake, Rose 50134 (CAS); Woodside to Crystal Springs Lake, Dudley, May 1894; San Gregorio Creek, Kellogg & Brannon, June 1, 1870; Kings Mt., Dudley, Apr. 4, 1896; Coal Mine Ridge, Dudley, May 28, 1910; Between Madrone Station & Llagas Creek, Dudley, June 9, 1909; Morgan Hill, Ferris 795; Camp Evers, Hesse 594, 608; La Selava Beach, Thomas 3054.

7. Carex phyllomanica Boott in Wats. Bot. Calif. 2: 233. 1880.

Local distribution: Known locally only from boggy areas at Camp Evers in central Santa Cruz County. May through July.

General distribution: Southern Alaska south, usually along the coast, to Santa Cruz County.

Specimens examined: Camp Evers, Hesse 532, 568 (CAS), 571.

8. Carex bolanderi Olney, Proc. Amer. Acad. 7: 393. 1868.

Local distribution: Along streams and in marshes, northern San Mateo County southward. May through July.

General distribution: British Columbia south to Monterey County and the San Bernardino Mountains, eastward to western Montana, Utah, and New Mexico.

Specimens examined: Pilarcitos Creek, Oberlander 946; San Mateo Creek, Dudley, May 14, 1899; Kings Mt., Rose 33253; Devils Canyon, Leitholt, Aug. 13, 1894; 3 miles south of Holy City, Rose 45290 (CAS); Wrights, Wooley-Dod, May 14, 1921 (CAS); Llagas Post Office, Dudley, June 7, 1909; Glenwood, Dudley, June 20, 1909; Near Boulder Creek, Hesse 523; Boulder Creek, Hesse 524; Ben Lomond, Rose 35230; Felton, Howell 19583 (CAS).

9. Carex leptopoda MacKenzie in Rydb. Fl. Rocky Mts. 124. 1917.

Local distribution: Known from Big Basin. June.

General distribution: British Columbia south to Santa Cruz County

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and the southern Sierra Nevada, east to Idaho, and in Arizona.

Specimen examined: Big Basin, Dudley, June 14, 1905.

10. Carex montereyensis MacKenzie, Erythea 8: 92. 1922.

Local distribution: Growing on open slopes and in the shade of redwoods, San Francisco southward. April through July.

General distribution: Sonoma County south to Santa Barbara County.

Specimens examined: Laguna Honda, San Francisco, Raven 6830 (CAS); Cahill Ridge, Oberlander 847; Ano Nuevo, Eastwood & Howell 6049 (CAS); Near Pescadero, Eastwood & Howell 6056 (CAS); Near Boulder Creek, Kearney, May 16, 1945 (CAS); Hesse 521; Jamison Creek, Hesse 1119 (CAS); Near Big Basin Highway, Hesse 617, 628.

11. Carex subfusca Boott in Wats. Bot. Calif. 2: 234. 1880.

Local distribution: Rare locally, known from San Francisco, Pescadero Creek, and from near Big Basin. June and July.

General distribution: Northern Oregon south to northern Baja California, east to Arizona.

Specimens examined: Golden Gate Park, Raven 2790 (CAS); Pescadero Creek, Dudley, June 12, 1905; Near Big Basin, Hesse 617 (CAS).

12. Carex subbracteata MacKenzie, Bull. Torr. Bot. Club 43: 612. 1917.

Local distribution: Fairly common in marshy ground, wet meadows, and in moist woods. April through June.

General distribution: Coast Ranges from Humboldt County south to Santa Barbara County.

Specimens examined: San Francisco, Jones 3253 (CAS); Sutro Forest, San Francisco, Eastwood & Howell 4367; Lake Merced, Dudley, May 11, 1901; South San Francisco, Howell 13778; Bayview Hills, Rose 38211 (CAS); Cahill Ridge, Dudley, June 10, 1906; Crystal Springs Lake, Elmer 4429; Half Moon Bay, Eastwood, Howell, & Stacey 5245 (CAS); Pescadero Creek, Dudley, June 12, 1905; Arroyo de los Frijoles, Ferris 2197; Coal Mine Ridge, Dudley, June 26, 1908; Wrights, Wolley-Dod, May

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21, 1921 (CAS); Near Camp Evers, Hesse 455; New Brighton, Thomas 1422; Santa Cruz, Eastwood, Howell, & Stacey 5259 (CAS).

13. Carex gracilior MacKenzie, Bull. Torr. Bot. Club 43: 614. 1917.

Local distribution: Occasional, growing in boggy ground, along streams, along edges of ponds, and on wet grassy slopes. March through July.

General distribution: Outer Coast Ranges, Mendocino County south to Santa Cruz County.

Specimens examined: Presidio, Howell 32684 (CAS); Lake Merced, Dudley, May 11, 1901; Seal Cove, Dudley, Mar. 17, 1900; Pescadero, Eastwood, Howell, & Stacey 5257 (CAS); Corte Madera Creek, Wiggins 5858; Near Camp Evers, Hesse 604; Near Watsonville, Hayward, July 10, 1929.

14. Carex harfordii MacKenzie, Bull. Torr. Bot. Club 43: 615. 1917.

Local distribution: Bogs, edges of ponds, and in sandy flats near the coast. May through August.

General distribution: Outer Coast Ranges from Humboldt County south to northern Monterey County.

Specimens examined: Mt. Lake, San Francisco, Howell 13006 (CAS); San Francisco, Congdon, May 3, 1881; South San Francisco, Howell 13782 (CAS); Cahill Ridge, Dudley, June 10, 1906; Pigeon Pt., Eastwood & Howell 6070 (CAS); Near Pescadero, Eastwood & Howell 6059 (CAS); Boulder Creek, Hesse 463, 527; Graham Hill, Hesse 531; Camp Evers, Hesse 549.

15. Carex salinaeformis MacKenzie, Bull. Torr. Bot. Club 36: 477. 1909.

Local distribution: Known from boggy ground at Camp Evers. May and June.

General distribution: Known only from Mendocino and Santa Cruz counties.

Specimen examined: Camp Evers, Hesse 457.

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16. Carex hassei Bailey, Bot. Gaz. 21: 5. 1896.

Local distribution: Known locally only from Loma Prieta. June.

General distribution: Yukon eastward to New Brunswick, south to northern Baja California, Arizona, Wisconsin, Pennsylvania, and New York.

Specimens examined: Loma Prieta Peak, Elmer 4865; Mexia, June 13, 1926 (CAS).

17. Carex obnupta Bailey, Proc. Calif. Acad. 3: 104. 1891.

Local distribution: Salt marshes and low wet ground usually near the coast. April through November.

General distribution: British Columbia and Queen Charlotte Island southward in the Coast Ranges to northern Monterey County.

Specimens examined: Fort Pt., San Francisco, Bolander 1566; Lake Merced, Dudley, May 7, 1904; Presidio, Rubtzoff 2751 (CAS); Pilarcitos Lake, Oberlander 828; Pescadero, Dudley, Apr. 18, 1896; Butano Ridge, Hesse 1190 (CAS); Near Ben Lomond, Hesse 492; Near Felton, Dudley, Apr. 17, 1904; Santa Cruz, Dudley, Nov. 30, 1908; Thompson, July 3, 1903.

18. Carex nudata Boott. in Wats. Bot. Calif. 2: 241. 1880.

Local distribution: Stream beds, often growing in crevices between rocks. March through May.

General distribution: Northern Oregon south to Santa Cruz and Santa Clara counties in the Coast Ranges and to Mariposa County in the Sierra Nevada.

Specimens examined: Peters Creek, Dudley, June 6, 1903; Stanford, Abrams 1103, 2433; Smith 1399 (CAS); San Jose, Kleeberger, May 1883 (CAS); Wrights, Wolley-Dod, May 20, 1921 (CAS); Big Basin, Abrams 13567; Ewan 8799 (CAS); San Lorenzo River, Thomas 1689.

19. Carex sitchensis Prescott in Bong. Mem. Acad. St. Petersb. 2: 169. 1832.

Local distribution: Rare, known only from near Boulder Creek.

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June and July.

General distribution: Alaska southward to Santa Cruz County, east to Idaho.

Specimen examined: Near Boulder Creek, Hesse 482.

20. Carex barbarae Dewey in Torr. Bot. Mex. Bound. 231. 1859.

Local distribution: Common in wet meadows and on moist brush-covered slopes. April through August.

General distribution: Southern Oregon south to Los Angeles and San Bernardino counties through cismontane California.

Specimens examined: Bayview Hills, Howell 31554 (CAS); South of Lake Merced, Dudley, May 11, 1901; South San Francisco, Howell 13780 (CAS); Lobitas, Eastwood, Howell, & Stacey 5247 (CAS); Near Crystal Springs Lake, Dudley, Apr. 27, 1909; Near San Carlos, Dudley, May 1906; ½ mile north of mouth of Pescadero Creek, Thomas 7371; Stanford, Dudley, June 14, 1895; Palo Alto, Dudley, Oct. 18, 1897; Page Mill Road, Dudley, May 16, 1896; Sargents, Duncan, Dec. 20, 1919; Santa Cruz Co., Wolley-Dod, May 26, 1921 (CAS); Near Glenwood, Dudley, June 20, 1909; Big Basin, Dudley, Aug. 23, 1900; Leschke, June 11, 1947 (CAS); Boulder Creek, Hesse 481; Felton, Howell 19606 (CAS); 4 miles north of Felton, Keck 4500; Near Camp Evers, Hesse 534; Santa Cruz, Thomas 1983; Dudley, Nov. 28, 1908; Watsonville, Hayward, Aug. 4, 1928.

21. Carex schottii Dewey in Torr. Bot. Mex. Bound. 231. 1859.

Local distribution: Rare in the Santa Cruz Mountains known from Sargents and from Watsonville. March through July.

General distribution: Coast Ranges from Santa Clara County south to San Diego County.

Specimens examined: Sargents, Abrams 6876; Watsonville, Hayward, July 5, 1929.

22. Carex senta Boott, Ill. Carex. 174. 1867.

Local distribution: Northern Santa Clara County southward, usually growing along creeks. April and May.

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General distribution: Solano and Amador counties south through the Coast Ranges and the Sierra Nevada to northern Baja California.

Specimens examined: Stanford, Schofield, Apr. 2, 1908; Applegate 777a; Coyote Creek, Dudley 4156.

23. Carex globosa Boott, Proc. Linn. Soc. 1: 259. 1845.

Local distribution: In redwoods and on wooded slopes. May through August.

General distribution: Humboldt County south through the Coast Ranges to San Diego County.

Specimens examined: Presidio, Howell 13005 (CAS); Sutro Forest, Eastwood & Howell 3834 (CAS); Big Basin, Dudley, June 14, 1905; Laurel, Smith 2902; Near Glenwood, Dudley, June 19, 1909; Boulder Creek, Hesse 526, 548; Near Felton, Howell 19581 (CAS); Ben Lomond sand hills, Howell 14757 (CAS); 3.5 miles north of Santa Cruz, Thomas 1897.

24. Carex brevicaulis MacKenzie, Bull. Torr. Bot. Club 40: 547. 1913.

Local distribution: San Francisco south to central Santa Cruz County, growing in exposed areas, often in sandy soil. March through June.

General distribution: British Columbia south to Monterey County, usually near the coast.

Specimens examined: Lake Merced, Howell 13766; Bayview Hills, Howell 31549 (CAS); San Bruno Hills, Howell 13774 (CAS); Near Seal Cove, Dudley, Mar. 17, 1900; San Pedro, Eastwood & Howell 6051 (CAS); Pigeon Pt., Eastwood, Howell, & Stacey 5265 (CAS); Ben Lomond Mt., Dudley, Mar. 30, 1899; Ben Lomond sand hills, Hesse 583; Howell 14758 (CAS); Near Felton, Dudley, Apr. 17, 1904; Howell 19620 (CAS).

25. Carex lanuginosa Michx. Fl. Bor. Amer. 2: 175. 1803.

Local distribution: Known locally only from wet ground in central Santa Cruz County. April and May.

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General distribution: British Columbia east to New Brunswick, south to southern California, New Mexico, Texas, and Tennessee; in the California Coast Ranges not known south of Santa Cruz County.

Specimens examined: Near Big Basin, Hesse 609; Ben Lomond, Hesse 460.

26. Carex gynodynama Olney, Proc. Amer. Acad. 7: 394. 1868.

Local distribution: Rare in moist places near the coast. April and May.

General distribution: Southern Oregon south in the Coast Ranges to Santa Cruz County.

Specimens examined: Pescadero, Eastwood, Howell, & Stacey 5255 (CAS); Dudley, Apr. 17, 1896; Boulder Creek, Hesse 1007 (CAS); Empire Grade, Hesse 448.

27. Carex amplifolia Boott in Hook. Fl. Bor. Amer. 2: 228. 1839.

Local distribution: Marshy areas and along streams, San Mateo and Santa Cruz counties. May through September.

General distribution: British Columbia south to Santa Cruz and Tulare counties, eastward to Idaho.

Specimens examined: Pilarcitos Lake, Cantelow 3063 (CAS); Pilarcitos Canyon, Oberlander 958; Kings Mt., Davis, May 18, 1920; Abrams 5563; Kings Mt., Rose 33250 (CAS); Squealer Gulch, Dudley, June 8 and 12, 1906; Boulder Creek, Hesse 367.

28. Carex serratodens Boott in Wats. Bot. Calif. 2: 245. 1880.

Local distribution: Most common in serpentine soils along springs and seeps, San Mateo County southward. April through August.

General distribution: Jackson County, Oregon, south through the Coast Ranges to San Luis Obispo County and through the Sierra Nevada foothills to the San Bernardino Mountains.

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Specimens examined: Spring Valley, Congdon, July 28, 1901; Between Woodside and Crystal Springs Lake, Dudley, Apr. 27, 1909; Emerald Lake, Rose 36304 (CAS); Woodside, Abrams 2425; Kings Mt., Dudley, Apr. 4, 1896; Little Los Gatos Creek, Wolley-Dod, May 22, 1921 (CAS); Foothills west of Los Gatos, Heller 8570; Wrights, Wolley-Dod, Apr. 25, 1921 (CAS); Loma Prieta, Elmer 4624, 4997; Between Madrone Springs and Llagas Creek, Dudley, June 10, 1909.

29. Carex rostrata Stokes in With. Brit. Pl. 2: 1059. 1787.

Local distribution: Rare locally, known from bogs at Camp Evers in Santa Cruz County and from near San Jose. June and July.

General distribution: Widely distributed in North America and Eurasia.

Specimens examined: Near San Jose, Bolander, June 1864; Camp Evers, Hesse 542.

30. Carex exsiccata Bailey, Mem. Torr. Bot. Club 1: 6. 1889.

Local distribution: Occasional in low marshy ground along ponds. April through July.

General distribution: Southern Alaska south to Santa Cruz County in the Coast Ranges, eastward to western Montana.

Specimens examined: Between Woodside and Crystal Springs, Dudley, May 1894; Wrights, Dudley, Nov. 1, 1903; Big Basin, Dudley, July 25, 1903; Comstock Rd., Santa Cruz Co., Wolley-Dod, May 26, 1921 (CAS).

31. Carex comosa Boott, Trans. Linn. Soc. 20: 117. 1846.

Local distribution: Known only from near San Francisco and from Santa Cruz County (Howell, Raven, & Rubtzoff, 1958, p. 45). June and July.

General distribution: Widespread in eastern North America from Minnesota and Louisiana east to the Atlantic, in the west occurring from Washington and Idaho south to Santa Cruz County.

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Specimen examined: Near San Francisco, Bolander 2301.

2. Cyperus L. Sp. Pl. 44. 1753.

Spikelets 1-flowered.....1. C. brevifolius.
Spikelets several-flowered.
  Styles bifid; achenes lenticular.
    Achenes flattened dorsally.....2. C. laevigatus.
    Achenes flattened laterally.....3. C. niger var. capitatus.
  Styles trifid; achenes trigonous.
    Spikelets deciduous above the basal pair of scales; inflorescence at length consisting only of the rachis of the spike and the basal scales of each spikelet..4. C. strigosus.
    Spikelets persistent, the scales deciduous; inflorescence at length consisting of the rachis of the spike and the rachillae of the spikelets.
      Rachillae of the spikelets not winged.
        Plants perennial, rhizomatous; scales about 2 mm. long.
          Stamen 1; bracts 5-8, very unequal; culm leaves with blades.....5. C. eragrostis.
          Stamens 3; bracts 18-20, equal in length; culm leaves reduced to sheaths.....6. C. alternifolius.
        Plants annual, not rhizomatous; scales about 0.7 mm. long. 7. C. difformis.
      Rachillae of the spikelets winged with hyaline appendages at each node.
        Scales 1-1.5 mm. long; plants annual, not stoloniferous. 8. C. erythrorhizos.
        Scales 2.5-3 mm. long; plants perennial, stoloniferous. 9. C. esculentus.

1. Cyperus brevifolius (Rottb.) Hassk. Cat. Hort. Bogor. Alt. 24. 1844.

Local distribution: Occasional as a weed of lawns and moist disturbed areas. July.

General distribution: Native in tropical regions, occasionally established as lawn weeds in California.

Specimens examined: Golden Gate Park, Walther, 1925 (CAS); Boulder Creek, Hesse 535.

2. Cyperus laevigatus L. Mant. 1: 179. 1771.

Local distribution: Known from southern Santa Cruz County in wet alkaline soils. June through October.

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General distribution: Widespread in California, east to Texas, south to South America, and in the eastern hemisphere.

Specimens examined: Near Chittenden, Dudley, Oct. 10, 1908; Soda Lake, Hayward, July 1929.

3. Cyperus niger Ruiz & Pavon var. capitatus (Britt.) O'Neill, Rhodora 44: 86. 1942.

Local distribution: Wet areas in marshes and along the edges of ponds, San Francisco southward. July through October.

General distribution: Widespread in California, east to Texas, southward to South America.

Specimens examined: Santa Cruz Mountains, Dudley, 1903; Alviso, Elmer 4947; Abrams 3091; Between Aptos and Watsonville, Hesse 578; Watsonville, Hayward, July 31, 1928.

This variety was reported from San Francisco by Brandegee (1891, p. 378).

4. Cyperus strigosus L. Sp. Pl. 47. 1753.

Local distribution: Known locally from Boulder Creek but to be expected elsewhere. September.

General distribution: California east to the Atlantic.

Specimen examined: Boulder Creek, Hesse 371.

5. Cyperus eragrostis Lam. Encycl. 1: 146. 1791.

Local distribution: The commonest local species of Cyperus, growing in low wet depressions, drainage ditches, river bottoms, and marshes. Latter part of May through October.

General distribution: California south to Mexico, and in South America.

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Specimens examined: Golden Gate Park, McClintock, Oct. 25, 1953 (CAS); Bayview Hills, Howell 31502 (CAS); Near Tanforan, Dudley, June 19, 1908; San Andreas Lake, Howell 2216 (CAS); Crystal Springs Lake, Oberlander 318; Mt. View - Alviso Rd., Ferris 2057; 3 miles southeast of Los Altos, Thomas 4307; Foothills west of Los Gatos, Heller 7487; Los Gatos Canyon, Abrams 4329; 1 mile north of Coyote Station, Wiggins 11163; Gilroy, Abrams 6662; Boulder Creek, Hesse 555; Near Santa Cruz, Thomas 3607; 5.5 miles east of Watsonville, Thomas 3297; Watsonville, Hayward, July 25, 1928; Thomas 1976.

6. Cyperus alternifolius L. Mant. 2: 28. 1771.

Local distribution: Known locally as an escape from cultivation in San Francisco. March and April.

General distribution: Native of Madagascar, becoming established as an escape from cultivation in California.

Specimen examined: Presidio, Raven 6456 (CAS).

7. Cyperus difformis L. Cent. Pl. 2: 6. 1755.

Local distribution: Known locally only from San Francisco where it has been collected in wet areas near San Francisco State College; to be expected elsewhere. July through October.

General distribution: Native of Asia, widely established as a weed in rice fields and other wet areas in California.

Specimen examined: San Francisco, Bush, no date (CAS).

8. Cyperus erythrorhizos Muhl. Descr. Gram. 20. 1817.

Local distribution: Known locally from the edges of lakes in southern Santa Cruz County. October through November.

General distribution: Washington south to southern California, east to the Atlantic.

Specimens examined: Pinto Lake, Hesse 1422; College Lake, Hesse 1429.

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9. Cyperus esculentus L. Sp. Pl. 45. 1753.

Local distribution: Sloughs, low moist areas, and as lawn weeds. July through November.

General distribution: Cosmopolitan in temperate, subtropical, and tropical regions.

Specimens examined: Russian Hill, Rose, 1957 (CAS); Stanford, Thomas 4670; Near Boulder Creek, Hesse 372; Watsonville, Hayward, July 1928.

3. Eleocharis R. Br. Prod. Fl. Nov. Holl. 1: 224. 1810.

Styles trifid; achenes trigonous.
Achenes with several longitudinal ridges and with fine horizontal lines.
Stamens 2; scales straw-colored; culms spongy, striate. 1. E. radicans.
Stamens 3; scales brown; culms capillary, furrowed. 2. E. acicularis.
Achenes not longitudinally ridged, the surface finely reticulate.
Tubercles subulate, continuous with the apex of the achene. 3. E. rostellata.
Tubercles conic, constricted at the base....4. E. montevidensis.
Styles bifid; achenes lenticular.....5. E. macrostachya.

1. Eleocharis radicans (Poir.) Kunth, Enum. Pl. 2: 142. 1837.

Local distribution: Known definitely from Lake Merced and from near Watsonville, but to be expected elsewhere along the edges of lakes and ponds. August through September.

General distribution: Widespread in both North and South America.

Specimens examined: Lake Merced, Howell 2244 (CAS); Dudley, May 7, 1904; Near Watsonville, Hesse 557.

2. Eleocharis acicularis (L.) Roem. & Schult. Syst. Veg. 2: 154. 1817.

Local distribution: Marshes andalong the edges of lakes and ponds. May through August.

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General distribution: Widespread in the northern hemisphere.

Specimens examined: Pilarcitos Canyon, Oberlander 841; Coal Mine Ridge, Lang, May 1923; Stanford, Dudley, June 25, 1897; Between Mt. View and Alviso, Dudley, Aug. 9, 1903; Watsonville, Hayward, Aug. 4, 1928.

This species was reported from San Francisco by Jepson (1901, p. 85).

3. Eleocharis rostellata (Torr.) Torr. Fl. New York 2: 347. 1843.

(E. rostellata (Torr.) Torr. var. congdonii Jepson, Fl. Calif. 1: 196. 1922.)

Local distribution: Occasional in fresh or brackish water marshes. August.

General distribution: Central California east to Nova Scotia, south to Mexico; also in Bermuda and Cuba.

Specimen examined: Watsonville Slough, Hayward, Aug. 9, 1928.

This species is also known from San Francisco (Howell, Raven, & Rubtzoff, 1958, p. 49).

4. Eleocharis montevidensis Kunth, Enum. Pl. 2: 144. 1837.

(E. montana of American authors.)

Local distribution: Occasional, sandy creek bottoms, marshes, and springs. May through November.

General distribution: Northern California to Texas, south to Mexico, and in South America.

Specimens examined: Emerald Lake, Rose 50146 (CAS); Near Mayfield, Dudley, May 11, 1902; Santa Cruz Mountains, Dudley, 1903; Alviso, Dudley, Oct. 24, 1909; Nov. 9, 1903; Loma Azule, Dudley, May 7, 1898; Llagas Creek, Dudley, June 6-10, 1909; Pajaro River, Thomas 3252.

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5. Eleocharis macrostachya Britt. in Small, Fl. S. E. United States 184. 1903.

(E. palustris of American authors.)

Local distribution: Fairly common along the edges of lakes and marshes. April through October.

General distribution: Widespread in North America.

Specimens examined: Lake Merced, Dudley, May 7, 1904; Mt. Lake, San Francisco, Howell 31946 (CAS); Near Tanforan, Dudley, June 19, 1908; San Pedro, Elmer 4767; Emerald Lake, Bacigalupi, May 25, 1922; Coal Mine Ridge, Ferris 2041; Lagunita, Stanford University, Dudley, June 25, 1897; Palo Alto, Dudley, June 24, 1909; Near Alviso, Dudley, Oct. 24, 1909; Near Raymonds, Dudley, Sept. 1, 1906; Coast, Santa Cruz County, Thompson, Apr. 27, 1902; Near Watsonville, Hayward, July 1, 1929.

4. Fimbristylis Vahl, Enum. Pl. 2: 285. 1806.

1. Fimbristylis miliacea (Thunb.) Vahl, Enum. Pl. 2: 287. 1806.

Local distribution: Collected in San Francisco in 1868 and not subsequently recollected. March through September.

General distribution: Native of the tropics, occasional as a weed elsewhere.

Specimen cited: San Francisco, Wood, 1868 (Abrams, 1940, p. 269).

5. Eriophorum L. Sp. Pl. 52. 1753.

1. Eriophorum gracile Koch in Roth, Catal. Bot. 2: 259. 1800.

Local distribution: Once collected in swamps in San Francisco. July and August.

General distribution: Circumpolar in the northern hemisphere, extending southward along mountain chains; in California extending south to San Francisco and the central Sierra Nevada.

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This species was reported from San Francisco by Behr (1891, p. 4).

6. Scirpus L. Sp. Pl. 47. 1753.

Involucral bracts not foliaceous.
  Plants annual, rarely over 1 dm. tall; culms filiform.
    Scales obtuse, only slightly keeled near the tip.
      1. S. cernuus var. californicus.
    Scales acute, strongly keeled on the back.
      2. S. koilolepis.
  Plants perennial, usually at least 2 dm. tall; culms stout.
    Culms leafy, triangular to subterete in cross section; spikelets 1-12, in a dense capitate cluster.
      Involucral bracts 3-10 cm. long; leaf-blades convolute; plants usually under 1 m. tall.
        3. S. americanus.
      Involucral bracts 1-3 cm. long; leaf-blades flat; plants 0.5-2.2 m. tall.....4. S. olneyi.
    Culms with leaves only at the base, terete in cross section at the base; spikelets numerous, in irregular umbels.
      Bristles ciliate to plumose; culms triangular in cross section at the top.....5. S. californicus.
      Bristles with retrorse barbs; culms terete in cross section.
        Spikelets ovoid; roots fibrous.
          6. S. validus.
        Spikelets subcylindric; roots fleshy.
          Scales at least 1.5 times as long as the mature achenes; styles trifid....7. S. acutus.
          Scales about as long as the mature achenes; styles trifid or bifid.....8. S. rubiginosus.
Involucral bracts foliaceous.
  Spikelets 0.3-0.6 cm. long.....9. S. microcarpus.
  Spikelets 1 cm. long or longer.
    Inflorescence umbellate; achenes trigonous.
      10. S. fluviatilis.
    Inflorescence a dense capitate cluster; achenes lenticular.
      11. S. robustus.

1. Scirpus cernuus Vahl var. californicus (Torr.) Beetle, Rhodora 46: 145. 1944.

Local distribution: Moist depressions in stabilized sand dunes, marshes, seeps, and occasionally on moist coastal bluffs. April through October.

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General distribution: British Columbia south to northern Mexico, introduced into Florida.

Specimens examined: San Francisco, Wolf 590; Lake Merced, Congdon, May 22, 1892; Laguna Puerca, San Francisco, Dudley, Oct. 25, 1908; Mussel Rock, Dudley, Oct. 4, 1909; Montara Pt., Copeland 3315; Crystal Springs Lakes, Oberlander 273; Pebble Beach, Dudley, Apr. 18, 1896; Mason, June 2, 1921; Ano Nuevo Pt., Clausen 1745; Wiggins & Ferris 9290, Near Palo Alto, Halsey, Nov. 30, 1908; Santa Cruz, Thomas 1977; Watsonville, Hayward, July 31, 1928.

2. Scirpus koilolepis (Steud.) Gleason, Rhodora 44: 479. 1942.

(S. carinatus (Hook. & Arn.) Gray, Proc. Amer. Acad. 7: 392. 1868.)

Local distribution: Rare in marshes and low wet areas, known from San Francisco, San Andreas Lake, and from near Boulder Creek, and to be expected elsewhere. April and May.

General distribution: Mendocino County south to Monterey County, and from Texas and Oklahoma east to the Atlantic.

Specimens examined: San Andreas Lake, Oberlander 872; 3 miles north of Boulder Creek, Hesse 606.

This species was reported from San Francisco by Brandegee (1891, p. 378).

3. Scirpus americanus Pers. Syn. Pl. 1: 68. 1805.

(S. americanus Pers. var. polyphyllus (Boeckl.) Beetle, Amer. Journ. Bot. 30: 399. 1943.)

Local distribution: Common in fresh and brackish water marshes. April through October.

General distribution: Widespread in North and South America and in New Zealand and Tasmania.

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Specimens examined: Lake Merced, Abrams 1630; Dudley, May 11, 1901; Ocean Blvd., San Francisco, Dudley, Oct. 3, 1897; Laguna Salada, Dudley, Oct. 4, 1908; Moss Beach, Wiggins 2947; Mulford, July 17, 1945 (CAS); Ano Nuevo Pt., Ferris 1982; Alviso, Dudley, July 18, 1903; Elmer 4965 (CAS); Waddell Creek, Thomas 1719; 5.5 miles east of Watsonville, Thomas 3295; Watsonville, Hayward, June 27, 1929.

4. Scirpus olneyi Gray, Bost. Journ. Nat. Hist. 5: 238. 1845.

Local distribution: Occasional in marshes, San Francisco southward. July through October.

General distribution: Widespread in North and South America.

Specimens examined: Alviso, Dudley, July 18, 1903; Chittenden, Dudley, Oct. 10, 1908; Watsonville, Hayward, July 1, 1929.

Behr (1888, p. 320) listed this species from San Francisco.

5. Scirpus californicus (C. A. Mey.) Steud. Nom. Bot. 2: 538. 1841.

Local distribution: Common in fresh and salt water marshes. May through November.

General distribution: California east to South Carolina, south to South America, also in the Hawaiian Islands.

Specimens examined: Near Lake Merced, Dudley, May 11, 1901; Lake Merced, Congdon, July 11, 1893; Northern part of San Mateo Co., Dudley, Oct. 4, 1909; San Andreas Lake, Oberlander 322; Alviso, Dudley, July 18, 1903; Nov. 9, 1903; Waddell Creek, Thomas 3627; Santa Cruz, Dudley, Nov. 27, 1908; Between Santa Cruz and Watsonville, Dudley, Sept. 18, 1909; Watsonville, Hayward, July 31, 1928.

6. Scirpus validus Vahl, Enum. Pl. 2: 268. 1806.

Local distribution: Known locally only from San Francisco. July and August.

General distribution: Widespread in North and South America.

Specimen examined: San Francisco, Walther, 1922 (CAS).

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7. Scirpus acutus Muhl. ex Bigel. Fl. Boston. 15. 1814.

Local distribution: Occasional along the edges of ponds and in marshes. July through November.

General distribution: Alaska east to Newfoundland, south to southern California, Arizona, New Mexico, Texas, and North Carolina.

Specimens examined: Searsville Lake, Dudley, Oct. 3, 1909; Felt Lake, Ferris 2029; Alviso, Dudley, Nov. 9, 1903; Big Basin, Dudley, July 25, 1903.

8. Scirpus rubiginosus Beetle, Amer. Journ. Bot. 28: 697. 1941.

Local distribution: Rare, known from San Francisco, Emerald Lake, and Felt Lake. May through August.

General distribution: Brackish waters from British Columbia south to Baja California.

Specimens examined: San Francisco, Howell 31745 (CAS); Emerald Lake, Bacigalupi, May 25, 1922; Felt Lake, Stanford University, Dudley, 1898.

9. Scirpus microcarpus Presl, Rel. Haenk. 1: 195. 1828.

Local distribution: A common plant of wet areas, springs, and marshes. May through October.

General distribution: Alaska southward to southern California, eastward to the Atlantic.

Specimens examined: Lake Merced, Howell 2236 (CAS); Mt. Lake, San Francisco, Eastwood, Oct. 1917 (CAS); Pilarcitos Canyon, Oberlander 296; San Antonio Creek, Kimber, May 1919; Soda Springs, Heller 7492; Loma Prieta, Elmer 4977; Glenwood, Dudley, June 19, 1909; Big Basin, Shockley, June 7-8, 1919; Thomas 3547; Blooms Grade, Thomas 3578; Near Olympia, Thomas 1861; Watsonville Slough, Hayward, June 27, 1929.

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10. Scirpus fluviatilis (Torr.) Gray, Man. 527. 1848.

Local distribution: Known only from marshy areas at Crystal Springs Lake. June through July.

General distribution: Widespread in the temperate parts of North America.

Specimen examined: Crystal Springs Lake, Hayward, July 4, 1927.

11. Scirpus robustus Pursh, Fl. Amer. Sept. 1: 56. 1814.

(S. paludosus Nels. Bull. Torr. Bot. Club 26: 5. 1899.)

Local distribution: Salt and fresh water marshes and in moist roadside ditches. May through October.

General distribution: Widespread in North America, South America, on some of the islands in the Pacific, and in Australia.

Specimens examined: San Francisco, Brandegee, 1891; McLaren Park, San Francisco, Howell 31766 (CAS); Granada, Eastwood 4714 (CAS); Crystal Springs Lake, Oberlander 311; Palo Alto, Ferris 2037; Alviso, Dudley, July 18, 1903; Santa Cruz, Hesse 1014 (CAS); Pajaro River, Dudley, Sept. 19, 1909; 5.5 miles east of Watsonville, Thomas 3294; Watsonville, Hayward, Aug. 21, 1927.

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13. ARACEAE

Spathe yellowish.....1. Lysichiton.
Spathe white.....2. Zantedeschia.

1. Lysichiton Schott, Oestr. Bot. Wochenbl. 7: 62. 1857.

1. Lysichiton americanum Hult. & St. John, Sv. Bot. Tidskr. 25: 455. 1931.

Local distribution: Known from only a few localities in the central part of the Santa Cruz Mountains. March through June.

General distribution: Kodiak Island, along the southern coast of Alaska, south through British Columbia to Montana and Santa Cruz County.

Specimens examined: Butano Creek, Elmer 4551; Butano Canyon, Norvell 1348; 2 miles from Ben Lomond, Ferris 2001; Near Alba School, Thomas 4317 (CAS); Near Felton Railway Station, Thomas 3747; Santa Cruz Mts., Kast, Mar. 31, 1929 (CAS).

So far as I can determine, Lysichiton americanum occurs in three general areas in the Santa Cruz Mountains. The first is along Butano Creek, the second is along Alba Grade near Alba School, and the third is along Graham Hill Road near the Felton Station. At the sites of the latter two localities in Santa Cruz County there are springs which flow well into the summer. The Alba locality is in deep redwoods. The locality near Felton is partly shaded, mainly by douglas fir and redwoods. This species is to be expected elsewhere in the redwoods where there is a perennial or near perennial spring. It is not found between southern San Mateo County and Sonoma County.

The spelling of the generic name in the description of this species was Lysichitum. Huttleston (1955) has concluded that Lysichiton is the preferred spelling.

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2. Zantedeschia Spreng. Syst. 3: 765. 1826.

1. Zantedeschia aethiopica (L.) Spreng. Syst. 3: 765. 1826.

Local distribution: Occasional as escapes from cultivation or on dump heaps where the rhizomes have been discarded. Spring.

General distribution: Native of southern Africa, widely grown as a garden ornamental.

Specimen examined: Along Pajaro River, 5.5 miles east of Watsonville, Thomas 3298.

In the locality cited above, Zantedeschia grew along the steep river bank at the edge of a highway in an evident dump heap. The plants appeared to be becoming established.

14. LEMNACEAE

Rootlets present on the underside of the thallus.
Rootlets more than 1 per thallus.....1. Spirodela.
Rootlets 1 per thallus.....2. Lemna.
Rootlets absent.....3. Wolffiella.

1. Spirodela Schleid. Linnaea 13: 391. 1839.

1. Spirodela polyrhiza (L.) Schleid. Linnaea 13: 392. 1839.

Local distribution: Occasional in freshwater ponds and lakes. June through October.

General distribution: Widely distributed in the northern hemisphere.

Specimens examined: Coal Mine Ridge, Ferris 2101; Watsonville, Hayward, July 27, 1928.

2. Lemna L. Sp. Pl. 970. 1753.

Thallus thick, obviously fleshy even in dried specimens. 1. L. gibba.
Thallus thin, not obviously fleshy in dried specimens.

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Thallus elongate, pale green, more or less translucent, asymmetrical at base.....2. L. valdiviana.
Thallus more or less round in outline, dark green, not translucent, usually not asymmetrical at base.
Thallus 3-5 mm. long, lacking papillae.....3. L. minor.
Thallus 1-3 mm. long, with papillae.....4. L. minima.

1. Lemna gibba L. Sp. Pl. 970. 1753.

Local distribution: Pools, ponds, and temporary puddles, San Mateo County southward. June through December.

General distribution: Eurasia and widely distributed in western North America.

Specimens examined: Mussel Rock, Dudley, Oct. 4, 1909; Jersey Farm Dairy, Dudley, June 19, 1908; San Francisquito Creek, Abrams 3007; Santa Cruz, Henney, Sept. 1896, Oct. 13, 1896, Dec. 7, 1896; Watsonville, Hayward, July 25, 1928.

2. Lemna valdiviana Philippi, Linnaea 33: 239. 1864.

Local distribution: Occasional in ponds and temporary puddles. August and September.

General distribution: Widely distributed in North and South America.

Specimens examined: Coal Mine Ridge, Ferris 2100; Camp Evers, Hesse 1398; Pajaro River, Watsonville, Hayward, Aug. 21, 1927.

3. Lemna minor L. Sp. Pl. 970. 1753.

Local distribution: Occasional in ponds, in isolated puddles along streams, and in small lakes. June through January.

General distribution: Almost cosmopolitan.

Specimens examined: Near Woodside, Dudley, Oct. 31, 1909; Between Pescadero and Swanton, Dudley, Jan. 5, 1898; Mt. View - Alviso Rd., Ferris 2069; Camp Evers, Thomas 3362.

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4. Lemna minima Philippi, Linnaea 33: 239. 1864.

Local distribution: Swampy areas, moist rocks, and borders of ponds, San Francisco southward. March through October.

General distribution: Widely distributed in North and South America.

Specimens examined: Cienega Lagoon, Dudley, Oct. 9, 1909; Lake Merced, Dudley, Oct. 3, 1897; 10 miles south of San Francisco, Wolf 3660; Alpine Rd., Ferris 2114A; Sargents, Dudley, May 15, 1897; Santa Cruz, Henney, Oct. 8, 1896; Watsonville, Hayward, July 21, 1928.

3. Wolffiella Hegelm. in Engler, Bot. Jahrb. 21: 303. 1895.

1. Wolffiella lingulata Hegelm. in Engler, Bot. Jahrb. 21: 303. 1895.

Local distribution: Occasional in freshwater ponds and puddles, rarely collected. June through October.

General distribution: Central California south into Mexico.

Specimens examined: Mussel Rock, Dudley, Oct. 1909; Watsonville Junction Lagoon, Hayward, Aug. 4, 1928; Near Hecker Pass, Carter 3453 (CAS).

15. JUNCACEAE

Seeds many; leaves rarely grass-like; sheaths open.....1. Juncus.
Seeds 3; leaves grass-like; sheaths closed.....2. Luzula.

1. Juncus L. Sp. Pl. 325. 1753.

Inflorescence appearing lateral, the lowest bract of the inflorescence appearing as a continuation of the stem; each flower subtended by 2 scarious bracts
  Plants caespitose; rhizomes poorly developed; anthers shorter than to as long as the filaments; perianth segments 2-3 mm. long.
    Stamens 6.....1. J. patens.
    Stamens 3.
      Perianth segments not very stiff, 2-2.5 mm. long, brown. Plants mainly coastal....2a. J. effusus var. brunneus.
      Perianth segments stiff, 2.5-3 mm. long, straw-colored. Inland plants.....2b. J. effusus var. pacificus.

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Plants not caespitose; rhizomes well developed; anthers longer than the filaments; perianth segments 5-6 mm. long.
Some basal bracts with blades; stems flattened.
3. J. mexicanus.
Basal bracts lacking blades; stems terete.
Perianth about 6 mm. long. Plants of coastal salt marshes and sand dunes.....4. J. leseurii.
Perianth about 5 mm. long. Plants usually of inland habitats.
5. J. balticus.
Inflorescence appearing terminal, the lowest bract of the inflorescence not appearing as a continuation of the stem.
Each flower subtended by 2 scarious bracts; flowers not in heads.
Plants perennial; plants commonly over 2 dm. tall.
6. J. occidentalis.
Plants annual; plants usually under 2 dm. tall (occasionally to 3 dm. tall).....7. J. bufonius.
Each flower not subtended by 2 scarious bracts; flowers in heads, the heads 1 to many.
Plants annual, less than 1 dm. tall.
Basal bract of the inflorescence at least twice as long as an individual flower; flowers usually several per head; stems not filiform.....8. J. capitatus.
Basal bract of the inflorescence only as long as an individual flower; flowers often solitary; stems filiform.
9. J. kelloggii.
Plants perennial, over 1 dm. tall.
Leaf blades septate, terete.
Septa of the leaf blades complete, i.e., continuous across the blade; stamens 3 or 6.
Stamens 6.....10. J. dubius.
Stamens 3.....11. J. bolanderi.
Septa of the leaf blades not complete, i.e., not continuous across the blade; stamens 6.
Perianth about 3 mm. long; anthers up to as long as the filaments.....12. J. xiphioides.
Perianth about 4-6 mm. long; anthers longer than the filaments.....13. J. phaeocephalus.
Leaves lacking septa, grass-like.....14. J. falcatus.

1. Juncus patens Meyer, Syn. Luzul. 28. 1823.

Local distribution: A common rush in the Santa Cruz Mountains along streams and in grassland. May through November.

General distribution: Coast Ranges from Columbia County, Oregon, south to northern Baja California.

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Specimens examined: Upper Crystal Springs Lake, Oberlander 270; Black Mt., Leitholt, Aug. 13, 1894; Alviso, Dudley, Aug. 1903; Palo Alto, Abrams 2231; Loma Prieta, Elmer 5002; Whitehouse Creek, Thomas 3515; Big Basin, Dudley, May 28, 1897; Gazos Creek, Thomas 3541; Big Basin - Boulder Creek, Randall, July 5, 1930; Watsonville, Hayward, July 20, 1928.

2a. Juncus effusus L. var. brunneus Engelm. Trans. St. Louis Acad. 2: 491. 1868.

Local distribution: Usually along or near the coast in bogs and along the borders of lagoons. June through November.

General distribution: British Columbia south to San Diego County.

Specimens examined: Lobos Creek, Kellogg, Aug. 4, 1866; Ocean View, Heller 8386; Union Gulch, Dudley, June 12, 1906; Near Alviso, Dudley, Oct. 24, 1909; Glenwood, Dudley, June 19, 1909; Santa Cruz, Jones 2340; Seabright, Dudley, Oct. 4, 1896.

2b. Juncus effusus L. var. pacificus Fern. & Wieg. Rhodora 12: 89. 1910.

Local distribution: Usually inland in marshes or along streams. June through September.

General distribution: British Columbia south to southern California.

Specimens examined: San Andreas Lake, Oberlander 1054; Crystal Springs Lake, Hayward, July 4, 1927; Kings Mt., Dudley, June 12, 1906; Black Mt., Dudley, Feb. 9, 1902; Palo Alto, Abrams 2230; Los Gatos Creek, Dudley, Oct. 11, 1902; Loma Prieta, Elmer 5006; 3.5 miles north of Boulder Creek, Thomas 1643; Watsonville, Hayward, July 31, 1929.

3. Juncus mexicanus Willd. in Roem. & Schult. Syst. 7: 178. 1829.

Local distribution: Occasional near lakes and sloughs. June and July.

General distribution: Central California south to Mexico, east to Nevada and Texas.

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Specimens examined: Crystal Springs Lake, Hayward, July 4, 1927; Watsonville Slough, Hayward, June 27, 1929.

4. Juncus leseurii Bolander, Proc. Calif. Acad. 2: 179. 1862.

Local distribution: Coastal salt marshes and dunes along the coast from San Francisco southward. April through November.

General distribution: Vancouver Island south to Monterey County, mainly coastal.

Specimens examined: Lake Merced, Dudley, Oct. 25, 1908; San Francisco, Dudley, Oct. 3, 1897; Baden, Dudley, May 14, 1899; Ano Nuevo Pt., Wiggins & Ferris 9289; Mouth of Pajaro River, Thomas 1584.

5. Juncus balticus Willd. Berlin Mag. 3: 298. 1809.

Local distribution: Along ponds, moist places in meadows, occasionally in salt marshes. May through October.

General distribution: A widespread circumpolar species, extending south to southern California.

Specimens examined: Crystal Springs Lake, Dudley, Oct. 10, 1909; Woodside, Dudley, June 12, 1906; Coal Mine Ridge, Barry 258; Palo Alto, Dudley, June 24, 1909; Loma Prieta, Dudley, May 1894; Pajaro River, Thomas 3253.

6. Juncus occidentalis (Cov.) Wieg. Bull. Torr. Bot. Club 27: 521. 1900.

Local distribution: Fairly common on grassy slopes and meadows throughout the Santa Cruz Mountains. April through July.

General distribution: Coast Ranges from the Olympic Peninsula, Washington, south to Santa Barbara County and to Tulare County in the Sierra Nevada.

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Specimens examined: San Francisco, Harford & Kellogg, June 12, 1878; Crystal Springs Lake, Elmer 5027; San Gregorio Creek, Kellogg & Brannon, July 1, 1870; Whitehouse Creek, Hesse 755; Coal Mine Ridge, Dudley, May 26, 1910; Near Campbell, Heller 8511; Foothills west of Los Gatos, Heller 7466; Near Eagle Rock, Thomas 4098; Scott Valley, Ferris 2014; Hilton Airport, Thomas 3139; Robroy, Thomas 3066; Watsonville, Hayward, July 31, 1928.

7. Juncus bufonius L. Sp. Pl. 328. 1753.

Local distribution: Common throughout the Santa Cruz Peninsula in sandy soils and less frequently in humus soils; along roadside ditches where water has stood, in depressions made by cattle in overgrazed areas, and sometimes in marshes; often forming pure stands. April through September.

General distribution: A widespread species, found on all continents but absent from the extreme arctic and the tropics.

Specimens examined: Golden Gate Park, Dudley, June 3, 1894; San Andreas Lake, Oberlander 1122; Ano Nuevo Pt., Wiggins & Ferris 9291; Woodside serpentine, Dutton, Apr. 19, 1900; Stanford, Baker 531; Hilton Airport, Thomas 1916; 3 miles north of Boulder Creek, Hesse 615; Pajaro River at Watsonville, Thomas 1970.

8. Juncus capitatus Weig. Obs. Bot. 28. 1772.

Local distribution: Known in the Santa Cruz Mountains only from Graham Hill Road between Felton and Santa Cruz. May and June.

General distribution: Widely distributed in Europe, western Asia, and North and South America, rare in most of its range.

Specimens examined: Between Felton and Santa Cruz, Hesse 613, 620.

9. Juncus kelloggii Engelm. Trans. St. Louis Acad. 2: 494. 1866.

Local distribution: Known locally only from near Jamison Creek Road in Santa Cruz County, but probably more common and usually overlooked. April.

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General distribution: Pacific coast states, Washington south to the southern end of the Sierra San Pedro Martir of Baja California.

Specimen examined: Jamison Creek Rd., Hesse 599.

10. Juncus dubius Engelm. Trans. St. Louis Acad. 2: 459. 1868.

Local distribution: Known only from near San Andreas Lake and Los Gatos, but probably more common. June and July.

General distribution: Columbia River, Oregon, south through the Coast Ranges and Sierra Nevada to the Sierra San Pedro Martir, Baja California.

Specimens examined: San Andreas Lake, Oberlander 300; Foothills west of Los Gatos, Heller 7516.

11. Juncus bolanderi Engelm. Trans. St. Louis Acad. 2: 436. 1866.

Local distribution: Occasional along the margins of small lakes and ponds. May and June.

General distribution: Coast Ranges from northern Washington south to central California, also in Orange County.

Specimens examined: Stanford, Dudley, 1903; Mill Creek Dam, Hesse 1284, 1318.

12. Juncus xiphioides Meyer, Syn. Junc. 50. 1822.

Local distribution: Along streams and creeks, occasionally in sloughs. June through October.

General distribution: A widespread species from Washington and Idaho south to Mexico, east to Colorado and Texas.

Specimens examined: Pilarcitos Canyon, Oberlander 1068; Palo Alto, Dudley, July 1893; Between Alviso and Coyote Creeks, Dudley, Oct. 24, 1909; Alam, Ferris 2074; Loma Prieta, Elmer 5001; Big Basin, Pendleton, 1908; Watsonville, Hayward, July 5, 1929; Pajaro River, Thomas 3296.

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13. Juncus phaeocephalus Engelm. Trans. St. Louis Acad. 2: 484. 1868.

Local distribution: Widely distributed in the Santa Cruz Mountains, growing along the coast in sand dunes, marshes, and sloughs, growing inland on wet grassy meadows, in bogs, and along streams and lakes. March through August.

General distribution: Lincoln County, Oregon, south to San Diego County mainly along the coast or in the Outer Coast Ranges, also in the San Bernardino Mountains.

Specimens examined: Golden Gate Park, Dudley, June 23, 1895; Cliff House, Congdon, Sept. 1887; Lone Mt., Bolander 6043; Baden, Dudley, June 19, 1908; Cahill Ridge, Dudley, June 10, 1906; Ano Nuevo Pt., Abrams & Wiggins 426; Coal Mine Ridge, Dudley, May 26, 1910; Stanford, Abrams 1647; Alviso, Elmer 4969; Near Gilroy, Dudley, May 29, 1899; Ben Lomond, Thompson, May 27, 1902; Camp Evers, Hesse 550; Thomas 3349; Hilton Airport, Thomas 1922, 3140; Soda Lake, Hayward, July 17, 1929; Watsonville, Hayward, Aug. 9, 1928.

Juncus phaeocephalus is a variable species in which several subspecific entities have been described, mainly on the basis of the branching patterns of the inflorescences. Plants with few, many-flowered heads have been called J. phaeocephalus var. phaeocephalus. Plants with many, few-flowered heads have been called J. phaeocephalus var. paniculatus Engelm. (loc. cit. 2: 484. 1868). Plants with many, many-flowered heads have been referred to J. phaeocephalus var. glomeratus Engelm. (loc. cit. 2: 484. 1868).

14. Juncus falcatus Meyer, Syn. Luzul. 34. 1823.

Local distribution: Occasional in moist ground in bogs or in sandy soil, known only from San Francisco and central Santa Cruz County. May through July.

General distribution: Aleutian Islands, southern coast of Alaska

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south to Monterey County; also in eastern Asia.

Specimens examined: San Francisco, Jones 3263; Lone Mt., Kellogg & Bolander 40; Camp Evers, Hesse 539.

2. Luzula DC. Fl. Fr. 3: 158. 1805.

1. Luzula multiflora (Retz.) Lejeune, Fl. Spa 1: 169. 1811.

Local distribution: Grasslands and shaded slopes, common. February through June.

General distribution: A variable species, circumpolar.

Specimens examined: Mission Hills, Rattan, Mar. 1881; Twin Peaks, Thomas 4867; San Andreas Lake, Oberlander 639; Coal Mine Ridge, Barry 7; Stevens Creek, Dudley, Apr. 2, 1904; Guadalupe Creek, Thomas 5564; 1 mile southeast of mouth of Waddell Creek, Thomas 1308; Empire Grade, Thomas 1337; Near Felton, Dudley, Apr. 17, 1904; Santa Cruz, Thompson, Mar. 25, 1902.

16. MELANTHACEAE

Plants with short woody rootstalks; racemes very dense..1. Xerophyllum.
Plants with membranous-coated bulbs; racemes lax.....2. Zygadenus.

1. Xerophyllum Michx. Fl. Bor. Amer. 1: 210. 1803.

1. Xerophyllum tenax (Pursh) Nutt. Gen. 1: 235. 1818.

Local distribution: Known from only two localities in the Santa Cruz Mountains, the vicinity of Bonny Doon and from Big Basin. May through June.

General distribution: British Columbia south to Monterey and Fresno counties in California and southeast to Wyoming.

Specimens examined: Snow Flower Ridge, south of Big Basin, Dudley, June 19, 1905; Sandstone cliffs, 1½ miles from Bonny Doon Post Office, Ferris 2007.

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2. Zygadenus Michx. Fl. Bor. Amer. 1: 213. 1803.

Stamens about ½ as long as the perianth segments.
Plants usually over 3 dm. tall; inflorescences many-flowered.
1a. Z. fremontii var. fremontii.
Plants usually under 3 dm. tall; inflorescences few-flowered.
1b. Z. fremontii var. minor.
Stamens as long as or longer than the perianth segments.
2. Z. venenosus.

1a. Zygadenus fremontii (Torr.) Torr. ex Wats. var. fremontii, Bot. King Expl. 343. 1871.

Local distribution: Fairly common in the Santa Cruz Mountains in woods and on brush-covered slopes. February through September.

General distribution: Coast Ranges from Coos County, Oregon, south to northern Baja California.

Specimens examined: Crystal Springs Lake, Oberlander 20; Abrams 2338; Woodside, Abrams 5072; Pigeon Pt., Ferris 1967; Kings Mt., Randall 242; Coal Mine Ridge, Barry 91; Stanford, Martin, Mar. 30, 1893; Foothills west of Los Gatos, Heller 7287; Mt. Umunhum, Thomas 3962; Swanton, Rich, 1912; 6 miles south of Saratoga summit, Thomas 1509; Glenwood, Davis, Sept. 1907; Empire Grade, Thomas 3408.

1b. Zygadenus fremontii (Torr.) Torr. ex Wats. var. minor Torr. ex Baker, Journ. Linn. Soc. 17: 480. 1879.

Local distribution: San Francisco southward, usually on open wind swept grassy hills. Latter part of February through April.

General distribution: Along or near the coast from Coos County, Oregon, south to San Luis Obispo County.

Specimens examined: Bernal Heights, Ferris & Wiggins 8037; South San Francisco, Dudley, Apr. 1893; San Bruno Hills, Dudley, Apr. 1899; Davenport - Bonnie Doon Road, Mason, Mar. 29, 1922; Between Felton and Santa Cruz, Wiggins 5096.

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2. Zygadenus venenosus Wats. Proc. Amer. Acad. 14: 279. 1879.

Local distribution: Known locally only from Crystal Springs Lake. April.

General distribution: British Columbia south to San Diego County, east to Idaho, Wyoming, Utah, and Nevada.

Specimen examined: Upper Crystal Springs Lake, Oberlander 772.

17. LILIACEAE

Perianth segments all similar.
  Inflorescence umbellate.
    Perianth segments free or only slightly united at the base, not forming a definite tube.
      Perianth segments rose, lavender, or purplish, rarely white; plants with the odor of onion.....1. Allium.
      Perianth segments yellowish; plants lacking onion odor. 2. Muilla.
    Perianth segments united, forming a definite tube.
      Inflorescence capitate, congested; pedicels usually much shorter than the flowers.....3. Dichelostemma.
      Inflorescence open, not congested; pedicels usually as long as or longer than the flowers.
        Stamens 6.....4. Triteleia.
        Stamens 3.....5. Brodiaea.
  Inflorescence not umbellate.
    Leaves basal; perianth segments under 3 mm. wide; inflorescence paniculate.....6. Chlorogalum.
    Leaves basal and cauline, often verticillate; perianth segments over 5 mm. wide; inflorescence more or less racemose.
      Perianth segments 5-8 cm. long, orange; plants usually over 10 dm. tall.....7. Lilium.
      Perianth segments 1-3.5 cm. long, never orange; plants usually under 6 dm. tall.....8. Fritillaria.
Perianth segments dissimilar.....9. Calochortus.

1. Allium L. Sp. Pl. 294. 1753.

Scapes terete.
  Outer bulb coats lacking "herring-bone" reticulations.
    Leaves 10 mm. or more wide; pedicels 2-3 cm. long; perianth segments about 10 mm. long, white.....1. A. neapolitanum.
    Leaves about 2 mm. wide or less; pedicels under 1 cm. long; perianth segments 6-8 mm. long, rose-colored. 2. A. lacunosum.

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Outer bulb coats with "herring-bone" reticulations.
Ovary crested.
Bracts of the inflorescence about 1 cm. long; perianth segments 6-8 mm. long.....3. A. amplectens.
Bracts of the inflorescence over 1.5 cm. long; perianth segments over 8 mm. long.
Inflorescence usually not congested; perianth segments 10 mm. or more long. Growing in heavy nonserpentine soil. 4. A. dichlamydeum.
Inflorescence more or less congested; perianth segments 8-10 mm. long. Growing on serpentine..5. A. serratum.
Ovary not crested.
Perianth segments becoming hyaline, under 9 mm. long; scapes coming directly from the bulbs.....6. A. hyalinum.
Perianth segments not becoming hyaline, over 10 mm. long; scapes from lateral offshoots.....7. A. unifolium.
Scapes flattened.....8. A. breweri.

1. Allium neapolitanum Cyr. Pl. Rar. Neap. 1: 13. 1788.

Local distribution: Known only from San Francisco as a garden escape, but to be expected elsewhere occasionally. April through June.

General distribution: Native of southern Europe, grown as an ornamental and becoming established as an escape.

Specimen examined: San Francisco, Howell 29140 (CAS).

2. Allium lacunosum Wats. Proc. Amer. Acad. 14: 231. 1879.

Local distribution: Serpentine outcroppings from southern San Mateo County southward. May through June.

General distribution: Coast Ranges from the Tiburon Peninsula, Marin County, south to San Diego County and along the western border of the Mojave Desert.

Specimens examined: Emerald Lake, Rose, May 1, 1932 (CAS); Redwood City, Davis, June 1, 1920; Near Menlo Park, Dale, June 1, 1920; Jasper Ridge, Mason, May 13, 1921.

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3. Allium amplectens Torr. Pacif. R. Rep. 4: 148. 1856.

Local distribution: Serpentine outcroppings from San Mateo County southward. May.

General distribution: Southern Washington south to southern California.

Specimens examined: Stanford, Abrams 2431; Jasper Ridge, Mason, May 13, 1921; Coyote Creek, Dudley, May 21, 1895.

4. Allium dichlamydeum Greene, Pittonia 1: 166. 1888.

Local distribution: Usually in heavy soils, San Francisco County southward to northern Santa Clara County. April through the first half of June.

General distribution: Outer Coast Ranges from Mendocino County south to Monterey County.

Specimens examined: Lands End, Setchell 81; Bayshore and Alemany Blvds., San Francisco, Thomas 4247; San Bruno Hills, Heller 8375; Abrams, May 26, 1926; Crystal Springs, Eastwood, June 10, 1912 (CAS); San Andreas Lake, Oberlander 929; Half Moon Bay Road, Heller 8564; Back of Redwood City, Abrams 7502; Woodside, Abrams 2411; Jasper Ridge, Mason, May 13, 1921; Stanford, Atkinson, Apr. 1900; Page Mill Rd., Thomas 548.

5. Allium serratum Wats. Bot. King Expl. 487. 1871.

Local distribution: Serpentine outcroppings, known from San Mateo, Evergreen, Guadalupe Creek, Almaden, Edenvale, and Coyote. Latter part of March and April.

General distribution: Colusa County south to the Mount Hamilton Range and the eastern slopes of the Santa Cruz Mountains in San Mateo and Santa Clara counties.

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Specimens examined: San Mateo, Elmer 5495 (CAS); Evergreen, Wehner, Apr. 17, 1898; Guadalupe Canyon, Borthwick, Apr. 23, 1921; Guadalupe Reservoir, Thomas 3923; Almaden, Bacigalupi 1334; Edenvale, Ferris 808; Abrams 5205; Thomas 4769; Morgan Hill, Clement, Apr. 1921.

6. Allium hyalinum Curran, Bull. Calif. Acad. 1: 155. 1885.

Local distribution: Known from the vicinity of Uvas Creek and Almaden. April and May.

General distribution: Sierra Nevada foothills, Eldorado County south to Kern County and in southwestern Santa Clara County.

Specimens examined: Uvas Creek, Bacigalupi, May 12, 1923; Uvas - Amaden Road, Ferris, May 6, 1922; Mason 6948.

The specimens cited above need further study. They fit the description of A. hyalinum, but are isolated in the Coast Range.

7. Allium unifolium Kell. Proc. Calif. Acad. 2: 112. 1861.

Local distribution: Moist areas along the coast, along ponds and streams, often in shaded areas. April through June.

General distribution: Humboldt County south to Monterey County.

Specimens examined: Cahill Ridge, Oberlander 663; Woodside to Crystal Springs Lake, Dudley, May 1894; Emerald Lake, Abrams, May 25, 1922; New Years Pt., Ferris 2183; Los Gatos, Sutton, Apr. 1926.

8. Allium breweri Wats. Proc. Amer. Acad. 14: 233. 1879.

Local distribution: Serpentine slopes, Crystal Springs Lake area southward to Loma Prieta. April through May.

General distribution: Coast Ranges to central California, Mount Diablo, Mount Hamilton Range, and the Santa Cruz Mountains.

Specimens examined: Crystal Springs Lake, Elmer 4831; Redwood City Hills, Hoover 4907; Emerald Lake, Wiggins 12049; Jasper Ridge, Mason, May 13, 1921; Thomas 6662; Loma Prieta, Dale, May 8, 1920.

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Allium breweri is closely related to A. falcifolium Hook. & Arn., a species of the north Coast Ranges, and should perhaps be considered a variety of it.

2. Muilla Wats. Proc. Amer. Acad. 14: 235. 1879.

1. Muilla maritima (Torr.) Wats. Proc. Amer. Acad. 14: 235. 1879.

Local distribution: Serpentine, inland sand deposits, and grassy slopes, San Francisco southward. Latter part of February through April.

General distribution: Coast Ranges, Glenn County south to northern Baja California.

Specimens examined: Mission Hills, Rattan, 1887; Ocean View, Rattan, Apr. 1885; Twin Peaks, Thomas 4858; San Andreas Dam, Oberlander 686; Crystal Springs Lake, Baker 423; Woodside, Dutton, Feb. 18, 1900; Stanford, Kraus, Apr. 12, 1893; 3 miles south of San Jose, Thomas 4790; Near Coyote, Ferris 781; Quail Hollow, Thomas 1868.

3. Dichelostemma Kunth, Enum. Pl. 4: 469. 1843.

Stamens with anthers 6.....1. D. pulchellum.
Stamens with anthers 3.
  Staminodia obtuse; pedicels completely free.....2. D. multiflorum.
  Staminodia bifid; pedicels more or less united toward the base.
    3. D. congestum.

1. Dichelostemma pulchellum (Salisb.) Heller, Muhl. 1: 132. 1906.

(Brodiaea capitata Benth. Pl. Hartw. 339. 1857.)

Local distribution: Common on grassy slopes, occasionally on sand dunes or in wooded areas. February through May.

General distribution: Douglas County, Oregon, south to about the center of Baja California, east from southern California to southwestern Utah.

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Specimens examined: Sawyer Ridge, Oberlander 563; Woodside, Dutton, Feb. 18, 1900; Coal Mine Ridge, Barry 119; Searsville Dam, Applegate 703b; Stanford, Dudley, Apr. 14, 1894; Foothills west of Los Gatos, Heller 8569; Edenvale, Abrams 5204; Thomas 4768; Saratoga Summit, Thomas 1614; Rancho del Oso, Thomas 1734; Glenwood, Davis, 1914 (CAS); Arano Gulch, Thompson, Mar. 30, 1902; Sunset Beach, Thomas 3086.

2. Dichelostemma multiflorum (Benth.) Heller, Muhl. 2: 15. 1905.

(Brodiaea multiflora Benth. Pl. Hartw. 339. 1857.)

Local distribution: Rare and isolated in southern San Mateo County and from near San Jose. May.

General distribution: Josephine County, Oregon, south to Trinity County in the Coast Ranges and to Mariposa County in the Sierra Nevada, in the Sacramento Valley, and isolated in southern San Mateo County and northern Santa Clara County.

Specimens examined: San Francisquito Creek, Hichborn 223; Lake Lagunita, Dudley, May 9, 1894; San Juan Hills near San Jose, Patterson, May 8, 1895.

3. Dichelostemma congestum (Smith) Kunth, Enum. Pl. 4: 470. 1843.

(Brodiaea congesta Smith, Trans. Linn. Soc. 10: 2. 1811.)

Local distribution: Occasional on grassy slopes and in open wooded areas. April and May.

General distribution: Washington south to Santa Clara and Santa Cruz counties through the Coast Ranges, mainly west of the Cascade Mountains.

Specimens examined: Stanford, Abrams 2376; Page Mill Creek, Applegate 704a; Stevens Creek, Pendleton 758 (UC); Near Glenwood, Thomas 3183.

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4. Triteleia Dougl. ex Lindl. Bot. Reg. 15: under pl. 1293. 1830.

Perianth segments 25-40 mm. long, blue; stamens inserted at two levels. 1. T. laxa.
Perianth segments 10-20 mm. long, white, yellow, rarely lilac; stamens inserted at one level.
Perianth segments 15-20 mm. long, yellow; filaments 2-toothed at the apex.....2. T. ixioides.
Perianth segments 10-15 mm. long, white, rarely lilac; filaments not 2-toothed at the apex.....3. T. hyacinthina.

1. Triteleia laxa Benth. Trans. Hort. Soc. 1: 143. 1835.

(Brodiaea laxa (Benth.) Wats. Proc. Amer. Acad. 14: 237. 1879.)

Local distribution: Common, especially on the eastern slopes of the Santa Cruz Mountains in grasslands and on serpentine slopes. April through June.

General distribution: Curry County, Oregon, south through the Coast Ranges, the Great Valley, and the Sierra Nevada foothills to Los Angeles County.

Specimens examined: Hunters Pt., Bacigalupi 2439 (teratological specimen); Cahill Ridge, Oberlander 892; Near Redwood City, Hichborn 289; Woodside, Dutton, Mar. 25, 1900; Stanford, Abrams 2391; Foothills west of Los Gatos, Heller 7389; 3 miles southeast of San Jose, Thomas 4958; Edenvale, Ferris 809; Thomas 4767; Loma Prieta, Thompson, June 9, 1902; Saratoga - Big Basin Road, Abrams 5275; Raymonds Ranch, Newell, June 18, 1914 (CAS); Santa Cruz, Thomas 1978.

Triteleia peduncularis Lindl. (Bot. Reg. 20: under pl. 1685. 1835) occurs from Humboldt and Tehama counties south to Monterey County. I have seen no specimens from the Santa Cruz Mountains, nor does Hoover (1941, p. 82) list any specimens from this area. Triteleia peduncularis may have a disjunct distribution and thus skip the Santa Cruz Mountains. It has pedicels 2-5 times the length of the perianth, while in T. laxa the pedicels are rarely longer than the perianth.

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2. Triteleia ixioides (Ait. f.) Greene, Bull. Calif. Acad. 2: 142. 1886.

(Brodiaea ixioides (Ait. f.) Wats. Proc. Amer. Acad. 14: 238. 1879.)

Local distribution: Northern San Mateo County southward, usually growing in oak woodland. Latter part of April through June.

General distribution: Coast Ranges from northern San Mateo County south to San Luis Obispo County.

Specimens examined: Woodside, Walther, June 9, 1919 (CAS); Woodside to Crystal Springs Lake, Dudley, Mar. 1894; La Honda Grade, Wolf 3724; Kings Mt., Abrams, Aug. 26, 1907; Palo Alto, Dudley, May 12, 1895; San Juan Hills near San Jose, Patterson, May 8, 1895; Between Gilroy and Watsonville, Elmer 4463.

3. Triteleia hyacinthina (Lindl.) Greene, Bull. Calif. Acad. 2: 142. 1886.

(Brodiaea hyacinthina (Lindl.) Baker, Gard. Chron. 20: 459. 1896.)

Local distribution: Meadows and low areas which are rather wet during the early spring, northern San Mateo County southward. April through June.

General distribution: Southern British Columbia south through Washington, northwestern Idaho, Oregon, and California to San Bernardino County.

Specimens examined: San Andreas Lake, Oberlander 932; Woodside to Crystal Springs, McMurphy, May 8, 1906; Lake Lagunita, Dudley, May 1893; Matadero Creek, Applegate 698; Hilton Airport, Thomas 3375; Graham Hill, Reed, 1937 (CAS).

5. Brodiaea Smith, Trans. Linn. Soc. 10: 2. 1811.

Anthers each with two appendages on the abaxial surface. ..... 1. B. appendiculata.

Anthers lacking appendages.

Scape mainly subterranean, usually no more than 5 cm. of it above ground..... 2. B. terrestris.

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Scape mainly above ground, more than 5 cm. of it above ground. Staminodia usually shorter than the stamens, acute. 3. B. elegans.
Staminodia usually longer than the stamens, usually obtuse and often 3-lobed at the apex.....4. B. coronaria.

1. Brodiaea appendiculata Hoover, Madroño 4: 130. 1937.

Local distribution: Known from only a few specimens in the Santa Cruz Mountains. May.

General distribution: Central Valley and the Sierra Nevada foothills from Sutter County south to Madera County and in the Coast Ranges from Napa County south to southern Santa Clara County.

Specimens examined: San Francisquito Creek, Chamberlain, Spring 1922; Stanford, Bacigalupi, May 31, 1922; 3-3/4 miles east of Almaden, Belshaw 2257 (UC).

2. Brodiaea terrestris Kell. Proc. Calif. Acad. 2: 6. 1859.

Local distribution: Serpentine or sandy soils, San Francisco southward. Latter part of March through June.

General distribution: Coast Ranges, Coos County, Oregon, south to San Luis Obispo County.

Specimens examined: Mission Hills, Rattan, May 1880; San Francisco, Thomas 4248; Sawyer Ridge, Oberlander 683; Crystal Springs Lake, Mason 113; Eastwood 334 (CAS); Near San Mateo, Dudley, Apr. 21, 1894; Woodside, Abrams 2427; Searsville, Applegate 700; Stanford, Atkinson, Mar. 1900; Swanton, Rich, May 1912; Big Basin, Dudley, June 5, 1897; Graham Hill Road, Gould 681; Hilton Airport, Thomas 3136.

3. Brodiaea elegans Hoover, Amer. Mid. Nat. 22: 555. 1939.

Local distribution: Occasional in grasslands and on serpentine, San Francisco southward. May and June.

General distribution: Hood River County, Oregon, south to San Diego County.

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Specimens examined: Presidio, Eastwood 272 (CAS); Serpentine back of Redwood City, Hichborn 280; Searsville, Dudley, May 27, 1893; Stanford, Abrams 2235; Randall 231; Foothills west of Los Gatos, Heller 7442 (UC); Los Gatos, Newell, June 18, 1914 (CAS); Eccles, Dudley, June 26, 1897.

4. Brodiaea coronaria (Salisb.) Engler, Notizbl. 2: 317. 1899.

Local distribution: Rare in the Santa Cruz Mountains, known from Hillsborough, Woodside, and Watsonville Junction. May and June.

General distribution: Southern British Columbia south to northern Baja California.

Specimens examined: Woodside, Walther, June 9, 1919 (CAS); Watsonville Junction, Belshaw 2136a (UC).

6. Chlorogalum Kunth, Enum. Pl. 4: 681. 1843.

1. Chlorogalum pomeridianum (DC.) Kunth, Enum. Pl. 4: 682. 1843.

Local distribution: Grasslands, serpentine slopes, and borders of woodlands from San Francisco southward, usually away from the coast. May and June.

General distribution: Josephine and Jackson counties, Oregon, south through the Coast Ranges and Sierra Nevada foothills to San Diego County.

Specimens examined: South San Andreas Lake, Oberlander 1039; Back of Redwood City, Davis 199; Woodside, Walther, June 9, 1919 (CAS); Kings Mt. Road, Randall 227; Stanford, Randall 226; Black Mt., Elmer 4563; Swanton, Rich, Spring 1912; Near Pajaro River, Thomas 3266.

7. Lilium L. Sp. Pl. 302. 1753.

1. Lilium pardalinum Kell. Proc. Calif. Acad. 2: 12. 1859.

Local distribution: Very wet meadows, along springs, and near

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streams, mainly on the western slopes of the Santa Cruz Mountains. June through September.

General distribution: Coast Ranges and Sierra Nevada foothills from Josephine and Jackson counties, Oregon, south to Monterey and Kern counties.

Specimens examined: San Mateo Creek, Oberlander 823; 4 miles west of La Honda, Wiggins 3771; Pescadero Creek, Mason, June 25, 1920; El Corte de Madera, Dudley, Sept. 15, 1895; Loma Prieta, Ferris, July 16, 1922; Mexia, June 13, 1926 (CAS); Big Basin, Dudley, Sept. 20, 1901; Santa Cruz, Jones 2281.

8. Fritillaria L. Sp. Pl. 303. 1753.

Leaves in verticils, usually on the upper half of the stem; bulbs with rice-grain bulblets.....1. F. lanceolata.
Leaves usually alternate, on the lower half of the stem; bulbs lacking rice-grain bulblets, composed of several scales.
Perianth segments white.....2. F. liliaceae.
Perianth segments not white.
Perianth segments greenish-yellow.....3. F. agrestis.
Perianth segments brown or purple-greenish.....4. F. biflora.

1. Fritillaria lanceolata Pursh, Fl. Amer. Sept. 1: 230. 1814.

(F. mutica Lindl. Bot. Reg. 20: under pl. 1663. 1835.)

Local distribution: The most common species of Fritillaria in the Santa Cruz Mountains, usually growing on wooded slopes, occasionally in exposed places as at Ano Nuevo Point. March through May.

General distribution: Southern British Columbia south through Washington, Oregon, and northwestern Idaho to southern California.

Specimens examined: Pillar Pt., Dudley, Mar. 17, 1900; Pilarcitos Canyon, Oberlander 81; Crystal Springs Lake, Dudley, Apr. 21, 1894; Pescadero Creek, Dudley, Mar. 24, 1893; Ano Nuevo Pt., Ferris 2121; Portola, Elmer 5045; Coal Mine Ridge, Barry 234; Monte Bello Ridge, Thomas 5672; Foothills west of Los Gatos, Heller 7271; Swanton, Rich, Apr. 6, 1912; San Lorenzo Rd., Dudley, May 7, 1893; Near Eccles, Dudley, June 26, 1897.

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2. Fritillaria liliaceae Lindl. Bot. Reg. 20: under pl. 1663. 1834.

Local distribution: San Francisco southward to the vicinity of Palo Alto, usually on open grassy hills. February through April.

General distribution: Coast Ranges from Sonoma County south to Monterey County.

Specimens examined: Potrero, San Francisco, Cannon, Mar. 1891; Michener & Bioletti, Feb. 1893; South San Francisco, Rattan, 1880; Spring Valley Lakes, Parks 400; Crystal Springs Lake, Oberlander 517; Stanford, Abrams 2299.

3. Fritillaria agrestis Greene, Erythea 3: 67. 1895.

Local distribution: Known locally only from along the coast at New Years Point and from between Santa Cruz and Soquel. March.

General distribution: Coast Ranges and the Central Valley from Mendocino and Placer counties south to San Luis Obispo County.

Specimens examined: New Years Pt., Ferris 2120; Near Santa Cruz, Campbell, Mar. 9, 1929.

4. Fritillaria biflora Lindl. Bot. Reg. 20: under pl. 1663. 1835.

Local distribution: Known from near Hillsborough and San Jose. April and May.

General distribution: Coast Ranges from southern Mendocino County south to San Diego County.

Specimens cited: Beetle (1944, p. 148) listed two collections from the Santa Cruz Mountains as follows: Hillsboro, Smith, 1914; Near San Jose, Lemmon, 1877. These specimens are probably both in the Jepson Herbarium at the University of California.

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9. Calochortus Pursh, Fl. Amer. Sept. 1: 240. 1814.

Fruits 3-winged, oblong; flowers not yellow.
Flowers globose, nodding; some leaves usually at least 1 cm. wide.
1. C. albus.
Flowers campanulate, erect or spreading; leaves usually under 1 cm. wide.
Petals conspicuously ciliate, clawed. Common..2. C. tolmiei.
Petals not conspicuously ciliate (except at the base on the adaxial surface), cuneate. Rare.
Stems branched, the internodes long. San Mateo Co.
3. C. umbellatus.
Stems unbranched, the internodes very short. Santa Cruz Co.
4. C. uniflorus.
Fruits 3-angled, linear; flowers sometimes yellow.
Flowers always yellow; glands of the petals lunate.
5. C. luteus.
Flowers usually white, pink, or rose; glands of the petals quadrate.
6. C. venustus.

1. Calochortus albus Dougl. ex Benth. Trans. Hort. Soc. 1: 413. 1834.

Local distribution: The most common species of Calochortus in the Santa Cruz Mountains, commonly growing in shade in oak woodland or in the open, often very common on partly shaded road embankments. Latter part of April through June.

General distribution: Coast Ranges from Contra Costa County south to San Diego County and in the Sierra Nevada foothills from Butte County south to Madera County.

Specimens examined: Colma, Vortriede, May 16, 1928 (CAS); Pilarcitos Canyon, Oberlander 975; San Mateo, Elmer 4846; 3 miles west of Woodside, Ownbey & Ownbey 1698; Alpine Rd., Thompson 1502; Coal Mine Ridge, Barry 135; Stanford, Leithold, Apr. 22, 1896; Near Saratoga, Thomas 4002; Foothills west of Los Gatos, Heller 7395; Los Gatos, Newell, June 20, 1914 (CAS); Loma Prieta, Thompson, June 9, 1902; Davenport, Hesse 1301; Big Basin, Dudley, June 5, 1897; Glenwood, Davis, 1914 (CAS); Summit of Santa Cruz - Los Gatos Highway, Thomas 3175; Blooms Grade, Thomas 1824; Big Trees, Stinchfield 147.

2. Calochortus tolmiei Hook. & Arn. Bot. Beechey 398. 1841.

Local distribution: Usually growing in oak - madrone woods, occas-

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sionally in chaparral, San Mateo County southward, most common on the western slopes of the Santa Cruz Mountains. Latter part of April through June.

General distribution: Kings County, Washington, south through Oregon to Santa Cruz and Santa Clara counties in the Coast Ranges and to Butte County in the Sierra Nevada.

Specimens examined: Near Pescadero, Dudley, June 6, 1895; La Honda Grade, Wolf 3722; Kings Mt., Abrams 2473; Mt. Umunhum, Davis, May 9, 1920; Uvas Canyon, Howell 1909 (CAS); Near Big Basin, Thompson 1495; Big Basin, Shockley, June 7-8, 1919; Little Basin, Thomas 1829; Loma Prieta, Dudley, May 30, 1893.

3. Calochortus umbellatus Wood, Proc. Acad. Phila. 20: 168. 1868.

Local distribution: Known only from near Belmont and Kings Mountains in the Santa Cruz Mountains, usually on wooded slopes. April through June.

General distribution: Lake County south to San Mateo and Santa Clara counties.

Specimens examined: Belmont, Davy 795 (UC); Kings Mt., Paulson, Apr. 10, 1915.

4. Calochortus uniflorus Hook. & Arn. Bot. Beechey 398. 1841.

Local distribution: Known within the range of this flora only from along the coast at Soquel Point. April.

General distribution: Coast Ranges from Lane County, Oregon, south to Monterey County.

Specimen examined: Soquel, Thompson, Apr. 27, 1902.

5. Calochortus luteus Dougl. ex Lindl. Bot. Reg. 19: pl. 1567. 1833.

Local distribution: Open grassy slopes from San Francisco south-

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ward, but more common on the eastern slopes of the Santa Cruz Mountains. April through the first half of July.

General distribution: Mendocino County south through the Coast Ranges to Santa Barbara County and from Tehama County south to Tulare County in the Sierra Nevada foothills.

Specimens examined: Hunters Pt., Rattan, June 1880; Woodside, to Crystal Springs Lake, Dudley, May 18, 1894; Kings Mt. Rd., Randall 222; San Francisquito Creek, Lamb, June 14, 1895; Searsville Lake, Ownbey & Ownbey 1699; Stanford, Abrams 1656; San Juan Hills near San Jose, Patterson, May 8, 1895; Foothills west of Los Gatos, Heller 7387; Above Wrights Station, Rattan, June 1880; Bielawski Lookout, Thomas 3437; Santa Cruz, Thompson, June 22, 1903.

6. Calochortus venustus Dougl. ex Benth. Trans. Hort. Soc. 1: 412. 1834.

Local distribution: Southern San Mateo County southward, on serpentine and on open slopes. May through July.

General distribution: Coast Ranges from Contra Costa County south to Los Angeles County and in the Sierra Nevada from El Dorado County south to Kern County.

Specimens examined: Woodside to Crystal Springs Rd., Abrams 5242; Portola, Elmer 4763; Serpentine back of Redwood City, Abrams 7499; Jasper Ridge, Mason, June 4, 1921; Palo Alto, Dudley, 1893; San Jose, Abrams, May 1901; San Juan Hills near San Jose, Patterson, May 7, 1895; Near Mt. Hermon, Pendleton 1480 (UC).

There is one sheet in the Dudley Herbarium annotated as Calochortus splendens Dougl. ex Benth. by Ownbey. This sheet was collected by Dudley on June 6-10, 1909, along Llagas Creek. Llagas Creek originates in the Santa Cruz Mountains but for a considerable part of its course runs outside of the boundaries of the area covered by this flora. There is no indication where along Llagas Creek Dudley collected the specimen.

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Ownbey (1940, pp. 461-463) listed no specimens from the Santa Cruz Mountains under C. splendens. Should C. splendens be found in the Santa Cruz Mountains, it may be distinguished from the first four species listed above by its linear capsule, from C. luteus by its purplish petals, and from C. venustus by its monopodial inflorescence.

18. CONVALLARIACEAE

Leaves usually 3, whorled; flowers 1; sepals 2.5 cm. long or longer. ..... 1. Trillium.
Leaves 2 or more, not whorled; flowers more than 1; sepals less than 2 cm. long.
  Leaves reduced to scales; branches filiform; introduced plants. ..... 2. Asparagus.
  Leaves not reduced to scales; branches not filiform; native plants.
    Leaves basal, 2 to 6 in number.
      Flowering pedicels over 5 cm. long; stamens 3; flowers mottled with green and purple ..... 3. Scoliopus.
      Flowering pedicels less than 2.5 cm. long; stamens 6; flowers rose-purple ..... 4. Clintonia.
    Leaves cauline, usually more than 10 in number.
      Flowers terminal in racemes or panicles; stems not branched. ..... 5. Smilacina.
      Flowers solitary or in few-flowered umbels, pendant; stems branching.
        Flowers terminal ..... 6. Disporum.
        Flowers axillary; peduncles adnate to the internode above its origin ..... 7. Streptopus.

1. Trillium L. Sp. Pl. 339. 1753.

Flowers sessile; petals over 3.5 cm. long, usually maroon. ..... 1. T. chloropetalum.
Flowers pedicellate; petals under 3 cm. long, white to pink, lavender upon drying ..... 2. T. ovatum.

1. Trillium chloropetalum (Torr.) Howell, Fl. N. W. Amer. 1: 661. 1902.

Local distribution: Wooded slopes and thickets, rarely in coniferous forests. Latter part of February through April.

General distribution: Washington south, mainly west of the Cascade

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Mountains, to Monterey County and the central Sierra Nevada.

Specimens examined: Pilarcitos Canyon, Oberlander 456; Montara Mt., Dudley, Mar. 17, 1900; Pescadero Beach, Wiggins 5092; Near Portola, McMurphy, Mar. 22, 1902; Coal Mine Ridge, Barry 13; Stevens Creek, Dudley, Apr. 2, 1904; Foothills west of Los Gatos, Heller 7254.

Petal color varies from greenish-yellow to mixtures of maroon, yellow, and white to completely maroon. Trillium chloropetalum commonly forms clones, white T. ovatum does not.

2. Trillium ovatum Pursh, Fl. Amer. Sept. 245. 1814.

Local distribution: Redwood - douglas fir forests. March through first half of May.

General distribution: British Columbia south to Monterey County and southeast through Idaho, Montana, and Wyoming to north-central Colorado.

Specimens examined: Pilarcitos Canyon, Oberlander 455; Near Pescadero, Dudley, May 2, 1903; Near Woodside, Applegate 43; Back of Saratoga, Heller 8434; Swanton, Rich, Mar. 6, 1912; Near Soquel, Thompson, May 1, 1902.

2. Asparagus L. Sp. Pl. 313. 1753.

1. Asparagus officinalis L. Sp. Pl. 313. 1753.

Local distribution: Occasional as an escape from cultivation near Gilroy.

General distribution: Native of Europe, widely naturalized, as in Australia, Japan, and North America.

Miss Vesta Hesse found this species near Gilroy in May, 1939, but did not prepare herbarium sheets.

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3. Scoliopus Torr. Pacif. R. Rep. 4: 145. 1857.

1. Scoliopus bigelovii Torr. Pacif. R. Rep. 4: 145. 1857.

Local distribution: Moist slopes and along creek banks in redwood forests. February through the first half of March.

General distribution: Redwood belt from northern Humboldt County south to Santa Cruz County.

Specimens examined: Pilarcitos Lake, Eastwood, Apr. 30, 1933; La Honda, Mason, Apr. 1917; Kings Mt., Abrams 2283; Woodside Hills, Leithold, Feb. 24, 1896; Los Gatos, Heller 7348 (UC); Waddell Creek, Dudley, June 4, 1897; 3.5 miles from mouth of San Lorenzo River, Thomas 2897.

This species is one of the earliest to flower in our flora. By the end of March the long reflexed pedicels bear maturing capsules. Plants with three leaves are occasionally found. The third leaf is smaller and narrower in proportion to its length than the others. Leaf blades vary from 10 to 45 cm. in length. The plants with their glossy green foliage, often mottled with purplish pigment, are an attractive element in the herbaceous understory of redwood forests.

4. Clintonia Raf. Journ. Phys. 89: 102. 1819.

1. Clintonia andrewsiana Torr. Pacif. R. Rep. 4: 150. 1857.

Local distribution: Occasional as a member of the herbaceous understory in moist coniferous or coniferous - hardwood forests, more common on the western slopes of the Santa Cruz Mountains. April through June.

General distribution: Outer Coast Ranges from southwestern Oregon south to Monterey County.

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Specimens examined: Pescadero, Wolf 3736; Kings Mt., Abrams 2465; Swanton, Rich, Spring 1912; Ben Lomond, Pettibone, May 22, 1894 (CAS); Glenwood, Davis, 1914 (CAS); Near Felton, Thomas 1507; Santa Cruz, Reed, May 1922 (CAS); Loma Prieta, Thompson, June 7, 1902.

5. Smilacina Desf. Ann. Mus. Paris 9: 51. 1807.

This treatment of Smilacina follows that of Galway (1945).

Inflorescence paniculate.....1. S. racemosa var. amplexicaulis.
Inflorescence racemose.....2. S. stellata.

1. Smilacina racemosa (L.) Desf. var. amplexicaulis (Nutt.) Wats. Bot. King Expl. 345. 1871.

Local distribution: On slopes in coniferous and mixed evergreen forests, usually in shade and in rich soil. Latter part of March through May.

General distribution: Southern British Columbia south to southern California and southeast to western Texas.

Specimens examined: Pilarcitos Canyon, Oberlander 583; Coal Mine Ridge, Barry 131; Foothills west of Los Gatos, Heller 7348A; Glenwood Highway, Thomas 2889; Soquel, Thompson, May 1, 1902.

Leaf shape and size is variable. The shape varies from elliptic to broadly lanceolate.

2. Smilacina stellata (L.) Desf. Ann. Mus. Paris 9: 52. 1807.

Local distribution: Foothills and mountains, usually on wooded slopes in partial shade. Latter part of February through March.

General distribution: Southern Alaska south to southern California and northern Mexico, and south and east to Nebraska, Virginia, and Newfoundland.

Specimens examined: Pilarcitos Canyon, Oberlander 513; Belmont, Rose 33070; Coal Mine Ridge, Barry 14; Stanford, Abrams, Apr. 1, 1898; Foothills west of Los Gatos, Heller 7384; Swanton, Rich, May 12, 1912.

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6. Disporum Salisb. Trans. Hort. Soc. 1: 331. 1812.

Flowers cylindrical, truncate at base; style pubescent; stigma 3-cleft; seeds usually more than 6; leaf margins glabrous or sparsely ciliate.....1. D. smithii.
Flowers turbinate; style glabrous or the lower half pubescent; stigma usually entire; seeds usually 6 or less; leaf margins with short, pointed hairs pointed forward.....2. D. hookeri.

1. Disporum smithii (Hook.) Piper, Contr. U. S. Nat. Herb. 11: 201. 1906.

Local distribution: Redwood - douglas fir forests in southern San Mateo County and adjacent Santa Clara County. March through May.

General distribution: Vancouver Island south through the Coast Ranges to San Mateo and northern Santa Clara counties.

Specimens examined: Butano Creek, Elmer 4697; Kings Mt., Rose, Apr. 4, 1931 (CAS); Rust 133; La Honda Road, Dudley, May 2, 1903; Woodside Road, Dudley, Apr. 14, 1895.

2. Disporum hookeri (Torr.) Nicholson, Dict. Gard. 2: 484. 1884.

Local distribution: In shaded places in redwood - douglas fir forests or in mixed coniferous - hardwood forests throughout the Santa Cruz Mountains. March through May.

General distribution: Southwestern Oregon south to Monterey County in both the Inner and Outer Coast Ranges.

Specimens examined: Crystal Springs Lake, Baker 5052; La Honda, Davis, May 2, 1903; Kings Mt., Paulson, Apr. 1915; Stevens Creek, Randall, July 10, 1907; Los Gatos, Newell, June 20, 1914 (CAS); Uvas Canyon, Thomas 1911; Swanton, Rich, Mar. 6, 1912; Soquel, Thompson, May 1, 1902.

7. Streptopus Michx. Fl. Bor. Amer. 1: 200. 1803.

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1. Streptopus amplexifolius (L.) DC. var. denticulatus Fassett, Rhodora 37: 98. 1935.

Local distribution: Known only from Boulder Creek about 3 miles northwest of the town of Boulder Creek in Santa Cruz County. April and May.

General distribution: Aleutian Islands, southern Alaska, British Columbia southward through Washington and Oregon to Humboldt County, in the Santa Cruz Mountains, and in the Upper Great Lakes region.

Specimens examined: Boulder Creek, Hesse 306; 3 miles northwest of Boulder Creek, Thomas 4560.

Berries in our plants are red.

19. IRIDACEAE

Perianth segments at least 3 cm. long; perianth tube at least 1 cm. long; styles petal-like.....1. Iris.
Perianth segments 2 cm. long; perianth tube very short; styles not petal-like.....2. Sisyrinchium.

1. Iris L. Sp. Pl. 38. 1753.

Standards 10 mm. or more wide; flowers white to purple, sometimes yellow. Growing on dry land.
  Perianth tube under 1 cm. long.....1. I. longipetala.
  Perianth tube over 1.5 cm. long.
    Perianth tube 1.5-2 cm. long.....2. I. douglasiana.
    Perianth tube more than 3 cm. long.....3. I. macrosiphon.
Standards about 2 mm. wide; flowers yellow. Growing along the edges of ponds and lakes.....4. I. pseudacorus.

1. Iris longipetala Herbert in Hook. & Arn. Bot. Beechey 395. 1841.

Local distribution: Open grasslands and slopes from San Francisco southward, mainly along the coast, to southern San Mateo County. March through May.

General distribution: Outer Coast Ranges from southern Mendocino

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County south to the Monterey Peninsula, Monterey County.

Specimens examined: Potrero, Congdon, May 1881; Presidio, Dudley, no date; Twin Peaks, Thomas 4862; South San Francisco, Baker 348; San Bruno Mt., Thomas 4240, 4838; San Andreas Lake, Oberlander 587; Half Moon Bay, Ferris 267; New Years Pt., Cooper, Apr. 3, 1925.

Colonies on the east slope of San Bruno Mountain are very extensive and despite overgrazing in that area, the Iris manages to survive very well.

2. Iris douglasiana Herbert in Hook. & Arn. Bot. Beechey 395. 1841.

Local distribution: Open woods, grassland, and coastal bluffs, mainly on the western slopes of the Santa Cruz Mountains from San Francisco southward. Latter half of February through June.

General distribution: Coast Ranges from Coos County, Oregon, south to northern Monterey County.

Specimens examined: Mt. Sutro, Constance 2237; Presidio, Rattan, Apr. 1883; Hills back of San Bruno, Dudley, May 2, 1893; Near Millbrae, Dudley, May 17, 1893; Upper Pescadero Creek, Dudley, May 21, 1903; Woodside serpentine, Dutton, Apr. 3, 1900; East of Tunnel, Dudley, Mar. 29, 1902; Rancho del Oso, Thomas 1727; Swanton, Rich, Spring 1912; Waddell Mill, Big Basin, Dudley, June 3, 1897.

3. Iris macrosiphon Torr. Pacif. R. Rep. 4: 144. 1857.

(Iris fernaldii Foster, Iridis Sp. Nov. 1. 1938.)

Local distribution: Grassy slopes in oak - madrone woods, edges of redwood - douglas fir forests, and on brush-covered areas. March through June.

General distribution: Del Norte County south through the Coast Ranges to Santa Clara County, also on Mount Shasta and in the foothills of the Sierra Nevada of Butte County.

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Specimens examined: Pescadero Creek, Dudley, June 6, 1895; Portola, Elmer 4503; Between Los Gatos and Saratoga, Dudley, Apr. 16, 1893; Below Wrights, Dudley, May 1893; Loma Prieta, Dudley, May 30, 1893; Gilroy, Elmer 4854; 1 mile south east of Saratoga Summit, Thomas 3425; Near Eagle Rock, Thomas 5038; Glenwood, Davis, Sept. 1907; Big Basin, Dudley, June 5, 1897; Graham Hill near Santa Cruz, Hesse 1037.

Flower color is exceedingly variable in this species. The specimen from near Eagle Rock, cited above, came from a population in which the color of the flowers varied from white through various shades of lavender and yellow to deep purple.

4. Iris pseudacorus L. Sp. Pl. 38. 1753.

Local distribution: Growing and apparently spreading in Searsville Lake. April through June.

General distribution: Naturalized in Siskiyou, Sonoma, San Mateo, Merced, and Santa Barbara counties and in the eastern part of the United States; native of Europe.

Specimen examined: Searsville Lake, Thomas 7165.

2. Sisyrinchium L. Sp. Pl. 954. 1753.

Flowers blue.....1. S. bellum.
Flowers yellow.....2. S. californicum.

1. Sisyrinchium bellum Wats. Proc. Amer. Acad. 12: 227. 1876.

Local distribution: Very common throughout our area, usually in grasslands, often sufficiently abundant locally to form blue patches among the vegetation; often found in serpentine soils. February through May.

General distribution: Southern Washington south to northern Baja California, mainly west of the Cascade - Sierra Nevada axis.

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Specimens examined: Mt. Sutro, Constance 2238; San Bruno Hills, Abrams 7061; 1 mile north of Belmont, Rollins 2948; Hills opposite Half Moon Bay, Dudley, Mar. 28, 1894; Woodside, Abrams 2426; Stanford, Abrams 2303; Foothills west of Los Gatos, Heller 7291; Swanton, Rich, Spring 1912; Sweets Gulch, Thompson, Apr. 12, 1902.

2. Sisyrinchium californicum (Ker.) Dryand. Hort. Kew. 4: 135. 1812.

Local distribution: Usually along or near the coast in boggy areas, occasionally found along the margins of San Francisco Bay or inland. March through May.

General distribution: Vancouver Island, British Columbia, south to northern Monterey County.

Specimens examined: Colma, Abrams 1607; Millbrae, Rattan, Apr. 1883; Between Pigeon Pt. and Pescadero, Wiggins 3677.

20. ORCHIDACEAE

Flowers large, generally few; inflorescence racemose.
  Lip saccate and inflated.....1. Cypripedium.
  Lip neither saccate nor inflated.....2. Epipactis.
Flowers small, many; inflorescence spicate.
  Spur present and free from the ovary.....3. Habenaria.
  Spur lacking (or in Corallorhiza maculata adnate to the ovary).
    Plants with green foliage, not saprophytic.....4. Spiranthes.
    Plants lacking green foliage, plants either white or brownish.
      Entire plant white; sepals and petals 12-15 mm. long.
        5. Cephalanthera.
      Entire plant brownish; sepals and petals 6-10 mm. long.
        6. Corallorhiza.

1. Cypripedium L. Sp. Pl. 975. 1753.

Leaves alternate, several.....1. C. montanum.
Leaves opposite, two.....2. C. fasciculatum.

1. Cypripedium montanum Dougl. ex Lindl. Gen. Sp. Orchid 528. 1840.

Local distribution: Very rare in the Santa Cruz Mountains in southern San Mateo County and perhaps in northern Santa Cruz County. April and May.

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General distribution: Southern British Columbia south to the Santa Cruz Mountains and Mariposa County and southeast through Montana and Idaho to Wyoming.

Specimens examined: La Honda Creek, Cranston, Apr. 1915; Corte de Madera Creek, Patterson, May 6, 1911; Santa Cruz Mountains, McKaye, May 1902.

2. Cypripedium fasciculatum Kell. ex Wats. Proc. Amer. Acad. 17: 380. 1882.

Local distribution: Very rare in moist woods, known definitely only from Kings Mountains south to Loma Prieta. April and May.

General distribution: Washington south to Del Norte and Plumas counties and in the Santa Cruz Mountains.

Specimens examined: Kings Mt., Jordan, Apr. 1915; Bolton, May 6, 1911; Stevens Creek, Dudley, Apr. 2, 1904; Black Mt., Dudley, Apr. 10, 1904; Loma Prieta, Dudley, 1895.

North of the Santa Cruz Mountains, Cypripedium fasciculatum is not found until one reaches Del Norte County, a distance of about 300 miles.

2. Epipactis Sw. Kongl. Svens. Vetens. Acad. Nya Handl. 21: 231. 1800.

1. Epipactis gigantea Dougl. ex Hook. Fl. Bor. Amer. 2: 202. 1839.

Local distribution: Occasional in moist places among rocks, often under Pseudotsuga menziesii. May through August.

General distribution: Widespread in North America from British Columbia south to Mexico, east to South Dakota, Oklahoma, and Texas.

Specimens examined: Cahill Ridge, Oberlander 1197; Pescadero Creek, Atkinson, July 6, 1901; Mason, June 25, 1920; Loma Prieta, Dudley, May 30, 1893; Powder Mill Gulch, Thompson, July 6, 1902.

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3. Habenaria Willd. Sp. Pl. 4: 44. 1805.

Stem leaves several.
Lip linear, not rhombic at base, 6 mm. long; flowers not white. Inland plants 1. H. sparsiflora.
Lip rhombic at base, about 8 mm. long; flowers white. Coastal plants. 2. H. dilatata var. leucostachys.
Stem leaves usually 2-4, commonly near the base.
Spur equal to or slightly longer than the lip; inflorescence slender, open, usually about 1 cm. in diameter. 3a. H. unalascensis var. unalascensis.
Spur at least twice as long as the lip; inflorescence more congested, usually over 1.5 cm. in diameter.
Inflorescence very congested, about 2 cm. in diameter. Coastal plants.....3b. H. unalascensis var. maritima.
Inflorescence only slightly congested, about 1.5 cm. in diameter. Inland plants.....3c. H. unalascensis var. elata.

1. Habenaria sparsiflora Wats. Proc. Amer. Acad. 12: 276. 1877.

Local distribution: Rare in northern Santa Clara County where it grows near springs. June and July.

General distribution: Central Washington south to northern Baja California, east to central New Mexico and Utah.

Specimens examined: Near Stanford, Dudley, July 8, 1903; Black Mt., Elmer 4970.

2. Habenaria dilatata (Pursh) Hook. var. leucostachys (Lindl.) Ames, Orch. 4: 71. 1910.

Local distribution: Marshy areas along the coast from San Francisco southward. May through July.

General distribution: Aleutian Islands, southern Alaska, and from British Columbia south to southern California, east to Nevada, Utah, and Montana.

Specimens examined: San Francisco, Ringston, Kellogg, & Bolander, Summer 1868; Pebble Beach, Wolf 3728; Arroyo de Los Frijoles, Swabey, June 3, 1923; Watsonville, Hayward, July 5, 1929.

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3a. Habenaria unalascensis (Spreng.) Wats. var. unalascensis, Proc. Amer. Acad. 12: 277. 1877.

Local distribution: Fairly rare, in our area known only from near Pescadero and Black Mountain. June through August.

General distribution: Aleutian Islands, southern Alaska, and from British Columbia south to northern Baja California, east to South Dakota, Colorado, and Nevada.

Specimens examined: Pescadero Creek, Dudley, June 18, 1905; Elmer 5058; Black Mt., Dudley, June 7, 1895.

3b. Habenaria unalascensis (Spreng.) Wats. var. maritima (Greene) Correll, Leafl. West. Bot. 3: 247. 1943.

(H. greenei Jepson, Leafl. West. Bot. 4: 260. 1946.)

Local distribution: Occasional, along the coast from San Francisco southward. August.

General distribution: Along the coast from Tillamook County, Oregon, south to Monterey County.

Specimens examined: Lands End, Setchell 82: Edgemar, Cox, Aug. 17, 1946; Peeble Beach, Abrams 4274.

3c. Habenaria unalascensis (Spreng.) Wats. var. elata (Jepson) Correll, Leafl. West. Bot. 3: 246. 1943.

(H. elegans (Lindl.) Bolander, Cat. Pl. San Franc. 29. 1870; H. michaelii Greene, Man. Bay Reg. 306. 1894.)

Local distribution: The most common variety of this species locally, growing in dry shaded woods from San Francisco southward, commonly under oaks and madrone. April through September.

General distribution: Southern British Columbia south to southern

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California, east to northern Idaho and western Montana.

Specimens examined: Mills Lake, Randall 269, 271; San Francisco Watershed Reserve, Oberlander 852; Pescadero Creek, Dudley, June 7, 1895; Kings Mt., Abrams, Aug. 1907; Coal Mine Ridge, Barry 220; Los Gatos, Mason, June 20, 1921; Big Basin, Dudley, Apr. 24, 1905; Waddell Creek, Dudley, July 25, 1903; Empire Grade, Thomas 3468; Santa Cruz, Jones 2244.

4. Spiranthes Rich, Mem. Mus. Hist. Nat. Paris 4: 50. 1818.

Lip lacking two mammillate callosities at the base, definitely dilated or expanded at the tip...1a. S. romanzoffiana var. romanzoffiana.
Lip with two mammillate callosities at the base, slightly or not dilated at the apex.....1b. S. romanzoffiana var. porrifolia.

1a. Spiranthes romanzoffiana Cham. var. romanzoffiana, Linnaea 3: 32. 1828.

Local distribution: Rare, usually in wet meadows near the coast. May through July.

General distribution: Widely distributed in North America from Alaska east to Labrador and south to southern California, Arizona, New Mexico, Colorado, Iowa, and South Carolina; also in Ireland.

Specimens examined: Swanton, Rich, Spring 1912; Moores Beach, Santa Cruz, Thompson, July 4, 1902.

This variety has been reported from San Francisco (Jepson, 1922, p. 332).

1b. Spiranthes romanzoffiana Cham. var. porrifolia (Lindl.) Ames & Correll, Bot. Mus. Leafl. Harvard Univ. 11: 1. 1943.

Local distribution: Rare, known definitely in the Santa Cruz Peninsula only from grassland in San Andreas Valley. May through July.

General distribution: Southern Washington south to the San Bernardino Mountains, also in Nevada and Utah.

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Specimens examined: San Andreas Valley, Oberlander 1203.

This variety has been reported from Santa Cruz County by Anderson (1892, p.126), and is to be expected occasionally elsewhere.

5. Cephalanthera Rich, Mem. Mus. Nat. Hist. Paris 4: 51. 1818.

1. Cephalanthera austinae (Gray) Heller, Cat. N. Amer. Pl. 4. 1900.

Local distribution: Rare, known locally only from Big Basin Redwoods State Park, but to be expected elsewhere. June.

General distribution: Washington and northern Idaho south through Oregon to Monterey and Mariposa counties.

Specimen examined: Big Basin, McCracken, June 1912.

6. Corallorhiza Chatelain, Spec. Inaug. Corall. 6. 1760.

Perianth segments not distinctly striate-veined; lip white, purple-spotted; ovary with a spur adnate to it.....1. C. maculata.
Perianth segments distinctly striate-veined; lip not white, striped with purple; ovary lacking a spur.....2. C. striata.

1. Corallorhiza maculata Raf. Amer. Month. Mag. & Crit. Rev. 2: 119. 1817.

Local distribution: Occasional in fairly dense shade, growing with Lithocarpus densiflora, Pseudotsuga menziesii, Arbutus menziesii, and Quercus agrifolia. April through July.

General distribution: Widespread in North America from British Columbia eastward to Newfoundland, south to California, New Mexico, Texas, and South Carolina, also in Mexico and Guatemala.

Specimens examined: Sawyer Ridge, Oberlander 529; La Honda Grade, Mason, May 28, 1921; Pescadero Creek, Elmer 4764; Mayfield, McMurphy, May 14, 1907; Castle Rock, Thomas 5195; Near Big Basin Park, Thomas 3529; Big Basin, Dudley, June 5, 1897.

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2. Corallorhiza striata Lindl. Gen. & Sp. Orch. pl. 534. 1840.

Local distribution: Occasional in woods, often with oaks and madrones. April through June.

General distribution: Widely distributed in the United States west of the Mississippi River, in southern Canada, and extending eastward to New Brunswick and Quebec.

Specimens examined: Cahill Ridge, Oberlander 528; San Mateo Creek, Dudley, Apr. 21, 1894; La Honda Grade, Mason, May 29, 1921; Peters Creek, Dudley, June 6, 1903; Searsville, Dudley, Apr. 1900; Adobe Creek, Herre & Wiggins 20A; Permanente Creek, Mason 120; Black Mt., Richardson, Apr. 15, 1906; Saratoga Springs, Smith, Apr. 1905; Big Basin, Dudley, June 5, 1897.

2. Subclass Dicotyledoneae

21. SAURURACEAE

1. Anemopsis Hook. & Arn. Ann. Nat. Hist. 1: 136. 1838.

1. Anemopsis californica (Nutt.) Hook. & Arn. Ann. Nat. Hist. 1: 136. 1838.

Local distribution: To be expected occasionally in the Santa Clara Valley in moist ditches and along stream banks. April through June.

General distribution: Santa Clara Valley and the lower portion of the Sacramento Valley south through California and Baja California, eastward at scattered localities to Colorado, New Mexico, and Texas.

Specimen examined: Near San Jose, Cody, May 15, 1919.

22. SALICACEAE

Leaves broad, commonly deltoid; margins of the floral bracts laciniate; ovary globose.....1. Populus.
Leaves narrow, elliptic to lanceolate or narrower; margins of the floral bracts not laciniate; ovary ovoid.....2. Salix.

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1. Populus L. Sp. Pl. 1034. 1753.

Petioles terete; leaves ovate, distinctly lighter beneath. The most common species.....1. P. trichocarpa.
Petioles flattened; leaves usually broadly triangular-ovate, not bi-colored.
Branches appressed-ascending; plants reproducing vegetatively. 2. P. nigra var. italica.
Branches ascending or spreading; plants reproducing sexually. 3. P. fremontii.

1. Populus trichocarpa Torr. & Gray ex Hook. Icon. Pl. 9: pl. 878. 1852.

Local distribution: Along the lower portions of stream courses from southern San Mateo County southward. Latter half of February through April.

General distribution: Southern Alaska and Yukon south through British Columbia, Washington, western Idaho, and adjacent Montana, Oregon, the California Coast Ranges, and the Sierra Nevada to northern Baja California.

Specimens examined: South of Crystal Springs Lake, Dudley, Sept. 21, 1902; Pescadero, Dudley, Mar. 26, 1894; San Francisquito Creek, Dudley, Mar. 29, 1898; Los Gatos Reservoir, Thomas 3988; Felton, Dudley, May 6, 1893; Santa Cruz, Jones, June 1881; Pajaro River, Thomas 1534.

2. Populus nigra L. var. italica Muenchh. Hausvater 5: 230. 1770.

Local distribution: Occasional along stream courses or moist places, spreading vegetatively and escaped from cultivation.

General distribution: Originated in Italy as a mutation of a staminate plant of P. nigra, now widely distributed throughout the world by

Specimens examined: South of San Andreas Dam, Oberlander 351; Carnadero Creek, Thomas 4372.

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3. Populus fremontii Wats. Proc. Amer. Acad. 10: 350. 1875.

Local distribution: Known only from one specimen from San Francisquito Creek. March and April.

General distribution: Shasta County south throughout most of California, east to Utah and western Texas, almost throughout the length of Baja California and in Sonora and Chihuahua.

Specimen examined: San Francisquito Creek, Randall 358.

2. Salix L. Sp. Pl. 1051. 1753.

Leaves essentially alike on both surfaces with respect to color and/or pubescence, narrowly linear to linear-lanceolate, silky-villous at least when young; stamens 2; capsules pubescent.
1. S. hindsiana.

Leaves not alike on both surfaces, variously shaped, pubescent or glabrous; stamens 1-10; capsules pubescent or glabrous.

Leaves densely silky-villous abaxially; stamen 1; capsules 4-4.5 mm. long, pubescent.....2. S. coulteri.

Leaves not densely silky-villous abaxially; stamens 2-10; capsules pubescent or glabrous.

Leaves usually broadest near the middle or above; stamens 2; capsules glabrous or pubescent; pedicels 0.5-1.5 mm. long.

Capsules 4-5.5 mm. long, glabrous; styles 0.5 mm. long; leaves usually oblong to oblanceolate.....3. S. lasiolepis.

Capsules 7-9 mm. long, pubescent; stigmas sessile; leaves broadly oblanceolate to obovate.....4. S. scouleriana.

Leaves usually broadest in the lower half; stamens 3-10; capsules glabrous; pedicels 1.5-3 mm. long.

Petioles with wart-like glands; capsules 5-6 mm. long.
5. S. lasiandra.

Petioles without wart-like glands; capsules 3.5-5 mm. long.
6. S. laevigata.

1. Salix hindsiana Benth. Pl. Hartw. 335. 1857.

Local distribution: Along streams and creeks in the Santa Clara Valley and along the Pajaro River. March through May.

General distribution: Southwestern Oregon south to northern Baja California.

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Specimens examined: Permanente Creek, Dudley, Apr. 30, 1899; Saratoga, Dudley, Sept. 15, 1901; Pajaro River, Thomas 1532; Watsonville, Dudley, Sept. 19, 1909.

2. Salix coulteri Anders. Svensk. Vet. Acad. Förh. 15: 119. 1858.

Local distribution: Occasional along streams and creeks, more common on the eastern slopes of the Santa Cruz Mountains than on the western. March through May.

General distribution: Mainly in the Coast Ranges, British Columbia south to Santa Barbara County.

Specimens examined: Baden, Dudley, May 14, 1899; San Mateo Creek, Oberlander 820; Crystal Springs to Half Moon Bay, Dutton, Oct. 15, 1899; Pescadero Creek, Dudley, May 1, 1903; Kings Mt., Abrams 2272; Stevens Creek, Dudley, June 2, 1902; Between Saratoga and Castle Rock, Dudley, Mar. 28, 1899; Los Gatos Creek, Dudley, May 28, 1894; Big Basin, Dudley, Nov. 29, 1902; About 2 miles south of Felton, Thomas 1684.

3. Salix lasiolepis Benth. Pl. Hartw. 335. 1857.

(S. lasiolepis Benth. var. bigelovii (Torr.) Bebb in Wats. Bot. Calif. 2: 86. 1879.)

Local distribution: The most common species of Salix in the Santa Cruz Mountains, along streams and the edges of marshes. February through April.

General distribution: Washington south to northern Baja California, in western Idaho, western Nevada, Arizona, western New Mexico, and northern Mexico.

Specimens examined: Golden Gate Park, Dudley, May 4, 1902; Lake Merced, Dudley, May 11, 1901; South San Francisco, Dudley, 1893; San Andreas Lake, Oberlander 949; San Gregorio, Ball & Hendry 14; Searsville, Abrams 67; Coal Mine Ridge, Barry, Apr. 6, 1938; Stanford, Abrams 2175; Guadalupe Creek, Patterson, Apr. 4, 1906; Foothills west of Los Gatos, Heller 7263; Near Camp Evers, Ball & Hendry 6; Near Santa Cruz, Ball & Hendry 12; Wood Lagoon, Dudley, Nov. 28, 1908; Soquel Creek, Thomas 1411; 3.5 miles northeast of Watsonville, Thomas 2738.

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4. Salix scouleriana Barratt ex Hook. Fl. Bor. Amer. 2: 145. 1839.

Local distribution: Moist places in woods, on brush-covered slopes, and along streams. February through April.

General distribution: Southern Alaska southward to southern California, New Mexico, and Colorado.

Specimens examined: Baden, Dudley, Mar. 18, 1900; Pescadero, Elmer 4864; Portola Valley, Dudley, Mar. 9, 1899; Black Mt., Elmer 2164; Stevens Creek, Dudley, June 1, 1902; Near Saratoga Summit, Dudley, Apr. 17, 1893; Los Gatos Creek, Dudley, Apr. 21, 1895; Ben Lomond Mt., Dudley, Mar. 30, 1899; Big Basin, Dudley, Apr. 16, 1904; Boulder Creek, Dudley, Mar. 29, 1899; Big Trees, Stinchfield 172.

5. Salix lasiandra Benth. Pl. Hartw. 335. 1857.

Local distribution: A common willow along the edges of streams, lakes, and on very moist slopes. February through April.

General distribution: British Columbia and Alberta south to southern California and New Mexico.

Specimens examined: Crystal Springs Lake, Dudley, Sept. 21, 1902; Peters Creek, Dudley, May 1, 1903; Kings Mt. Road, Randall, Mar. 28, 1908; Searsville, Dudley, Apr. 14, 1903; Palo Alto, Dudley, Mar. 21, 1903; Los Gatos Ravine, Dudley, Apr. 19, 1895; Ben Lomond Mt., Dudley, Mar. 30, 1899; Near Eagle Rock, Thomas 4022; Loma Prieta, Dudley, Oct. 12, 1902; Near Felton, Dudley, Oct. 3, 1896; Santa Cruz, Heller 6556.

6. Salix laevigata Bebb, Amer. Nat. 8: 202. 1874.

Local distribution: Along the edges of lakes, ponds, and streams. February through May.

General distribution: Mendocino and Siskiyou counties south to Baja California, east to western Nevada and western Arizona.

Specimens examined: San Andreas Lake, Dudley, Mar. 18, 1900; Near Portola, Dudley, Apr. 7, 1904; Stanford, Dudley, Apr. 1902; Guadalupe Creek, Patterson, Apr. 4, 1906; Wrights, Dudley, May 28, 1894; Near Felton, Dudley, Mar. 30, 1899; Aptos, Dudley & Abrams, Oct. 13, 1902.

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23. MYRICACEAE

1. Myrica L. Sp. Pl. 1024. 1753.

1. Myrica californica Cham. & Sch. Linnaea 6: 535. 1831.

Local distribution: Along or near the coast, often on dunes, up to about 10 miles inland in valleys or on shaded slopes; near the coast Myrica californica is a shrub, while in protected valleys it becomes a small tree to about 30 feet tall and grows with Sequoia sempervirens, Pseudotsuga menziesii, Lithocarpus densiflora, Vaccinium ovatum, Rhododendron occidentale, Gaultheria shallon, Arbutus menziesii, Acer macrophyllum, and Alnus oregona; absent east of the crest of the Santa Cruz Mountains except in northern San Mateo County. April through June.

General distribution: Puget Sound south near the coast to the Santa Monica Mountains of southern California.

Specimens examined: Land's End, San Francisco, McMinn 303; Lobos Creek, San Francisco, Abrams 2197; Arroyo de los Frijoles, Bacigalupi, Mar. 1922; 1 mile north of Pigeon Pt., Wolf 3709; Swanton, Rich, Apr. 6, 1912; Big Basin, Pendleton, 1908; Santa Cruz, Dudley, Nov. 27, 1908.

24. BETULACEAE

1. Alnus Hill, Brit. Herb. 510. 1756.

Leaves with narrow, revolute margins, the margins coarsely toothed. Plants of the coastal areas.....1. A. oregona.
Leaves lacking revolute margins, the margins finely toothed. Inland plants.....2. A. rhombifolia.

1. Alnus oregona Nutt. Sylva 1: 28. 1842.

(A. rubra Bong. Mem. Acad. St. Petersb. 2: 162. 1832.)

Local distribution: Confined to the western side of the Santa Cruz Mountains, usually near the coast along the streams which run into

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the Pacific Ocean. Staminate catkins appear in September, October, or November and shed pollen in February and March. The pistillate catkins are evident in January, February, or March and produce mature seeds by fall.

General distribution: Along or near the coast from southeastern Alaska south to Santa Barbara County.

Specimens examined: Pilarcitos Canyon, Oberlander 454; Pescadero Creek, Dudley, Oct. 3, 1906; San Gregorio Creek, Dudley, Mar. 26, 1894; Ano Nuevo Pt., Gillespie, Apr. 18, 1925; Along Gazos Creek, Dudley, Dec. 31, 1902; Waddell Creek, Thomas 2931; East fork of Waddell Creek, Dudley, Nov. 29, 1902; Big Basin, Dudley, Sept. 23, 1901; Liddell Creek, Bacigalupi, Mar. 29, 1922; Aptos, Dudley, Oct. 13, 1902.

2. Alnus rhombifolia Nutt. Sylva 1: 33. 1842.

Local distribution: Along streams on the eastern slopes of the Santa Cruz Mountains and occasionally on the western, but always away from the immediate coast. Staminate catkins produce pollen in January and February. Seeds mature in the late summer and early fall.

General distribution: Southern British Columbia south to northern Baja California, also in northern and western Idaho.

Specimens examined: San Mateo Creek, Oberlander 508; Coal Mine Canyon, Dudley, Jan. 19, 1901; Stanford, Abrams 2257; Los Gatos Creek, Dudley, Oct. 11, 1902; Los Gatos Reservoir, Thomas 3986; Boulder Creek, Thomas 1469.

25. CORYLACEAE

1. Corylus L. Sp. Pl. 998. 1753.

1. Corylus californica (A. DC.) Rose, Gard. & Forest 8: 263. 1895.

Local distribution: A fairly common shrub of oak - madrone woods and along creeks, usually growing in at least partial shade. The stam-

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inate catkins appear in October and November and shed pollen from January through March. Mature nuts are to be found as early as May.

General distribution: British Columbia south to Santa Cruz County, in the California Coast Ranges and to Tulare County in the Sierra Nevada.

Specimens examined: Sawyer Ridge, Oberlander 415; Pescadero, Atkinson, July 3, 1901; Kings Mt., Elmer 4536; Black Mt., Leithold, Aug. 13, 1894; Stevens Creek, Randall 111; Swanton, Rich, Feb. 4, 1912; Near Glenwood, Dudley, July 19, 1909; Alba Grade, Thomas 3382, 2475; Ben Lomond sand hills, Thomas 2775.

26. FAGACEAE

Fruit surrounded by a spiny involucre; abaxial leaf surfaces and young twigs covered with a dense golden-colored pubescence. 1. Castanopsis.

Fruit surrounded basally by a scaly cup-like involucre; abaxial leaf surfaces glabrous to golden pubescent.

Staminate catkins stiff, erect; trees evergreen; leaves oblong, serrate, the lateral veins parallel; cup with stiff, spreading scales.....2. Lithocarpus.

Staminate catkins not stiff, usually drooping; trees or shrubs, evergreen or deciduous; leaves variously shaped, toothed, lobed, or divided, the lateral veins usually not parallel; cup without stiff, spreading scales.....3. Quercus.

1. Castanopsis (D. Don) Spach, Hist. Veg. Phan. 11: 185. 1842.

1. Castanopsis chrysophylla (Dougl.) A. DC. var. minor (Benth.) A. DC. Prod. 16: 110. 1864.

Local distribution: Dry open ridges in chaparral, usually at higher elevations, northern San Mateo County southward. July through August.

General distribution: Humboldt and Trinity counties south to San Luis Obispo County.

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Specimens examined: Cahill Ridge, Oberlander 411; Kings Mt., Wolf 2335; Between Loma Prieta and Mt. Umunhum, Hichborn, May 9, 1920; Loma Prieta, Elmer 4989; Abrams 3032; Chalks Lookout, Thomas 3508.

2. Lithocarpus Blume, Bijdr. 526. 1825.

1. Lithocarpus densiflora (Hook. & Arn.) Rehd. in Bailey, Cycl. Hort. 6: 3569. 1917.

Local distribution: A common tree in the Santa Cruz Mountains, commonly growing with Umbellularia californica and Arbutus menziesii along the edges of coniferous forests or forming pure, dense stands. May through July.

General distribution: Douglas County, Oregon, south through the Coast Ranges to Santa Barbara County and in the Sierra Nevada from Lassen County south to Mariposa County.

Specimens examined: La Honda, Randall 128; Coal Mine Ridge, Barry 266; Black Mt., Dudley, July 1903; Los Gatos Creek, Dudley, Apr. 21, 1895; Loma Prieta, Dudley, July 22, 1893; Along State Highway 9, Thomas 3503; Big Basin, Dudley, Aug. 23, 1900; Opal Creek, Thomas 2431; Blooms Grade, Thomas 3555; Santa Cruz, Jones 2298.

3. Quercus L. Sp. Pl. 994. 1753.

Scales of the involucre thin; abaxial leaf surfaces not conspicuously paler than the adaxial; stigmas on slender styles.
- Trees, deciduous; leaves thin, deeply to shallowly sinuately lobed.
  - Lobes of the leaves usually with several long, bristle-tipped teeth, leaves usually lobed about 3/4 of the way to the midrib.....1. Q. kelloggii.
  - Lobes of the leaves usually with only 1 bristle-like tooth, leaves usually lobed less than 1/3 of the way to the midrib. 2. Q. ×morehus.
- Trees, evergreen; leaves thick, toothed.
  - Leaves usually convex, the teeth always spine-tipped, usually with tufts of hair in the axils of the veins abaxially, veins not conspicuously parallel.....3. Q. agrifolia.
  - Leaves usually plane, often entire, lacking tufts of hair, the lateral veins conspicuously parallel....4. Q. wislizenii.

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Scales of the involucre usually warty or thick at the base, or often obscured by dense tomentum; abaxial leaf surfaces usually conspicuously paler than the adaxial; stigmas more or less sessile.
Trees, deciduous; leaves relatively thin, usually 5-12 cm. long.
Leaves blue-green, shallowly lobed, usually less than 1/3 of the way to the midrib; acorns oval, 2-2.5 cm. long
5. Q. douglasii.
Leaves not blue-green, distinctly lobed, usually at least ½ of the way to the midrib; acorns conical, pointed, 3-5 cm. long.....6. Q. lobata.
Trees or shrubs, evergreen; leaves thick, leathery, usually 1.5-5 cm. long.
Abaxial surfaces of young leaves densely golden-pubescent; acorns maturing in 2 years; trees, or shrubs in chaparral.
7. Q. chrysolepis.
Abaxial surfaces of young leaves lacking dense golden pubescence; shrubs.
Leaves more or less plane or undulate, usually glossy adaxially. Not growing on serpentine.....8. Q. dumosa.
Leaves convex, the margins revolute, not glossy adaxially, stellate-pubescent. Growing on serpentine.
9. Q. durata.

1. Quercus kelloggii Newb. Pacif. R. Rep. 6: 28. 1857.

Local distribution: Growing in oak - grasslands, usually at higher elevations, and on slopes with other oaks and Arbutus menziesii, more common to the east of the crests of the Santa Cruz Mountains. March through May.

General distribution: Southwestern Oregon south through the Coast Ranges and the Sierra Nevada to San Diego County.

Specimens examined: Near Woodside, McMurphy 48; Searsville Lake, Elmer 4520; Coal Mine Ridge, Dudley, May 4, 1901; Black Mt., Applegate, May 8, 1895; Foothills west of Los Gatos, Heller 7264; Madrone Station, Dudley 4105; Near Burrell, Thomas 3984.

2. Quercus ✗morehus Kell. Proc. Calif. Acad. 2: 26. 1863.

Local distribution: Occasional in the Santa Cruz Mountains. March through May.

General distribution: Occasional in areas where Quercus kelloggii

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and Q. wislizenii occur together.

Specimens examined: Black Mt., Dudley, Apr. 10, 1904; Near Saratoga Summit, Dudley, Apr. 17, 1893; Mt. Charlie Rd., Thomas 3330; Near Gilroy, Dudley, Mar. 11, 1901; Near Bonnie Doon, Wolf 3105; Abrams 13742

Quercus ✗ morehus is a hybrid between Q. kelloggii and Q. wislizenii. The leaves are usually larger than those of Q. wislizenii, rarely lobed more than one-third of the way to the midrib or merely coarsely toothed, thin or leathery, and usually have only one bristle-tip per lobe.

3. Quercus agrifolia Nee, Anal. Cienc. Nat. 3: 271. 1801.

Local distribution: A common tree of valleys and on rolling foothills, often growing with Quercus lobata, Arbutus menziesii, Umbellularia californica, and Aesculus californica. February through April.

General distribution: Coast Ranges from Mendocino County south to the Sierra San Pedro Martir in northern Baja California.

Specimens examined: Golden Gate Park, Dudley, Nov. 29, 1894; Sawyer Ridge, Oberlander 397; Jasper Ridge, Dudley, Apr. 15, 1898; Stanford, Dudley, Apr. 16, 1894; Los Gatos, Smith 39025; Rancho Del Oso, Thomas 2763; Near Saratoga Summit, Thomas 1123; Near Glenwood, Thomas 2893; Tuxedo, Dudley, Apr. 17, 1904; Ben Lomond sand hills, Thomas 2780.

4. Quercus wislizenii A. DC. Prod. 16: 67. 1864.

Local distribution: Woodlands and chaparral, central San Mateo County southward. April and May.

General distribution: Coast Ranges and Sierra Nevada foothills from Humboldt and Shasta counties south to northern Baja California.

Specimens examined: Peters Creek, Dudley, May 2, 1903; Butano Creek, Dudley, Jan. 1, 1898; Kings Mt., Abrams 2439; Jasper Ridge, Wolf 3655; Black Mt., Elmer 4726; Mt. Umunhum, Dudley, Sept. 11, 1900; Loma Prieta, Dudley, May 29, 1894; Near Eagle Rock, Thomas 3492; Big Basin, Dudley, Aug. 27, 1903; Boulder Creek, Hesse 1021; Santa Cruz, Jones 2292.

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In chaparral Q. wislizenii is a shrub, usually three to seven feet tall, and has been called Q. wislizenii var. frutescens Engelm. (Trans. St. Louis Acad. 3: 396. 1877). On wooded slopes and in lowlands, Q. wislizenii is a medium- to large-sized tree.

5. Quercus douglasii Hook. & Arn. Bot. Beechey 391. 1840.

Local distribution: Wooded, rolling hills, southern San Mateo County southward along the eastern slopes of the Santa Cruz Mountains, often growing with Quercus agrifolia, Q. lobata, Photinia arbutifolia, and Aesculus californica. March through May.

General distribution: Coast Ranges and Sierra Nevada foothills from Shasta County south to Los Angeles County.

Specimens examined: Near Searsville, Applegate 644; Stanford, Elmer 4528; Foothills west of Los Gatos, Heller 7300.

Quercus douglasii apparently hybridizes with Q. lobata. Examples of probable hybrids are: Corte de Madera Creek, Benson 4030; Jasper Ridge, Gray, Oct. 19, 1916.

6. Quercus lobata Nee, Anal. Cienc. Nat. 3: 277. 1801.

Local distribution: Central San Mateo County southward, mainly in valleys and on low rolling foothills, rare west of the crests of the Santa Cruz Mountains. March through May.

General distribution: Head of the Sacramento Valley south to Los Angeles County, at lower elevations in the Sierra Nevada foothills, and in valleys in the Coast Ranges.

Specimens examined: Near Woodside, Dudley, Dec. 4, 1893; Alpine Road, Dudley, Nov. 19, 1893; Page Mill Road, Dudley, Oct. 14, 1894; Stanford, McMurphy 53; Black Mt. Road, Dudley, Apr. 1894; Guadalupe, Patterson, Apr. 7, 1906; Guadalupe Creek, Thomas 4974; Glenwood, Dudley, June 20, 1909; Thomas 3199.

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7. Quercus chrysolepis Liebm. Dansk. Vidensk. Forhandl. 1854: 173. 1854.

Local distribution: Open woods, growing with Quercus kelloggii, Q. agrifolia, Lithocarpus densiflora, and Arbutus menziesii, or growing as a shrub or a small tree in chaparral. May through June.

General distribution: Douglas County, Oregon, south through the Coast Ranges to northern Baja California, also in Arizona, New Mexico, and Sonora.

Specimens examined: Portola, Abrams, May 1901; Coal Mine Ridge, Barry, May 15, 1938; Black Mt., Dudley, Oct. 13, 1894; Stevens Creek Rd., Dudley, June 1, 1902; Castle Rock Ridge, Abrams, Oct. 7, 1906; Foothills west of Los Gatos, Heller 7402; Loma Prieta, Dudley, May 29, 1894; Chalks Lookout, Thomas 3505; Big Basin, Dudley, Dec. 1, 1899; Near Boulder Creek, Thomas 2789.

8. Quercus dumosa Nutt. Sylva 1: 7. 1842.

Local distribution: Chaparral, San Mateo County southward on both slopes of the Santa Cruz Mountains. April through June.

General distribution: Mendocino County south through the Coast Ranges to northern Baja California, the Sierra Nevada foothills from Tehama County southward, and on some of the Channel Islands.

Specimens examined: Jasper Ridge, Abrams, May 5, 1904; Page Mill Road, Dudley, Apr. 14, 1900; Foothills west of Los Gatos, Heller 7534; Loma Prieta, Elmer 5018; Llagas Post Office, Dudley, June 6, 1909; Rancho del Oso, Thomas 2764; Mill Creek drainage, Thomas 4011.

9. Quercus durata Jepson, Fl. Calif. 1: 356. 1909.

Local distribution: Chaparral, usually restricted to serpentine soils, rocks, and ridges, Crystal Springs Lakes area south to southern Santa Clara County on the eastern slopes of the Santa Cruz Mountains. May through July.

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General distribution: Coast Ranges from Trinity County south to Santa Barbara County, in Los Angeles County, and in the Sierra Nevada foothills of Nevada, Placer, and El Dorado counties.

Specimens examined: San Francisco Watershed Reserve, Oberlander 359; Between Woodside and Crystal Springs Lake, Dudley, Apr. 27, 1909; Woodside serpentine, Dutton, Feb. 18, 1900; Jasper Ridge, Dudley, Jan. 25, 1901; Black Mt., Dudley, July 6, 1903; Loma Prieta, Dudley, May 30, 1893; Near Mt. Madona - Watsonville Road, Dudley, Mar. 11, 1901.

27. URTICACEAE

Plants with stinging hairs; leaves opposite.
  Pistillate flowers with distinct sepals.....1. Urtica.
  Pistillate flowers with united sepals.....2. Hesperocnide.
Plants lacking stinging hairs; leaves alternate.
  More or less erect plants, not rooting at the nodes; leaves over 5 mm. long, not shiny.....3. Parietaria.
  Prostrate plants, rooting at the nodes; leaves under 5 mm. long, shiny.....4. Helxine.

1. Urtica L. Sp. Pl. 983. 1753.

Plants annual; staminate and pistillate flowers in the same cluster; plants usually under 5 dm. tall.....1. U. urens.
Plants perennial; staminate and pistillate flowers in different clusters; plants usually over 10 dm. tall.
  Stems more or less glabrous; adaxial leaf surface nearly glabrous; leaf blade broadly ovate.....2. U. californica.
  Stems densely white-pubescent; adaxial leaf surface short-pubescent; leaf blade lanceolate to ovate.....3. U. holosericea.

1. Urtica urens L. Sp. Pl. 984. 1753.

Local distribution: Weeds of disturbed areas, cultivated fields, and gardens, fairly common but poorly collected. March through June.

General distribution: Introduced from Europe, widely naturalized in the United States.

Specimens examined: San Francisco, Rattan, May 5, 1878; Coal Mine Ridge, Barry 264; Aptos, Leeds, June 6, 1888; Pajaro Valley, Thomas 1566.

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2. Urtica californica Greene, Pittonia 1: 281. 1889.

Local distribution: Occasional along or near the coast from San Francisco south to central Santa Cruz County. April through July.

General distribution: Along or near the coast from Sonoma County south to central Santa Cruz County.

Specimens examined: Montara Mt., Raven 1979 (CAS); Alpine Creek Road, Sutliffe, July 12, 1933 (CAS); Mouth of Pescadero Creek, Ferris 1965; Gazos Creek, Hesse 941 (CAS); Santa Cruz, Thompson, July 20, 1903.

3. Urtica holosericea Nutt. Journ. Acad. Phila. 1: 183. 1847.

Local distribution: Occasional in moist areas in redwoods and along streams. May through October.

General distribution: Washington and Idaho south to northern Baja California, also in southern Nevada.

Specimens examined: Lake Merced, Rose 33383 (CAS); Between La Honda and Pescadero, Abrams 4246; Menlo Park, Abrams 2218; Page Mill Road, Randall 399; 3 miles south of Holy City, Rose 45294 (CAS); Near Felton, Howell 25354 (CAS); Boulder Creek, Hesse 1016 (CAS); Pajaro River, Thomas 3239.

2. Hesperocnide Torr. Pacif. R. Rep. 4: 139. 1857.

1. Hesperocnide tenella Torr. Pacif. R. Rep. 4: 139. 1857.

Local distribution: Fairly common in shaded areas, under shrubs or trees, San Francisco southward. Latter part of March through May.

General distribution: Coast Ranges from Napa County south to San Diego County and in the Sierra Nevada foothills from Amador County south to Kern County.

Specimens examined: Lone Mt., Rattan, 1877; Catholic Cemetery, San Francisco, Rattan, Apr. 27, 1877; Pescadero Creek, Ferris 2109; Woodside serpentine, Dutton, May 6, 1900; Stanford, Dudley, May 1902; Uvas Road

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near Gilroy Waterworks, Abrams 10113; Ben Lomond sand hills, Hesse 742; Soda Lake, Thomas 3311.

3. Parietaria L. Sp. Pl. 1052. 1753.

Leaves commonly 1.5 cm. long or longer, broadly ovate; not weak-stemmed, perennial. Introduced.....1. P. judaica.
Leaves commonly 0.5-1 cm. long, suborbicular to deltoid; weak-stemmed, annual. Native.....2. P. floridana.

1. Parietaria judaica L. Sp. Pl. ed. 2. 1492. 1763.

Local distribution: Occasional as a weed in San Francisco and Santa Cruz. May through October.

General distribution: Native of Europe, sparingly introduced into California.

Specimens examined: Hinckley Alley, San Francisco, Bacigalupi 2758; San Francisco, Graeter, Oct. 31, 1948 (CAS); Santa Cruz, Reed, Aug. 1919 (CAS).

2. Parietaria floridana Nutt. Gen. 2: 208. 1818.

Local distribution: Fairly rare, known only from near the coast along San Vicente Road in Santa Cruz County.

General distribution: Central California south to Baja California, on the Channel Islands, and in Florida.

Specimen examined: San Vicente Road, Hesse 1837.

4. Helxine Req. Ann. Sci. Nat. 5: 384. 1825.

1. Helxine soleirollii Req. Ann. Sci. Nat. 5: 384. 1825.

Local distribution: Occasional in gardens and lawns, persisting. To be found in flower at all times of the year.

General distribution: Native of Corsica and Sardinia, widely used

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in rock gardens.

Specimens examined: Lake St. near 20th Ave., San Francisco, Raven 6398; Palo Alto, Thomas 3895.

This species spreads vegetatively and may reproduce sexually. Plants have persisted in my garden in College Terrace, Palo Alto, for at least five years despite repeated attempts to remove them.

28. LORANTHACEAE

Leaves conspicuous, green, fleshy. Parasitic on angiosperms. 1. Phoradendron.
Leaves scale-like, yellowish. Parasitic on gymnosperms. 2. Arceuthobium.

1. Phoradendron Nutt. Journ. Acad. Phila. 1: 185. 1848.

1. Phoradendron villosum Nutt. Journ. Acad. Phila. 1: 185. 1848.

Local distribution: Parasitic on Quercus kelloggii, Q. douglasii, perhaps on other species of Quercus, and Castanopsis chrysophylla var. minor, throughout the Santa Cruz Mountains. To be found with flowers throughout most of the year.

General distribution: Willamette Valley, Oregon, south through the Coast Ranges and the Sierra Nevada foothills to the vicinity of Rosario, Baja California.

Specimens examined: Woodside, Rose, Dec. 14, 1930 (CAS); Stanford, Abrams 2250; Saratoga Summit, Dudley, Apr. 17, 1893; Bielawski Lookout, Thomas 2831; Near Burrell, Thomas 2849; Swanton, Rich, May 23, 1912.

Phoradendron villosum is also to be expected on Quercus lobata, Q. wislizenii, Alnus rhombifolia, and Umbellularia californica, although it has not been observed on these species in the Santa Cruz Mountains.

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2. Arceuthobium M. Bieb. Fl. Tour. Cauc. Suppl. 629. 1819.

1. Arceuthobium campylopodum Engelm. Bost. Journ. Nat. Hist. 6: 214. 1850.

Local distribution: Known as a native in the Santa Cruz Mountains only on Pinus attenuata and P. sabiniana in the vicinity of Mount Umunhum and Loma Prieta and on their eastern slopes. It has been collected on Pinus radiata at Stanford and in other parts of Santa Clara County. July through October.

General distribution: A wide-ranging species, southern Canada south to Mexico and from the Pacific Ocean eastward to Montana, Wyoming, and Texas, parasitic on a number of species of Abies, Larix, Picea, Pinus, and Tsuga.

Specimens examined: Stanford, Swabey, Apr. 10, 1923; Mt. Umunhum, Ferris 2083; Thomas 3977; Loma Prieta, Dudley, Apr. 20, 1895.

29. ARISTOLOCHIACEAE

Plants stemless; rootstalks creeping; flowers regular; stamens 12. 1. Asarum.
Plants caulescent; stems climbing; flowers irregular, calyx saccate; stamens 6.....2. Aristolochia.

1. Asarum L. Sp. Pl. 442. 1753.

1. Asarum caudatum Lindl. Bot. Reg. 17: under pl. 1399. 1831.

Local distribution: Deep shade in redwood - douglas fir forests in San Mateo and Santa Cruz counties, especially common along streams banks and on slopes which are kept moist by spring seepage, commonly growing with Oxalis oregana and with it often forming a dense green forest carpet. Latter part of March through July.

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General distribution: British Columbia south through Washington, northern Idaho, and Oregon to Santa Cruz County, absent from the Sierra Nevada.

Specimens examined: Butano Creek, Elmer 4421 (CAS); El Corte de Madera Creek, Dudley, Apr. 24, 1898; Near mouth of canyon of Pescadero Creek, Ferris 1962; Alma, Norton, 1881 (CAS); Los Gatos, Newell, July 20, 1914 (CAS); Glenwood, Davis, Spring 1907 (CAS); 7 miles north of Davenport, Crum 1706; Alba Road, Thomas 3743; Zayante Station, Rossbach 719.

Kellogg collected Asarum caudatum on May 17, 1870, in "Damp shady places — neighborhood of San Francisco." This collection may well have come from Marin County or San Mateo County as I have seen no other specimens nor know of other reports from San Francisco.

2. Aristolochia L. Sp. Pl. 960. 1753.

1. Aristolochia californica Torr. Pacif. R. Rep. 4: 128. 1857.

Local distribution: Known definitely from Lake Merced in San Francisco and reported from other parts of the Santa Cruz Mountains. February through May.

General distribution: Lassen and Shasta counties south to El Dorado and Monterey counties.

Specimens examined: Lake Merced, Congdon, May 22, 1892; Cannon, Feb. 1894 (CAS); Sand hills of Golden Gate Park, Mason 910 (UC).

I have seen no specimens from south of San Francisco. Anderson (1892, p. 126) reported this species from Santa Cruz County. McMinn (1939, p. 93) lists this species from San Mateo County. It is probable that Aristolochia californica does not extend farther south than San Francisco.

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30. POLYGONACEAE

Stipules none; cauline leaves when present opposite or alternate.
  Cauline leaves opposite, usually 2-lobed; flower not enclosed within an involucre; stems weak, prostrate to decumbent.
    1. Pterostegia.
  Cauline leaves opposite or alternate, entire; flowers enclosed within an involucre; stems not weak, usually more or less erect.
    Lobes of the involucres spiny; plants annual....2. Chorizanthe.
    Lobes in the involucres not spiny; plants annual or perennial.
      3. Eriogonum.
Stipules present, often scarious and sheathing; leaves alternate.
  Leaves not suborbicular; plants not usually vines.
    Perianth 6-parted.
      Perianth becoming bur-like in fruit, spinescent.
        4. Emex.
      Perianth herbaceous or papery in fruit, not spinescent.
        5. Rumex.
    Perianth usually 5- (in one species 4-) parted..6. Polygonum.
  Leaves suborbicular to elliptic; plants much branched vines.
    7. Muhlenbeckia.

1. Pterostegia Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 48. 1835.

1. Pterostegia drymarioides Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 48. 1935.

A common prostrate herb, growing in open woods, on brush-covered slopes, occasionally on serpentine, and on coastal sand dunes. March through June.

General distribution: Humboldt County south to northern Baja California through the Coast Ranges and the Sierra Nevada, in southwestern Utah, in Arizona, on some of the Channel Islands, and on Guadalupe Island.

Specimens examined: Mission Hills, Rattan, 1878; Hills north of Golden Gate Park, Rattan, Apr. 10, 1877; Montara Mt., Dudley, Mar. 17, 1900; Coal Mine Ridge, Barry 121; Stanford, Atkinson, Mar. 1900; Guadalupe Creek, Mason & Borthwick, Mar. 20, 1921; San Jose serpentine, Dutton, Apr. 30, 1900; Near Edenvale, Ferris, Apr. 23, 1918; Waddell Creek, Thomas 1722; Between Saratoga Summit and Boulder Creek, Thomas 1513; Santa Cruz, Jones 2239; Sunset Beach State Park, Thomas 3076.

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2. Chorizanthe R. Br. ex Benth. Trans. Linn. Soc. 17: 416. 1836.

Involucres 3-ribbed, the sides folded together, transversely wrinkled; teeth of the involucre lacking membranous margins.
1. C. polygonoides.

Involucres 6-ribbed, the sides not folded together, usually not transversely wrinkled; teeth of the involucre with scarious membranous margins (except in C. cuspidata var. cuspidata).

Membranous margins continuous across the sinuses between adjacent teeth.....2. C. membranacea.

Membranous margins not continuous across the sinuses.

Involucres over 4 mm. long; plants usually erect.
3. C. robusta.

Involucres less than 4 mm. long; plants erect to diffuse.

Lobes of the perianth pubescent abaxially, cuspidate; tube of the involucre with transverse wrinkles. Sand dune plants.

Teeth of the involucre lacking membranous margins.
4a. C. cuspidata var. cuspidata.

Teeth of the involucre with membranous margins.
4b. C. cuspidata var. marginata.

Lobes of the perianth usually glabrous abaxially, not cuspidate. Inland plants.

Membranous margins of the involucral teeth rose-colored; lobes of the perianth usually obovate, erose.
5. C. pungens var. hartwegii.

Membranous margins of the involucral teeth usually white; lobes of the perianth oblong to lanceolate, entire.
6. C. diffusa.

1. Chorizanthe polygonoides Torr. & Gray, Proc. Amer. Acad. 8: 197. 1870.

Local distribution: Known locally only from northern Santa Clara County. May and June.

General distribution: A widespread, but nowhere common, species ranging from Tehama and Modoc counties south to northern Baja California.

Specimen examined: Page Mill Road, Hesse 1136.

2. Chorizanthe membranacea Benth. Trans. Linn. Soc. 17: 419. 1836.

Local distribution: Dry rocky slopes along the crests of the

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Santa Cruz Mountains. May through July.

General distribution: Coast Ranges from Trinity County south to Santa Barbara County and in the Sierra Nevada foothills from Butte County south to Kern County.

Specimens examined: Castle Rock Ridge, Hesse 1599; Mt. Umunhum, Ferris 3610.

3. Chorizanthe robusta Parry, Proc. Davenp. Acad. 5: 176. 1889.

Local distribution: Coastal sand dunes, rarely inland, San Francisco southward. April through July.

General distribution: San Francisco and Alameda counties south to central Monterey County.

Specimens examined: Colma, Brandegee, June 1905; Santa Cruz, Thompson, June 22, 1903; Reed, June 21, 1917 (CAS); Sunset Beach, Thomas 3074, 3275; Near Watsonville, Smith, July 8, 1907; Hayward, July 5, 1929.

4a. Chorizanthe cuspidata Wats. var. cuspidata, Proc. Amer. Acad. 17: 379. 1882.

Local distribution: Coastal and inland sand dunes, San Francisco southward to the vicinity of Santa Cruz. April through July.

General distribution: Along or near the coast from southern Sonoma County south to the vicinity of Santa Cruz.

Specimens examined: Lake Merced, Raven 11032 (CAS); San Francisco, Jones 2386 (isotype); Mason 2871; Lone Mt., Rattan, June 1886; Dudley, June 3, 1894; San Pedro, Elmer 4793.

4b. Chorizanthe cuspidata Wats. var. marginata Goodman, Ann. Mo. Bot. Gard. 21: 40. 1934.

Local distribution: Coastal sand dunes and on sandy coastal

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bluffs, San Francisco south to central San Mateo County. May through June.

General distribution: Along the coast, San Francisco south to northern Monterey County.

Specimens examined: San Francisco, Brandegee, 1905; Lake Merced, Rose 41281; Near Ocean View, Heller 8383; Colma, Abrams 1603; Dudley, May 11, 1901; San Pedro, Elmer 4828 (isotype).

5. Chorizanthe pungens Benth. var. hartwegii (Benth.) Goodman, Ann. Mo. Bot. Gard. 21: 37. 1934.

Local distribution: Known from San Francisco and from Santa Cruz County where it occurs on inland marine sand deposits and in sandy soil on sandstone outcroppings. Latter part of April through June.

General distribution: Along the coast from San Francisco south to the vicinity of Monterey, Monterey County, and on inland sand deposits in Santa Cruz County.

Specimens examined: Near Eccles, Dudley, June 26, 1897; Saratoga to Big Basin, Rose 35227 (CAS); Big Basin, Dudley, May 29, 1897; Hilton Airport, Thomas 3121, 3376; 2.5 miles northwest of Boulder Creek, Thomas 1801; Glenwood, Rossbach 792; Ferris 11141; Ben Lomond sand hills, Hoover 5120; Ben Lomond, Elmer 4671; Felton, Thompson, July 11, 1903; Mt. Hermon, Bacigalupi 1491; Santa Cruz, Reed, June 21, 1917 (CAS).

6. Chorizanthe diffusa Benth. Pl. Hartw. 333. 1857.

Local distribution: Known from Jasper Ridge in southern San Mateo County and from dry sandy or rocky areas in Santa Cruz County. May and June.

General distribution: Coast Ranges from southern San Mateo County south to Santa Barbara County.

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Specimens examined: Jasper Ridge, Dudley, May 29, 1910; Abrams 1653; China Grade, Hesse 1276, 1286; Eagle Rock, Thomas 3480; Big Basin, Dudley, June 7, 1895; Ben Lomond sand hills, Thomas 6012; Howell 14762 (CAS); Near Mt. Hermon, Bacigalupi 1490; Santa Cruz, Thompson, June 22, 1903.

3. Eriogonum Michx. Fl. Bor. Amer. 1: 246. 1803.

Plants perennial; stout woody caudex present.
- Involucres aggregated into heads, rarely solitary, the heads terminal or axillary; leaves green adaxially, densely white-tomentose abaxially; stems glabrous or tomentose.
  - Stems white-tomentose, glabrate in age; heads usually 1 per peduncle-like stem, terminal. Coastal..1. E. latifolium.
  - Stems glabrous; heads usually several per stem, the stems branched above. Inland.....2. E. nudum.
- Involucres scattered along the stems; leaves densely white-tomentose on both surfaces; stems tomentose, glabrous in age. 3. E. saxatile.

Plants annual; roots slender.
- Perianth with uncinate bristles; involucres about 1 mm. long; plants diffusely branched above.....4. E. hirtiflorum.
- Perianth glabrous; involucres 3-5 mm. long; plants not diffusely branched above.
  - Involucres broadly campanulate; branches of the inflorescence short, not virgate; involucres mainly borne terminally. 5. E. argillosum.
  - Involucres cylindric; branches of the inflorescence long, virgate; involucres borne at the nodes of the virgate branches.
    - Plants usually densely tomentose or floccose throughout; involucres 4-5 mm. long, uniformly tomentose. 6. E. virgatum.
    - Plants usually tomentose or floccose only below, the distal internodes usually glabrous, reddish; involucres 2.5-3 mm. long, not uniformly tomentose, the ribs usually glabrous. 7. E. vimineum.

1. Eriogonum latifolium Smith in Rees, Cycl. 13: no. 3. 1809.

Local distribution: Coastal bluffs, San Francisco southward, often growing with Baccharis pilularis, Fragaria chiloensis, Eriophyllum staechadifolium, Dudleya farinosa, and Artemisia pycnocephala. June through October.

General distribution: Along the coast from Curry County, Oregon,

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south to the Monterey Peninsula.

Specimens examined: Presidio, Stokes 1; Twin Peaks, Rose 41271; Lands End, McMinn 310; Ocean View, Heller 8373; Half Moon Bay, Elmer 4557; Pescadero, Leitholt, July 29, 1894; Swanton, Rich, Spring 1912; Davenport, Thomas 3532; Santa Cruz, Brewer, Aug. 5, 1861; Capitola, Abrams 3041.

2. Eriogonum nudum Dougl. ex Benth. Trans. Linn. Soc. 17: 413. 1837.

(E. latifolium Smith ssp. decurrens Stokes, Gen. Eriog. 64. 1936.)

Local distribution: Fairly common on dry open slopes, inland marine sand deposits, rock outcroppings, and along the edges of chaparral, San Francisco southward. June through August.

General distribution: Western Washington south through Oregon and California to northern Baja California, east to western Nevada.

Specimens examined: Presidio, Heller 5710; Sweeney Ridge, Oberlander 215; Crystal Springs Lake, Elmer 4311; Peters Creek, Randall 284; Coal Mine Ridge, Barry 171; Stanford, Dudley, Aug. 28, 1897; Foothills west of Los Gatos, Heller 7522; Loma Prieta, Abrams 3046; Below Saratoga Summit, Thomas 1131; Glenwood, Davis, Sept. 1907; Near Felton, Dudley, Oct. 3, 1896; Mt. Hermon, Stokes 6; Soda Lake, Thomas 3302.

Eriogonum nudum is a variable species. Several subspecific entities have been proposed and are discussed by Stokes (1936).

3. Eriogonum saxatile Wats. Proc. Amer. Acad. 12: 267. 1877.

Local distribution: Known locally only from the eastern slope of Mount Umunhum, growing in rocky outcroppings and on serpentine. June through August.

General distribution: Santa Clara and Fresno counties southward to the higher mountains of southern California, also in Inyo and San Bernardino counties.

Specimens examined: Mt. Umunhum, Ferris 2085, 3611.

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Eriogonum fasciculatum Benth. ssp. foliosum (Nutt.) Stokes (Gen. Eriog. 86. 1936) was introduced into San Francisco prior to 1890 by sheep and persisted for at least a few years (Brandegee, 1891, p. 337). Specimens are: Fort Mason, Cannon, Sept. 1893 (CAS); Black Pt., Cannon, no date (CAS). Eriogonum fasciculatum ssp. foliolosum is native in California from Monterey County southward and differs from the other perennial species listed above in having linear-oblanceolate leaves borne in fascicles at the nodes of the stem.

4. Eriogonum hirtiflorum Gray ex Wats. Proc. Amer. Acad. 12: 259. 1877.

Local distribution: Known locally only from Empire Grade near Eagle Rock. July through September.

General distribution: Mendocino and Glenn counties south to Santa Cruz County, in the Sierra Nevada from Mariposa County south to Tulare County, and in Ventura County.

Specimens examined: Empire Grade, Hesse 995, 1162 (CAS).

5. Eriogonum argillosum Howell, Leafl. West. Bot. 1: 13. 1932.

Local distribution: Known only from the serpentine hills about 4 miles south of San Jose, but to be expected elsewhere in the Santa Clara Valley and the bordering foothills. Latter part of March through May.

General distribution: Mainly in the Inner Coast Ranges of Santa Clara, San Benito, and Monterey counties.

Specimen examined: Hills 4 miles south of San Jose, Rattan, May 1, 1887.

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6. Eriogonum virgatum Benth. in DC. Prod. 14: 16. 1856.

Local distribution: Occasional on the eastern slopes of the Santa Cruz Mountains in Santa Clara County and in dry creek bottoms in the Santa Clara Valley. July and August.

General distribution: Southern Oregon and cismontane California as far south as Los Angeles County.

Specimens examined: Black Mt., Dudley, July 6, 1903; Carnadero Creek, Thomas 4367.

7. Eriogonum vimineum Dougl. ex Benth. Trans. Linn. Soc. 17: 416. 1837.

Local distribution: Fairly common on rocky slopes, serpentine outcroppings, and in chaparral, central San Mateo County southward mainly on the eastern slopes of the Mountains. July through September.

General distribution: Western Washington south through Oregon, western Nevada, and California, to northern Baja California.

Specimens examined: Crystal Springs Lake, Abrams 2988; San Francisco Watershed Reserve, Oberlander 349; Belmont, Elmer 4309; Emerald Lake, Rose 41432; Jasper Ridge, Vestal, July 18, 1937; Stanford, Dudley, Aug. 28, 1897; Black Mt., Dudley, July 6, 1903; Mt. Umunhum, Ferris 3628; Loma Prieta, Elmer 4455; New Almaden, Rose 41437.

Eriogonum vimineum is variable and has been divided into a number of subspecific and varietal units (Stokes, 1936, pp. 47-53). Our plants may for the most part be referred to E. vimineum var. caninum Greene (Fl. Franciscana 150. 1891).

4. Emex Neck. Elem. 2: 214. 1790.

1. Emex australis Steinh. Ann. Sci. Nat. 9: 195. 1838.

Local distribution: Occasional as a weed in disturbed areas. June and July.

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General distribution: Native of South Africa and Australia, sparingly introduced into central California.

Specimen examined: San Francisco, Jones 2393.

5. Rumex L. Sp. Pl. 333. 1753.

Leaves hastate at the base; plants dioecious, perennial; inner perianth segments entire; lacking callous grains. 1. R. acetosella.
Leaves at most cordate at the base; plants monoecious, annual or perennial; inner perianth segments entire or not; callous grains present or not.
Stems branched below the inflorescence, often prostrate or decumbent; plants perennial; inner perianth segments entire; callous grains usually present on at least one perianth segment in each flower.
Leaf blades ovate-lanceolate or oblong-lanceolate, usually 2-3 times as long as wide; inner perianth segments 4-5 mm. long; callous grains about as wide as the inner perianth segment; branches of the inflorescence densely flowered. 2. R. crassus.
Leaf blades linear-oblong to lanceolate, usually at least 3 times as long as broad; inner perianth segments 2-4 mm. long; callous grains narrower than the inner perianth segment; branches of the inflorescence not densely flowered.
Callous grains usually 1 per flower, rarely lacking; achenes about 2 mm. long.....3. R. salicifolius.
Callous grains usually 3 per flower; achenes about 2.5 mm. long. 4. R. transitorius.
Stems not branched below the inflorescence, always erect; plants annual or perennial; inner perianth segments entire or not; callous grains present or not.
Callous grains lacking.....5. R. fenestratus.
Callous grains present on at least one inner perianth segment per flower.
Mature perianth segments entire.
Inner perianth segments 4-6 mm. long; callous grains narrower than the margins of the inner perianth segments; verticillate-like glomerules approximate, obscuring the stem; branches of the inflorescence strict. 6. R. crispus.
Inner perianth segments 2.5-3 mm. long; callous grains wider than the margins of the inner perianth segments; verticillate-like glomerules remote, not obscuring the stem; branches of the inflorescence spreading. 7. R. conglomeratus.
Mature perianth segments variously toothed or divided.
Plants annual; leaves 3 or more times as long as broad.

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Callous grains 1/2-1/3 the width of the body of the inner perianth segments, the body 1.7-2 mm. wide. 8. R. fueginus.

Callous grains about as wide as the body of the inner perianth segments, the body about 1 mm. wide. 9. R. persicarioides.

Plants perennial; leaves usually less than 2.5 times as long as wide.

Some branches of the inflorescence at right angles to the stem; achenes 3-4 mm. long; all inner perianth segments usually with callous grains and with 5-10 teeth on each margin.....10. R. pulcher.

Branches of the inflorescence rarely divergent at more than 45° from the stem; achenes about 2 mm. long; usually only one inner perianth segment with a callous grain, segments with 3-5 narrow teeth on each margin.....11. R. obtusifolius.

1. Rumex acetosella L. Sp. Pl. 338. 1753.

Local distribution: A common Rumex of disturbed areas, fallow fields, and in poor soils of open slopes, San Francisco southward. March through September.

General distribution: Widely introduced into temperate regions, native of Europe.

Specimens examined: San Francisco, Rattan, no date; Twin Peaks, Thomas 4873; 4 miles south of Daly City, Thomas 237; Moss Beach, Wiggins 2945; Cahill Ridge, Oberlander 59; Searsville Ridge, Davis, Apr. 1903; Stanford, Randall 288; Swanton, Rich, Mar. 6, 1912; Hilton Airport, Thomas 1326; Glenwood, Davis, Sept. 1907; Camp Evers, Thomas 1669; Sunset Beach, Thomas 3096.

2. Rumex crassus Rech. f. Rep. Sp. Nov. 40: 295. 1936.

Local distribution: Most common along the coast in sandy soil, occasionally inland. June through August.

General distribution: Coastal, Puget Sound, Washington, south to the Monterey Peninsula, also in Lassen County.

Specimens examined: Cliff House, Heller, June 16, 1902; San Francisco - San Mateo Co. line, Bacigalupi 2745; Montara, Rose 54134

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(CAS); Mussel Rock, Dudley, Oct. 4, 1909; Pescadero, Eastwood 18887 (CAS); Waddell Creek, Eastwood & Howell, June 26, 1938 (CAS); Santa Cruz, Thompson, June 23, 1903; Howell 10859 (CAS); Near Seabright, Dudley June 29, 1909.

3. Rumex salicifolius Weinm. Flora 4: 28. 1821.

Local distribution: Occasional in wet areas, along lakes, ponds, streams, and drainage ditches. May through August.

General distribution: British Columbia south to northern Baja California.

Specimens examined: Crystal Springs Reservoir, Dudley, Oct. 10, 1909; Near Crystal Springs Lake, Randall 291; Stevens Creek Rd., Randall, July 10, 1907; Uvas Creek, Ferris 3725; Glenwood, Dudley, June 19, 1909; Blooms Grade, Thomas 2384; Bear Creek Rd., Thomas 1849; Felton, Howell 19604.

4. Rumex transitorius Rech. f. Rep. Sp. Nov. 40: 296. 1936.

Local distribution: Edges of lakes and ponds or in moist disturbed areas. May through August.

General distribution: Coastal, occasionally inland, Aleutian Islands, southern Alaska, southward to Ventura County, and in the Sierra Nevada from Butte County to El Dorado County.

Specimens examined: San Francisco, Rattan, no date; San Pedro, Goodman, July 23, 1918 (CAS); Lake Lagunita, Dudley, June 25, 1897; Stanford, Thomas 7218; Palo Alto, Dudley, June 22, 1909; Near Moffett Field, Thomas 7245.

5. Rumex fenestratus Greene, Pittonia 4: 306. 1901.

Local distribution: Known only from San Francisco and in northern San Mateo County, growing in marshes. May through August.

General distribution: Alaska east to Labrador, south to Monterey County, the southern part of the Hudson Bay, and Nova Scotia.

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Specimens examined: Lake Merced, Rubtzoff 2765 (CAS), 3415 (CAS); Near San Mateo, Dudley, May 1894.

6. Rumex crispus L. Sp. Pl. 335. 1753.

Local distribution: The most common species of Rumex in the Santa Cruz Mountains, growing along streams, drainage ditches, wet fields, and along the edges of ponds. April through July.

General distribution: Native of Eurasia, now a cosmopolitan weed.

Specimens examined: Mt. Lake, San Francisco, Pettibone, July 21, 1894 (CAS); Cahill Ridge, Oberlander 328; Near Crystal Springs Lake, Randall 291; San Mateo, Elmer 4266; Coal Mine Ridge, Barry 169; Stanford, Dudley, June 6, 1893; Black Mt., Dudley, July 1, 1903; Foothills west of Los Gatos, Heller 7303; Santa Cruz, Thompson, June 29, 1903; Twin Lakes, Dudley, Nov. 27, 1908; Pajaro River, Thomas 3245; Near mouth of Pajaro River, Thomas 2408.

7. Rumex conglomeratus Murr. Prod. Fl. Gott. 52. 1770.

Local distribution: Fairly common in low moist areas where water stands in the spring and along the edges of marshes, ponds, and streams. Latter part of April through October.

General distribution: Native of Europe, widely introduced into North America.

Specimens examined: Mt. Lake, Eastwood, June 1917 (CAS); Crystal Springs Lake, Randall 290; San Mateo, Wolf 3658; Stanford, Dudley, June 25, 1897; Alviso, Dudley, Nov. 9, 1903; Camp Evers, Thomas 1668; Santa Cruz, Thompson, June 29, 1903; Watsonville, Dudley, Oct. 10, 1908.

8. Rumex fueginus Phil. Anal. Univ. Chile 91: 493. 1895.

Local distribution: Borders of lakes, ponds, and marshes, San Francisco southward. June through August.

General distribution: Southern Canada, throughout most of the United States, Ecuador, and southern South America.

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Specimens examined: Lake Merced, Howell 2241 (CAS); Mt. Lake, Abrams 2204; San Andreas Lake, Oberlander 1106; Crystal Springs Lake, Ferris 729; Near Pescadero, Wiggins 8049; Kelly Lake, Hesse 1414; Pajaro River, Dudley, Sept. 1909.

9. Rumex persicarioides L. Sp. Pl. 335. 1753.

Local distribution: Occasional in marshes near the coast in San Mateo and Santa Cruz counties. June through August.

General distribution: New England and adjacent Canada, Oregon, and the Santa Cruz Mountains, California.

Specimens examined: Granada, Walker 1539 (UC); Pilarcitos Creek, Dudley, Nov. 18, 1896; Moss Beach, Wiggins 3870.

10. Rumex pulcher L. Sp. Pl. 336. 1753.

Local distribution: Fairly common in moist pastures and disturbed areas. May through July.

General distribution: Native of Europe, now naturalized on all continents.

Specimens examined: San Francisco, Rattan, May 1887; Laguna Honda, Dudley, Nov. 8, 1908; Pilarcitos Stone Dam, Dudley, June 28, 1909; Crystal Springs Lake, Oberlander 342; Millbrae, Dudley, May 17, 1893; Coal Mine Ridge, Barry, June 22, 1938; Stanford, Abrams 1659; Seabright, Dudley, June 28, 1909.

11. Rumex obtusifolius L. Sp. Pl. 335. 1753.

Local distribution: Occasional along streams and the shores of lakes. May through September.

General distribution: Native of Europe, widely established in North America.

Specimens examined: Golden Gate Park, Clear, July 1, 1938 (CAS); Lake Merced, Eastwood, Sept. 1894 (CAS).

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6. Polygonum L. Sp. Pl. 359. 1753.

Plants climbing vines; leaves hastate to cordate at the base.
1. P. convolvulus.
Plants not vines; leaves never hastate, rarely cordate at the base.
Leaves articulate with the sheaths, dehiscent at the point of articulation; flowers scattered along the stems, solitary or few in the axils of the leaves.
Plants perennial; leaf margins strongly revolute; midribs of the leaves keeled, prominent.....2. P. paronychia.
Plants annual; leaf margins revolute or not; midribs of the leaves not keeled, usually not prominent.
Achenes smooth.....3. P. patulum.
Achenes striate.....4. P. aviculare.
Leaves not articulate with the sheaths, rarely dehiscent, usually withering; flowers in definite, spike-like racemes.
Inflorescences 1 or rarely 2 per stem or branch, terminal; peduncles stout, 1-2 mm. in diameter; perianth rose-red.
Inflorescences 5-10 cm. long; leaves lanceolate to ovate-lanceolate; sheaths never with herbaceous margins.
5. P. coccineum.
Inflorescences 1-4 cm. long; leaves elliptic to oblong; sheaths of terrestrial plants with herbaceous margins.
6. P. natans.
Inflorescences numerous, terminal or in the axils of the leaves; peduncles slender, under 3/4 mm. in diameter; perianth pink, greenish, or white.
Perianth glandular-punctate.....7. P. punctatum.
Perianth glabrous, not glandular-punctate.
Perianth 5-parted.....8. P. persicaria.
Perianth 4-parted.....9. P. lapathifolium.

1. Polygonum convolvulus L. Sp. Pl. 364. 1753.

Local distribution: Occasional in disturbed areas, in gardens, and along roadsides. July through September.

General distribution: Native of Europe, widely introduced into the United States.

Specimens examined: San Francisco, Clear, June 26, 1939 (CAS); Near Half Moon Bay, Wiggins 8159; Stanford, Abrams, Aug. 30, 1910.

2. Polygonum paronychia Cham. & Schlecht. Linnaea 3: 51. 1828.

Local distribution: Coastal sand dunes and sandy bluffs along the coast. May through July.

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General distribution: Along the coast, Vancouver Island, British Columbia, south to the Monterey Peninsula, Monterey County.

Specimens examined: San Francisco, Vasey, July 1880; Greene, May 6, 1891; Cliff House, Heller 5672; Lake Merced, Abrams 1606; Pescadero, Grant 944; Pebble Beach, Hesse 1343; Ano Nuevo Pt., Class collection, Summer 1940; Palm Beach, McMinn 259.

3. Polygonum patulum Bieberst. Fl. Taur. Cauc. 1: 304. 1808.

Local distribution: Known from the salt marshes bordering San Francisco Bay and as an occasional urban weed. June through October.

General distribution: Native of Europe, sparingly introduced into central California.

Specimens examined: San Francisco, Howell 31378 (CAS); Redwood City, Howell 29057 (CAS); Cooleys Landing, Abrams 2213; Dudley, Sept. 14, 1901; Between Palo Alto & Sunnyvale, Howell 11712A.

4. Polygonum aviculare L. Sp. Pl. 362. 1753.

Local distribution: A common species of dry land, packed soils, and disturbed areas. May through October.

General distribution: Native of Eurasia, now nearly cosmopolitan as a weed.

Specimens examined: Golden Gate Park, Stacey, Sept. 6, 1937 (CAS); Cahill Ridge, Oberlander 316; San Gregorio Creek, Thomas 1145; Stanford, Randall 285; Alviso, Thomas 5305; Moffet Field, Thomas 7239; Rancho del Oso, Thomas 2463; Swanton, Rich, May 1912; Blooms Grade, Thomas 3590; Pajaro River, Thomas 3222; Near Watsonville, Thomas 2426.

Polygonum aviculare is exceedingly variable with respect to internode length, length of the branches, position of the branches, and length of the perianth. Plants with erect stems have been called P. aviculare L. var. erectum (L.) Roth (Teut. Fl. Germ. 1: 174. 1788). Fleshy-leaved plants with prostrate stems and very short internodes have

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been called P. aviculare L. var. littorale (Link.) Martens & Koch (Deutsche Fl. 3: 59. 1831). Polygonum aviculare var. aviculare has prostrate stems and internodes which are about as long as the leaves.

5. Polygonum coccineum Muhl. ex Willd. Enum. Hort. Berol. 428. 1809.

Local distribution: A common Polygonum of ponds, lakes, the edges of fresh-water marshes, and along the edges of slow-flowing streams, becoming terrestrial as the water dries up, San Francisco southward. July through October.

General distribution: British Columbia south to southern California, east to the Atlantic coast.

Specimens examined: Lake Merced, Kellogg & Harford, Aug. 22, 1868; Crystal Springs Lake, Randall 287; Woodside, Dudley, Oct. 31, 1909; Searsville Lake, Dudley, Oct. 31, 1909; Coal Mine Ridge, Ferris 2048; Lake Lagunita, Thomas 5527; Raymonds, Dudley, Sept. 1, 1906; Waddell Creek, Dudley, Sept. 1901; Kelly Lake, Dudley, Oct. 11, 1908; Pajaro River, Dudley, Sept. 27, 1903; Watsonville, Hayward, Aug. 4, 1928.

6. Polygonum natans (Michx.) Eat. Man. Bot. 400. 1822.

Local distribution: Occasional in ponds in northern San Mateo County and probably elsewhere. July through October.

General distribution: Cosmopolitan.

Specimens examined: Northern end of San Mateo Co., Dudley, Oct. 4, 1907; San Pedro, Elmer 4650.

7. Polygonum punctatum Ell. Bot. S. C. & Ga. 1: 445. 1817.

Local distribution: Fairly common along the edges of ponds, lakes, and slow-moving streams, San Francisco southward. June through October.

General distribution: Southern Canada, the United States, and southward through central America to Argentina.

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Specimens examined: Mt. Lake, Cannon, Oct. 1896 (CAS); San Andreas Lake, Oberlander 387; Pedro Pt., Ferris 11107 (CAS); Pilar Pt., Dudley, Oct. 10, 1897; Searsville Lake, Abrams 1003; Felt Lake, Dudley, Oct. 5, 1898; Mt. View - Alviso, Abrams 3094; Near Santa Clara, Dudley, Sept. 13, 1897; Rancho del Oso, Thomas 2473; Santa Cruz, Thompson, June 29, 1903; Watsonville, Dudley, Sept. 1909.

8. Polygonum persicaria L. Sp. Pl. 361. 1753.

Local distribution: Marshes, edges of ponds, and drainage ditches, occasional from San Francisco southward. July through October.

General distribution: Native of Europe, widely introduced into North America.

Specimens examined: Mt. Lake, Eastwood, Oct. 1917 (CAS); San Andreas Lake, Oberlander 317; About 6 miles north of Boulder Creek, Thomas 3594; Watsonville, Dudley, Sept. 1909; Hayward, Aug. 9, 1928.

9. Polygonum lapathifolium L. Sp. Pl. 360. 1753.

Local distribution: Common in streams, marshes, ditches, ponds, and lakes, San Francisco southward. August through October.

General distribution: Native of Europe, widely introduced into other parts of the northern hemisphere.

Specimens examined: Presidio, Cannon, Sept. 17, 1894 (CAS); San Francisco, Howell 8124; Pilar Pt., Dudley, Oct. 11, 1897; Felt Lake, Abrams 2238; Searsville Lake, Ferris 4094; Lake Lagunita, Dudley, Oct. 1897; Campbell Creek, Ferris 2060; Wrights, Elmer 5010; Aptos, Abrams 3035; Santa Cruz - Watsonville Rd., Dudley, Sept. 18, 1909; Watsonville, Dudley, Sept. 1909.

Plants in which the abaxial leaf surfaces are white-tomentose have been called P. lapathifolium L. var. salicifolium Sibth. (Fl. Oxon. 129. 1794).

7. Muhlenbeckia Meissn. Pl. Vasc. Gen. 227. 1840.

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1. Muhlenbeckia complexa Meissn. Pl. Vasc. Gen. 227. 1840.

Local distribution: Occasional as a garden escape in San Francisco and perhaps elsewhere. January through November.

General distribution: Native of New Zealand, occasional as an escape from cultivation in temperate regions.

Specimens examined: Presidio, Raven 8233 (CAS); Golden Gate Park, Eastwood, Jan. 1914 (CAS); Lake Merced, Rubtzoff 3050 (CAS).

31. CHENOPODIACEAE

Leaves reduced to opposite scales; stems and branches succulent, terete, the basal ones becoming woody.....1. Salicornia.
Leaves not reduced to scales, alternate; stems often somewhat succulent.
  Fruit dehiscent; calyx indurate at the base.....2. Beta.
  Fruit commonly indehiscent; calyx not indurate at the base.
    At least some utricles in each plant enclosed by 2 separate or partly united bracts.
      Leaf blades under 5 cm. long, variously shaped; plants commonly scurfy, occasionally glabrous; bracts not becoming spinescent.....3. Atriplex.
      Leaf blades 5-20 cm. long, deltoid to hastate; plants glabrous; bracts with 2-3 spines at maturity.....4. Spinacia.
    Utricles subtended by a 3- or 5-merous calyx.
      Fruiting calyx winged or armed with hooks on the abaxial surface.
        Calyx-lobes each with a hook.....5. Echinopsilon.
        Calyx-lobes horizontally winged.
          Leaves pungent; wings broad.....6. Salsola.
          Leaves not pungent; wings small.....7. Kochia.
      Fruiting calyx sometimes keeled, but not usually with wings or hooks.
        Stamens and calyx-lobes commonly 1.....8. Monolepis.
        Stamens and calyx-lobes commonly 3 or 5.
          Leaves narrowly linear, semiterete, fleshy. 9. Suaeda.
          Leaves with a flattened blade, fleshy or not.
            Fruiting calyx herbaceous or fleshy, not reticulate. 10. Chenopodium.
            Fruiting calyx dry, reticulate.....11. Roubieva.

1. Salicornia L. Sp. Pl. 3. 1753.

Plants perennial, commonly rooting at the nodes. Common. 1. S. pacifica.
Plants annual. Rare.....2. S. depressa.

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1. Salicornia pacifica Standley, N. Amer. Fl. 21: 83. 1916.

Local distribution: Salt marshes along the ocean and along San Francisco Bay, occasionally inland along the borders of sloughs. July through November.

General distribution: Coastal salt marshes, southern Alaska south to Baja California, occasionally inland in alkaline soils, and along the coast of Sonora, Mexico.

Specimens examined: San Francisco, Howell 31908 (CAS); San Mateo, Sindel 303 (UC); Palo Alto, Dudley, Oct. 18, 1897; McMurphy, Aug. 1906; Near Mt. View, Dudley, July 18, 1903; Alviso, Thomas 5306; Near Santa Cruz, Dudley, July 1895; Capitola, Wilson 334 (UC); Near Chittenden Station, Dudley, Oct. 10, 1908; Near mouth of Pajaro R., Thomas 2389, 2390; 5 miles west of Watsonville, Clar 6 (UC).

2. Salicornia depressa Standley, N. Amer. Fl. 21: 85. 1916.

Local distribution: Known only from the salt marshes east of Palo Alto. August through November.

General distribution: At scattered localities from Sonoma County south to Baja California.

Specimen examined: Palo Alto, Congdon, Aug. 1897 (UC).

Arthrocnemum subterminale (Parish) Standley (Journ. Wash. Acad. Sci. 4: 399. 1914) has been collected on the eastern side of San Francisco Bay north of Milpitas by Dr. Carl Sharsmith. His specimen is in the herbarium of San Jose State College. This species is to be expected in low alkaline fields and may be distinguished from Salicornia pacifica by the fact that the flowers are subterminal rather than terminal on the branches.

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2. Beta L. Sp. Pl. 222. 1753.

1. Beta vulgaris L. Sp. Pl. 222. 1753.

Local distribution: Common as an escape from cultivation in the lower portion of the Santa Clara Valley in low alkaline areas, fallow fields, and salt marshes, less frequently elsewhere. April through November.

General distribution: Native of Europe, grown in all temperate regions, and commonly naturalized.

Specimens examined: San Francisco, Howell 31674 (CAS); Bayview Hills, Howell 31475 (CAS); Embarcadero Rd., Congdon, Aug. 20, 1897; Near Moffett Field, Thomas 7232; Alviso, Thomas 5308; Near Santa Clara, Dudley, Sept. 13, 1897; Near Mouth of Pajaro River, Thomas 1579.

3. Atriplex L. Sp. Pl. 1052. 1753.

Plants perennial; herbage usually at least somewhat furfuraceous.
  Erect shrubs; plants dioecious; mature bracts 2-3 mm. long.
    1. A. lentiformis var. breweri.
  Prostrate to decumbent herbaceous perennials, often woody at the base; plants monoecious; mature bracts 3-7 mm. long.
    Mature bracts united to the middle, 5-7 mm. long, tuberculate on the surfaces; leaves oblong to orbicular.
      2. A. leucophylla.
    Mature bracts distinct or united only at the base, 3-5(7) mm. long, the surfaces not tuberculate; leaves lanceolate to elliptic or oblong.
      Mature bracts united at the base, 4-5(7) mm. long; leaves oblong to oblong-ovate, about 3.5 cm. long, the lower usually toothed, usually glabrous and green adaxially.
        3. A. semibaccata.
      Mature bracts distinct, about 3 mm. long; leaves elliptic to lanceolate or oblanceolate, 1-2 cm. long, entire, densely furfuraceous adaxially...4. A. californica.
Plants annual; herbage furfuraceous to glabrous.
  Pistillate flowers of 2 kinds, some with 2 bracts, others with a 5-parted calyx; bracts broadly ovate to orbicular, entire.
    5. A. hortensis.
  Pistillate flowers all 2-bracteate; bracts usually more or less deltoid, toothed or divided.
    Mature bracts variously toothed or truncate.

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Mature bracts with several sharp teeth at the apex, 2-2.5 mm. long, usually not tuberculate on the surfaces. 6. A. serenana.
Mature bracts toothed on the margins, but the terminal portion of the bract entire or more or less truncate, 2-12 mm. long, usually more or less tuberculate on the surfaces.
Mature leaves densely furfuraceous; mature bracts 4-12 mm. long.
Mature bracts truncate or shallowly 3-toothed terminally; leaves usually cordate at the base. 7. A. truncata.
Mature bracts acute terminally; leaves cuneate or rounded at the base.....8. A. rosea.
Mature leaves more or less glabrous.
Lower cauline leaves lanceolate to oblong, not hastate. 9a. A. patula var. patula.
Lower cauline leaves deltoid to rhomboidal, hastate. 9b. A. patula var. hastata.
Mature bracts entire.....10. A. joaquiniana.

1. Atriplex lentiformis (Torr.) Wats. var. breweri (Wats.) McMinn, Ill. Man. Calif. Shrubs 113. 1939.

Local distribution: Occasional in saline soils near the coast, known locally only from Watsonville. August through October.

General distribution: Solano County southward to northern Baja California, eastward to the San Joaquin Valley.

Specimen examined: Watsonville, Dudley, Oct. 10, 1908.

This variety is occasionally used as an ornamental hedge plant (Atherton, Duncan, Sept. 1922).

2. Atriplex leucophylla (Moq.) Dietr. Syn. Pl. 5: 536. 1852.

Local distribution: Coastal sand dunes and beaches, San Francisco southward, commonly growing with Franseria bipinnatifida. June through September.

General distribution: Humboldt County south along the coast to the vicinity of Vizcaíno Bay, along the margins of San Francisco Bay,

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and on some of the Channel Islands.

Specimens examined: San Francisco, Vasey, June 1880; Bacigalupi 2773; Princeton, Rose 41460; Moss Beach, Wiggins 3871; Swanton, Rich, Spring 1912; Waddell Creek, Thomas 2481; Davenport, Hesse 1149; Santa Cruz, Heller, Aug. 27, 1924; Between Santa Cruz and Capitola, Howell 4379 (CAS); Palm Beach, McMinn 269.

3. Atriplex semibaccata R. Br. Prod. 406. 1810.

Local distribution: Occasional as a weed in San Francisco, Alviso, and probably elsewhere, usually in saline soils. June through September.

General distribution: Native of Australia, widely introduced into Oregon, California, and Arizona.

Specimens examined: San Francisco, Howell 32842 (CAS); Alviso, Thomas 7253.

4. Atriplex californica Moq. in DC. Prod. 13: 98. 1849.

Local distribution: Sand dunes along the coast. June and July.

General distribution: Coastal sand dunes, Marin County south to the vicinity of Cedros Island, Baja California, on the Channel Islands, and on Guadalupe Island.

Specimens examined: Pilar Pt., Baker 1743 (CAS); Santa Cruz, Keck 2975; Seabright, Dudley, June 29, 1909; Palm Beach, McMinn 268.

5. Atriplex hortensis L. Sp. Pl. 1053. 1753.

Local distribution: Occasional as a weed in disturbed areas, most common along Bayshore Highway in southern San Mateo and northern Santa Clara counties. August and September.

General distribution: Native of Asia, widely naturalized in the United States and southern Canada.

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Specimens examined: Redwood City, Ferris 8270; Wiggins 6969; Near Moffett Field, Ferris & Wiggins 11103.

6. Atriplex serenana Nels. Proc. Biol. Soc. Wash. 17: 99. 1904.

Local distribution: Known only from San Francisco and from near Watsonville, in the latter locality growing along the Pajaro River. July through October.

General distribution: Sacramento Valley south to northern Baja California, occasionally in the Coast Ranges, and in Nevada.

Specimens examined: Golden Gate Park, Eastwood, Oct. 1919 (CAS); Watsonville, Dudley, Sept. 1909.

7. Atriplex truncata (Torr.) Gray, Proc. Amer. Acad. 8: 398. 1872.

Local distribution: Rare as a weed in San Francisco. May through July.

General distribution: British Columbia south to Mexico, east to Colorado, introduced into central California.

Specimen examined: San Francisco, Howell 32850 (CAS).

8. Atriplex rosea L. Sp. Pl. ed. 2. 1493. 1763.

Local distribution: Occasional as a weed in San Francisco and in northern Santa Clara County, commonly growing along the edges of cultivated fields. August and September.

General distribution: Native of Eurasia, widely introduced into North America and Africa.

Specimens examined: San Francisco, Eastwood, Sept. 9, 1819 (CAS); Howell 32634 (CAS); Palo Alto Yacht Harbor, Ferris 8268; Near Bayshore and Embarcadero Roads, Wiggins 6966.

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9a. Atriplex patula L. var. patula, Sp. Pl. 1053. 1753.

Local distribution: Occasional in salt marshes. July through September.

General distribution: Widespread from British Columbia south to southern California, eastward to the Atlantic Ocean; also in Eurasia.

Specimens examined: San Francisco, Howell 31905 (CAS); Santa Cruz, Dudley, Oct. 4, 1896.

9b. Atriplex patula L. var. hastata (L.) Gray, Man. 409. 1867.

Local distribution: Common in salt marshes along the coast and along San Francisco Bay, occasionally inland. July through September.

General distribution: Widespread from British Columbia south to southern California, eastward to the Atlantic; also in Eurasia.

Specimens examined: San Francisco, Eastwood, Sept. 9, 1918 (CAS); Near Colma, Abrams & Wiggins 177; Moss Beach, Wiggins 3873; San Mateo, Howell 661 (CAS); Cooleys Landing, Abrams 2215; Searsville Lake, Ferris 4095; Palo Alto, Keck 1301 (CAS); Alviso, Abrams 3097; Santa Cruz, Hesse 585; Thomas 1191; Watsonville Slough, Hayward, July 1931; Near mouth of Pajaro River, Thomas 2406.

10. Atriplex joaquiniana Nels. Proc. Biol. Soc. Wash. 17: 99. 1904.

Local distribution: Occasional as a weed in San Francisco. June through September.

General distribution: Central Valley and the Inner Coast Ranges, occasional as a weed elsewhere.

Specimen examined: Golden Gate Park, Eastwood, Sept. 9, 1921 (CAS).

4. Spinacia L. Sp. Pl. 1027. 1753.

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1. Spinacia oleracea L. Sp. Pl. 1027. 1753.

Local distribution: Occasional as an escape from cultivation in low wet areas, especially near the coast. March through May.

General distribution: Native of Eurasia, widely grown as a vegetable, occasionally found as an escape from cultivation.

Specimen examined: Northwestern San Mateo County, Eastwood & Howell, Mar. 1937 (CAS).

5. Echinopsilon Moq. Ann. Sci. Nat. 2: 127. 1834.

1. Echinopsilon hyssopifolium (Pall.) Moq. in DC. Prod. 13: 135. 1849.

(Bassia hyssopifolia (Pall.) Kuntze, Gen. Pl. 547. 1891.)

Local distribution: Salt marshes and disturbed areas in San Francisco and in the Santa Clara Valley. July through October.

General distribution: Native of Europe, widely introduced into the Pacific States, eastward to at least Wyoming and Arizona; also introduced into Australia.

Specimens examined: San Francisco, Howell 32635 (CAS); Palo Alto Yacht Harbor, Ferris 8267; Sutliffe, Sept. 27, 1931 (CAS); Alviso, Thomas 5311; San Jose, Smith, Oct. 8, 1941.

6. Salsola L. Sp. Pl. 222. 1753.

1. Salsola kali L. Sp. Pl. 222. 1753.

Local distribution: Occasional in disturbed areas, known from San Francisco, the Santa Clara Valley, and Watsonville. July through October.

General distribution: Native of Eurasia, now nearly cosmopolitan as a weed.

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Specimens examined: Mission Rock terminal, San Francisco, Howell 31687 (CAS); Lake Merced, Howell 31882 (CAS); Bayview Hills, Howell 31742 (CAS); Coyote, Abrams 10978; Watsonville, Dudley, Sept. 1909.

7. Kochia Roth in Schrad. Journ. Bot. 1: 307. 1801.

1. Kochia scoparia (L.) Roth in Schrad. Neues Journ. 3: 85. 1809.

Local distribution: Disturbed areas near the waterfront in San Francisco. June through September.

General distribution: Native of Eurasia, widely introduced into the western states.

Specimens examined: Mission Rock terminal, Howell 31774 (CAS), 31898 (CAS); Thomas 7279.

8. Monolepis Schrad. Ind. Sem. Hort. Goett. 1830: 4. 1830.

1. Monolepis nuttalliana (Roem. & Schult.) Greene, Fl. Franciscana 168. 1891.

Local distribution: Known locally only as a weed from San Francisco. May through September.

General distribution: Widespread in North America, Siberia, and Patagonia.

Specimen examined: San Francisco, Howell 32629 (CAS).

9. Suaeda Forsk. Fl. Aegypt. 69. 1775.

Plants annual, erect; calyx-lobes with horn-like appendages. 1. S. depressa var. erecta.

Plants perennial, prostrate to decumbent; calyx-lobes without appendages. 2. S. californica.

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1. Suaeda depressa (Pursh) Wats. var. erecta Wats. Proc. Amer. Acad. 9: 90. 1874.

Local distribution: Known only from Soda Lake in southern Santa Cruz County. May through August.

General distribution: Widespread from the Pacific States east to Saskatchewan, Minnesota, and Texas.

Specimens examined: Soda Lake, Hayward, July 1929; Belshaw 2199 (UC), 2200 (UC).

2. Suaeda californica Wats. Proc. Amer. Acad. 9: 89. 1874.

Local distribution: Salt marshes along San Francisco Bay, rarely collected. July through October.

General distribution: Salt marshes in San Francisco Bay, San Luis Obispo County south to Baja California, on the Channel Islands, and on some of the islands off the coast of Baja California.

Specimen examined: Bay, Palo Alto, McMurphy, Jan. 16, 1905.

10. Chenopodium L. Sp. Pl. 218. 1753.

Leaves glandular-pubescent or glandular-punctate at least abaxially.
  Leaves glandular-pubescent at least abaxially.
    1. C. botrys.
  Leaves glandular-punctate abaxially.
    Inflorescence bracteate; leaves sinuate-dentate.
      2a. C. ambrosioides var. ambrosioides.
    Inflorescence ebracteate; leaves laciniate-serrate.
      Stems densely wooly..2b. C. ambrosioides var. vagans.
      Stems more or less glabrous, not densely wooly.
        2c. C. ambrosioides var. anthelminticum.
Leaves glabrous or scurfy abaxially, never glandular.
  Most seeds situated vertically.
    Flowers in a terminal spike-like inflorescence.
      3. C. californicum.
    Flowers in axillary clusters.
      4. C. farinosum.
  Seeds all situated horizontally.

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Leaves mealy abaxially, pale; seeds shiny.
5. C. album.
Leaves usually glabrous abaxially, dark green; seeds dull.
6. C. murale.

1. Chenopodium botrys L. Sp. Pl. 219. 1753.

Local distribution: Occasional along highways and in stream beds. April through September.

General distribution: Native of Eurasia, widely introduced into other temperate regions.

Specimens examined: Presidio, Rattan, Apr. 1883; San Francisco, Howell 32810 (CAS); Wrights, Dudley, Sept. 29, 1894; Lexington, Dudley, Sept. 11, 1906; Saratoga Summit, Hesse 1214.

2a. Chenopodium ambrosioides L. var. ambrosioides, Sp. Pl. 219. 1753.

Local distribution: Occasional as a weed in disturbed areas. July through December.

General distribution: Native of tropical America, widely introduced into temperate North America.

Specimens examined: San Francisco, Rattan, 1880; Curran, July 1882; Crystal Springs, Abrams 2997; Menlo Park, Dudley, Dec. 8, 1897; Stanford, Dudley, June 29, 1894; Wrights, Dudley, Oct. 11, 1902; Near Eccles, Dudley, June 26, 1897; Santa Cruz, Dudley, Nov. 29, 1908; Pajaro River, Thomas 3243.

2b. Chenopodium ambrosioides L. var. vagans (Standl.) Howell, Leafl. West. Bot. 5: 105. 1948.

(C. ambrosioides L. ssp. chilense Aellen, Fedde Rep. Spec. Nov. 26: 36. 1929.)

Local distribution: Occasional as a weed in San Francisco. July through December.

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General distribution: Native of South America, occasional as a weed in the United States.

Specimen examined: Mt. Lake, Raven 8225 (CAS).

2c. Chenopodium ambrosioides L. var. anthelminticum (L.) Gray, Man. 364. 1856.

Local distribution: Occasional in disturbed areas in the Santa Clara Valley. July through December.

General distribution: Native of tropical America, widely established in the United States and southern Canada.

Specimen examined: Campbell, Ferris 2095.

3. Chenopodium californicum (Wats.) Wats. Bot. Calif. 2: 48. 1880.

Local distribution: Widespread on moist slopes, occasionally in sandy soils, and becoming a weed in disturbed areas, poorly collected locally. February through June.

General distribution: Coast Ranges from Glenn County south to northern Baja California, occasionally in the Sierra Nevada foothills, and on most of the Channel Islands.

Specimens examined: Lake Merced, Rubtzoff 2467 (CAS); Bayview Hills, Howell 32315 (CAS); Stanford, Randall 38; Swanton, Rich, May 12, 1912; Sunset Beach, Thomas 3072.

4. Chenopodium farinosum (Wats.) Standley, N. Amer. Fl. 21: 28. 1916.

Local distribution: Edges of salt marshes along the coast and San Francisco Bay and along the margins of stagnant ponds. July through November.

General distribution: Marin and Contra Costa counties south to

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Los Angeles County, mainly along or near the coast.

Specimens examined: Salada, Abrams & Wiggins 178; Menlo Park, Abrams 4018; Near Palo Alto, Halsey, Sept. 26, 1908; Near Santa Cruz, Dudley, Nov. 27, 1908; Chittenden, Dudley, Oct. 10, 1908.

5. Chenopodium album L. Sp. Pl. 219. 1753.

Local distribution: Fairly common as a weed of disturbed areas, orchards, fields, and vineyards. July through October.

General distribution: Native of Europe, widely introduced into other temperate regions.

Specimens examined: San Francisco, Rattan, Sept. 1880; Near San Francisco, Bacigalupi, Oct. 22, 1941; Palo Alto, Dudley, Oct. 20, 1896; 6 miles south of San Jose, Thomas 5323A; Near Boulder Creek, Thomas 3616; Swanton, Rich, Spring 1912.

6. Chenopodium murale L. Sp. Pl. 219. 1753.

Local distribution: A common weed of disturbed areas, fallow fields, and orchards. June through October.

General distribution: Native of Europe, widely introduced into other temperate regions.

Specimens examined: San Francisco, Rattan, 1877; Eastwood, Sept. 1917 (CAS); San Francisco--San Mateo Co. line, Bacigalupi 2733; Crystal Springs Lake, Dudley, Sept. 21, 1902; Portola, Randall 35; Stanford, Dudley, Oct. 2, 1895; Moffett Field, Thomas 7220; San Antonio Creek, Randall 36; Foothills west of Los Gatos, Heller 7538; Watsonville Slough, Thomas 1595.

11. Roubieva Moq. Ann. Sci. Nat. 1: 292. 1834.

1. Roubieva multifida (L.) Moq. Ann. Sci. Nat. 1: 293. 1834.

Local distribution: Occasional in disturbed areas, quite common in San Francisco, less frequent elsewhere. July through October.

General distribution: Native of Chile, introduced into Oregon and California.

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Specimens examined: San Francisco, Wilkens, Dec. 4, 1914 (CAS); Brandegee, Apr. 1892; Lands End, Walker 3925 (CAS); Cliff House, Wolf 3790; San Mateo - San Francisco Co. line, Bacigalupi 2735; Daly City, Howell 691 (CAS); Near Wrights, Dudley, Oct. 11, 1902.

32. AMARANTHACEAE

1. Amaranthus L. Sp. Pl. 989. 1753.

As in the case of weeds generally, and with Amaranthus in particular, they are rarely collected. The paucity of cited specimens is due not to the absence of the plants in the field but in the herbarium.

Plants with dense terminal spikes, these usually at least 2 cm. long, smaller axillary spikes also usually present.
  Stems prostrate to decumbent; utricle indehiscent. 1. A. deflexus.
  Stems erect; utricle circumscissile.
    Spikes slender, not stiff, not crowded.....2. A. hybridus.
    Spikes thick, in a stiff glomerate panicle, few. 3. A. retroflexus.
Plants with only axillary spikes.
  Stems erect; sepals of the pistillate flowers 3. 4. A. albus.
  Stems prostrate or decumbent; sepals of the pistillate flowers 3-5.
    Sepals of the pistillate flowers 4-5, about 3 mm. long, enclosing the lower part of the utricle; bracts attenuate to spinose-tipped.....5. A. graecizans.
    Sepals of the pistillate flowers 3, two often scale-like, usually less than 2 mm. long, not enclosing the lower part of the utricle; bracts narrowly subulate.....6. A. californicus.

1. Amaranthus deflexus L. Mant. 2: 295. 1771.

Local distribution: A common weed of disturbed areas, such as railroad rights of way, along sidewalks and roads, and in vacant lots. May through October.

General distribution: Native of tropical America, widely established in North America, Europe, and Africa.

Specimens examined: San Carlos, Howell 31631 (CAS); Menlo Park, Dudley, Sept. 21, 1895; Alviso, Dudley, July 18, 1903; Palo Alto, Dudley, June 24, 1909; Santa Clara, Abrams 3043; Pajaro River, Dudley, Sept. 27, 1903.

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2. Amaranthus hybridus L. Sp. Pl. 990. 1753.

Local distribution: Disturbed areas and fallow fields. June through December.

General distribution: Native of tropical America, widely introduced into temperate regions.

Specimens examined: Near Spanishtown, Dudley, Oct. 11, 1897; Stanford, Thomas 6448; Santa Cruz, Thomas 1193.

3. Amaranthus retroflexus L. Sp. Pl. 991. 1753.

Local distribution: Fairly common in disturbed areas and fallow fields. June through December.

General distribution: Native of tropical America, now widespread as a weed.

Specimens examined: Near Spanishtown, Dudley, Oct. 11, 1897; Stanford, Dudley, July 1893; San Antonio Creek, Randall 4; Near Glenwood, Thomas 3181.

4. Amaranthus albus L. Sp. Pl. 1404. 1763.

Local distribution: Weeds of disturbed areas, fields, and vineyards. July through October.

General distribution: Probably native of eastern North America, now a cosmopolitan weed.

Specimens examined: Stanford, Thomas 6446; 6 miles south of San Jose, Thomas 5323; Los Gatos Creek near dam, Dudley, Oct. 11, 1902.

5. Amaranthus graecizans L. Sp. Pl. 990. 1753.

Local distribution: Disturbed areas, usually in dry, hard-packed soils. June through October.

General distribution: Native of tropical America, now common in

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the United States and Canada.

Specimens examined: Menlo Park, Dudley, Oct. 11, 1896; Stanford, Thomas 6447; Wrights, Dudley, Oct. 11, 1902.

6. Amaranthus californicus (Moq.) Wats. Bot. Calif. 2: 42. 1880.

Local distribution: Shores of lakes and ponds after the water has receded. July through October.

General distribution: Washington and Alberta south to southern California and Nevada.

Specimens examined: Crystal Springs, Dudley, Sept. 21, 1902; Abrams 2995.

33. NYCTAGINACEAE

Fruits winged; leaves succulent. Sand dune plants.....1. Abronia.
Fruits not winged; leaves not succulent. Garden escapes.2. Mirabilis.

1. Abronia Juss. ex Lam. Tab. Encyc. 1: 469. 1791.

Flowers yellow; leaves orbicular-reniform to ovate....1. A. latifolia.
Flowers purplish; leaves elliptic to lanceolate.....2. A. umbellata.

1. Abronia latifolia Esch. Mem. Acad. St. Petersb. 5: 271. 1826.

Local distribution: Coastal sand dunes and sea beaches above the high water mark, San Francisco southward. February through November.

General distribution: Along the coast and shores of bays from southern British Columbia south to Santa Barbara County.

Specimens examined: Cliff House, San Francisco, Baker 694 (CAS); San Francisco, Heller 5696; Pescadero, Dudley, July 5, 1891 (?); Swanton, Rich, May 22, 1912; Santa Cruz, Thomas 1187; Watsonville, Elmer 4323 (CAS).

2. Abronia umbellata Lam. Tab. Encyc. 1: 469. 1791.

Local distribution: Coastal sand dunes from San Francisco

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southward. February through November.

General distribution: British Columbia south to Baja California and on some of the Channel Islands.

Specimens examined: San Francisco, Olsson-Seffer, 1904; Salada, Rose 35654; Waddell Creek, Eastwood & Howell 6071 (CAS); Swanton, Rich, May 22, 1912; Santa Cruz, Hichborn 312; Watsonville, Elmer 4314.

2. Mirabilis L. Sp. Pl. 177. 1753.

1. Mirabilis jalapa L. Sp. Pl. 177. 1753.

Local distribution: Occasional as an escape from cultivation in San Francisco and probably elsewhere. September and October.

General distribution: Native of tropical America, occasional as as escape from cultivation in California.

Specimen examined: San Francisco, Howell 32983 (CAS).

34. ILLECEBRACEAE

Leaves pubescent; sepals similar.
  Stipules conspicuous; calyx 2 mm. long.....1. Paronychia.
  Stipules minute; calyx 1 mm. long.....2. Herniaria.
Leaves glabrous; sepals unequal.....3. Cardionema.

1. Paronychia Adans. Fam. Pl. 2: 272. 1763.

1. Paronychia franciscana Eastw. Bull. Torr. Bot. Club 28: 288. 1902.

Local distribution: Rocky hill tops and slopes, San Francisco and northern San Mateo counties. April through June.

General distribution: Sonoma County south to northern San Mateo County.

Specimens examined: Presidio, Heller 5677; Bioletti, May 1891; San Francisco, Greene, Apr. 22, 1887; Bernal Heights, Howell 10918 (CAS); San Bruno Mt., Ferris 2143.

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2. Herniaria L. Sp. Pl. 218. 1753.

1. Herniaria cinerea DC. Fl. Franc. Suppl. 375. 1815.

Local distribution: Known definitely only from near the Pajaro River east of Watsonville, but to be expected elsewhere in dry sandy localities. April through the first part of June.

General distribution: Native of southern Europe, sparingly established in the Central Valley, Sierra Nevada foothills, Coast Ranges, southern California, and on Guadalupe Island.

Specimen examined: Pajaro River, Thomas 3232.

3. Cardionema DC. Prod. 3: 372. 1828.

1. Cardionema ramosissima (Weinm.) Nels. & Macbr. Bot. Gaz. 56: 473. 1913.

Local distribution: Mainly on coastal sand dunes and on inland sand deposits, but occasionally on rocky slopes, San Francisco south to the Pajaro River. April through August.

General distribution: Along or near the coast from Washington to Baja California; also in Chile.

Specimens examined: San Francisco, Moore 942 (CAS); Lone Mt., Kellogg & Harford, Mar. 22, 1869; San Francisco, Bigelow, 1853-1954; San Bruno Mt., Ferris 2143a; Between Glenwood and Scotts Valley, Abrams 10929; Santa Cruz, Jones 2347; Watsonville, Smith, July 8, 1907.

35. AIZOACEAE

Ovary superior; petals lacking; leaves not succulent.
  Leaves whorled; stipules lacking or inconspicuous.
    1. Mollugo.
  Leaves opposite; stipules present, conspicuous...2. Cypselea.
Ovary inferior; petals present or absent; leaves succulent.
  Leaves triangular-ovate in outline; petals lacking.
    3. Tetragonia.
  Leaves not triangular in outline; petals present..4. Mesembryanthemum.

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1. Mollugo L. Sp. Pl. 89. 1753.

1. Mollugo verticillata L. Sp. Pl. 89. 1753.

Local distribution: Occasional in low areas where water has stood during the winter and early spring. June through October.

General distribution: Native of tropical America, widely introduced into North America.

Specimens examined: Stanford, Abrams 10117; San Jose, Rattan, June 1880.

2. Cypselea Turpin, Ann. Mus. Paris 7: 219. 1806.

1. Cypselea humifusa Turpin, Ann. Mus. Paris 7: 219. 1806.

Local distribution: Occasional in low ground where water has stood during the winter and spring. July through August.

General distribution: Native of the West Indies, sparingly introduced into central California and into some of the southern states.

Specimens examined: Upper Crystal Springs Lake, Oberlander 372; Aptos, Parry, July 31, 1883.

3. Tetragonia L. Sp. Pl. 480. 1853.

1. Tetragonia expansa Murr. Commentat. 6: 13. 1785.

Local distribution: Along or near the coast usually near salt marshes. April through September.

General distribution: Native of Asia and New Zealand, widely introduced along the coast in the Pacific States, occasionally found along the east coast of the United States.

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Specimens examined: Western end of Golden Gate Park, Thomas 7179; San Francisco, Brandegee, no date; San Mateo - San Francisco Co. line, Bacigalupi 2740; Moss Beach, Wiggins 8161; Rose, Dec. 21, 1930 (CAS); Palo Alto Airport, Reeves 7.

4. Mesembryanthemum L. Sp. Pl. 480. 1753.

Leaves triangular in cross section, at least 8 mm. thick.
  Leaves usually less than 5 cm. long, obtusely angled; flowers 3-5 cm. in diameter.....1. M. chilense.
  Leaves usually over 5 cm. long, sharply angled; flowers 8-10 cm. in diameter.....2. M. edule.
Leaves not triangular in cross section, less than 2 mm. thick.
  Leaves under 1.5 cm. long; calyx about 1 cm. in diameter; plants densely pubescent.....3. M. floribundum.
  Leaves over 2 cm. long; calyx usually over 3 cm. in diameter; plants more or less glabrous.....4. M. elongatum.

1. Mesembryanthemum chilense Molina, Sagg. Chile 133. 1810.

Local distribution: Dunes along the coast, San Francisco southward. April through September.

General distribution: Along the coast from Oregon south to Baja California; also in Chile and Australia.

Specimens examined: San Francisco, Dudley, May 1897; Swanton, Rich, Spring 1912; Sea Bright, Hichborn 319; Near mouth of Pajaro River, Thomas 2414.

2. Mesembryanthemum edule L. Syst. Nat. ed. 10. 1060. 1759.

Local distribution: Occasional on sand dunes and bluffs along the coast. April through September.

General distribution: Native of South Africa, widely introduced into California as an ornamental and as a plant to check erosion on highway cuts and earth fills, occasionally naturalized along sand dunes and bluffs.

Specimens examined: Lands End, Walther, Oct. 10, 1922 (CAS); Near mouth of Pajaro River, Thomas 1583.

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3. Mesembryanthemum floribundum Haw. Misc. Nat. 61. 1803.

Local distribution: Naturalized along sea cliffs, occasional from San Francisco south to Santa Cruz. June through October.

General distribution: Native of South Africa, naturalized along the coast of central California southward to San Diego and on Santa Catalina Island.

Specimens examined: San Francisco - San Mateo Co. line, Bacigalupi 2744; Santa Cruz, Hesse 783.

4. Mesembryanthemum elongatum Haw. Obs. Mesemb. 236. 1794.

Local distribution: Known locally from the vicinity of the Cliff House in San Francisco south to Lake Merced. September through October.

General distribution: Introduced at San Francisco, Pacific Grove, and in San Luis Obispo County, native of South Africa.

Specimen examined: Dunes just east of Lake Merced, Howell 19337.

36. PORTULACACEAE

Capsules valvate.
- Capsules splitting into 3 valves.
  - Stem leaves alternate; seeds numerous.....1. Calandrinia.
  - Stem leaves usually opposite; seeds few.....2. Montia.
- Capsules splitting into 2 valves.
  - Styles long; drying petals twisting around the style; inflorescence umbellate-cymose.....3. Spraguea.
  - Styles very short; drying petals forming a cap around the capsules; inflorescence a spike-like panicle. 4. Calyptridium.

Capsules circumscissile.
- Plants perennial, roots and caudex stout; petals 2 or more cm. long, rose-colored or white.....5. Lewisia.
- Plants annual, roots more slender; petals less than 1 cm. long, yellow.....6. Portulaca.

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1. Calandrinia H. B. K. Nov. Gen. & Sp. 6: 77. 1823.

Mature capsules about as long as the calyx. Plants common.
1. C. ciliata var. menziesii.
Mature capsules about twice as long as the calyx. Plants rare.
2. C. breweri.

1. Calandrinia ciliata (Ruiz & Pavon) DC. var. menziesii (Hook.) Macbr. Field Mus. Bot. Ser. 11: 20. 1931.

Local distribution: Meadows, open areas, and frequently in cultivated fields and orchards, throughout the Santa Cruz Mountains. February through June.

General distribution: Southern British Columbia south, mainly west of the Cascade - Sierra axis, to Baja California, in south central Arizona and adjacent Sonora, on some of the Channel Islands, and on Guadalupe Island.

Specimens examined: San Francisco, Dudley, 1897; Sweeney Ridge, Oberlander 630; Woodside, Abrams 2406; Stanford, Abrams 2315; Foothills west of Los Gatos, Heller 7299; Santa Cruz, Jones, June 25, 1881; Corralitos, Thomas 1282.

This variety is extremely variable with respect to flower size. Numerous segregates have been described. The typical variety is a native of Peru. Plants of C. ciliata var. menziesii are among the first to flower in the spring.

2. Calandrinia breweri Wats. Proc. Amer. Acad. 11: 124. 1876.

Local distribution: Occasional on grassy slopes and cultivated fields, common in burned or disturbed chaparral. April through June.

General distribution: Sonoma and Napa counties south to northern Baja California, also occasionally in the Sierra Nevada foothills and on some of the Channel Islands.

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Specimens examined: Stevens Creek Reservoir, Thomas 5718; Near Loma Prieta, Dudley, May 30, 1893; China Grade, Hesse 1275.

2. Montia L. Sp. Pl. 87. 1753.

Cauline leaves alternate.....1. M. parvifolia.
Cauline leaves opposite.
Stems with several pairs of leaves, often rooting at the nodes, prostrate to more or less erect.....2. M. fontana.
Stems with 1 pair of leaves, not rooting at the nodes, more or less erect.
Cauline leaves not connate, usually at least 2 cm. long; flowers bracteate.....3. M. sibirica.
Cauline leaves connate at least on one side; inflorescences with bracts only at the base.
Cauline leaves connate on both sides, forming a conspicuous disk; basal leaf blades often spatulate to rhomboidal. 4. M. perfoliata.
Cauline leaves connate on one side, not forming a disk; basal leaf blades linear to linear-spatulate.
Petals 2-4 times as long as the sepals; racemes over 3 cm. long, long-pedunculate.....5. M. gypsophiloides.
Petals about twice as long as the sepals; racemes 0.5-3 cm. long, short-pedunculate.....6. M. spathulata.

1. Montia parvifolia (Moc.) Greene, Fl. Franciscana 181. 1891.

Local distribution: Moist shaded locations along streams in redwood - douglas fir forests, mainly on the western slopes of the Santa Cruz Mountains. April through July.

General distribution: Southern Alaska southward to Monterey County in the Coast Ranges and to Mariposa County, also in Idaho and Montana.

Specimens examined: San Mateo Canyon, Dudley, Apr. 27, 1909; Pescadero Creek, Dudley, June 6, 1903; Waddell Creek, Dudley, June 5, 1897; Big Basin, Thomas 3543; Ferris, Spring, 1921.

2. Montia fontana L. Sp. Pl. 87. 1753.

Local distribution: Springs, small pools, slowly running rivulets, and moist meadows, often beginning as an aquatic and becoming terrestrial as water becomes less available. January, and perhaps before,

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through July.

General distribution: Temperate regions throughout the world.

Specimens examined: San Francisco, Rattan, 1879; Below San Andreas Dam, Oberlander 632; Near summit of La Honda Grade, Wolf 3661; Page Mill Road, Ferris 10643; 1 mile north of Felton, Thomas 1456; Big Basin, Thomas 7010; Hilton Airport, Thomas 1325, 3712.

3. Montia sibirica (L.) Howell, Erythea 1: 39. 1893.

Local distribution: Known in the Santa Cruz Mountains only from Santa Cruz County where it occurs along the shaded banks of streams and creeks which do not dry up completely in the late summer. March through August.

General distribution: Eastern Siberia, Aleutian Islands, and south coastal Alaska, southward to Santa Cruz County, California, Idaho, and Montana.

Specimens examined: Swanton, Rich, Mar. 1912; Boulder Creek, Thomas 4562; Hesse 307; Lower Zayante Creek, Dudley, May 6, 1893; Mt. Hermon, Cox, Aug. 2, 1908.

4. Montia perfoliata (Donn) Howell, Erythea 1: 28. 1893.

Local distribution: A common variable species occurring in moist habitats throughout the Santa Cruz Peninsula, often becoming a weed. February through May.

General distribution: Widespread in western North America from British Columbia south to Baja California, east to North Dakota, Colorado, and Arizona.

Specimens examined: Pt. Lobos, Howell 11336; Kings Mt. Rd., Randall 295; Coal Mine Ridge, Barry 98; Stanford, Baker 486; Foothills west of Los Gatos, Heller 7298; Loma Prieta Rd., Dudley, May 30, 1893; Edenvale, Abrams 6872; Swanton, Rich, Spring 1912; Tuxedo, Dudley, Apr. 17, 1904; Ben Lomond sand hills, Hesse 1438; Near Boulder Creek, Hesse 927; Santa Cruz, Thompson, Apr. 14, 1902.

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Numerous segregates of this species have been described (Rydberg, 1932, pp. 302-313; Howell, 1949, pp. 129-130). Much, if not most, of the variation is probably ecological. Until such time as Montia perfoliata is studied carefully and grown in a uniform environment, I prefer to consider it as a polymorphic species and not to accord each minor variation as a name.

5. Montia gypsophiloides (Fisch. & Mey.) Howell, Erythea 1: 38. 1893.

Local distribution: Known only from serpentine slopes near Edenvale, about 6 miles southeast of San Jose, but to be expected elsewhere in the foothills bordering the Santa Clara Valley. February through May.

General distribution: Open slopes, often on serpentine, Mendocino County south through the Coast Ranges to San Luis Obispo County.

Specimens examined: Edenvale, Abrams 6871; Near Edenvale, Abrams 6397.

6. Montia spathulata (Dougl.) Howell, Erythea 1: 38. 1893.

(M. tenuifolia (Torr. & Gray) Howell, Erythea 1: 38. 1893; M. exigua (Torr. & Gray) Jepson, Fl. Calif. 1: 473. 1914.)

Local distribution: Grasslands, shaded slopes, and edges of chaparral, San Francisco southward. January through the first half of May.

General distribution: British Columbia south to northern Baja California through the Coast Ranges and the Sierra Nevada foothills, also in western Nevada.

Specimens examined: San Francisco, Rattan, Apr. 1881; San Francisco Watershed Reserve, Oberlander 445; Pescadero Creek, Dudley, Apr. 17, 1896; Emerald Lake, Gillespie, Apr. 21, 1930; Searsville Lake, Davis, Apr. 5, 1903; Stanford, Abrams 1101; Black Mt., Ferris 746; Monte Bello

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Ridge, Thomas 5699; Castle Rock, Dudley, Mar. 28, 1899; Loma Prieta, Hesse 1303; Edenvale, Abrams 6871; Near Eagle Rock, Hesse 915.

3. Spraguea Torr. Smiths. Contr. 6: 4. 1853.

1. Spraguea umbellata Torr. Smiths. Contr. 6: 4. 1853.

Local distribution: Known only from the Ben Lomond sand hills. June through July.

General distribution: British Columbia south to Lake County in the Coast Ranges, to Baja California through the Sierra Nevada, in Santa Cruz County, and in the Rocky Mountains.

Specimens examined: Ben Lomond sand hills, Hesse 967; Thomas 6032.

4. Calyptridium Nutt. in Torr. & Gray, Fl. N. Amer. 1: 198. 1838.

1. Calyptridium parryi Gray var. hesseae Thomas, Leafl. West. Bot. 8: 10. 1956.

Local distribution: Known only from a few localities in the Santa Cruz Mountains, Loma Prieta, Ben Lomond Mountain, and the Ben Lomond sand hills. June through the middle of August.

General distribution: Santa Cruz Mountains and the Mount Hamilton Range.

Specimens examined: Ben Lomond Mt., Hesse 1288, 1317; Thomas & Ernst 6001; Loma Prieta, Hesse 972; Ben Lomond sand hills, Thomas 6028.

5. Lewisia Pursh, Fl. Amer. Sept. 368. 1814.

1. Lewisia rediviva Pursh, Fl. Amer. Sept. 368. 1814.

Local distribution: Known only from the serpentine hills east of the mouth of Almaden Creek. March through June.

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General distribution: British Columbia south to the higher mountains of southern California, Arizona, and Colorado.

Specimen examined: Mouth of Almaden Canyon, Bacigalupi 1340.

6. Portulaca L. Sp. Pl. 445. 1753.

1. Portulaca oleracea L. Sp. Pl. 445. 1753.

Local distribution: Common throughout the Santa Cruz Peninsula as a weed of gardens and disturbed areas; seldom collected. May through October.

General distribution: Native of Europe, introduced into temperate and subtropical regions.

Specimens examined: San Francisco, Rose, Oct. 2, 1952 (CAS); Redwood City, Gilbert, June 1, 1920; Stanford University, Randall 297; Swanton, Rich, Spring 1912.

37. CARYOPHYLLACEAE

Sepals distinct.
- Stipules none.
  - Capsules cylindric.....1. Cerastium.
  - Capsules globose, ovate, to oblong.
    - Styles as many as the sepals and alternate with them. 2. Sagina.
    - Styles fewer than the sepals.
      - Petals deeply 2-parted or -cleft, rarely none. 3. Stellaria.
      - Petals entire to emarginate.....4. Arenaria.
- Stipules present, scarious.
  - Leaves obovate.....5. Polycarpon.
  - Leaves linear to subulate, often fleshy.
    - Leaves subulate-setaceous, 4-6 mm. long.....6. Loeflingia.
    - Leaves linear, usually somewhat fleshy, (6)10-50 mm. long.
      - Styles and valves of the capsule 5; leaves appearing verticillate.....7. Spergula.
      - Styles and valves of the capsule 3; leaves not appearing verticillate.....8. Spergularia.

Calyx tubular, the tube at least ½ the length of the calyx.
- Styles 3.....9. Silene.
- Styles 2.....10. Saponaria.

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1. Cerastium L. Sp. Pl. 437. 1753.

Petals 2-3 times as long as the sepals; mature capsules about equalling the sepals.....1. C. arvense.
Petals about equalling the sepals; mature capsules longer than the sepals.
  Plants perennial; sepals shorter than the pedicels.
    2. C. holosteoides.
  Plants annual; sepals longer than the pedicels..3. C. glomeratum.

1. Cerastium arvense L. Sp. Pl. 438. 1753.

Local distribution: Open grassy hill tops and slopes, San Francisco and northern San Mateo counties. March through May.

General distribution: A widely distributed species from Alaska south to central California, probably to Monterey County, eastward across the continent; also in Eurasia.

Specimens examined: Mission Hills, Rattan, 1877; Ocean View, Dudley, Mar. 24, 1895; Twin Peaks, Thomas 4869; Lake Merced, Eastwood, Apr. 1920 (CAS); Potrero Hills, Cannon, Apr. 7, 1895 (CAS); Seal Cove, Dudley, Mar. 17, 1900.

2. Cerastium holosteoides Fries, Novit. 126. 1828.

(C. vulgatum L. Sp. Pl. 627. 1762.)

Local distribution: Occasional as a lawn weed and on grassy slopes, probably much more common than the number of collections would indicate. March through July.

General distribution: Native of Europe, widely introduced into temperate North America.

Specimens examined: Stanford, Dudley, Apr. 14, 1899; Thomas 4117.

3. Cerastium glomeratum Thuill. Fl. Paris 226. 1799.

(C. viscosum L. Sp. Pl. 437. 1753.)

Local distribution: A common weed of gardens, open grassy slopes,

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disturbed areas, and cultivated fields. March through June.

General distribution: Native of Europe, widely distributed in temperate regions.

Specimens examined: Presidio, San Francisco, Dudley, Apr. 29, 1902; San Bruno Hills, Elmer 4473; Cahill Ridge, Oberlander 920; Coal Mine Ridge, Barry 89; Stanford, Abrams 1131; Swanton, Rich, Spring 1912; Near Felton, Dudley, Apr. 17, 1904; Sweets Gulch, Thompson, Apr. 12, 1902; Pajaro River, Thomas 3214.

2. Sagina L. Sp. Pl. 128. 1753.

The members of this genus occurring locally are very poorly represented in herbaria. All four species listed below are probably much more common than the number of specimens cited would indicate.

Sepals 4; petals present or absent; bases of the leaves glabrous or ciliolate.
  Petals none; bases of the leaves ciliolate; plants glandular-pubescent.....1. S. apetala var. barbata.
  Petals present; bases of the leaves not ciliolate; plants glabrous. 2. S. procumbens.
Sepals 5; petals present; bases of the leaves glabrous.
  Sepals about 2 mm. long; plants annual; stems very slender. 3. S. occidentalis.
  Sepals about 3 mm. long; plants perennial; stems somewhat succulent. 4. S. crassicaulis.

1. Sagina apetala Ard. var. barbata Fenzl ex Ledeb. Fl. Ross. 1: 388. 1842.

Local distribution: A diminutive weed of paths, gravelled areas, and other disturbed habitats. April and May.

General distribution: Native of Eurasia, introduced into the Pacific States.

Specimens examined: San Francisco, Rattan, 1877; Burlingame, Howell, May 5, 1955; Stanford, Dudley, Apr. 29, 1905; Abrams, Apr. 8, 1910; Eva, Wooley-Dod, Mar. 27, 1921 (CAS); Boulder Creek, Hesse 397 (CAS).

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2. Sagina procumbens L. Sp. Pl. 128. 1753.

Local distribution: A weed of gardens and disturbed areas. May through September.

General distribution: Native of Europe and Asia, introduced into British Columbia, the Pacific States, and eastern North America.

Specimen examined: San Francisco, Howell 32571 (CAS).

3. Sagina occidentalis Wats. Proc. Amer. Acad. 10: 344. 1875.

Local distribution: Occasional in moist ground. Latter part of February through April.

General distribution: British Columbia south to southern California and Idaho, introduced into southern Alaska.

Specimens examined: Lake Merced, San Francisco, Congdon, May 22, 1892; Seal Cove, Dudley, Mar. 16, 1900; Stanford, Dudley, Apr. 25, 1905; Jamison Creek Road, Thomas 7015.

4. Sagina crassicaulis Wats. Proc. Amer. Acad. 18: 191. 1883.

Local distribution: Known only from sea cliffs along the coast. May through December.

General distribution: Along or near the coast, southern Alaska south to Monterey County, also on the Aleutian Islands, in Kamtchatka, and in Japan.

Specimens examined: Pt. Lobos, Jussel, May 7, 1933 (CAS); Bakers Beach, Raven 2741 (CAS); Sea Cliff, Pollard, July 31, 1955 (CAS); Santa Cruz, Hesse 986.

3. Stellaria L. Sp. Pl. 421. 1753.

Plants with pubescent lines on the stems; annual.....1. S. media.
Plants, of pubescent, not with hairs in distinct lines on the stems; annual or perennial.
Plants with filiform stems, usually glabrous; sepals about 3 mm. long; annual.....2. S. nitens.

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Plants without filiform stems, glabrous to villous-pubescent; sepals 4-6 mm. long; perennial.
Plants villous-pubescent; sepals 5-6 mm. long..3. S. littoralis.
Plants essentially glabrous; sepals 4-4.5 mm. long.
4. S. graminea.

1. Stellaria media (L.) Cry. Char. Comm. 36. 1784.

Local distribution: A very common species of moist disturbed areas, pastures, cultivated fields, grasslands, and gardens. February through October.

General distribution: Native of Europe, widely introduced into temperate regions.

Specimens examined: San Francisco, Rattan, 1877; Twin Peaks, Thomas 4854; Portola Valley, Randall 34; Coal Mine Ridge, Barry 88; Near Los Gatos, Heller 7380; Waddell Creek, Thomas 2471; Sweets Gulch, Thompson, Apr. 12, 1902; Between Santa Cruz and Watsonville, Thomas 2720.

2. Stellaria nitens Nutt. in Torr. & Gray, Fl. N. Amer. 1: 185. 1838.

Local distribution: Grasslands, serpentine soils, and inland sand deposits, probably quite common but inconspicuous, San Francisco southward. March and April.

General distribution: Widely distributed from southern British Columbia south to northern Mexico, east to western Montana, Utah, and Arizona.

Specimens examined: San Francisco, Rattan, 1877; Sawyer Ridge, Oberlander 446; Woodside serpentine, Dutton, Mar. 25, 1900; Near Palo Alto, Dudley, Mar. 1894; Guadalupe Creek, Thomas 5563; Edenvale, Abrams 6398; Hilton Airport, Thomas 3787; Near Felton, Thomas 1453.

3. Stellaria littoralis Torr. Pacif. R. Rep. 4: 69. 1857.

Local distribution: Known only from along the coast at Lands End and Point Lobos in San Francisco. May through June.

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General distribution: Occasional along the coast from Humboldt County south to San Francisco.

Specimens examined: Pt. Lobos, Michener & Bioletti, May 1893; Lands End, Walker 3974; Eastwood, Sept. 1921 (CAS); Cliff House, Cannon, May 1894 (CAS).

4. Stellaria graminea L. Sp. Pl. 422. 1753.

Local distribution: Known locally only from lawns on the Stanford University campus, but to be expected elsewhere. April through June.

General distribution: Native of Europe, widely introduced into the United States.

Specimen examined: Stanford, Thomas & Ernst 7202.

4. Arenaria L. Sp. Pl. 423. 1753.

Plants perennial; leaves linear-lanceolate or broader.
  Plants puberulent; leaves lanceolate to ovate-lanceolate. Not palustrine.....1. A. macrophylla.
  Plants glabrous; leaves linear-lanceolate. Palustrine.
    2. A. paludicola.
Plants annual; leaves linear-subulate or filiform.
  Petals shorter than the sepals or lacking.....3. A. pusilla.
  Petals longer than the sepals.
    Leaves filiform, 8-20 mm. long.....4. A. douglasii.
    Leaves linear-subulate, 2-4 mm. long.....5. A. californica.

1. Arenaria macrophylla Hook. Fl. Bor. Amer. 1: 202. 1830.

Local distribution: Known only from the peak of Loma Prieta, growing in rocky soil. May and June.

General distribution: Southern British Columbia east to Quebec and Labrador, south to southern California, New Mexico, Texas, Colorado, Wisconsin, and New England.

Specimen examined: Peak of Loma Prieta, Dudley, May 30, 1893.

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2. Arenaria paludicola Robins. Proc. Amer. Acad. 29: 298. 1894.

Local distribution: Swampy ground, known from San Francisco and Camp Evers in Santa Cruz County, probably more common, but rarely collected. May through August.

General distribution: Swampy ground, Washington south to southern California.

Specimens examined: Fort Point, Eastwood, July 29, 1899 (CAS); Camp Evers, Bacigalupi, Sharsmith, & Wiggins 2852.

3. Arenaria pusilla Wats. Proc. Amer. Acad. 17: 367. 1882.

Local distribution: Known only from serpentine slopes near Bakers Beach in San Francisco. April and May.

General distribution: Southern and western Washington and adjacent Idaho south to San Francisco and Tuolumne counties.

Specimen examined: San Francisco, Raven 3968 (CAS).

4. Arenaria douglasii Fenzl ex Torr. & Gray, Fl. N. Amer. 1: 674. 1840.

Local distribution: Serpentine and open grassy slopes, mainly on the eastern side of the crests of the Santa Cruz Mountains. March through May.

General distribution: Southern Oregon south through the California Coast Ranges and the western slopes of the Sierra Nevada to northern Baja California.

Specimens examined: San Bruno Hills, Elmer 5042; Sawyer Ridge, Oberlander 750; Woodside serpentine, Abrams 2429; Waddell Creek, Dudley, June 5, 1897; Los Gatos, Dudley, Apr. 16, 1893; Almaden Canyon, Bacigalupi 1330; Almaden Ridge, Howell 1886 (CAS).

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5. Arenaria californica (Gray) Brewer, Bot. Calif. 1: 69. 1876.

Local distribution: Shallow soil in rocky areas and inland sand deposits, San Francisco southward, fairly rare but locally abundant where it does occur. February through April.

General distribution: Central Oregon south to San Luis Obispo and Kern counties.

Specimens examined: Near Lake Merced, Heller 8447; San Bruno Hills, Bacigalupi 2243; Eastwood, May 12, 1914 (CAS); Hilton Airport, Thomas 3866; Near Felton, Dudley, Apr. 17, 1904.

5. Polycarpon L. Syst. Nat. 881. 1759.

1. Polycarpon tetraphyllum (L.) L. Syst. Nat. 881. 1759.

Local distribution: Occasional as a weed of clay and sandy soils, often forming dense, extensive stands. April through September.

General distribution: Native of Europe, occasionally found as an introduced weed in California.

Specimens examined: Near Fishermans Wharf, Thomas 6820; San Francisco, Jussel, Sept. 27, 1935 (CAS); Stanford, Ballou, May 7, 1923; Thomas & Ernst 7203.

6. Loeflingia L. Sp. Pl. 35. 1753.

1. Loeflingia squarrosa Nutt. in Torr. & Gray, Fl. N. Amer. 1: 174. 1838.

Local distribution: Known only from the Ben Lomond sand hills, but to be expected elsewhere in similar habitats. April and May.

General distribution: Sacramento Valley south to northern Baja California, east through southern Arizona to Texas.

Specimens examined: Ben Lomond sand hills, Hesse 945; Ben Lomond, Eastwood & Howell 7452 (CAS).

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7. Spergula L. Sp. Pl. 440. 1753.

1. Spergula arvensis L. Sp. Pl. 440. 1753.

Local distribution: A very common weed of orchards, cultivated fields, and disturbed areas. To be found in flower at all times of the year, but most commonly so from March through July.

General distribution: Native of Europe, widely introduced into North America.

Specimens examined: Golden Gate Park, Parish, Nov. 1881; Ocean View, Dudley, Apr. 1897; Bernal Heights, Thomas 4741; Stanford, Randall 33; Swanton, Rich, May 1912; Arano Gulch, Thompson, May 25, 1902; Near Corralitos, Thomas 1283.

8. Spergularia Pers. Syn. Pl. 1: 504. 1805.

Plants annual or short-lived perennials; seeds not winged.
  Leaves distinctly fascicled; stipules triangular-acuminate, conspicuous.....1. S. rubra.
  Leaves not fascicled or rarely so; stipules broadly deltoid, 2-4 mm. long, not very conspicuous.
    Seeds usually less than 0.5 mm. long; stamens 6-10. 2. S. bocconii.
    Seeds usually over 0.5 mm. long; stamens usually 2-5.
      Inflorescence lax, not crowded; mature capsules 3.5-6.5 mm. long.....3a. S. marina var. marina.
      Inflorescence crowded; mature capsules 3-4.5 mm. long. 3b. S. marina var. tenuis.
Plants usually perennial; seeds winged or not.
  Plants usually glabrous; leaves not fascicled; annual to perennial; seeds about 1 mm. long. Rare.....4. S. media.
  Plants usually pubescent and glandular, conspicuously so in the inflorescence; leaves fascicled or not; perennial with a stout taproot; seeds 0.5-1 mm. long.
    Petals pink; seeds usually about 1 mm. long. Common. 5. S. macrotheca.
    Petals white; seeds usually about 0.5 mm. long. Fairly rare. 6. S. villosa.

1. Spergularia rubra (L.) J. & C. Presl, Fl. Cech. 94. 1819.

Local distribution: Common, but poorly collected, growing in dis-

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turbed areas, hard-packed soils, and pastures. April through September.

General distribution: Introduced from Europe, occurring throughout much of North America.

Specimens examined: San Francisco, Dudley, Apr. 17, 1898; Summit of Santa Cruz - Los Gatos Highway, Thomas 3168; Camp Evers, Thomas 1674.

2. Spergularia bocconii (Scheele) Foucard ex Marino, Mem. Soc. Esp. Hist. Nat. 2: 496. 1904.

Local distribution: Disturbed areas throughout the Santa Cruz Mountains and adjacent lowlands, but nowhere very common. April through July.

General distribution: Introduced into North and South America from southern Europe.

Specimens examined: Granada, Eastwood, July 17, 1921 (CAS); Montara Pt., Rossbach 737 (CAS); Pebble Beach, Eastwood 18888; Stanford, Rossbach 600; Foothills west of Los Gatos, Heller 7499; Mouth of Waddell Creek, Hesse 1156 (CAS); Santa Cruz, Rose 35223; Pajaro River, Thomas 1577A.

3a. Spergularia marina (L.) Griseb. var. marina, Spicil. Fl. Rumel. 1: 213. 1843.

Local distribution: Along the coast and occasionally inland in more or less alkaline areas. April through October.

General distribution: Along the coast from British Columbia south to Baja California, from Quebec south to Florida, at scattered localities in alkaline areas across North America, and introduced into South America.

Specimens examined: San Francisco, Rattan, 1881; Mussel Rock, Dudley, Oct. 4, 1909; Leslie Salt Refinery, San Mateo, Howell 662 (CAS); Near Palo Alto, Leithold, July 31, 1893; Stanford, Dudley, June 7, 1905; Searsville, Baker 1859 (CAS).

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3b. Spergularia marina (L.) Griseb. var. tenuis (Greene) Rossbach, Rhodora 42: 138. 1940.

Local distribution: Salt marshes near Alviso. April through November.

General distribution: Alkaline habitats in the Central Valley from Colusa County south to northern Kern County and from Contra Costa County south to northern Santa Clara County.

Specimen examined: Alviso, Dudley, Nov. 9, 1903.

4. Spergularia media (L.) Presl, Fl. Sic. 1: 161. 1826.

Local distribution: Known only from one specimen from near Redwood City. April through October.

General distribution: Native of Europe, sparingly introduced into Oregon and central California, the eastern portion of the United States, and in Chile.

Specimen examined: Redwood City, Halsey, Oct. 1908.

5. Spergularia macrotheca (Hornem.) Heynh. Nom. 2: 689. 1846.

Local distribution: Along or near the ocean and the San Francisco Bay in saline soils along marshes and bluffs. March through October.

General distribution: Along the coast from Vancouver Island south to northern Baja California, along the margins of bays, on Guadalupe Island, and on the Channel Islands.

Specimens examined: Pt. Lobos, Howell 972 (CAS); Lands End, Eastwood, June 12, 1919 (CAS); San Francisco - San Mateo Co. line, Bacigalupi 2743; Montara Pt., Rossbach 728; Pigeon Pt., Wiggins 8932; Guadalupe Valley, Thomas 4245; Near Burlingame, Rossbach 615; Alviso, Thomas 4753; Mouth of Waddell Creek, Hesse 1157 (CAS); Swanton, Rich, May 22, 1912; Santa Cruz, Dudley, Sept. 12, 1897; Pajaro River, Thomas 1577.

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6. Spergularia villosa (Pers.) Camb. in St. Hilaire, Fl. Bras. 2: 178. 1829.

Local distribution: Along the coast and inland in clay soils, San Francisco, Stanford, and Santa Clara. May through July.

General distribution: Native of South America, introduced on the Pacific Coast from Oregon south to southern California.

Specimens examined: San Francisco, Eastwood 235 (CAS); Presidio, Heller 5699; North Beach, Rattan, July 1880; Mission Hills, Michener, June 1893; Near Stanford, Baker 666 (CAS).

9. Silene L. Sp. Pl. 416. 1753.

Calyx with 15 or more nerves.....1. S. cucubalus.
Calyx with 10 nerves.
  Annuals; petals less than 5 mm. longer than the calyx.
    Calyx glabrous, or with a very few hairs; upper internodes with a purplish, viscid-pubescent band between the nodes; inflorescence paniculate.....2. S. antirrhina.
    Calyx hirsute; whole plant hirsute, lacking viscid-pubescent bands; inflorescence a one-sided raceme. 3. S. gallica.
  Perennials; petals at least 7 mm. longer than the calyx.
    Flowers large, the calyx at least 1.5 cm. long; flowers not glomerate.....4. S. californica.
    Flowers small, the calyx less than 1.5 cm. long; flowers somewhat glomerate.
      Stamens and stiles long exserted; flowers nodding at anthesis. 5. S. lemmonii.
      Stamens and styles not long exserted; flowers erect at anthesis.
        Flowers often glomerate; stems few from a taproot. 6. S. scouleri ssp. grandis.
        Flowers not glomerate; stems many from a branched rootcrown.
          Calyx long-pubescent, the trichomes about 0.5 mm. long; leaves usually less than 5 cm. long. San Francisco south to northern Santa Cruz Co. 7a. S. verecunda ssp. verecunda.
          Calyx densely pubescent, the trichomes much less than 0.5 mm. long; leaves usually over 5 cm. long. Central Santa Cruz Co.....7b. S. verecunda ssp. platyota.

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1. Silene cucubalus Wibel. Prim. Fl. Werth. 241. 1799.

(S. latifolia (Mill.) Britt. & Rendle, List. Brit. Seed Plants 5: 1907.)

Local distribution: An occasional escape from cultivation, common at Moffett Field as a weed. June through July.

General distribution: Widely naturalized in temperate North America, native of Eurasia.

Specimens examined: Hills above Saratoga, Cody, June 6, 1939; Near Moffett Field, Thomas, July 25, 1956, 7236.

2. Silene antirrhina L. Sp. Pl. 419. 1753.

Local distribution: Occasionally found in disturbed and cultivated areas. May through June.

General distribution: Widely distributed in temperate North America from British Columbia east to Quebec and New England, south to Mexico.

Specimens examined: 4 miles south of San Jose, Rattan, May 1886; Boulder Creek, Thomas 1785.

3. Silene gallica L. Sp. Pl. 417. 1753.

Local distribution: A very common weed in disturbed areas, along roads, and on open grassy slopes; the most common species of Silene in the Santa Cruz Mountains. April through October.

General distribution: Native of Europe, widely introduced into temperate North America.

Specimens examined: Lone Mt., Rattan, 1877; Twin Peaks, Thomas 4874; Sawyer Ridge, Oberlander 811; Woodside serpentine, Dutton, Apr. 29, 1900; Coal Mine Ridge, Barry 144; Stanford, Randall 31; San Jose, Rattan, Apr. 19, 1877; Waddell Creek, Thomas 2469; Santa Cruz, Jones, June 1881; Soda Lake, Thomas 3306-A.

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4. Silene californica Durand, Journ. Acad. Phila. 3: 83. 1855.

Local distribution: Eastern slopes of the Santa Cruz Mountains from Crystal Springs Lake south to Stevens Creek and Black Mountain, commonly growing on serpentine outcroppings. April through July.

General distribution: Douglas County, Oregon, south in the Coast Ranges to Monterey County and south in the Sierra Nevada to Los Angeles County.

Specimens examined: Crystal Springs Lake, Elmer 4446; Redwood City, Abrams 7494; Woodside, Dutton, Apr. 17, 1900; Page Mill Rd., Dudley, June 8, 1895; Stevens Creek Rd., Randall 29.

5. Silene lemmonii Wats. Proc. Amer. Acad. 10: 342. 1875.

Local distribution: Rare in the Santa Cruz Mountains, known locally only from Saratoga and Boulder Creek. May and June.

General distribution: Jackson County, Oregon, south through the Coast Ranges to Monterey County and through the Sierra Nevada and the higher mountains of southern California to northern San Diego County.

Specimens examined: Above Saratoga, Meynier, May 1925; Boulder Creek, Hesse 304; Thomas 1789.

6. Silene scouleri Hook. ssp. grandis (Eastw.) Hitchc. & Maguire, Univ. Wash. Pub. Biol. 13: 25. 1947.

(S. pacifica Eastw. Bot. Gaz. 41: 285. 1906.)

Local distribution: Known from San Francisco, Pescadero, and Millbrae, but to be expected elsewhere, mainly along the coast. July through August.

General distribution: Along or near the coast, the San Juan Islands, southern Vancouver Island, and from central Oregon south to San Mateo County.

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Specimens examined: San Francisco, Howell 31723 (CAS); Millbrae, Eastwood 328 (CAS); Pescadero, Leitholt, July 29, 1894.

7a. Silene verecunda Wats. ssp. verecunda, Proc. Amer. Acad. 10: 344. 1875.

Local distribution: A narrowly restricted endemic, occurring from San Francisco south to northern Santa Cruz County. March through October.

General distribution: Endemic.

Specimens examined: Presidio, Sutliffe, May 16, 1933 (CAS); Lands End, Eastwood 2438 (CAS); Lake Merced, Howell 11426 (CAS); Montara Mt., Dudley, Mar. 17, 1900; Ano Nuevo Pines, Howell 10982 (CAS); Near mouth of Waddell Creek, Thomas 1732; Ben Lomond sand hills, Howell 14764 (CAS); Bracken Brae, Hesse 1171 (CAS).

7b. Silene verecunda Wats. ssp. platyota (Wats.) Hitchc. & Maguire, Univ. Wash. Pub. Biol. 13: 42. 1947.

Local distribution: Usually in sandy soil of chaparral and often growing with Pinus attenuata and P. ponderosa, central Santa Cruz County.

General distribution: Lake County south at scattered localities in the Coast Ranges to San Diego County, in the Sierra Nevada of Fresno and Tulare counties, and in the mountains of southwestern San Bernardino County.

Specimens examined: Glenwood, Davis, Sept. 1907; Between Glenwood and Scotts Valley, Abrams 10928; Between Zayante and Ben Lomond, Ferris 11131.

10. Saponaria L. Sp. Pl. 408. 1753.

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1. Saponaria officinalis L. Sp. Pl. 408. 1753.

Local distribution: Common in the southern part of the Santa Clara Valley and adjacent foothills, growing in disturbed areas and in vineyards where it is sometimes a serious weed. June through August.

General distribution: Native of Europe, widely established in the United States.

Specimens examined: Uvas Creek, Appel, July 31, 1925; Uvas Road, Thomas 4377; Carnadero Creek, Thomas 4351.

38. NYMPHAEACEAE

1. Nymphaea L. Sp. Pl. 510. 1753.

1. Nymphaea polysepala (Engelm.) Greene, Bull. Torr. Bot. Club 15: 84. 1888.

Local distribution: Occasional in ponds near the coast. April through September.

General distribution: Alaska southward to San Luis Obispo County in the Coast Ranges, to Mariposa County in the Sierra Nevada, and to Utah, Colorado, and South Dakota.

Specimens examined: Mt. Lake, San Francisco, Cannon, July 1899 (CAS); Pescadero, Elmer 5077; Big Basin, Dudley, July 25, 1903; Watsonville, Dudley, Oct. 11, 1908.

39. CERATOPHYLLACEAE

1. Ceratophyllum L. Sp. Pl. 992. 1753.

1. Ceratophyllum demersum L. Sp. Pl. 992. 1753.

Local distribution: Submerged aquatic plants of ponds, reservoirs, lakes, and slow-moving streams. June through August.

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General distribution: Nearly world-wide in distribution.

Specimens examined: Mt. Lake, Setchell, Aug. 1896; Lake Merced, Dudley, Oct. 25, 1908; Near Mussel Rock, Dudley, Oct. 4, 1909; Coal Mine Ridge, Ferris 2042; Felt Lake, Dudley, July 21, 1903; Mt. View-Alviso Road, Ferris 2068; Campbell Creek, Dudley, July 18, 1903; Near Santa Cruz, Howard, Sept. 1897; Watsonville, Dudley, Oct. 11, 1908.

40. RANUNCULACEAE

Carpels with more than 1 seed.
- Fruit a berry, red.....1. Actaea.
- Fruit of separate follicles.
  - Neither the petals nor sepals spurred.....2. Isopyrum.
  - Petals and/or sepals spurred.
    - Flowers regular; petals 5, spurred; sepals not spurred. 3. Aquilegia.
    - Flowers irregular; petals 2 or 4, the upper 2 spurred; upper sepal prolonged into a spur.....4. Delphinium.

Carpels 1-seeded.
- Cauline leaves opposite or whorled; petals none.
  - Perennial herbs.....5. Anemone.
  - Vines.....6. Clematis.
- Cauline leaves alternate; petals absent or present.
  - Petals usually present; plants not dioecious; leaves entire to once-pinnate.
    - Receptacle cylindrical, several times as long as broad; sepals spurred.....7. Myosurus.
    - Receptacle conical, about as long as broad; sepals lacking spurs.....8. Ranunculus.
  - Petals absent; plants dioecious; leaves tripinnately compound. 9. Thalictrum.

1. Actaea L. Sp. Pl. 504. 1753.

1. Actaea arguta Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 35. 1838.

Local distribution: Northern San Mateo County southward, in woods and along streams, nowhere very abundant. March through May.

General distribution: Southern Alaska southward to southern California, New Mexico, Colorado, and Montana.

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Specimens examined: San Andreas Lake, Oberlander 237; Between Pescadero and San Gregorio, Dudley, Mar. 26, 1894; Butano Creek, Elmer 4703; Coal Mine Ridge, Barry 197; Stanford, Abrams, Apr. 1898; Stevens Creek, Randall 302; 2 miles northeast of Felton, Thomas 1503; Powder Mill Gulch, Thompson, July 6, 1902.

2. Isopyrum L. Sp. Pl. 557. 1753.

1. Isopyrum occidentale Hook. & Arn. Bot. Beechey 316. 1840.

Local distribution: Rare, known locally only from Big Basin. April.

General distribution: Napa County south through the Coast Ranges to San Luis Obispo County and in the Sierra Nevada foothills from Butte County south to Kern County.

Specimen examined: California Redwood Park, Paulson, Apr. 1915.

3. Aquilegia L. Sp. Pl. 533. 1753.

Stems not densely glandular-pubescent or viscid, varying from glabrous to puberulent.....1. A. formosa var. truncata.
Stems densely glandular-pubescent or viscid.
2. A. eximia.

1. Aquilegia formosa (Fisch.) var. truncata (Fisch. & Mey.) Jones, Zoe 4: 259. 1893.

Local distribution: Fairly common in mixed evergreen forests, along the margins of redwood forests, and on brush-covered slopes. April through June.

General distribution: Southwestern Oregon south through California to northern Baja California.

Specimens examined: Pilarcitos Canyon, Oberlander 66; Crystal Springs, Abrams 2343; Kings Mt., Randall, Apr. 12, 1908; San Francisquito Creek, Dudley, May 1, 1893; Near Black Mt., Randall 304; Foothills west of Los Gatos, Heller 7390; Loma Prieta, Dudley, July 22,

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1893; Swanton, Rich, June 8, 1912; Bielawski Lookout, Thomas 3426; Near Eagle Rock, Thomas 6010; San Lorenzo River, Dudley, May 7, 1893; 3.5 miles inland from Aptos, Thomas 2585.

2. Aquilegia eximia Van Houtte ex Planch, Fl. Serres 2: 15. 1857.

Local distribution: Known locally from northern San Mateo County and from near Los Gatos, growing on or near serpentine outcroppings. June through August.

General distribution: Coast Ranges from Mendocino County south to San Benito County.

Specimens examined: Crystal Springs Lake, Elmer 4952; Spring Valley, Geis, July 29, 1901; Southwest of Crystal Springs Lake, Dudley, Sept. 21, 1902; Los Gatos Creek, Dudley, Aug. 1903; Near Novitiate, Los Gatos, Howell 30021 (CAS).

4. Delphinium L. Sp. Pl. 530. 1753.

Pistil 1; plants annual.....1. D. ajacis.
Pistils 3; plants perennial.
  Flowers red.....2. D. nudicaule.
  Flowers blue, purple, or occasionally white.
    Plants 1 m. or more tall; flowers usually over 50 in mature inflorescences.....3. D. californicum.
    Plants under 1 m. tall; flowers under 50 in mature inflorescences.
      Pistils glabrous; stems slender, the diameter of the lowest inch of the stem smaller than the diameter of the rest of the stem; stems separating easily from the tuberous roots.
        Rachis of the inflorescence puberulent. Plants of the immediate coast.....4. D. decorum.
        Rachis of the inflorescence glabrous. Inland plants. 5. D. patens.
      Pistils pubescent; stems stout, of about equal diameter throughout; stems not separating easily from the fusiform or fibrous roots.
        Stems spreading-pubescent, especially in the lower portion; inflorescences spreading, paniculate; flowers usually few; sepals 12-24 mm. long, 10-17 mm. wide. 6. D. variegatum.
        Stems puberulent with incurved trichomes; inflorescences narrow, racemose; flowers numerous; sepals 8-12 mm. long, 5-7 mm. wide.

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Divisions of the leaves 3 mm. or more broad. Common, on grassy slopes and in serpentine.
7. D. hesperium.
Divisions of the leaves 2 mm. or less broad. Rare, on inland marine sand deposits.
8. D. parryi var. seditosum.

1. Delphinium ajacis L. Sp. Pl. 531. 1753.

Local distribution: Occasional as an escape from cultivation. June and July.

General distribution: Native of Europe, occasionally found as an escape from cultivation in the United States.

Specimens examined: Palo Alto, Dudley, July 1, 1895; Stanford, Dudley, June 11, 1897.

2. Delphinium nudicaule Torr. & Gray, Fl. N. Amer. 1: 33. 1838.

Local distribution: Occasional in the Santa Cruz Mountains, usually growing in shade of mixed evergreen forests. April through June.

General distribution: Southwestern Oregon south through the Coast Ranges to Monterey County and in the Sierra Nevada south to Mariposa County.

Specimens examined: San Mateo Creek, Oberlander 164; Kings Mt., Dudley, May 28, 1893; Stevens Creek, Duthie 499; Campbell Creek, Thomas 4039; Alba Grade, Thomas 3381; Boulder Creek, Thomas 1793; San Lorenzo River, Dudley, May 7, 1893; Big Trees, Stinchfield 173; Loma Prieta, Thompson, May 8, 1902.

3. Delphinium californicum Torr. & Gray, Fl. N. Amer. 1: 31. 1838.

Local distribution: San Francisco southward, growing in moist places in thickets, in chapparral, and in willow thickets, forming extensive local colonies. April through July.

General distribution: Coast Ranges from Sonoma County south to San Luis Obispo County.

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Specimens examined: Mission Hills, Rattan, May 1, 1886; Bayview Hills, Raven 2127 (CAS); Colma, Curran, 1884; Pilarcitos Canyon, Oberlander 241; Coal Mine Ridge, Barry 187; Stanford, Dudley, May 23, 1893; Foothills west of Los Gatos, Heller 7457; Uvas Creek, Keck & Hiesey 5061; Swanton, Rich, Spring 1912; Santa Cruz, Jones 2353.

4. Delphinium decorum Fisch. & Mey. Ind. Sem. Hort. Petrop. 3: 33. 1837.

Local distribution: Grassy slopes, on bluffs, and on rocky slopes near the coast. March and April.

General distribution: Near the coast from northern Humboldt County south to northern Monterey County.

Specimens examined: San Bruno Mt., Bolander, no date; Potrero Hill, Kellogg & Harford, 1868 (CAS); Near the top of Montara Mt., Dudley, Mar. 17, 1900; Pebble Beach, Dudley, Apr. 17, 1896; Pigeon Pt., Bacigalupi, Mar. 1922; Scott Creek, Thomas 1765.

5. Delphinium patens Benth. Pl. Hartw. 296. 1848.

Local distribution: Central San Mateo County southward, growing in grassland or in open woods, often in the shade of Quercus, Acer, and Aesculus. March through May.

General distribution: Coast Ranges from Glenn County south to Monterey and San Benito counties and in the Sierra Nevada from Butte County south to Tulare County.

Specimens examined: Woodside to Crystal Springs Reservoir, Dudley, May 1894; Woodside, Wolf 3659; Coal Mine Ridge, Barry 32; Stanford, Baker 5069; Stevens Creek, Duthie 501; Black Mt., Dudley, Apr. 14, 1900; Campbell Creek, Thomas 4006; Lexington, Heller 7297; Swanton, Rich, Mar. 1912; Ben Lomond Mt., Dudley, Mar. 30, 1899; Skyline Blvd., Thomas 1847.

6. Delphinium variegatum Torr. & Gray, Fl. N. Amer. 1: 32. 1838.

Local distribution: Known locally from Crystal Springs Lakes south to northern Santa Clara County, growing in grasslands,

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occasionally in the partial shade of oaks, and in heavy soil in serpentine areas. Latter part of February through May.

General distribution: Shasta County south through the Sierra Nevada foothills to Tulare County, occasionally in the central part of the Central Valley, and in the Coast Ranges as far south as San Luis Obispo County.

Specimens examined: Crystal Springs Lake, Elmer 4796; Dudley, Apr. 4, 1896; Emerald Lake, Gillespie 9221; Redwood City, Rose 33125; Woodside, Abrams 2410; Woodside serpentine, Dutton, May 11, 1900; Stanford, Dudley, Apr. 16, 1894; Stinchfield 483.

7. Delphinium hesperium Gray, Bot. Gaz. 12: 53. 1887.

Local distribution: Usually growing on open grassy slopes and in meadows, central San Mateo County southward. April through the first half of July.

General distribution: Inner and Outer Coast Ranges from Humboldt and Trinity counties south to Santa Cruz and Santa Clara counties.

Specimens examined: Redwood City, Abrams 7495; Pescadero Creek, Mason, July 14, 1921; Woodside, Dutton, Apr. 29, 1900; Stanford, Duthie 502; Black Mt. Road, Dudley, May 26, 1898; Foothills west of Los Gatos, Heller 7440; Near San Jose, Rattan, June 1880; Below Saratoga Summit, Thomas 1945; Big Basin, Dudley, June 5, 1897.

8. Delphinium parryi Gray ssp. seditosum (Jepson) Ewan, Univ. Colorado Stud. Phys. & Biol. Sci. 2: 183. 1945.

Local distribution: Rare in the Santa Cruz Mountains, commonly growing on inland marine sand deposits with Pinus ponderosa, P. attenuata, Arctostaphylos spp., Salvia mellifera, and Adenostoma fasciculatum. May.

General distribution: Santa Cruz Mountains and Contra Costa County

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south through the Coast Ranges to southern Monterey County.

Specimens examined: Mt. Hermon, Bacigalupi, May 18, 1926; Between Ben Lomond and Zayante, Ferris 11135.

5. Anemone L. Sp. Pl. 538. 1753.

1. Anemone quinquefolia L. var. grayi (Behr & Kell.) Jepson, Fl. W. Mid. Calif. 198. 1901.

Local distribution: Moist soil, often along streams, in deep shade in redwood - douglas fir forests from northern San Mateo County to southern Santa Clara and Santa Cruz counties. March through May.

General distribution: Coast Ranges from southern Oregon south to southern Santa Clara and Santa Cruz counties.

Specimens examined: Cahill Ridge, Oberlander 354; Kings Mt., Abrams 2275; La Honda, Mason 3698; Woodside, Applegate 3½; El Corte Madera, Dudley, Apr. 24, 1898; Wrights, Dudley, Apr. 19, 1895; Loma Prieta, Dudley, May 30, 1893; Swanton, Rich, Apr. 1, 1912; Big Trees, Dudley, May 15, 1893; Aptos Creek, Rattan, Apr. 12, 1884.

6. Clematis L. Sp. Pl. 543. 1753.

Leaflets usually 3; sepals about 2 cm. long; flowers few, usually 1-3. ..... 1. C. lasiantha.
Leaflets usually 5-7; sepals about 1 cm. long; flowers numerous, inflorescence paniculate..... 2. C. ligusticifolia.

1. Clematis lasiantha Nutt. in Torr. & Gray, Fl. N. Amer. 1: 9. 1838.

Local distribution: Growing on dry brush-covered slopes and in chaparral, usually with Adenostoma fasciculatum, Quercus dumosa, Ceanothus thyrsiflorus, Lepechina calcina, Dendromecon rigida, and Arctostaphylos spp. March through May.

General distribution: Coast Ranges and Sierra Nevada foothills from Humboldt and Shasta counties south to San Diego County.

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Specimens examined: Mills Lake, Randall 305; La Honda, Baker 499; Woodside, Abrams 5076; Stanford, Atkinson, Apr. 1900; Black Mt., Dudley, July 6, 1903; Foothills west of Los Gatos, Heller 7269; 2.3 miles southwest of Eagle Rock, Thomas 5019.

2. Clematis ligusticifolia Nutt. in Torr. & Gray, Fl. N. Amer. 1: 9. 1838.

Local distribution: Commonly growing in creek bottoms and along their banks, growing up through and over the other shrubby vegetation, more common on the eastern slopes of the Santa Cruz Mountains than on the western. June through September.

General distribution: A wide-ranging species, occurring from southern British Columbia south to northern Baja California, and east to Montana, Wyoming, Colorado, and New Mexico.

Specimens examined: Near Stanford, Randall 306; Near Black Mt., Randall 309; Stevens Creek, Thomas 4306; Los Gatos Canyon, Dudley, Sept. 11, 1906; Carnadero Creek, Thomas 4361; Powder Mill Gulch, Thompson, July 6, 1902.

7. Myosurus L. Sp. Pl. 284. 1753.

1. Myosurus minimus L. Sp. Pl. 284. 1753.

Local distribution: Occasional, to be found in heavy clay soils in the Santa Clara Valley and perhaps elsewhere. April.

General distribution: A widespread species, occurring in North and South America, Europe, Australia, and New Zealand.

Specimens examined: Lone Mt., Rattan, no date; 3 miles south of San Jose, Thomas 4794.

Local plants may be referred to M. minimus var. minimus.

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8. Ranunculus L. Sp. Pl. 548. 1753.

Plants aquatic; petals white, not glossy.
Receptacles glabrous; styles 2-3 times as long as the ovaries; leaves usually floating.....1. R. lobbii.
Receptacles hispid; styles ½ as long as the ovaries; leaves floating or submerged.
Floating leaves none.....2a. R. aquatilis var. capillaceus.
Floating leaves present....2b. R. aquatilis var. hispidulus.
Plants not aquatic; petals yellow, glossy.
Leaves entire to crenate, not lobed or divided.
3. R. pusillus.
Leaves lobed or divided.
Achenes hairy or muricate; plants annual.
Achenes muricate on the surface; petals 5-8 mm. long; plants coarse.....4. R. muricatus.
Achenes not muricate, but with uncinate bristles; petals about 1.5 mm. long; plants slender.
5. R. hebecarpus.
Achenes glabrous (if pubescent then neither muricate nor with uncinate bristles); plants perennial.
Stems creeping, rooting at the nodes.
6. R. repens.
Stems erect or ascending, not rooting at the nodes.
Beak as long as the achene, not hooked.
7. R. bloomeri.
Beak much shorter than the achene, hooked.
Basal leaf blades usually compound; petals 9-16 or more; beak of the achene stout, under 0.8 mm. long.
8a. R. californicus var. californicus.
Basal leaf blades usually simple; petals 5-16; beak of the achene stout or slender, 0.5-1.5 mm. long.
Petals 5-9; beak of the achene slender, 1-1.5 mm. long; stems erect, 3-7 dm. long. Inland plants.
8b. R. californicus var. gratus.
Petals 9-16 or sometimes more; beak of the achene stout, under 0.8 mm. long; stems prostrate, 1-2.5 dm. long. Plants of coastal bluffs.
8c. R. californicus var. cuneatus.

1. Ranunculus lobbii (Hiern) Gray, Proc. Amer. Acad. 21: 364. 1886.

Local distribution: Growing in ponds and lakes and in pools in fresh-water marshes, northern San Mateo County south to central Santa Cruz County. Latter part of March through May.

General distribution: In aquatic habitats from Vancouver Island,

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British Columbia, south to Santa Cruz and Alameda counties.

Specimens examined: Crystal Springs Lake, Oberlander 518; McMurphy, May 8, 1906; Woodside to Crystal Springs, Dudley, May 1894; Corte Madera Creek, Dudley, Apr. 27, 1904; Page Mill Road and Skyline Blvd., Dudley, Apr. 10, 1904; Coal Mine Ridge, Ferris 758; Stanford, Abrams, Apr. 23, 1904; Glenwood, Michener & Bioletti, May 1893.

2a. Ranunculus aquatilis L. var. capillaceus (Thuill.) DC. Prod. 1: 26. 1824.

Local distribution: Lakes and ponds from San Francisco southward. March through July.

General distribution: Widely distributed in North America, Eurasia, and apparently also in South America (Benson, 1954, p. 367).

Specimens examined: Lake Merced, Carruth, Aug. 1900 (CAS); Laguna Puerca, San Francisco, Dudley, Oct. 25, 1908; San Andreas Lake, Oberlander 1115; 1 mile south of Portola, Wolf 3664; Coal Mine Ridge, Ferris 756; Dudley, May 22, 1906; Near Stanford, Dudley, Apr. 29, 1902; Lake Lagunita, Thomas 4976.

2b. Ranunculus aquatilis L. var. hispidulus Drew, Bull. Torr. Bot. Club 16: 150. 1889.

Local distribution: Known only from one specimen from a pond in northern San Mateo County, but to be expected elsewhere. June and July.

General distribution: Widely distributed in North America from Alaska south to southern California and east to Montana, Wyoming, and Utah.

Specimen examined: Cahill Ridge Pond, Dudley, June 10, 1906.

3. Ranunculus pusillus Poir. in Lam. Encycl. 6: 99. 1804.

Local distribution: Growing in wet areas and along the margins of pools, fairly rare. May and June.

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General distribution: Coast Ranges from Humboldt County south to Santa Cruz County, in Sacramento and San Joaquin counties, and in the eastern part of the United States from Missouri south to Texas, east to New York and Florida.

Specimens examined: Woodside, Dudley, May 8, 1911; Coal Mine Ridge, Dudley, May 22, 1906; Santa Cruz, Thompson, June 29, 1903.

4. Ranunculus muricatus L. Sp. Pl. 555. 1753.

Local distribution: Moist ground, seeps, and around springs, San Francisco southward. February through June.

General distribution: Native of Europe, introduced into the Pacific States, and from Arkansas and Texas to South Carolina.

Specimens examined: Presidio, Rattan, Apr. 1882; Near Ocean View, Dudley, May 1897; Near Bernal Heights, Dudley, Feb. 24, 1895; San Bruno Mt., Thomas 4837; Half Moon Bay, Keck 5046; San Pedro, Elmer 4661; La Honda, Bacigalupi, May 27, 1923; El Corte Madera Canyon, Benson 6546.

5. Ranunculus hebecarpus Hook. & Arn. Bot. Beechey 316. 1840.

Local distribution: Wooded slopes, commonly under oaks and madrones in very moist situations. Latter half of March through the first half of May.

General distribution: Southern Washington and western Idaho south through Oregon, mostly west of the Cascades, and California, in the Coast Ranges and Sierra Nevada foothills, to northern Baja California, also on Guadalupe Island.

Specimens examined: South San Francisco, Cannon, Mar. 1895 (CAS); Sawyer Ridge, Oberlander 592; Near Menlo Park, Abrams 1164; Coal Mine Ridge, Barry 64; Near Stanford, Baker 491; Permanente Creek, Daniel, Apr. 24, 1915; Los Gatos, Leeds, Apr. 12, 1889; Foothills west of Los Gatos, Heller 7302; Bear Creek Canyon, Hesse 590.

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6. Ranunculus repens L. Sp. Pl. 554. 1753.

Local distribution: Common as a weed in lawns, in marshes, and along seeps and springs. To be found in flower at all seasons of the year.

General distribution: Native of Europe, widely introduced into North America.

Specimens examined: Golden Gate Park, Raven 538 (CAS); San Mateo County, Dudley, Oct. 12, 1906; Kings Mt., Dudley, Apr. 27, 1907; Stanford University, Randall 315; Thomas 4120A; Watsonville, Hayward, July 5, 1929.

7. Ranunculus bloomeri Wats. Bot. Calif. 2: 426. 1880.

Local distribution: Moist heavy soils, in marshland, and often in low fields near the San Francisco Bay, San Francisco south to northern Santa Clara County. February through June.

General distribution: Lake County, Oregon, and from Mendocino County south to Santa Clara County.

Specimens examined: San Francisco, Raven 1327 (CAS); Near South San Francisco, Dudley, 1893; Baden, Rattan, about 1880; Montara Mt., Dudley, Mar. 17, 1900; San Andreas Lake, Oberlander 480; San Pedro, Elmer 4665; Between Woodside and Crystal Springs Lake, Bacigalupi, Apr. 18, 1922; Alviso, Bioletti, 1892; Mayfield, Dudley, May 11, 1902.

8a. Ranunculus californicus Benth. var. californicus, Pl. Hartw. 295. 1848.

Local distribution: A very common species of open fields, meadows, and grasslands, occasionally in partial shade in oak woodlands, sometimes in serpentine soil. February through April.

General distribution: Curry County, Oregon, southward through the Coast Ranges to Baja California, in the Sierra Nevada from Amador County

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south to Madera County, in the central portion of the Central Valley, and on some of the Channel Islands.

Specimens examined: Ocean View, Dudley, Mar. 24, 1895; South San Francisco, Benson 1953; Sweeney Ridge, Oberlander 20; Coal Mine Ridge, Barry 56; Foothills near Stanford, Baker 335; Swanton, Rich, Apr. 6, 1912; Big Basin, Dudley, Apr. 16, 1904; Near Bielawski Lookout, Thomas 2816; Near Glenwood, Thomas 2867, 3179; Arano Gulch, Thompson, Mar. 30, 1902.

Teratological forms in which all the flower parts are sepaloid are fairly common. The following specimens are abnormal in this respect: Woodside - Half Moon Bay Rd., Wiggins 9719; Stanford, Thomas 3994.

8b. Ranunculus californicus Benth. var. gratus Jepson, Fl. W. Mid. Calif. 201. 1901.

Local distribution: Southern San Mateo County southward on the eastern slopes of the Santa Cruz Mountains, in ravines and deep canyons. March through June.

General distribution: Coast Ranges from Humboldt County south to northern Monterey County.

Specimens examined: San Mateo County, Abrams 1148; Stevens Creek, Benson 2630; San Antonio Creek, Dudley, May 21, 1898; Congress Springs, Dudley, Mar. 31, 1899; Los Gatos, Dudley, Apr. 16, 1893; Foothills west of Los Gatos, Heller 7374; Loma Prieta, Elmer 4667; East slope of Loma Prieta, Hesse 1478.

Jepson (1921, p. 540) considered that Heller's specimen from west of Los Gatos was R. occidentalis Nutt. var. eisenii Gray. The achenes of this specimen match those of R. californicus var. gratus, but the number of petals is less.

8c. Ranunculus californicus Benth. var. cuneatus Greene, Fl. Franciscana 299. 1892.

Local distribution: Coastal bluffs, occasionally inland on open

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wind-swept summits such as Twin Peaks. March through June.

General distribution: Along the coast from Clatsop County, Oregon, south to northern Monterey County and on the Santa Barbara Islands.

Specimens examined: Pt. Lobos, Setchell, Mar. 16-23, 1909; Bakers Beach, Dudley, Mar. 29, 1902; Twin Peaks, Thomas 4872; San Gregorio Creek, Thomas 4679; Pigeon Pt., Thomas 4284; Near Swanton, Thomas 1307.

9. Thalictrum L. Sp. Pl. 545. 1753.

1. Thalictrum polycarpum (Torr.) Wats. Proc. Amer. Acad. 14: 282. 1879.

Local distribution: Brush-covered slopes and occasionally along the edges of chaparral in moist places, more common on the eastern slopes of the Santa Cruz Mountains than on the western. March through May.

General distribution: Lower Willamette Valley south through the Coast Ranges and the western slopes of the Sierra Nevada at low altitudes to northern Baja California.

Specimens examined: Pilarcitos Creek, Thomas 3834, 3835; Sawyer Ridge, Oberlander 91; San Andreas Reservoir, Dudley, Mar. 18, 1900; Butano Creek, Elmer 4425; West of Redwood City, Dudley, May 19, 1906; Kings Mt., Dudley, May 27, 1893; Searsville Ridge, Davis, Apr. 10, 1903; Stanford, Dudley, May 3, 1893; Black Mt., Dudley, May 21, 1898; Swanton, Rich, Mar. 1912.

41. BERBERIDACEAE

Plants shrubby; leaflets spinose, thick.....1. Mahonia.
Plants herbaceous; leaflets not spinose, thin.....2. Vancouveria.

1. Mahonia Nutt. Gen. Pl. 1: 211. 1818.

Leaves borne in a terminal tuft; veins of the leaflets palmate from the base; bud scales persistent.....1. M. nervosa.
Leaves borne along the stem; veins of the leaflets pinnate throughout; bud scales not persistent.....2. M. pinnata.

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1. Mahonia nervosa (Pursh) Nutt. Gen. Pl. 1: 212. 1818.

Local distribution: Known locally only from Butano Creek, Waddell Creek, and Rincon Canyon, growing in coniferous woods. April through June.

General distribution: Southern British Columbia south through Washington, Idaho, and Oregon to the Santa Lucia Mountains, Monterey County.

Specimens examined: Butano Creek, Dudley, June 1, 1897; Rincon Canyon, McMinn 1203.

2. Mahonia pinnata (Lag.) Fedde, Bot. Jahrb. 31: 36. 1901.

Local distribution: Rocky outcroppings throughout the Santa Cruz Mountains, but nowhere common, often growing with oaks, madrones, baccharis, redwoods, and douglas firs. March through May.

General distribution: Curry County, Oregon, south through the Coast Ranges to northern Baja California.

Specimens examined: San Bruno Hills, Elmer 4820; Hills west of San Andreas Reservoir, Dudley, May 14, 1899; Pescadero Creek, Dudley, Apr. 18, 1894; Jasper Ridge, Hannibal, Oct. 10, 1910; Waddell Creek, Mason, Mar. 29, 1922; Los Gatos Creek, Dudley & Abrams, Oct. 11, 1902.

2. Vancouveria Morr. & Dec. Ann. Sci. Nat. 2: 351. 1834.

1. Vancouveria planipetala Calloni, Malphighia 1: 266. 1887.

Local distribution: Most common on the western slopes of the Santa Cruz Mountains, usually growing in redwood forests. April through September.

General distribution: Del Norte County south through the Coast Ranges to Monterey County.

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Specimens examined: Kings Mt., Patterson, Apr. 27, 1906; Above Gazos Creek, Dudley, Dec. 31, 1901; Glenwood, Davis, Sept. 1907; Big Trees, Dudley, May 15, 1893.

42. LAURACEAE

1. Umbellularia Nutt. Sylva 1: 87. 1842.

1. Umbellularia californica (Hook. & Arn.) Nutt. Sylva 1: 87. 1842.

Local distribution: A common tree of canyons, mountain slopes, valleys, and occasionally in chaparral. January through April.

General distribution: Southwestern Oregon, south through the Coast Ranges and the Sierra Nevada foothills to San Diego County.

Specimens examined: San Francisco, Andersson, July 1852 (CAS); Black Mt., Leithold, Jan. 19, 1901; Page Mill Road, Wiggins 9213; Stevens Creek, Dudley, Apr. 2, 1904; Los Gatos, Heller 10380; Near Saratoga Summit, Thomas 3589; Waddell Creek, Thomas 2756; Arano Gulch, Thompson, Mar. 12, 1902.

43. PAPAVERACEAE

Plants woody shrubs.....1. Dendromecon.
Plants annual or perennial herbs.
  Leaves entire, at least some usually opposite.
    Carpels remaining united, smooth, usually 4; stamens under 12.
      2. Meconella.
    Carpels separating, 9-18, moniliform when mature; stamens numerous.
      3. Platystemon.
  Leaves not entire, alternate.
    Sepals united to form a calyptra; petals orange or yellow.
      4. Eschscholzia.
    Sepals not united to form a calyptra; petals yellow or scarlet.
      Petals yellow; capsules 2-celled, bicarpellate.
        5. Glaucium.
      Petals scarlet; capsules 1-celled, several-carpellate.
        6. Stylomecon.

1. Dendromecon Benth. Trans. Hort. Soc. 1: 407. 1835.

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1. Dendromecon rigida Benth. Trans. Hort. Soc. 1: 407. 1835.

Local distribution: Chaparral and closed-cone pine forests, northern San Mateo County southward, commonly in sandy or rocky soils. To be found in flower at all seasons of the year, but most commonly so from April through July.

General distribution: Coast Ranges and Sierra Nevada foothills from Mendocino and Shasta counties south to northern Baja California.

Specimens examined: Cahill Ridge, Oberlander 414; Peters Creek, Ferris 1954; Butano Ridge, Mason, July 1921; Los Gatos Hills, Dudley, Apr. 16, 1893; Black Mt., Richardson, Apr. 15, 1906; Loma Prieta, Dudley, July 22, 1893; Eagle Rock, Thomas 1340; Ben Lomond, Elmer 4604.

2. Meconella Nutt. in Torr. & Gray, Fl. N. Amer. 1: 64. 1838.

Capsules obovoid; basal leaves linear; scapes spreading-pilose. 1. M. linearis.
Capsules linear; basal leaves obovate to spatulate; scapes glabrous. 2. M. californica.

1. Meconella linearis (Benth.) Nels. & Macbr. Bot. Gaz. 61: 31. 1916.

Local distribution: Known locally from San Francisco, San Bruno Mountain, and from the vicinity of Ben Lomond. February through June.

General distribution: Del Norte and Siskiyou counties south to Santa Barbara County and in the Sierra Nevada from Fresno County south to Kern County.

Specimens examined: Golden Gate Park, Rattan, Feb. 1877; Near Lake Merced, Brandegee 80; Lone Mt., Bolander, no date; San Bruno Hills, Elmer 4594; Lower Zayante Creek, Dudley, May 6, 1893; Near Camp Evers, Hesse 601.

2. Meconella californica Torr. in Frem. Second Rep. 312. 1845.

Local distribution: Fairly rare, wet rocky slopes and grasslands, San Francisco south to Santa Cruz County, commonly growing with Mimulus

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guttatus, Montia fontana, Lithophragma affinis, and Alchemilla occidentalis. Latter part of February through April.

General distribution: Marin County south to Santa Cruz County and in the Sierra Nevada foothills from Butte County south to Kern County.

Specimens examined: Hills west of Golden Gate Park, Rattan, Feb. 22, 1877; San Bruno Mt., Mason 4162; San Mateo to Crystal Springs, Dudley, Mar. 26, 1894; Big Basin, Thomas 7003; Jamison Creek, Thomas 2917.

3. Platystemon Benth. Trans. Hort. Soc. 1: 405. 1835.

1. Platystemon californicus Benth. Trans. Hort. Soc. 1: 405. 1835.

Local distribution: Widely distributed in the Santa Cruz Mountains and adjacent lowlands, in rocky soil, in serpentine, on grassy slopes, and on coastal sand dunes. March through June.

General distribution: Coos County, Oregon, south through California to northern Baja California, in southern Utah, and in Arizona.

Specimens examined: Mission Hills, Rattan, 1877; Lake Merced, Brandegee 195; Crystal Springs Lake, Oberlander 597; Seal Cove, Dudley, Mar. 17, 1900; Redwood City, Rose 33107; Palo Alto, Leithold, Mar. 26, 1904; Stevens Creek, Dudley, Apr. 2, 1904; Los Gatos, Heller 7379; San Jose, Dudley, May 6, 1893; Coyote, Ferris 817; Canada Valley near Gilroy, Sheldon, Apr. 4, 1915; Swanton, Rich, Spring 1912; Lower Zayante, Dudley, May 6, 1893; Scotts Valley, Thomas 1448; Sunset Beach State Park, Thomas 1602.

Coastal populations usually have much wider leaves than inland ones.

4. Eschscholzia Cham. in Nees, Hort. Phys. Ber. 73. 1820.

Plants perennial; outer torus rim spreading, usually over 1 mm. wide; seeds reticulate.....1. E. californica.
Plants annual; outer torus rim usually poorly developed or lacking, under 1/2 mm. wide; seeds smoth to slightly reticulate.
  Stems usually with at least a few leaves.
    2. E. caespitosa var. hypecoides.
  Stems scapose.....3. E. lobbii.

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1. Eschscholzia californica Cham. in Nees, Hort. Phys. Ber. 73. 1820.

Local distribution: Common on grassy and rocky slopes, coastal sand dunes and bluffs, and in disturbed habitats, throughout the Santa Cruz Mountains and adjacent lowlands. March through October and occasionally in flower at other times of the year.

General distribution: Western Washington and Oregon south through California to Baja California, also in western Nevada and widely introduced into other temperate regions.

Specimens examined: Sand hills near Marine Hospital, Heller 6624; San Francisco, Brandegee, Nov. 1888; San Bruno Hills, Heller 8457; Pigeon Pt., Mason, Apr. 1, 1922; Crystal Springs, Abrams 2453; Coal Mine Ridge, Barry 20; Foothills west of Los Gatos, Heller 7285; Edenvale, Abrams 5189; San Martin, Abrams 5181; Ben Lomond, Brandegee, June 1889; Davenport, Mason, Mar. 29, 1922; Sunset Beach, Thomas 3069.

2. Eschscholzia caespitosa Benth. var. hypecoides Gray, Proc. Amer. Acad. 22: 272. 1887.

Local distribution: Known from the vicinity of Coyote Creek, Loma Prieta, and from the Ben Lomond sand hills. April through June.

General distribution: Klamath County, Oregon, southward mainly through the Inner Coast Ranges and the Sierra Nevada foothills to the vicinity of Los Angeles Bay, Baja California.

Specimens examined: Coyote, Dudley, May 31, 1895; Ben Lomond, Brandegee, June 1889; Ben Lomond sand hills, Hesse 1070.

The material from the Ben Lomond sand hills is variable with respect to the size of the outer torus rim. Within one collection and often on one specimen, the rim varies from well developed and conspicuous to almost obsolete. The habit of the plants suggests E. californica, but in view of the torus and the smooth or nearly smooth

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seeds, I am referring these plants to E. caespitosa var. hypecoides. Greene called the Ben Lomond populations E. leucostricta (Pittonia 5: 229. 1905).

3. Eschscholzia lobbii Greene, Pittonia 5: 290. 1905.

Local distribution: Known from one specimen collected near Stanford in 1893. April.

General distribution: Sierra Nevada foothills from Shasta County south to Kern County, occasionally in the Central Valley, the Inner Coast Ranges, and in the Santa Cruz Mountains.

Specimen examined: Stanford, Dudley, Apr. 19, 1893.

5. Glaucium Mill. Gard. Dict. ed. 4. 1754.

1. Glaucium flavum Crantz, Stirp. Aust. 2: 131. 1763.

Local distribution: Occasional as an escape from cultivation. June through September.

General distribution: Native of Europe, sparingly established in the Pacific States and in northeastern United States as an escape.

Specimen examined: Stanford, Abrams 5119.

6. Stylomecon Taylor, Journ. Bot. Brit. & For. 68: 140. 1930.

1. Stylomecon heterophylla (Benth.) Taylor, Journ. Bot. Brit. & For. 68: 140. 1930.

Local distribution: Most common on moist shaded slopes, but also in more open areas, occasionally on serpentine. April and May.

General distribution: Coast Ranges from Lake and Sonoma counties

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south to Rosario, Baja California, in the San Joaquin Valley and adjacent foothills of the Sierra Nevada, and on some of the Channel Islands.

Specimens examined: Spanishtown, Elmer 4921; Near San Mateo, Dudley, May 13, 1905; Stanford, Abrams 2430; San Jose serpentine, Dutton, Apr. 30, 1900; Los Gatos, McMurphy, Apr. 6, 1905; Loma Azule, Dudley, May 9, 1898.

This species has been assigned to the genera Papaver and Meconopsis by various authors.

44. FUMARIACEAE

Flowers 2-3 cm. long, yellow or lavender; outer petals similar; capsules ovate to cylindrical, 1.5-2 cm. long. Native plants. ..... 1. Dicentra.

Flowers less than 7 mm. long, white or tinged with pink or purple; outer petals dissimilar; capsules nearly globose, 2-3 mm. in diameter. Introduced plants ..... 2. Fumaria.

1. Dicentra Bernh. Linnaea 8: 468. 1833.

Stems scapose; primary leaf divisions ternate; flowers lavender; outer petals not reflexed ..... 1. D. formosa.

Stems leafy; primary leaf divisions pinnate; flowers yellow; outer petals reflexed from the middle ..... 2. D. chrysantha.

1. Dicentra formosa (Andr.) Walp. Rep. 1: 118. 1842.

Local distribution: Crystal Springs south to Black Mountain and northwestern Santa Cruz County, growing in moist situations along stream banks in shade, abundant in local colonies, but not widespread; occasional as an escape from cultivation in San Francisco. April through July.

General distribution: Southern British Columbia south through the Cascades and the Coast Ranges to Santa Clara and Santa Cruz counties and through the Sierra Nevada to Tulare County.

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Specimens examined: Crystal Springs, Abrams 2336; Waddell Creek, 2 miles from the coast, Thomas 2928; Scott Creek, Ferris 1990; Ben Lomond Ridge near Eagle Rock, Ferris 1997; Black Mt., Elmer 4819; Big Basin, Paulson, Apr. 1914.

2. Dicentra chrysantha (Hook. & Arn.) Walp. Rep. 1: 118. 1842.

Local distribution: Eastern slopes of the Santa Cruz Mountains in Santa Clara County from about 400 to 2000 feet elevation, usually in dry rocky soil, often in chaparral. Latter part of May through August.

General distribution: Lake, Colusa, and Calaveras counties south through the Coast Ranges and the Sierra Nevada to northern Baja California.

Specimens examined: 3 miles back of Los Altos, Wolf 3745; Hidden Villa near Black Mt., Dudley, June 3, 1900; Wrights Station, Rattan, July 10, 1885; Alma - Sierra Azule Rd., Ferris 2078.

2. Fumaria L. Sp. Pl. 699. 1753.

Flowers 3-4 mm. long, cream-colored, the tip purple; leaf segments narrowly linear.....1. F. parviflora.
Flowers 4-7 mm. long, purple; leaf segments linear...2. F. officinalis.

1. Fumaria parviflora Lam. Encycl. 2: 567. 1786.

Local distribution: Known only as an introduced weed at Mountain View, Moffett Field, and probably elsewhere.

General distribution: Native of Europe, introduced into central California.

Specimens examined: Mountain View, Gates, Apr. 1910, Apr. 1921; Moffett Field, Thomas 7237.

2. Fumaria officinalis L. Sp. Pl. 700. 1753.

Local distribution: Known from San Francisco as an escape from cultivation. April through June.

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General distribution: Native of Europe, occasional as a weed in disturbed areas in the Pacific States.

Specimen examined: San Francisco, Eastwood, June 1918 (CAS).

45. BRASSICACEAE

Pods usually at least three times as long as broad.
- Pods indehiscent, but often breaking into 1-seeded joints.
  - Leaves fleshy; pods 1-seeded. Sand dune and beach plants. 1. Cakile.
  - Leaves not fleshy; pods several-seeded. Plants of various habitats.....2. Raphanus.
- Pods dehiscent by valves.
  - Pods with a prominent beak; petals yellow.
    - Upper cauline leaves more or less entire to pinnately lobed or divided.....3. Brassica.
    - Upper cauline leaves bipinnately lobed.....4. Erucastrum.
  - Pods lacking a prominent beak; petals of various colors.
    - Cauline leaves entire or dentate.
      - Pods 2-jointed, the upper joint 5-ribbed; petals yellow. 5. Rapistrum.
      - Pods not 2-jointed; petals of various colors.
        - Pods tipped by the persistent, corniculate stigmas, the pods often to 12 cm. long; petals purple; herbage stellate-pubescent.....6. Matthiola.
        - Pods not tipped by persistent stigmas, the pods usually less than 10 cm. long; petals yellow, white, or purplish; herbage if pubescent with simple or 2-forked hairs.
          - Petals with undulate margins, purple or white; pubescence of simple hairs.....7. Streptanthus.
          - Petals plain, yellow, rose, or purplish; pubescence usually of forked hairs.
            - Petals yellow to yellow-orange, over 10 mm. long. 8. Erysimum.
            - Petals rose, purple, or if yellow then about 3 mm. long.....9. Arabis.
    - Cauline leaves usually deeply lobed or pinnatifid.
      - Stems from underground tubers.....10. Dentaria.
      - Stems lacking tubers.
        - Pods oblong, the seeds in 2 rows. Plants of very wet areas.....11. Rorippa.
        - Pods linear, the seeds in 1 row. Plants of fairly dry areas.
          - Pods flattened parallel to the partition. 12. Cardamine.
          - Pods terete or quadrangular in cross section.

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Pods more or less 4-angled in cross section; mid-veins of the valves prominent; stems glabrous. 13. Barbarea.
Pods terete in cross section; veins of the valves prominent or not; stems variously pubescent.
Petals yellowish or greenish, occasionally fading to white; pods erect or ascending, 0.5-10 cm. long.
Pubescence of simple hairs; pods over 1 cm. long.....14. Sisymbrium.
Pubescence of forked hairs; pods 0.6-0.8 mm. long.....15. Descurainia.
Petals white; pods usually reflexed, 3-6 cm. long.....16. Thelypodium.
Pods about as broad as long, at most twice as long as broad.
Pods 1-seeded, indehiscent.
Pods with hooked hairs (these rarely lacking), the margins never perforate.....17. Athysanus.
Pods glabrous or pubescent, the hairs not hooked, the margins often perforate.....18. Thysanocarpus.
Pods 2- to many-seeded, usually dehiscent.
Pods flattened at right angles to the partition, the partition thus narrower than the pods.
One pair of petals larger than the other.....19. Iberis.
Petals all about equal.
Pods wrinkled or tuberculate.....20. Coronopus.
Pods smooth.
Pods obdeltoid to deltoid-obcordate; seeds several in each cell.....21. Capsella.
Pods variously shaped, but not as above, often notched and/or winged at the apex; seeds 1 per cell.
Pods indehiscent, not notched or winged at the apex. 22. Cardaria.
Pods dehiscent, notched or winged at the apex. 23. Lepidium.
Pods flattened parallel to the partition or more or less terete, the partition thus about as wide as the pods.
Petals purple; pods flattened, thin, over 15 mm. wide. 24. Lunaria.
Petals white or yellow; pods less than 5 mm. wide.
Leaves pinnately divided, glabrous.....11. Rorippa.
Leaves entire, pubescence of stellate or forked hairs.
Petals white; pubescence of 2-forked hairs. 25. Lobularia.
Petals yellow; pubescence stellate.....26. Alyssum.

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1. Cakile Mill. Gard. Dict. abr. ed. 4. 1754.

Leaves entire or sinuate-dentate; pods lacking horns at the joints.
1. C. edentula ssp. californica.
Leaves pinnately lobed; pods with horns at the joints.
2. C. maritima.

1. Cakile edentula (Bigel.) Hook. ssp. californica (Heller) Hulten, Arssk. Lunds. 41: 824. 1945.

Local distribution: Coastal sand dunes and beaches. May through November.

General distribution: Along the coast from Alaska to San Diego County, California.

Specimens examined: Waddell Creek, Thomas 2476; Swanton, Rich, May 22, 1912.

2. Cakile maritima Scop. Fl. Carn. 2: 35. 1772.

Local distribution: Coastal sand dunes and beaches, San Francisco southward, occasionally as a weed in disturbed areas near the Bay. March through October.

General distribution: Sea beaches almost throughout the world.

Specimens examined: San Francisco, Thomas 7259; Golden Gate Park, Thomas 7171; Davenport Landing, Thomas 1365.

2. Raphanus L. Sp. Pl. 669. 1753.

Pods grooved lengthwise, constricted between the seeds when mature; petals yellow.....1. R. raphanistrum.
Pods not grooved lengthwise, not constricted between the seeds when mature; petals white to purple or yellow, usually purple-veined.
2. R. sativus.

1. Raphanus raphanistrum L. Sp. Pl. 669. 1753.

Local distribution: Occasional in disturbed areas. May through July.

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General distribution: Native of Eurasia, widely distributed in temperate regions.

Specimens examined: Menlo Park, Quayle, May 1920; Stanford, Kolts, July 27, 1946; Santa Cruz, Thomas 1984.

1. Raphanus sativus L. Sp. Pl. 669. 1753.

Local distribution: One of the most common introduced weeds in the Santa Cruz Mountains, growing in fallow fields, coastal sand dunes, road embankments, and disturbed areas. February through July.

General distribution: Native of Europe, now a cosmopolitan weed.

Specimens examined: San Francisco, Wolf 577; Stanford, Dudley, May 24, 1897; Swanton, Rich, Spring 1912; Sea Cliff Beach, Thomas 2723.

3. Brassica L. Sp. Pl. 666. 1753.

Beak at least 1/3 the length of the pod, usually somewhat flattened; valves usually with 3 equally distinct longitudinal veins; cauline leaves not clasping.
  Pods bristly; seeds usually 3 per cell.....1. B. hirta.
  Pods not bristly; seeds usually 5 or more per cell.
    Pods 3-4 mm. wide at maturity, spreading; leaves glabrous or slightly hispid.....2. B. kaber.
    Pods about 1 mm. wide at maturity, appressed; leaves hirsute. 3. B. geniculata.

Beak less than 1/3 the length of the pod, usually round; valves with one prominent median longitudinal vein; cauline leaves sometimes clasping.
  Upper cauline leaves auriculate-clasping, sessile, glabrous, glaucous.
    Buds exceeding the flowers; basal leaves glabrous. 4. B. cleracea.
    Buds not exceeding the flowers; basal leaves somewhat hirsute. 5. B. campestris.
  Upper cauline leaves not clasping, sessile or petiolate, occasionally hirsute, usually not glaucous.
    Pedicels of mature pods less than 5 mm. long; pods appressed to the rachis, 1-2 cm. long, to 2 mm. in diameter, somewhat quadrangular.....6. B. nigra.
    Pedicels of mature pods more than 5 mm. long; pods not appressed to the rachis, usually 2-3 cm. long or longer, at least 2 mm. in diameter.
      Plants annual; pods not stipitate.....7. B. juncea.
      Plants biennial or perennial; pods short stipitate, the stipes 1-3 mm. long.....8. B. fruticulosa.

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1. Brassica hirta Moench, Suppl. Meth. 84. 1802.

Local distribution: To be expected occasionally in orchards, cultivated fields, and disturbed areas. March through August.

General distribution: Native of Eurasia, widely, but nowhere commonly, escaped in North America.

Jepson (1936, p. 50) cited a Bolander reference to a collection from "the vicinity of San Francisco."

2. Brassica kaber (DC.) Wheeler, Rhodora 40: 306. 1938.

Local distribution: Common in fields and disturbed areas, San Francisco southward. March through October.

General distribution: Native of Europe, widely naturalized in North America.

Specimens examined: San Mateo Co., Davis, Mar. 1903; Stanford, Quayle, Apr. 16, 1920; Edenvale, Thomas 4952; Laurel, Abrams 13822.

3. Brassica geniculata (Desf.) Ball, Journ. Linn. Soc. 16: 327. 1878.

Local distribution: Occasional as a weed in disturbed areas and on open slopes. June through September.

General distribution: Native of the Mediterranean Region, introduced into California.

Specimens examined: San Francisco, Ferris 3871; Abrams 6859; Stanford, Thomas 6432; Near Watsonville Slough, Thomas 2407.

4. Brassica oleracea L. Sp. Pl. 667. 1753.

Local distribution: Occasional as an escape from cultivation or persisting for a short time in neglected fields, mainly along or near the coast. Probably to be found in flower at all seasons.

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General distribution: Native of Europe, widely cultivated throughout the world.

Specimen examined: 2 miles north of Pigeon Pt., Abrams & Wiggins 439.

5. Brassica campestris L. Sp. Pl. 666. 1753.

Local distribution: Probably the most common species of Brassica in the local flora, especially common in the spring in fields, orchards, and disturbed areas. To be found in flower at all seasons of the year.

General distribution: Native of Europe, widely established in other temperate regions.

Specimens examined: San Gregorio Creek, Thomas 1143; San Mateo Co., Davis, Mar. 1903; East Palo Alto, Wiggins 3396; Near Edenvale, Thomas 4953; Davenport Landing, Thomas 1355; Near Watsonville, Thomas 2736.

6. Brassica nigra (L.) Koch in Roehl, Deutsch. Fl. 4: 713. 1833.

Local distribution: Disturbed areas throughout the Santa Cruz Mountains and adjacent lowlands. April through September.

General distribution: Native of Europe, widely established in North America.

Specimens examined: Crystal Springs Lake, Bacigalupi 2794; Stanford, Dudley, June 10, 1897; Pajaro River, Thomas 1538.

7. Brassica juncea (L.) Cosson, Bull. Soc. Bot. Fr. 6: 609. 1859.

Local distribution: Occasional as a weed in disturbed habitats. June through September.

General distribution: Native of Asia, introduced into North America.

Specimen examined: San Francisco, Howell 31464 (CAS).

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8. Brassica fruticulosa Cyr. Pl. Rar. 2: 7. 1788.

Local distribution: Known only as a weed in San Francisco. May through July.

General distribution: Native of the Mediterranean Region, rare as a weed in central California.

Specimens examined: San Francisco, Rubtzoff 1304 (CAS), 2418 (CAS).

This species has persisted for at least four years in San Francisco and thus merits inclusion.

4. Erucastrum Presl, Fl. Sic. 1: 92. 1826.

1. Erucastrum gallicum (Willd.) Schulz, Bot. Jahrb. 54: Beibl. 119: 56. 1916.

Local distribution: Occasional in the Santa Clara Valley as far north as Palo Alto. March through September.

General distribution: Native of Europe, introduced at scattered localities in the United States and Canada.

Specimen examined: Stanford, Sels, Mar. 1929.

5. Rapistrum Crantz, Class. Cruciform. 105. 1769.

1. Rapistrum rugosum (L.) All. Fl. Ped. 1: 257. 1785.

Local distribution: Known only from disturbed areas in San Francisco. July.

General distribution: Native of the Mediterranean Region, widely introduced into other temperate regions.

Specimen examined: San Francisco, King, July 1930.

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6. Matthiola R. Br. Hort. Kew. 4: 119. 1812.

1. Matthiola incana (L.) R. Br. Hort. Kew. 4: 119. 1812.

Local distribution: Occasional as an escape from cultivation along sea cliffs in San Francisco and perhaps elsewhere. April and May.

General distribution: Native of southern Europe, occasional as an escape from gardens in California.

Specimen examined: Bakers Beach, Raven 6526 (CAS).

7. Streptanthus Nutt. Journ. Acad. Phila. 5: 209. 1825.

Sepals and petals usually purple; at least the lower leaves coarsely dentate.....1a. S. glandulosus var. glandulosus.
Sepals and petals white; lower leaves entire or dentate.
1b. S. glandulosus var. albidus.

1a. Streptanthus glandulosus Hook. var. glandulosus, Ic. Pl. 1: pl. 40. 1837.

Local distribution: Rocky slopes, usually serpentine, from the Los Altos Hills southward on the eastern slopes of the Santa Cruz Mountains. April through June.

General distribution: Mendocino and Colusa counties south through the Coast Ranges to San Luis Obispo County.

Specimens examined: Los Altos Hills, McMurphy, Apr. 7, 1905; Campbell Creek, Thomas 4000; Permanente Creek, Dudley, Apr. 23, 1899; Alma Soda Springs, Heller 7502; 2.5 miles east of Los Gatos, Thomas 3918; Loma Prieta, Elmer 4979.

1b. Streptanthus glandulosus Hook. var. albidus (Greene) Jepson, Man. Fl. Pl. Calif. 419. 1925.

Local distribution: San Juan Bautista Hills south of San Jose. April and May.

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General distribution: Santa Clara Valley and the adjacent foothills of the Mount Hamilton Range.

Specimens examined: 4 miles south of San Jose, Hoover 3257; Rattan, May 1, 1887; San Juan Bautista Hills, Dudley 4017.

8. Erysimum L. Sp. Pl. 660. 1753.

Leaves under 1 mm. broad. Inland sand deposits, Santa Cruz Co.
1. E. teretifolium.

Leaves over 2 mm. broad.
Seeds wingless; plants never woody; upper cauline leaves usually not toothed; mature pods usually about 2 mm. wide, somewhat quadrangular.....2. E. capitatum.
Seeds winged; plants woody or not; upper cauline leaves toothed or not; mature pods usually over 2 mm. wide, somewhat flattened.
Pods usually ascending; pedicels not at right angles to the axis of the inflorescence.
Leaves under 6 mm. wide, entire to remotely denticulate.
3a. E. franciscanum var. franciscanum.
Leaves 9-15 mm. wide, commonly sharply toothed.
3b. E. franciscanum var. crassifolium.
Pods usually divaricate; pedicels more or less at right angles to the axis of the inflorescence. Coastal southern Santa Cruz Co.....4. E. ammophilum.

1. Erysimum teretifolium Eastw. Leafl. West. Bot. 2: 144. 1938.

Local distribution: Known only from the inland marine sand deposits in Santa Cruz County. April through September.

General distribution: Endemic.

Specimens examined: Glenwood, Rossbach 813b; Ben Lomond Mt., Dudley, Mar. 30, 1899; 3 miles southeast of Ben Lomond, Rollins 4195; Ben Lomond sand hills, Thomas 1657.

2. Erysimum capitatum (Dougl.) Greene, Fl. Franciscana 269. 1891.

Local distribution: Chaparral, oak woods, and in disturbed areas in redwood - douglas fir forests. April through June.

General distribution: British Columbia east to Saskatchewan, south to northern Mexico and New Mexico.

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Specimens examined: 2 miles south of San Gregorio, Eastwood & Howell 6053; La Honda, Davis, May 1, 1903; Castle Rock Ridge, Rossbach 929, 930; Loma Prieta, Dudley, May 30, 1893; Thomas 3951; Near Boulder Creek, Thomas 1779.

3a. Erysimum franciscanum Rossb. var. franciscanum, Aliso 4: 118. 1958.

Local distribution: Rocky slopes and summits, often on serpentine outcroppings, grassy slopes, and coastal sand dunes, San Francisco south to about Crystal Springs, often growing with Lupinus arboreus, Baccharis pilularis, Artemisia californica, Pteridium aquilinum, Rhus diversiloba, Chlorogalum pomeridianum, and Castilleja latifolia. March through May.

General distribution: Curry County, Oregon, Marin and Sonoma counties, and in the Santa Cruz Mountains.

Specimens examined: Presidio, Heller 6593; Lands End, Setchell 100; Lake Merced, Rossbach 903a, 903b; San Bruno Hills, Rossbach 806; 1 mile north of Sharp Park, Rossbach 573; Montara Mt., Rossbach 925; Crystal Springs Lake, Baker 342; Rossbach 837 (type).

3b. Erysimum franciscanum Rossb. var. crassifolium Rossb. Aliso 4: 120. 1958.

Local distribution: San Bruno Hills south to northern Santa Cruz County, growing on sandy or rocky slopes, in ravines, and in oak woods. March through May.

General distribution: Endemic.

Specimens examined: San Bruno Hills, Rossbach 807; Salada, Rossbach 572 (type); Montara Mts., Rossbach 568; Sawyer Ridge, Rossbach 907a, 907b; San Mateo Creek, Rossbach 905a, 905b; San Mateo, Dudley, Apr. 21, 1894; Greyhound Rock, Rossbach 909a, 909b; Scott Creek, Bacigalupi, Mar. 29, 1922.

4. Erysimum ammophilum Heller, Muhlenbergia 8: 96. 1912.

Local distribution: Sand dunes and hills along the coast in southern Santa Cruz County. March through May.

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General distribution: Southern Santa Cruz County south to the Monterey Peninsula, at Torrey Pines in San Diego County, and on Santa Rosa Island.

Specimens examined: Sunset Beach State Park, Thomas 3090, 3282; Near mouth of Pajaro River, Thomas 1589.

9. Arabis L. Sp. Pl. 664. 1753.

Petals rose or purple; cauline leaves sessile or auriculate, not glaucous but glabrous or pubescent.
Petals 10-12 mm. long; pods straight, erect...1. A. blepharophylla.
Petals 6-8 mm. long; pods arcuate, spreading..2. A. breweri.
Petals yellow-white; cauline leaves auriculate, glaucous, glabrous. 3. A. glabra.

1. Arabis blepharophylla Hook. & Arn. Bot. Beechey 321. 1840.

Local distribution: Rocky coastal bluffs, bare granitic soils, and open grassy slopes on the coastal side of the Santa Cruz Mountains from San Francisco south to northern Santa Cruz County. Latter part of February through May.

General distribution: Along or near the coast from southern Sonoma County to southern Santa Cruz County.

Specimens examined: Presidio, Heller 6591; Ocean View, Dudley, 1893; Twin Peaks, Thomas 4856; San Bruno Hills, Rollins 2950; South Peak, Montara Mts., Ferris 1763.

Anderson (1892, p. 118) listed Arabis blepharophylla from "open places" in Santa Cruz County. Miss Vesta Hesse has told me that this species also occurs on Basin Way near Boulder Creek. Rollins (1941, p. 349) discussed the possibility of the occurrence of the species on the Monterey Peninsula.

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2. Arabis breweri Wats. Proc. Amer. Acad. 11: 123. 1876.

Local distribution: Known definitely only from the vicinity of Mount Umunhum. May through June.

General distribution: Jackson and Josephine counties, Oregon, south through the Coast Ranges to Monterey County and in the Sierra Nevada south to Plumas County.

Specimens examined: Blue Ridge Gap, Dudley 4169; Mt. Umunhum, Davis 112.

3. Arabis glabra (L.) Bernh. Syst. Verz. Erf. 195. 1800.

Local distribution: Occasional on coastal sand dunes, and on wooded slopes. February through June.

General distribution: British Columbia east to Quebec and south to southern California, Arizona, and South Carolina; also in Eurasia.

Specimens examined: Ocean View, Dudley, Mar. 24, 1895; Top of Montara Mts., Dudley, Mar. 17, 1900; Coal Mine Ridge, Barry, Apr. 28, 1938; Permanente Creek, Dudley, Apr. 30, 1899; Saratoga - Big Basin Rd., Abrams 5264; Ridge between Scott and Mill creeks, Thomas 4095; Sunset Beach, Thomas 3091, 3277.

10. Dentaria L. Sp. Pl. 653. 1753.

Leaflets of cauline leaves 3-5, ovate, toothed, thin.
1a. D. californica var. californica.
Leaflets of cauline leaves usually 3, oblanceolate, usually entire, thick.
1b. D. californica var. integrifolia.

1a. Dentaria californica Nutt. in Torr. & Gray var. californica, Fl. N. Amer. 1: 88. 1838.

Local distribution: Common along moist stream banks and slopes in redwood - douglas fir forests. December through the first half of May.

General distribution: Coos County, Oregon, south through the Coast Ranges to northern Baja California and on the western slopes of the

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Sierra Nevada at lower elevations.

Specimens examined: Twin Peaks, Thomas 4855; San Mateo, Kellogg, Mar. 27, 1870; La Honda, Baker 501; Coal Mine Ridge, Barry 130; Los Gatos foothills, Dudley, Apr. 16, 1893; Swanton, Rich, Mar. 6, 1912; Jamison Creek, Dudley, Mar. 29, 1899; Near Santa Cruz, Detling 1532.

1b. Dentaria californica Nutt. var. integrifolia (Nutt.) Detling, Amer. Journ. Bot. 23: 576. 1936.

Local distribution: Fields, open slopes, and occasionally in shade. Latter part of November through April.

General distribution: Coast Ranges from Humboldt County south to Monterey County.

Specimens examined: Near South San Francisco, Dudley, Mar. 1894; Arroyo de los Frijoles, Dudley, Feb. 9, 1895; Aptos, Rattan, Nov. 1883; Near Mt. Madona Rd., Thomas 1276.

Dentaria californica is a variable species with respect to shape, lobing, and thickness of both the cauline and the rhizomal leaves. Intermediate specimens, which are difficult to assign to one variety or another, are often found.

The initial flowering dates listed above for both varieties are the exception rather than the rule. In general, plants do not flower in any great number until February.

11. Rorippa Scop. Fl. Carn. 520. 1760.

Petals yellow.
  Stems much branched from the base; pedicels usually 2-4 mm. long; segments of the leaves sharply toothed. 1. R. curvisiliqua.
  Stems not branched from the base; pedicels usually over 6 mm. long; segments of the leaves with rounded teeth or the margin more or less entire.....2. R. islandica var. occidentalis.
Petals white.....3. R. nasturtium-aquaticum.

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1. Rorippa curvisiliqua (Hook.) Bessey, Mem. Torr. Bot. Club 5: 169. 1894.

Local distribution: Margins of ponds and small lakes and in boggy ground. March through November.

General distribution: British Columbia south to southern California, east to western Montana, Wyoming, Colorado, and Arizona.

Specimens examined: Jersey Pond west of Baden, Dudley, June 19, 1908; Cahill Ridge, Dudley, June 10, 1906; Woodside Valley ponds, Dudley, Oct. 31, 1909; Lake Lagunita, Dudley, June 25, 1899; Carnadero Creek, Thomas 4371; Swanton, Rich, May 12, 1912; Camp Evers, Hesse 603; Tuxedo, Dudley, Apr. 17, 1904; Ben Lomond, Thompson, May 27, 1902.

2. Rorippa islandica (Oeder) Borbas var. occidentalis (Wats.) Butters & Abbe, Rhodora 42: 27. 1940.

Local distribution: Occasional in ponds in the Pajaro Valley and along the streams in the vicinity of Gilroy. July through October.

General distribution: Widely distributed from Alaska to California and in Siberia.

Specimens examined: Carnadero Creek, Abrams 6680; Kellogg Lake, Dudley, Oct. 11, 1908.

3. Rorippa nasturtium-aquaticum (L.) Schinz & Thell. Fl. Schweiz 240. 1909.

Local distribution: Fairly common along the margins of streams and small ponds. March through November.

General distribution: Native of Eurasia, now widely introduced into North and South America and probably in other temperate regions.

Specimens examined: San Francisco, Dudley, Apr. 14, 1897; Palo Alto, Dudley, July 1893; Stevens Creek, Thomas 3914; Swanton, Rich, Spring 1912; 1 mile south of Olympia, Thomas 1859.

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12. Cardamine L. Sp. Pl. 654. 1753.

1. Cardamine oligosperma Nutt. in Torr. & Gray, Fl. N. Amer. 1: 85. 1838.

Local distribution: A common plant, often forming dense stands, in moist woods and on brush-covered slopes, becoming a weed in urban areas. February through June.

General distribution: Southern British Columbia south to northern Baja California, mainly east of the Cascade - Sierra Nevada axis, also in southeastern Washington, northeastern Oregon, and adjacent Idaho.

Specimens examined: Ocean View, Dudley, Mar. 24, 1895; Mission Hills, Rattan, 1877; Pilar Pt., Dudley, May 17, 1900; Searsville, Abrams 5586; Coal Mine Ridge, Barry 107; Loma Prieta Peak, Dudley, Apr. 20, 1895; Congress Springs Station, Schreiber 2586; Swanton, Rich, June 10, 1912; Arano Gulch, Thompson, Mar. 12, 1902.

13. Barbarea R. Br. in Ait. Hort. Kew. 4: 109. 1812.

Basal leaves with 2-4 pairs of lateral lobes.....1. B. americana.
Basal leaves with 4-10 pairs of lateral lobes.....2. B. verna.

1. Barbarea americana Rydb. Mem. N. Y. Bot. Gard. 1: 174. 1900.

Local distribution: Widespread in the Santa Cruz Mountains, growing in partial shade in woods, along the edges of chaparral, and in disturbed areas. March through July.

General distribution: Widely distributed from British Columbia to Montana, south to northern Mexico.

Specimens examined: San Francisco, Rattan, May 1867; San Andreas Lake, Dudley, Mar. 18, 1900; Stanford, Elmer 4495; Loma Prieta Ridge, Dudley, July 22, 1893; Near Burrell, Thomas 2860; Swanton, Rich, Spring 1912; La Selva Beach, Thomas 3045.

2. Barbarea verna (Mill.) Aschers. Fl. Brand. 1: 36. 1864.

Local distribution: Occasional as a weed in urban areas. March

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through July.

General distribution: Native of Europe, introduced into many parts of the United States and Canada.

Specimens examined: Lands End, Rubtzoff 3164 (CAS); Mt. Davidson, Rose 33034 (CAS).

Some specimens of Barbarea are difficult to assign to one or another of the two species listed above, especially if the basal leaves have already withered.

14. Sisymbrium L. Sp. Pl. 657. 1753.

Pods closely appressed to the rachis, under 2 cm. long, acuminate; pedicels 2 mm. long.....1. S. officinale.
Pods spreading, over 2 cm. long, not acuminate; pedicels 3-10 mm. long.
  Pedicels stout.
    Upper cauline leaves with filiform divisions; pods about 1 mm. in diameter, 7-10 cm. long.....2. S. altissimum.
    Upper cauline leaves when present entire or hastate; pods about 2 mm. in diameter, 4-6 cm. long.....3. S. orientale.
  Pedicels very slender.....4. S. irio.

1. Sisymbrium officinale (L.) Scop. Fl. Carn. 2: 26. 1772.

Local distribution: Weeds of roadsides, disturbed areas, and overgrazed slopes. February through August.

General distribution: Native of Europe, widely established as a weed in temperate North America.

Specimens examined: San Francisco, Thomas 7260; Lone Mt., Rattan, 1877; 10 miles south of San Francisco, Rollins 2941; Stanford, Dudley, Apr. 8, 1895; Between Saratoga Summit and Big Basin, Thomas 1937; Soda Lake, Thomas 3303.

2. Sisymbrium altissimum L. Sp. Pl. 659. 1753.

Local distribution: Occasional as a weed in disturbed areas. May through July.

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General distribution: Native of Europe, widely introduced into North America.

Specimens examined: San Francisco, Howell 32362 (CAS); Near summit of Santa Cruz - Los Gatos Highway, Thomas 3212; Pajaro River, Thomas 3235.

3. Sisymbrium orientale L. Cent. Pl. 2: 24. 1756.

Local distribution: Known definitely only from disturbed areas in San Francisco, but to be expected elsewhere farther south. May through August.

General distribution: Native of Europe, sparingly established in California.

Specimens examined: San Francisco, Howell 21759, Howell, Aug. 13, 1937.

4. Sisymbrium irio L. Sp. Pl. 659. 1753.

Local distribution: Occasional as a weed in San Francisco and perhaps elsewhere. March and April.

General distribution: Native of Europe, introduced into western North America.

Specimen examined: San Francisco, Howell 32630 (CAS).

15. Descurainia Webb & Berthel. Phytogr. Canar. 1: 71. 1836.

Pods 1.5-2.5 cm. long, linear, about 1 mm. or less in diameter.
1. D. sophia.
Pods 0.8-1.2 cm. long, clavate, about 2 mm. in diameter.
2. D. pinnata ssp. menziesii.

1. Descurainia sophia (L.) Webb ex Prantl, Pflanzenf. 3(2): 192. 1892.

Local distribution: Occasional as a weed in San Francisco. May through August.

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General distribution: Native of Europe, widely introduced into the western part of the United States and Canada.

Specimen examined: San Francisco, Howell 32633 (CAS).

2. Descurainia pinnata (Walt.) Britt. ssp. menziesii (DC.) Detling, Amer. Mid. Nat. 22: 508. 1939.

Local distribution: Known only from fields near Stanford. April.

General distribution: Central California, Santa Clara and Contra Costa counties, south to northern Baja California through the Coast Ranges and the San Joaquin Valley, in the southern Sierra Nevada, and in the Mojave and Colorado deserts.

Specimens examined: Near Stanford, Dudley, 1904; Near Lake Lagunita, Dudley, Apr. 11, 1894.

16. Thelypodium Endl. Gen. 876. 1839.

Pods reflexed.....1a. T. lasiophyllum var. lasiophyllum.
Pods spreading or ascending.....1b. T. lasiophyllum var. inalienum.

1a. Thelypodium lasiophyllum (Hook. & Arn.) Greene var. lasiophyllum, Bull. Torr. Bot. Club 13: 142. 1886.

Local distribution: Dry stream banks, rock outcroppings, and serpentine ridges, San Francisco southward. February through June.

General distribution: Western Washington south to northern Baja California.

Specimens examined: Lake Merced, Bacigalupi 1495; Belmont, Greene, June 1886; Crystal Springs Lake, Dudley, Apr. 4, 1896; San Mateo, Dudley, Apr. 24, 1894; Woodside, Dutton, Feb. 11, 1900; Stanford, Applegate 33; 2 miles northwest of Los Altos, Rollins 2965; Almaden Canyon, Bacigalupi 1338; Edenvale, Thomas 4761; Swanton, Rich, Spring 1912; Big Basin, Dudley, June 7, 1895; Empire Grade, Thomas 3410.

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1b. Thelypodium lasiophyllum (Hook. & Arn.) Greene var. inalienum Robins. in Gray, Syn. Fl. N. Amer. 1: 177. 1895.

Local distribution: Serpentine outcroppings, dry open slopes, and on brush-covered areas. February through June.

General distribution: Occurring throughout the range of T. lasiophyllum var. lasiophyllum, but most common in central California.

Specimens examined: Lake Merced, Dudley, May 11, 1901; San Francisco, Greene, Apr. 1886; San Bruno Mt., Ferris 2150; Crystal Springs Lake, Abrams 6434; Redwood City, Abrams 7503; Tuff Hill, Cannon, Feb. 15, 1900; Near San Jose, Patterson, Apr. 15, 1907; Edenvale, Abrams 6401.

17. Athysanus Greene, Bull. Calif. Acad. 1: 72. 1885.

1. Athysanus pusillus (Hook.) Greene, Bull. Calif. Acad. 1: 72. 1885.

Local distribution: Widely scattered on grassy or rocky slopes. February through the first part of May.

General distribution: A widespread species occurring from British Columbia south to southern California and probably to northern Baja California, east to Idaho and Arizona.

Specimens examined: Mission Hills, Rattan, May 1881; Crystal Springs Lake, Baker 456; Portola, Abrams 198; Coal Mine Ridge, Barry 44; Lake Lagunita, Dudley, Apr. 4, 1894; Near Saratoga Summit, Thomas 4705; Hilton Airport, Thomas 5525.

The specimen from Mission Hills has glabrous pods, all the rest have pods with hooked hairs.

18. Thysanocarpus Hook. Fl. Bor. Amer. 1: 69. 1833.

Pedicels curved uniformly throughout their length.
Cauline leaves auriculate at the base; basal leaves hirsute, rosulate.
Pods 3-4 mm. broad, the wings not perforate; petals 1-1.5 mm. long.
1a. T. curvipes var. curvipes.

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Pods 5-6 mm. broad, the wings usually perforate; petals 2-3 mm. long.....1b. T. curvipes var. elegans.
Cauline leaves usually not auriculate; basal leaves usually glabrous, not rosulate.....2. T. lacinatus var. crenatus.
Pedicels curved abruptly below the pods, otherwise more or less straight.....3. T. radicans.

1a. Thysanocarpus curvipes Hook. var. curvipes, Fl. Bor. Amer. 1: 69. 1833.

Local distribution: Open or partly shaded slopes, often in gravelly soils, throughout the Santa Cruz Mountains. March through May.

General distribution: British Columbia and Idaho south to northern Baja California, probably east to Nevada and Utah.

Specimens examined: Alpine Road, Wolf 3716; Coalmine Ridge, Barry 3; Stanford, Abrams 2353; Black Mt., Dudley, Apr. 14, 1900; Los Gatos Creek, Dudley, Apr. 17, 1910; Guadalupe Mines, Parks 495A; Swanton, Rich, May 12, 1912; Bear Creek Canyon, Hesse 919.

1b. Thysanocarpus curvipes Hook. var. elegans (Fisch. & Mey.) Robins. in Gray, Syn. Fl. N. Amer. 1: 114. 1895.

Local distribution: Usually on somewhat rocky slopes, southern San Mateo County southward mainly on the eastern slopes of the Santa Cruz Mountains. Latter part of March through May.

General distribution: Trinity and Butte counties south through the Coast Ranges and the Sierra Nevada foothills to San Diego County; also in southern Arizona, southwestern New Mexico, and adjacent Mexico.

Specimens examined: Coalmine Ridge, Barry 18; Stanford, Abrams 5071; 1.2 miles southeast of Saratoga Summit, Thomas 4068; Los Gatos Creek, Dudley, Apr. 21, 1895; Guadalupe Mines, Park 495; Gilroy, Elmer 4904.

Many plants are intermediate in flower and fruit character and cannot be placed in either variety with ease. Among these are the following specimens: Stanford, Baker 294; Tuxedo, Dudley, Apr. 17, 1904.

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2. Thysanocarpus laciniatus Nutt. var. crenatus (Nutt.) Brewer, Bot. Calif. 1: 49. 1880.

Local distribution: Dry usually rocky slopes, not as common as the preceding species. March and April.

General distribution: Marin County south through the Coast Ranges to San Diego County.

Specimens examined: Near Saratoga, Thomas 4004; Guadalupe Canyon, Mason & Borthwick, Mar. 20, 1921; Waddell Creek, Thomas 1739.

3. Thysanocarpus radicans Benth. Pl. Hartw. 297. 1848.

Local distribution: Known locally only from near Stanford, but to be expected elsewhere. March and April.

General distribution: Douglas County, Oregon, south through the Coast Ranges and the Sierra Nevada foothills to Calaveras and western Fresno counties; also in the Sacramento Valley.

Specimens examined: Stanford, Dudley, Apr. 6, 1894; Applegate 35.

19. Iberis L. Sp. Pl. 648. 1753.

1. Iberis umbellata L. Sp. Pl. 649. 1753.

Local distribution: Occasional as an escape from cultivation near Lake Merced and to be expected elsewhere. May through July.

General distribution: Native of Europe, widely used as a garden ornamental and occasionally found as an escape.

Specimen examined: Lake Merced, Raven 2603A (CAS).

20. Coronopus Gaertn. Fruct. 2: 293. 1791.

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1. Coronopus didymus (L.) Sm. Fl. Brit. 3: 691. 1800.

Local distribution: Weed of roadsides, disturbed areas, and coastal bluffs, San Francisco southward. March through November.

General distribution: Native of Europe, widely introduced into North America.

Specimens examined: San Francisco, Vasey, July 1880; Golden Gate Park, Parish, Nov. 1881; Wiggins 8165; Lands End, Thomas 4249; Pebble Beach, Mason, May 21, 1921; San Mateo - Santa Cruz Co. line, Thomas 1694; Bonny Doon Road, Hesse 1324.

21. Capsella Medic. Pflanzeng. 1: 85. 1792.

1. Capsella bursa-pastoris (L.) Medic. Pflanzeng. 1: 85. 1792.

Local distribution: A very common species of cultivated fields, roadsides, disturbed areas, and on open grassy slopes. To be found in flower at all seasons of the year.

General distribution: Native of Europe, now a cosmopolitan weed.

Specimens examined: San Francisco, Rattan, Feb. 22, 1877; East Palo Alto, Wiggins 3397; Alviso, Thomas 4755; Loma Prieta, Thomas 2549; Santa Cruz, Thomas 1266; Seacliff Beach State Park, Thomas 2719.

22. Cardaria Desv. Journ. Bot. 3: 163. 1813.

1. Cardaria draba (L.) Desv. Journ. Bot. 3: 163. 1813.

Local distribution: Occasional in disturbed areas and fields from San Francisco southward, especially common near Watsonville and in the Pajaro Valley. March through December.

General distribution: Native of Europe, widely distributed in the Pacific States and other temperate regions.

Specimens examined: Near San Carlos, Thomas 4920; Near Sargents, Abrams & Borthwick 7802; Near Watsonville, Kennedy, May 25, 1917.

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23. Lepidium L. Sp. Pl. 643. 1753.

Upper cauline leaves cordate-clasping.....1. L. perfoliatum.
Upper cauline leaves not cordate-clasping.
  Sepals long-persistent after anthesis.....2. L. pubescens.
  Sepals not long-persistent.
    Pods rounded at the apex, not winged or with acute, divergent teeth. Plants of nonsaline or alkaline areas.
      Pedicels distinctly flattened.....3. L. nitidum.
      Pedicels nearly terete.....4. L. virginicum.
    Pods winged at the apex or with acute, divergent teeth. Plants of saline or alkaline areas along San Francisco Bay and in the Santa Clara Valley.
      Pods with divergent teeth at the apex, the teeth less than 1/3 the length of the body; inflorescence not congested. 5. L. oxycarpum.
      Pods with two wings at the apex, the wings nearly as long as the body; inflorescence congested.....6. L. latipes.

1. Lepidium perfoliatum L. Sp. Pl. 643. 1753.

Local distribution: Known definitely only from disturbed areas in San Francisco and from alkaline soil at the edge of San Francisco Bay near Redwood City. March through May.

General distribution: Native of Europe, widely introduced into the eastern part of the United States, sparingly so in the Pacific States.

Specimens examined: San Francisco, Howell 32644 (CAS); Redwood City, Keck 1400.

2. Lepidium pubescens Desv. Journ. Bot. 3: 165. 1814.

(L. bipinnatifidum Desv. Journ. Bot. 3: 165. 1814.)

Local distribution: Fairly common as a weed in disturbed dry ground. March through May.

General distribution: Native of South America, introduced into the Pacific States.

Specimens examined: San Francisco, Rattan, 1878; Jones 3272; Spanishtown, Dudley, Mar. 27, 1894; Stanford, Dudley, Mar. 31, 1900; Swanton, Rich, May 1912; Near Saratoga Summit, Thomas 2945; Santa Cruz, Thompson, Apr. 12, 1902.

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3. Lepidium nitidum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 116. 1838.

Local distribution: Common throughout the Santa Cruz Mountains on grassy slopes, rocky areas, and in disturbed places. January through May.

General distribution: Washington south mainly west of the Cascade-Sierra Nevada axis to the southern end of the Sierra San Pedro Martir in northern Baja California.

Specimens examined: Woodside serpentine, Dutton, Feb. 18, 1900; Coal Mine Ridge, Barry 83; Stanford, Baker 310; 3 miles south of San Jose, Thomas 4792; Edenvale, Thomas 4771; Swanton, Rich, Spring 1912; Bielawski Lookout, Thomas 1515; Santa Cruz, Thomas 1484.

4. Lepidium virginicum L. Sp. Pl. 645. 1753.

Local distribution: Occasional in the Santa Cruz Mountains at scattered localities, often as a weed. May through November.

General distribution: Canada south to Mexico and the Caribbean, and from the Pacific east to the Atlantic.

Specimens examined: San Francisco, Thomas 7267; Palo Alto, Thomas 7164; Permanente Creek, Abrams 6624; Santa Cruz, Jones, June 1881; Pajaro, Dudley, Sept. 27, 1903.

5. Lepidium oxycarpum Torr. & Gray, Fl. N. Amer. 1: 116. 1838.

Local distribution: Saline and alkaline flats along the San Francisco Bay southward into the Santa Clara Valley. March through May.

General distribution: Saline and alkaline areas from Sonoma and Yolo counties south to Monterey County.

Specimens examined: Redwood City, Keck 1401; Cooleys Landing, Abrams 2277; Southeast of Mayfield, Dudley, May 11, 1902; San Jose, Rattan, Mar. 1880; 3 miles south of San Jose, Thomas 4795.

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6. Lepidium latipes Hook. Ic. Pl. 1: pl. 41. 1837.

Local distribution: Alkaline areas bordering the southern portion of San Francisco Bay and in the Santa Clara Valley. March through May.

General distribution: Alkaline flats and low areas, Mendocino County south to San Diego County, in the Central Valley from Colusa County south to San Joaquin and Tuolumne counties, and on Santa Cruz Island.

Specimens examined: Mayfield, McMurphy, May 5, 1906; 3 miles south of San Jose, Thomas 4796.

24. Lunaria L. Sp. Pl. 653. 1753.

1. Lunaria annua L. Sp. Pl. 653. 1753.

Local distribution: Occasional as an escape from gardens. March through June.

General distribution: Native of southeastern Europe, occasionally established as an escape where planted as an ornamental.

Specimens examined: Lone Mt., Howell 32543 (CAS); Kings Mt., Millet, Apr. 4, 1917; Woodside Post Office, Rust, Mar. 28, 1908; Near Woodside, Thompson, Apr. 6, 1907.

25. Lobularia Desv. Journ. Bot. 3: 172. 1814.

1. Lobularia maritima (L.) Desv. Journ. Bot. 3: 169. 1814.

Local distribution: Escaped from cultivation and occasionally found in disturbed habitats along the coast. To be found in flower all year.

General distribution: Native of southern Europe, often escaped where grown as an ornamental.

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Specimens examined: Lands End, Thomas 4250; Sand dunes, San Francisco, Olsson-Seffer, 1904; Near Santa Cruz, Thomas 1390; Near mouth of Pajaro River, Thomas 1591.

26. Alyssum L. Sp. Pl. 650. 1753.

1. Alyssum alyssoides L. Syst. Veg. 1130. 1759.

Local distribution: Known locally only from one specimen from Sierra Azule, west of Mount Umunhum. April through May.

General distribution: Native of Europe, now widely established in the United States, especially in the western ones.

Specimen examined: Sierra Azule, Davis 108.

46. RESEDACEAE

1. Reseda L. Sp. Pl. 448. 1753.

1. Reseda alba L. Sp. Pl. 449. 1753.

Local distribution: Rare as an escape from cultivation, known definitely only from San Francisco, but to be expected elsewhere. June through October.

General distribution: Native of the Mediterranean region, now widely, but sparingly, introduced into temperate North America, South Africa, and Japan.

Specimen examined: San Francisco, Howell 12577.

47. CRASSULACEAE

Plants diminutive, annual, aquatic or terrestrial; leaves opposite; flowers under 2 mm. long.....1. Tillaea.
Plants annual or perennial, terrestrial; leaves alternate or in a basal rosette; flowers over 5 mm. long.
  Petals widely spreading; basal leaves under 3 cm. long..2. Sedum.
  Petals erect; basal leaves usually over 3 cm. long.....3. Dudleya.

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1. Tillaea L. Sp. Pl. 128. 1753.

Flowers clustered in the leaf axils; terrestrial.....1. T. erecta.
Flowers solitary in the leaf axils; aquatic or palustrine.
2. T. aquatica.

1. Tillaea erecta Hook. & Arn. Bot. Beechey 24. 1830.

Local distribution: Very common in sandy soil throughout the Santa Cruz Mountains. February through May.

General distribution: Southwestern Oregon south through California to Baja California, eastward to Arizona and Sonora, on Guadalupe Island, and in Chile.

Specimens examined: San Francisco, Cannon, Apr. 13, 1896 (CAS); San Bruno Hills, Elmer 4719; Coal Mine Ridge, Barry 129; Mayfield, McMurphy, Apr. 2, 1906; Foothills west of Los Gatos, Heller 7340; Hilton Airport, Thomas 2562; Sunset Beach State Park, Thomas 3075.

2. Tillaea aquatica L. Sp. Pl. 128. 1753.

Local distribution: Vernal pools, drying puddles, and along the edges of ponds. May through July.

General distribution: Widely dispersed throughout North America, Eurasia, and Africa.

Specimens examined: Presidio, San Francisco, Bioletti, May 1891; Lake Merced, Howell 2243 (CAS); San Andreas Lake, Oberlander 374; Coal Mine Ridge, Dudley, May 26, 1910.

2. Sedum L. Sp. Pl. 430. 1753.

Perennial; basal leaves spatulate; follicles erect or ascending.
1. S. spathulifolium.
Annual; basal leaves lanceolate; follicles widely divergent.
2. S. douglasii var. radiatum.

1. Sedum spathulifolium Hook. Fl. Bor. Amer. 1: 227. 1832.

Local distribution: Cliffs and rocks in exposed locations. Latter

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part of April through July.

General distribution: Southern British Columbia south through the Coast Ranges and the Sierra Nevada to southern California.

Specimens examined: Sutro Hill, San Francisco, Cannon, June 13, 1896 (CAS); Montara Mt., Rossbach 755; Crystal Springs Lake, Elmer 4550; Stevens Creek, Dudley, July 11, 1901; Loma Prieta, Davis, Mar. 8, 1920; Eagle Rock, Thomas 3484; Near Boulder Creek, Kearney, May 16, 1945 (CAS).

2. Sedum douglasii Hook. ssp. radiatum (Wats.) Clausen, Cact. & Succ. Journ. 18: 59. 1946.

Local distribution: Rare in the Santa Cruz Mountains, known from San Mateo County and from Hilton Airport, in the latter locality growing on sandstone outcroppings in less than 1 cm. of soil. May through July.

General distribution: Southern Oregon south through the Coast Ranges to Monterey County and in the Sierra Nevada foothills to Tulare County.

Specimens examined: San Mateo trap hills, Dudley, Mar. 26, 1894; Hilton Airport, Thomas 4325.

3. Dudleya Britt. & Rose, Bull. N. Y. Bot. Gard. 3: 12. 1903.

Pedicels stout, usually shorter than the flowers. Plants of coastal bluffs.....1. D. farinosa.
Pedicels slender, longer than the flowers. Plants of dry inland areas.
Petals bright yellow to red; rosette leaves oblong-lanceolate, 1-4 cm. wide. Common.....2a. D. cymosa ssp. cymosa.
Petals pale yellow; rosette leaves oblong-lanceolate to triangular-oblong, 0.5-2 cm. wide. Restricted to the vicinity of Guadalupe Mine, Madrone, and Coyote.....2b. D. cymosa ssp. setchellii.

1. Dudleya farinosa (Lindl.) Britt. & Rose, Bull. N. Y. Bot. Gard. 3: 15. 1903.

Local distribution: Rocky slopes and bluffs along the coast. July through August.

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General distribution: Along the coast from Coos County, Oregon, south to the Monterey Peninsula, Monterey County.

Specimens examined: Bakers Beach, Walker 1794; Mussel Rock, Rose 37646 (UC); Pescadero, Wiggins 3802; Swanton, Rich, Spring 1912; 5.7 miles northwest of Davenport, Thomas 3521; Santa Cruz, Dudley, 1893.

2a. Dudleya cymosa (Lemaire) Britt. & Rose ssp. cymosa, Bull. N. Y. Bot. Gard. 3: 21. 1903.

Local distribution: Rocky ridges and slopes away from the ocean from the San Bruno Mountains southward. April through July.

General distribution: Coast Ranges from Humboldt County south to Santa Clara County and in the Sierra Nevada foothills from Tehama County south to Kern County.

Specimens examined: San Bruno hills, Nutting, 1893 (UC); Waddell Creek, Dudley, June 5, 1897; Black Mt., Elmer 4758; Stevens Creek Canyon, Abrams 4239; Foothills west of Los Gatos, Heller 7480; Mt. Umunhum, Ferris 3630; Loma Prieta, Elmer 4653; Eagle Rock, Thomas 3487.

2b. Dudleya cymosa (Lemaire) Britt. & Rose ssp. setchellii (Jepson) Moran, Madroño 14: 108. 1957.

Local distribution: Local in the Santa Clara Valley on serpentine, known from Guadalupe Mine, between Coyote and Morgan Hill, and from the San Juan Bautista Hills. February through June.

General distribution: Inner Coast Ranges from Contra Costa County south to San Benito County and in central Santa Clara County.

Specimens examined: 5 miles south of San Jose, Ferris 843; Serpentine hills just south of Cemetaries, San Jose, Vestal, June 12, 1925; Guadalupe Mine, Parks 92A; El Toro, Kimber & Roush, Apr. 12, 1918.

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48. SAXIFRAGACEAE

Hypanthium deeply cleft on the lower side; stamens 3...1. Tolmiea.
Hypanthium not deeply cleft; stamens 5 or 10.
  Stamens 5.
    Branches of the inflorescence subtended by foliaceous bracts; placentae axile.....2. Boykinia.
    Branches of the inflorescence subtended by reduced linear bracts, these sometimes toothed; placentae parietal or basal. 3. Heuchera.
  Stamens 10.
    Carpels soon unequally 2-valved.....4. Tiarella.
    Carpels approximately equal.
      Styles normally 3.....5. Lithophragma.
      Styles normally 2.
        Leaves oblong-ovate to elliptic; petals entire. 6. Saxifraga.
        Leaves reniform to cordate; petals finely dissected. 7. Tellima.

1. Tolmiea Torr. & Gray, Fl. N. Amer. 1: 582. 1840.

1. Tolmiea menziesii (Pursh) Torr. & Gray, Fl. N. Amer. 1: 582. 1840.

Local distribution: Known locally only from Boulder Creek, about 2 miles northwest of the town of Boulder Creek. May through June.

General distribution: Southernmost Alaska southward near the coast to Mendocino County, in the Cascades of Washington, and in the Santa Cruz Mountains.

Specimens examined: Boulder Creek, Hesse 308; Boulder Creek, 2.2 miles northwest of town of Boulder Creek, Thomas 4561.

2. Boykinia Nutt. Journ. Acad. Phila. 7: 113. 1834.

1. Boykinia elata (Nutt.) Greene, Fl. Franciscana 190. 1891.

Local distribution: Moist shaded slopes and stream banks in redwood - douglas fir forests throughout the Santa Cruz Mountains. May through August.

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General distribution: Southern British Columbia south through the Coast Ranges to the Santa Monica Mountains in southern California and in the northern Sierra Nevada.

Specimens examined: Pescadero Creek, Dudley, June 6, 1895; Stevens Creek Canyon, Abrams 4243; Los Gatos, Cannon, June 1892 (CAS); New Almaden, Ferris 3032; Big Basin, Abrams 5253; Boulder Creek, Winblad, Aug. 14, 1937 (CAS).

3. Heuchera L. Sp. Pl. 226. 1753.

Hypanthium turbinate, thinly pubescent; inflorescence not congested. 1. H. micrantha.
Hypanthium rounded at the base, densely pilose; inflorescence congested at least when young.....2. H. pilosissima.

1. Heuchera micrantha Dougl. ex Lindl. Bot. Reg. 15: pl. 1302. 1830.

Local distribution: Common in moist shaded areas and often on stream banks usually in the redwood - douglas fir forests. May through June.

General distribution: Southern British Columbia south through Washington and Oregon to San Luis Obispo and Tulare counties, eastward to northern Idaho.

Specimens examined: San Francisco, Cannon, 1891 (CAS); La Honda Rd., Dudley, July 30, 1894; Stone Dam, Elmer 4762; Kings Mt., Rose 42189; Near Palo Alto, Dudley, May 1893; Foothills west of Los Gatos, Heller 7429; Near summit, Santa Cruz - Los Gatos highway, Thomas 3159; Near Davenport, Hesse 942; San Vicente Creek, Thomas 3395; California Redwood Park, Shockley, June 7-8, 1919; Santa Cruz, Jones, 1881.

2. Heuchera pilosissima Fisch. & Mey. Ind. Sem. Hort. Petrop. 5: 36. 1838.

Local distribution: Known locally only from hills near the coast in San Mateo County. March through June.

General distribution: Outer Coast Ranges from Mendocino County

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south to San Luis Obispo County.

Specimens examined: Montara Mt., Dudley, Mar. 17, 1900; Near Pebble Beach, Mason, June 2, 1921.

4. Tiarella L. Sp. Pl. 405. 1753.

1. Tiarella unifoliata Hook. Fl. Bor. Amer. 1: 238. 1832.

Local distribution: Moist stream banks in redwood forests, occurring most commonly on the seaward slopes of the Santa Cruz Mountains. May through July.

General distribution: Southern Alaska southward to western Montana, Washington, Oregon, and the Santa Cruz Mountains.

Specimens examined: Pescadero, Dudley, June 18, 1905; Stevens Creek, Atkinson, July 1901; Big Basin, Abrams 5254; Near Boulder Creek, Kearney, May 16, 1945 (CAS); Felton, Elmer 4450; Santa Cruz Mountains, Faunt le Roy, 1939 (CAS).

5. Lithophragma Nutt. Journ. Acad. Phila. 7: 26. 1834.

Hypanthium obconic, the base cuneate.....1. L. affinis.
Hypanthium campanulate, the base truncate or rounded.2. L. heterophylla.

1. Lithophragma affinis Gray, Proc. Amer. Acad. 6: 534. 1865.

Local distribution: Moist rocky slopes, meadows, and open oak - madrone forests throughout the Santa Cruz Mountains and foothills. Latter part of February through May.

General distribution: Southern Oregon south in the Sierra Nevada, the Coast Ranges, and the Central Valley to the San Bernardino Mountains, also on some of the Channel Islands.

Specimens examined: Mission Hills, San Francisco, Bolander, 1881; San Bruno Hills, Heller 8464; Coal Mine Ridge, Barry 52; Swanton, Rich, May 12, 1912.

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2. Lithophragma heterophylla (Hook. & Arn.) Torr. & Gray, Fl. N. Amer. 1: 584. 1840.

Local distribution: Moist shaded slopes, widespread. March through June.

General distribution: Southern Oregon south through the Coast Ranges and the Sierra Nevada to San Diego County.

Specimens examined: San Francisco, Rattan, June 1883; Crystal Springs Lake, Baker 651; Black Mt., Dudley, June 8, 1895; Near Stanford, McMurphy, May 25, 1907; Waddell Creek, Thomas 1747; Bonny Doon, Thompson, Apr. 14, 1902.

6. Saxifraga L. Sp. Pl. 398. 1753.

1. Saxifraga californica Greene, Pittonia 1: 286. 1889.

Local distribution: Rocky meadows and oak - madrone woodland, usually at lower elevations in the Santa Cruz Mountains. February through April.

General distribution: Southwestern Oregon south to San Diego County through the Coast Ranges and the western slopes of the Sierra Nevada.

Specimens examined: Mission Hills, San Francisco, Rattan, 1877; Bayview Hills, Raven 1451 (CAS); Coal Mine Ridge, Barry 233; Alma, Baker 370 (CAS); Swanton, Rich, May 1, 1912; Glenwood, Thomas 2873.

7. Tellima R. Br. in Frankl. 1st Journ. Bot. App. 765. 1823.

1. Tellima grandiflora (Pursh) Dougl. ex Lindl. Bot. Reg. 14: pl. 1178. 1828.

Local distribution: Moist woods throughout the forested areas of the Santa Cruz Mountains. Latter half of March through June.

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General distribution: Aleutian Islands, coastal southern Alaska, from British Columbia south through the Coast Ranges to San Luis Obispo County and to the northern Sierra Nevada, eastward to the Selkirk Mountains and northern Idaho.

Specimens examined: Pescadero, Elmer 4702; Coal Mine Ridge, Barry 261; Stevens Creek, Abrams 4240; Santa Cruz, Thompson, June 7, 1903.

49. HYDRANGEACEAE

1. Whipplea Torr. Pacif. R. Rep. 4: 90. 1857.

1. Whipplea modesta Torr. Pacif. R. Rep. 4: 90. 1857.

Local distribution: Common in the drier parts of redwood - douglas fir forests. Latter part of March through June.

General distribution: Olympic Peninsula, Washington, south in the Coast Ranges to central Monterey County.

Specimens examined: Cahill Ridge, Oberlander 177; Kings Mt., Abrams 2471; Searsville, Dudley, Apr. 15, 1898; Big Basin, McMinn 47; Zayante, Dudley, May 6, 1893.

50. GROSSULARIACEAE

Plants without nodal spines; pedicels with a joint below the ovary. ..... 1. Ribes.
Plants with nodal spines; pedicels not jointed..... 2. Grossularia.

1. Ribes L. Sp. Pl. 201. 1753.

Hypanthium yellow; plants glabrous..... 1. R. gracillimum.
Hypanthium not yellow; plants variously pubescent.
  Styles glabrous; leaves usually thin, the abaxial surfaces usually lacking tomentum..... 2. R. glutinosum.
  Styles pubescent below; leaves usually thick, the abaxial surfaces with a dense tomentum..... 3. R. malvaceum.

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1. Ribes gracillimum Cov. & Britt. N. Amer. Fl. 22: 205. 1908.

Local distribution: Along streams in southern San Mateo, northern Santa Cruz, and northern Santa Clara counties. April.

General distribution: Lake County south through the Coast Ranges to Los Angeles and Riverside counties.

Specimens examined: Portola, Elmer 4515; Coal Mine Ridge, Barry 241; 3 miles west of Los Altos, Wolf 2330; Stanford, Pendleton 1343, 1493.

2. Ribes glutinosum Benth. Trans. Hort. Soc. 1: 476. 1835.

Local distribution: Usually along streams or in moist woods, San Francisco southward. March and April.

General distribution: Coast Ranges, Lincoln County, Oregon, south to San Luis Obispo County.

Specimens examined: Lands End, McMinn 304; Pilarcitos Canyon, Oberlander 51; Crystal Springs Lake, Dudley, Mar. 18, 1900; Near La Honda, Dudley, Mar. 23, 1894; Kings Mt., Randall 387; Palo Alto, Dudley, Mar. 23, 1903; Stevens Creek, Dudley, June 1, 1902; Near Saratoga, Heller, Apr. 13, 1907; Below Wrights, Dudley, Apr. 21, 1895; Near Felton, Dudley, Apr. 16, 1893; Liddell Creek, Bacigalupi, Mar. 29, 1922; Between Santa Cruz and Watsonville, Thomas 2730.

3. Ribes malvaceum Smith in Rees, Cycl. 30: no. 13. 1815.

Local distribution: Shaded ravines and chaparral slopes, northern San Mateo County southward. October through April.

General distribution: Coast Ranges from Tehama County south to Ventura County and on some of the Channel Islands.

Specimens examined: Sweeney Ridge, Oberlander 5; Near Belmont, Dudley, 1893; Portola, Elmer 4535; Coal Mine Ridge, Barry 223; Black Mt., Dudley, Feb. 15, 1896; Foothills west of Los Gatos, Heller 7219; Loma Prieta, Dudley, Apr. 21, 1895; El Toro, Ferris 800; Near Eagle Rock, Thomas 4725.

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2. Grossularia Mill. Gard. Dict. ed. 7. 1759.

Anthers less than 1 mm. long; berries glabrous.....1. G. divaricata.
Anthers over 2 mm. long; berries with spines.
  Ovary with long white hairs.....2. G. senilis.
  Ovary without long white hairs.
    Abaxial leaf surfaces more or less glabrous...3. G. californica.
    Abaxial leaf surfaces glandular-pubescent.....4. G. leptosma.

1. Grossularia divaricata (Dougl.) Cov. & Britt. N. Amer. Fl. 22: 224. 1908.

Local distribution: Occasional in the Santa Cruz Mountains from northern San Mateo County southward, usually in moist shaded areas, often along or near creeks and streams. Latter part of February through May.

General distribution: British Columbia south through western Washington and Oregon and the California Coast Ranges to Ventura County.

Specimens examined: Pilarcitos Canyon, Oberlander 49; La Honda Road, Jack, Mar. 24, 1894; Near Searsville, Dudley, 1893; Near Stanford, Baker 563; Wrights Station, Dudley, Sept. 29, 1894; Liddell Creek, Bacigalupi, Mar. 29, 1922; Scott Creek, Ferris 1991; Ben Lomond sand hills, Thomas 3863.

2. Grossularia senilis Cov. N. Amer. Fl. 22: 214. 1908.

Local distribution: Santa Clara and Santa Cruz counties southward to near Watsonville, usually on wooded slopes. March through August.

General distribution: Endemic.

Specimens examined: Near Saratoga, Heller, Apr. 13, 1907; Loma Prieta, Dudley, May 29, 1894; Near New Almaden, Ferris 2030; Big Basin, Dudley, Sept. 20, 1901; Waddell Creek, Thomas 2761; Glenwood, Abrams 10927; Soquel, Elmer 4605; Aptos, Coville & Bacigalupi 98.

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3. Grossularia californica (Hook. & Arn.) Cov. & Britt. N. Amer. Fl. 22: 214. 1908.

Local distribution: Usually on more or less open or partly wooded hills, northern San Mateo County southward, mainly on the eastern slopes of the Santa Cruz Mountains. Late January through April.

General distribution: California Coast Ranges from Mendocino County south to San Luis Obispo County.

Specimens examined: San Francisco, Bigelow, 1853-1854; Pilarcitos Canyon, Oberlander 527; Belmont, Rose 33226; Portola, Elmer 4683; Coal Mine Ridge, Barry 224; Stanford, Abrams 2329; Foothills west of Los Gatos, Heller 7249; Guadalupe River, Coville 61; El Toro, Ferris 798.

Leaf size and the number of spines per berry varies from plant to plant. Plants growing in more exposed habitats are usually gnarled and very woody.

4. Grossularia leptosma Cov. N. Amer. Fl. 22: 214. 1908.

Local distribution: Northern San Mateo County south to northern Santa Cruz County and to the vicinity of Loma Prieta in Santa Clara County, usually in moist woods or on brush-covered slopes. March through June.

General distribution: Sonoma County south to northern Santa Cruz County and to Santa Clara County.

Specimens examined: Edgemar, Bacigalupi 2792; Pilarcitos Canyon, Oberlander 822; Between Halfmoon Bay and Woodside, Dudley, Mar. 1894; Pescadero Creek, Abrams 4999; Portola, Elmer 4496; Stanford, Dudley, June 29, 1894; Los Gatos, Heller 10382; Mt. Umunhum, Dudley, Sept. 11, 1906; Loma Prieta, Davis, May 9, 1920; Liddell Creek, Bacigalupi, Mar. 1922; Waddell Creek, Thomas 2924.

The Grossularia menziesii complex occurs from southern Oregon south to southern California and is a difficult one taxonomically. Numerous

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local populations have been described as species. Grossularia senilis is an example of a fairly distinct local population while G. leptosma is much more variable and has a wider geographic distribution. Many specimens of G. leptosma tend toward G. menziesii (Pursh) Cov. & Britt. in having thicker, more glandular-pubescent leaves. I have assigned all of these intermediates to G. leptosma as none have leaves which are as thick as those of typical G. menziesii.

51. PLATANACEAE

1. Platanus L. Sp. Pl. 999. 1753.

1. Platanus racemosa Nutt. Sylva 1: 47. 1842.

Local distribution: Along the bottoms of creeks and rivers and on flood plains and terraces, Santa Clara and Santa Cruz counties. March and April.

General distribution: Upper Sacramento Valley south through the Coast Ranges to northern Baja California, also in Sinaloa, Mexico.

Specimens examined: Near Santa Clara, Dudley, Oct. 1893; 4 miles south of San Jose, Rattan, May 1, 1887; Carnadero Creek, Thomas 4375; San Lorenzo River, Santa Cruz, Thompson, Apr. 2, 1904; Pajaro River, Thomas 3284.

52. ROSACEAE

Plants herbaceous, not shrubs or vines.
- Petals present, conspicuous, white or yellow; stamens 10 or more; pistils numerous.
  - Receptacle enlarging in fruit, becoming red; leaves ternate. 1. Fragaria.
  - Receptacle not enlarging in fruit; leaves pinnate or sometimes ternate.
    - Filaments dilated; stamens inserted at a distance from the receptacle.....2. Horkelia.
    - Filaments filiform; stamens inserted near the base of the receptacle.....3. Potentilla.

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Petals absent; stamens less than 5; pistils 1 or 2.
Plants annual, under 1 dm. tall; flowers axillary; stamen 1.
4. Alchemilla.
Plants annual or perennial, over 1 dm. tall; flowers in definite inflorescences; stamens 2 or more.
Hypanthium with barbed prickles.....5. Acaena.
Hypanthium without barbed prickles.....6. Sanguisorba.
Shrubs or vines.
Fruit of dehiscent follicles; pedicels and hypanthium densely stellate-pubescent.....7. Physocarpus.
Fruit of indehiscent achenes or drupelets; pedicels and hypanthium not stellate-pubescent.
Leaves not divided; plants not prickly; flowers under 5 mm. in diameter, not showy.
Leaves ovate, over 1.5 cm. long.
Pistils 5; styles not becoming plumose; achenes enclosed within a saucer-shaped hypanthium; leaves usually at least 4 cm. long.....8. Holodiscus.
Pistil 1; styles becoming plumose; hypanthium salverform; leaves usually under 2.5 cm. long....9. Cercocarpus.
Leaves fascicled, linear-subulate, less than 1 cm. long.
10. Adenostoma.
Leaves pinnatifid or palmately lobed; plants usually prickly; flowers showy.
Fruit of drupelets, not enclosed by a fleshy hypanthium.
11. Rubus.
Fruit of achenes, enclosed in a fleshy hypanthium.
12. Rosa.

1. Fragaria L. Sp. Pl. 494. 1753.

Leaves thin, not leathery. Plants of shaded slopes.1. F. californica.
Leaves thick, leathery. Plants of the immediate coast.
2. F. chiloensis.

1. Fragaria californica Cham. & Schlecht. Linnaea 2: 20. 1827.

Local distribution: Shaded slopes and hillsides at the edge of and in clearings in douglas fir forests, San Francisco southward. January through June, with mature fruit from May through July.

General distribution: Southwestern Oregon south to the Sierra San Pedro Martir, through the Coast Ranges and Sierra Nevada.

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Specimens examined: Twin Peaks, Thomas 4871; Pilarcitos Canyon, Oberlander 58; Kings Mt., Abrams 2469; Between La Honda and Pescadero, Dudley, July 28, 1894; Near Searsville, Dudley, Apr. 15, 1898; Stevens Creek, Dudley, Mar. 5, 1905; Lexington, Heller 7296; Near Bielawski Lookout, Thomas 2826; Swanton, Rich, Mar. 7, 1912.

2. Fragaria chiloensis (L.) Duchesne, Hist. Nat. Fraisiers 165. 1766.

Local distribution: Coastal sand dunes from San Francisco southward. February through August.

General distribution: Along the coast from the Aleutian Islands to San Luis Obispo County, in South America from Peru to the Tierra del Fuego, on the San Juan Fernandez Islands, and in the Hawaiian Islands.

Specimens examined: Near the Presidio, Dudley, Apr. 29, 1902; Lake Merced, Abrams 1585; San Pedro, Dudley, Mar. 18, 1900; Pescadero Beach, Bennett 17; Mouth of Waddell Creek, Thomas 1720; Swanton, Rich, May 12, 1912.

2. Horkelia Cham. & Schlecht. Linnaea 2: 26. 1827.

Pistils more than 50; bractlets ovate, sepaloid.
  Hypanthium cup-shaped, 3-5.5 mm. deep.
    Hypanthium glabrous within; calyx-lobes greenish within.
      1. H. frondosa.
    Hypanthium pubescent within; calyx-lobes purple-flecked within.
      2. H. californica.
  Hypanthium saucer-shaped, 1.5-2 mm. deep.
    Leaves glandular-villous to glabrate.
      3a. H. cuneata ssp. cuneata.
    Leaves densely silky-pubescent, obscurely glandular.
      3b. H. cuneata ssp. sericea.
Pistils fewer than 40; bractlets lanceolate, smaller than the calyx-lobes.....4. H. bolanderi ssp. parryi.

1. Horkelia frondosa (Greene) Rydb. Bull. Torr. Bot. Club 25: 54. 1898.

Local distribution: Occasional on the eastern slopes of the Santa Cruz Mountains in southern San Mateo and Santa Clara counties. April through October.

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General distribution: Sonoma County south to Monterey County.

Specimens examined: Woodside, Dudley, May 1894; Stanford, Dickson, Oct. 29, 1896; Llagas Creek, 4 miles west of Morgan Hill, Keck & Hiesey 5054.

2. Horkelia californica Cham. & Schlecht. Linnaea 2: 26. 1827.

Local distribution: Coastal bluffs and grassy slopes, mainly overlooking the ocean. June through October.

General distribution: Coastal side of the Outer Coast Ranges from Humboldt County south to San Luis Obispo County.

Specimens examined: San Francisco, Greene, June 1887; San Bruno Hills, Heller 8374; Spanishtown, Geis, Oct. 25, 1901; Pescadero Creek, Thomas 4273; Ano Nuevo Pt., Abrams & Wiggins 436; Stevens Creek, Atkinson, July 1901; Aptos, Dudley, Oct. 13, 1902.

3a. Horkelia cuneata Lindl. ssp. cuneata, Bot. Reg. 23: under pl. 1997. 1837.

Local distribution: Near the ocean and in central Santa Cruz County on the inland marine sand deposits. March through September.

General distribution: San Francisco south to San Diego County, mainly along the coast.

Specimens examined: Ocean View, Dudley, Nov. 1896; Ben Lomond Mt., Dudley, Mar. 30, 1899; Glenwood, Rossbach 784; Ben Lomond sand hills, Thomas 1866; Santa Cruz, Jones 2251; Watsonville, Eastwood 11138a (CAS).

3b. Horkelia cuneata Lindl. ssp. sericea (Gray) Keck, Lloydia 1: 86. 1938.

Local distribution: Near the coast or on the sand hills in Santa Cruz County. April through June.

General distribution: Along or near the coast from Sonoma County south to Santa Barbara County.

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Specimens examined: Near Ocean View, Heller 8374; Near Colma, Dudley, May 11, 1901; Mt. Hermon, Bacigalupi 1486.

Plants with pubescence intermediate between the two subspecies occur occasionally. Examples are: Near Eccles, Dudley, June 26, 1897; Lower Zayante, Dudley, May 6, 1893; Between Scott and Waddell Creeks, Ferris 1988.

4. Horkelia bolanderi Gray ssp. parryi (S. Wats.) Keck, Lloydia 1: 92. 1938.

Local distribution: Known locally only from San Andreas Valley where it occurs in grasslands. June and July.

General distribution: San Mateo County, Monterey County, and from Mount Pinos to Mount San Gregorio in southern California.

Specimen examined: San Andreas Valley, Oberlander 1204.

The specimen cited above is typical of H. bolanderi ssp. parryi with respect to the filament and bractlet shape, however it varies in the direction of H. marinensis (Elmer) Crum ex Keck with respect to the woody rootstock, dense foliage, and fairly short flowering branches.

Horkelia tenuiloba (Torr.) Gray (Proc. Amer. Acad. 6: 529. 1865) is not known from the Santa Cruz Mountains, but it does occur in Sonoma, Marin, and San Luis Obispo counties and is perhaps to be expected locally. It may be distinguished from the first three Horkelias by its narrower bractlets, fewer than 20 pistils, and from the last species by its deeply palmatifid leaflets.

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3. Potentilla L. Sp. Pl. 495. 1753.

Basal leaves with 3-5 leaflets; styles terminal or subterminal.
Leaves 5-foliolate at least below.....1. P. rivalis.
Leaves 3-foliolate at least below.....2. P. millegrana.
Basal leaves with 7 to many leaflets; styles terminal to basal.
Basal leaves pinnately compound.
Styles terminal or subterminal.....3. P. hickmanii.
Styles basal or lateral
Leaflets white-silky and tomentose beneath; styles lateral.
4. P. egedii var. grandis.
Leaflets sparingly glandular beneath, not white-silky; styles basal.....5. P. glandulosa.
Basal leaves palmately compound.....6. P. recta.

1. Potentilla rivalis Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 437. 1840.

Local distribution: Known only from Mountain Lake in San Francisco and from Kelly Lake near Watsonville, but to be expected elsewhere along the margins of lakes. May through November.

General distribution: Widespread and sporadic from British Columbia to Manitoba, south to California, Mexico, Kansas, and Missouri.

Specimens examined: Mt. Lake, Sutliffe, May 31, 1935; Kelly Lake, Hesse 1425.

2. Potentilla millegrana Engelm. ex Lehm. Ind. Sem. Hamb. 1849: Add. 12. 1849.

Local distribution: Occasional in the Santa Cruz Mountains, usually in marshy or swampy areas. April through October.

General distribution: Washington east to Manitoba, south to California and New Mexico, southeast to Illinois and Missouri, and introduced into Virginia.

Specimens examined: Pilarcitos Canyon, Oberlander 560; Kelly Lake, Hesse 1426; Watsonville, Hayward, July 13, 1929.

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3. Potentilla hickmanii Eastw. Bull. Torr. Bot. Club 29: 77. 1902.

Local distribution: Known locally from the vicinity of Moss Beach. May.

General distribution: Central Sonoma County, in San Mateo County, and on the Monterey Peninsula.

Specimens examined: Moss Beach, Sutliffe, May 6, 1933 (CAS), May 10, 1933 (CAS).

4. Potentilla egedii Wormskj. var. grandis (Torr. & Gray) Howell, Leafl. West Bot. 5: 106. 1948.

(Potentilla pacifica Howell, Fl. N. W. Amer. 1: 179. 1898.)

Local distribution: Along the edges of coastal marshes and ponds, occasionally inland as at Crystal Springs Lake. April through June.

General distribution: Along the coast from the Aleutian Islands to Los Angeles County and in Asia from Kamtschatka to Japan.

Specimens examined: San Francisco, Blasdale, May 1891; Crystal Springs, Oberlander 925; Pebble Beach, Grant 941; Waddell Creek, Thomas 1714; Capitola, Pendleton, May 1908; Near mouth of Pajaro, Thomas 2392.

5. Potentilla glandulosa Lindl. Bot. Reg. 19: pl. 1583. 1838.

Local distribution: Open woods, hillsides, and adventive in disturbed areas. Latter part of March through July.

General distribution: Southern British Columbia south through western Idaho, Washington, Oregon, and the California Coast Ranges to northern Baja California.

Specimens examined: San Francisco, Dudley, May 14, 1894; Montara Mts., Dudley, Mar. 17, 1900; Pebble Beach, Dudley, Apr. 18, 1896; Woodside, Crum 707; Foothills west of Los Gatos, Heller 7329; Loma Prieta, Davis, May 8, 1920; Swanton, Rich, Apr. 25, 1912; Laurel, Smith 2898; Near Warrenella, Thomas 3406; 6 miles east of Watsonville, Thomas 1559.

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Clausen, Keck, and Hiesey (1940, pp. 44-46) have discussed the synonymy and variability of this species.

6. Potentilla recta L. Sp. Pl. 497. 1753.

Local distribution: Known as a weed from San Francisco and Saratoga. June and July.

General distribution: Native of Europe, a common weed in the eastern portion of the United States, occasional in central California.

Specimen examined: San Francisco, Bush, no date (CAS).

This species was reported from Saratoga by Jepson (1936, p. 189).

4. Alchemilla L. Sp. Pl. 123. 1753.

1. Alchemilla occidentalis Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 432. 1840.

Local distribution: Common on grassy and sandy slopes throughout the area. February through May.

General distribution: British Columbia and perhaps Idaho south through western Washington and Oregon, the California Coast Ranges and the Sierra Nevada foothills to northern Baja California, and on Guadalupe Island.

Specimens examined: San Bruno Mt., Thomas 4835; Crystal Springs Lakes, McMurphy, May 8, 1906; Woodside serpentine, Dutton, Mar. 11, 1900; Stanford, Atkinson, March 1900; Edenvale, Thomas 4777; Hilton Airport, Thomas 3768; Big Basin, Thomas 7008.

Alchemilla occidentalis is an inconspicuous plant and is often overlooked by collectors. Flowering plants may be less than 1 cm. tall.

5. Acaena L. Mant. 2: 145. 1771.

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1. Acaena californica Bitter, Bibl. Bot. 17: 116. 1910.

Local distribution: Grassy slopes near the ocean or San Francisco Bay, San Francisco south to Pescadero and Crystal Springs Reservoir. March through June.

General distribution: Near the coast from Sonoma County south to northern Monterey County and in western Alameda and Contra Costa counties.

Specimens examined: Twin Peaks, Thomas 4865; Lake Merced, Hall, Apr. 25, 1901; San Bruno Hills, Rollins 3015; San Andreas Reservoir, Dudley, Mar. 18, 1900; 2.5 miles south of Pescadero, Wiggins 10096.

Bitter (1911, pp. 117-119) described five varieties of this species from the San Francisco Bay area based on minor differences in the vegetative parts of the plants.

6. Sanguisorba L. Sp. Pl. 116. 1753.

1. Sanguisorba minor (L.) Scop. Fl. Carn. 1: 110. 1772.

Local distribution: Adventive in disturbed areas and occasionally in grain fields. May through September.

General distribution: Native from the Mediterranean region east to central Russia, introduced into Europe and North America.

Specimens examined: San Francisco, Patton, Sept. 1930; Corte Madera Creek, Wiggins 11203; Bayshore Highway near Sunnyvale, Ferris & Bacigalupi 2789; Glenwood, Thomas 3196.

7. Physocarpus Maxim. Act. Hort. Petrop. 6: 219. 1879.

1. Physocarpus capitatus (Pursh) Kuntze, Rev. Gen. Pl. 2: 219. 1891.

Local distribution: Along the lower courses of streams and creek bottoms, more common in the drainages on the eastern side of the Santa

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Cruz Mountains. April through July.

General distribution: Southernmost Alaska south through British Columbia, Washington, and Oregon to Idaho, the Santa Cruz Mountains, and the central Sierra Nevada.

Specimens examined: San Andreas Valley, Oberlander 1041; Foothills back of Redwood City, Abrams 2397; Coal Mine Ridge, Barry 112; Los Trancos Creek, McMurphy 41; Permanente Creek, Dudley, Apr. 23, 1899.

Miss Vesta Hesse has reported that she has seen this species along the San Lorenzo River in Santa Cruz County, but no specimens are available.

8. Holodiscus Maxim. Act. Hort. Petrop. 6: 253. 1879.

1. Holodiscus discolor (Pursh) Maxim. Act. Hort. Petrop. 6: 254. 1879.

Local distribution: A common shrub in soft chaparral, oak woodland, open douglas fir forests, and along stream banks. Latter part of April through July.

General distribution: Southern British Columbia south to northern Idaho and adjacent Montana and through Washington, Oregon, the California Coast Ranges, and the Sierra Nevada to Los Angeles and Orange counties.

Specimens examined: Sawyer Ridge, Oberlander 183; San Mateo, Elmer 4274; Coal Mine Ridge, Barry 180; 3 miles southwest of Mayfield, Wiggins 9219; Foothills west of Los Gatos, Heller 7514; Rancho del Oso, Thomas 1731; 1 mile southeast of Saratoga Summit, Thomas 3422; Hecker Pass, Thomas 1958.

9. Cercocarpus H. B. K. Nov. Gen. & Sp. 6: 232. 1823.

1. Cercocarpus betuloides Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 427. 1840.

Local distribution: Growing on poor or rocky soils from sea level

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to about 3500 feet elevation, usually in chaparral with Quercus dumosa, Q. wislizenii, Q. durata, Arctostaphylos glauca, Adenostoma fasciculatum, Ceanothus spp., Garrya fremontii, and occasionally with Pinus attenuata and P. sabiniana, southern San Mateo County southward.

General distribution: Lane County, Oregon, south through the Coast Ranges and the Sierra Nevada to northern Baja California.

Specimens examined: Coal Mine Ridge, Barry 11; Searsville Lake, Dale, May 30, 1927; West slope of Loma Prieta, Hitchborn 164; Trail to New Almaden, Dudley, May 29, 1899; Eagle Rock, Thomas 6846.

10. Adenostoma Hook. & Arn. Bot. Beechey 139. 1832.

1. Adenostoma fasciculatum Hook. & Arn. Bot. Beechey 139. 1832.

Local distribution: Chaparral and exposed slopes from San Francisco southward. May through July.

General distribution: Trinity County south through the Coast Ranges and the mountains of southern California to northern Baja California, also in the central Sierra Nevada at low elevations.

Specimens examined: Emerald Lake, Rose 41270; Sawyer Ridge, Oberlander 234; Jasper Ridge, Gillespie, May 1927; 3 miles southwest of Mayfield, Wiggins 9218; Foothills west of Los Gatos, Heller 7515; Glenwood, Davis, Sept. 1907; Big Basin, Randall, July 4, 1930.

The leaves of seedlings and crown sprouts are palmately or bipinnately divided, as for example Abrams, Oct. 9, 1909, from Black Mountain. Germination during the first rainy season following a fire is rapid and numerous seedlings come up. Adenostoma occurs as a component of chaparral with various species of Arctostaphylos, Eriodictyon californicum, Photinia arbutifolia, Quercus spp., Pickeringia montana, Dendromecon rigida, and Prunus spp., or it occurs in relatively pure stands called chamise.

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11. Rubus L. Sp. Pl. 492. 1753.

Plants without spines; leaves palmately 5-lobed; styles club-shaped; receptacles flat.....1. R. parviflorus var. velutinus.
Plants with spines; leaves pinnately 3-lobed or 3-5-foliolate or palmately 5-foliolate; styles filiform; receptacles convex to conical.
Leaflets usually 3, if more the leaves pinnate; plants erect or prostrate.
Flowers single or few; sepals ovate; petals rose-colored, $1\frac{1}{2}$-2 times as long as the sepals.
2. R. spectabilis var. franciscanus.
Flowers clustered; sepals lanceolate, long acuminate; petals white, about as long as the sepals.
Leaves greyish-white abaxially, 3-foliolate; prickles stout, recurved at the apex, prominently enlarged at the base.
3. R. leucodermis.
Leaves green abaxially, 3-5-foliolate or 3-lobed; prickles slender, straight, little enlarged at the base.
4. R. ursinus.
Leaflets 5, leaves palmate; plants prostrate or trailing.
5. R. procerus.

1. Rubus parviflorus Nutt. var. velutinus (Hook. & Arn.) Greene, Bull. Torr. Bot. Club 30: 274. 1903.

Local distribution: Streambanks, moist slopes, and protected ravines, throughout the Santa Cruz Mountains. March through August.

General distribution: Outer Coast Ranges of California from Del Norte County south to Santa Barbara County.

Specimens examined: Pilarcitos Canyon, Oberlander 902; Sea Cove, Dudley, Mar. 17, 1900; Gazos Creek, Wiggins 9296A; Coal Mine Ridge, Barry 251; Page Mill Road, Olsson-Seffer, Apr. 27, 1904; Foothills west of Los Gatos, Heller 7401; Glenwood, Davis, Sept. 1907; Boulder Creek, Thomas 1791; San Vicente Creek, Thomas 3399.

2. Rubus spectabilis Pursh var. franciscanus (Rydb.) Howell, Leafl. West. Bot. 5: 106. 1948.

Local distribution: Along or near the coast in wooded canyons, San Francisco south to central Santa Cruz County. March through May.

General distribution: Along or near the coast from Curry County,

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Oregon, south to Santa Cruz County.

Specimens examined: Sunset Heights, San Francisco, Congdon, Mar. 27, 1892; Half Moon Bay, Stinchfield 265; Swanton, Rich, May 12, 1912; Liddell Creek, Mason, Mar. 29, 1922.

Rubus spectabilis var. franciscanus occurs alone from Sonoma County southward. North of Sonoma County it occurs with R. spectabilis var. spectabilis. Local plants are variable with respect to the number and length of the prickles, the size of the leaves, and the thickness of the leaves.

3. Rubus leucodermis Dougl. ex Torr. & Gray, Fl. N. Amer. 1: 454. 1840.

Local distribution: Santa Clara and Santa Cruz counties, growing along streams and in clearings in redwood - douglas fir forests. March through June.

General distribution: Eastern Pacific Coast District of Alaska southeast to Montana and Wyoming, south to Sonoma County, California, southern California, Arizona, and New Mexico, and in the Santa Cruz Mountains.

Specimens examined: Wrights, Elmer 4994; Loma Prieta, Ferris 2020; Summit of Los Gatos - Santa Cruz highway, Thomas 3174; Glenwood, Dudley, June 20, 1909; Zayante Creek, Dudley, May 6, 1893; Big Trees, Stinchfield 163.

4. Rubus ursinus Cham. & Schlecht. Linnaea 2: 11. 1827.

(R. vitifolius Cham. & Schlecht. Linnaea 2: 10. 1827.)

Local distribution: A common woody plant, growing along streams, coastal bluffs, road banks, fence rows, and in disturbed areas. March through August.

General distribution: Southern British Columbia and Idaho south to northern Baja California.

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Specimens examined: San Francisco, Dudley, May 1897; Between Colma and Lake Merced, Dudley, May 11, 1901; Near Pescadero, Eastwood & Howell 6055; Coal Mine Ridge, Barry 243; Glenwood, Davis, Sept. 1907; Santa Cruz, Thomas 1262; Near Pajaro River, Thomas 1535.

The types of both R. ursinus and R. vitifolius came from what is now the Presidio in San Francisco (Bailey, 1932, pp. 280-281). Diploid chromosome numbers ranging from 42 to 84 are known in the section Ursinus of which both R. ursinus and R. vitifolius are members (Brown, 1943, pp. 686-689). In view of the high degree of polyploidy, the large number of names that have been applied (Bailey, 1941, pp. 47-64), and the fact that most herbarium specimens are inadequate in that they show only one of the successive growth stages needed for sure identification, I prefer to refer all of the blackberries of the section Ursinus from the Santa Cruz Mountains to the species R. ursinus.

5. Rubus procerus Muell. ex Boulay, Ronces Vosgiennes 6: 7. 1864.

Local distribution: Occasional as a weed in San Francisco and probably elsewhere. June through August.

General distribution: Native of Europe, introduced into some of the eastern states and into central California.

Specimens examined: San Francisco, Howell 31474 (CAS), 32429 (CAS).

12. Rosa L. Sp. Pl. 491. 1753.

Abaxial surfaces of the leaves densely pubescent; plants with stout, usually recurved prickles.....1. R. californica.
Abaxial surfaces of the leaves glabrous or with thick, glandular hairs; plants usually with slender, terete, ascending or straight prickles.
  Hypanthium densely glandular, the upper part and the sepals persistent.....2. R. spithamea.
  Hypanthium glabrous, the upper portion and the sepals deciduous. 3. R. gymnocarpa.

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1. Rosa californica Cham. & Schlecht. Linnaea 2: 35. 1827.

(R. aldersonii Greene, Pittonia 5: 110. 1903.)

Local distribution: Open stream banks, wooded hills, and on coastal sand dunes and bluffs. April through October.

General distribution: Humboldt County south to northern Baja California, in the Sierra Nevada from Butte County south to Tulare County, and on some of the Channel Islands.

Specimens examined: Pilarcitos Canyon, Oberlander 370; Back of San Mateo, Heller 8582; Woodside, McMurphy 64; Los Altos, Randall 343; Castle Rock Ridge, Abrams, Oct. 7, 1906; Between Morgan Hill and Gilroy, Abrams 6385; Near Llagas Post Office, Dudley, June 8, 1909; Carnadero Creek, Thomas 4352; Glenwood, Dudley, June 20, 1909; Swanton, Rich, Apr. 1912; Santa Cruz, Dudley, Oct. 4, 1896; Kelly Lake, Hayward, July 13, 1929; Mouth of Pajaro River, Thomas 2412.

2. Rosa spithamea Wats. Bot. Calif. 2: 444. 1880.

(R. sonomensis Greene, Fl. Franciscana 72. 1891.)

Local distribution: Central portion of the Santa Cruz Mountains, in open oak - madrone woods, occasionally in chaparral or in disturbed areas. Latter part of May through August.

General distribution: Southwestern Oregon south through the Coast Ranges to San Luis Obispo County and in the Sierra Nevada from Butte County south to Tulare County.

Specimens examined: Mt. Umunhum, Ferris 3613; Guadalupe Creek above San Jose, Dudley, July 22, 1893; Saratoga - Big Basin Road, Abrams 52580; China Grade, Thomas 3535; 1 mile north of Felton, Thomas 1171.

3. Rosa gymnocarpa Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 461. 1840.

Local distribution: Occasional in open woods. April through September.

General distribution: Southern British Columbia south to western

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Montana, the central Sierra Nevada, and Monterey County.

Specimens examined: Crystal Springs Lake, Dudley, May 8, 1906; White House Canyon, Demaree 10386; Pescadero Creek, Elmer 4923; Stevens Creek, Abrams 3015; Near Wrights Station, Dudley, Sept. 29, 1894; Sierra Azule Ridge, Ferris, July 15, 1922; Swanton, Rich, May 22, 1912; Big Basin, McMinn 103; 1 mile west of Eagle Rock, Thomas 4071; Soquel, Thompson, May 1, 1902.

53. AMYGDALACEAE

Leaves variously serrate; pistil 1; flowers perfect.....1. Prunus.
Leaves entire; pistils usually 5; plants dioecious.....2. Osmaronia.

1. Prunus L. Sp. Pl. 473. 1753.

Inflorescence corymbose or umbellate.
  Leaves narrowed at the base; drupe red, about 5 mm. long; flowers in corymbose clusters.....1. P. emarginata.
  Leaves rounded or subcordate at the base; drupe purple, 20-25 mm. long; flowers in umbel-like clusters.....2. P. subcordata.
Inflorescence racemose.
  Leaves deciduous, thin, not spinose-margined.....3. P. demissa.
  Leaves persistent, coriaceous, spinose-margined...4. P. ilicifolia.

1. Prunus emarginata (Dougl.) Walp. Rep. 2: 9. 1843.

Local distribution: Streamsides, shaded slopes, and occasionally in chaparral. April and May.

General distribution: British Columbia south to southern California, east to Montana, North Dakota, and New Mexico.

Specimens examined: Pilarcitos Canyon, Abrams 5575; Cahill Ridge, Oberlander 956; Searsville, Elmer 4523; Los Gatos Hills, McMurphy, Apr. 7, 1905; Loma Prieta Ridge Rd., Thomas 3950; ½ mile above Mt. Hermon, Ferris 2009.

Pedicels and hypanthia vary from glabrous to densely pubescent.

2. Prunus subcordata Benth. Pl. Hartw. 308. 1849.

Local distribution: Southern San Mateo and Santa Clara counties, usually on the eastern slopes of the mountains, growing along creeks and

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occasionally in chaparral. March and April.

General distribution: Southern Oregon south through the Coast Ranges to Santa Clara County and in the Sierra Nevada to Kern County.

Specimens examined: Portola, Elmer 4533; Coal Mine Ridge, Barry 248; Page Mill Rd., Thompson, Apr. 23, 1904; Permanente Creek, Dudley, Apr. 23, 1899.

3. Prunus demissa (Nutt.) Walp. Rep. 2: 10. 1843.

Local distribution: Ravines and woods on the eastern slopes of the Santa Cruz Mountains. April through the first part of June.

General distribution: Washington and northwestern Idaho south through the Coast Ranges and the Sierra Nevada to San Diego County.

Specimens examined: Pilarcitos Canyon, Oberlander 245; Coal Mine Ridge, Barry 113; Near summit of Page Mill Road, Olsson-Seffer, Apr. 27, 1904; Near Permanente Creek, Dudley, Apr. 30, 1899.

4. Prunus ilicifolia (Nutt.) Walp. Rep. 2: 10. 1843.

Local distribution: Common throughout the Santa Cruz Mountains either as a member of the chaparral or in relatively pure stands in ravines, gullies, or on open hillsides. March through June.

General distribution: Napa County south to northern Baja California.

Specimens examined: San Bruno Mt., Thomas 4239; Pilarcitos, Elmer 4773; Menlo Park, Brandegee, no date; Searsville, Stinchfield 154; Between Alma and Soda Springs, Heller 7418; Loma Prieta, Cody, July 1932; Saratoga Summit, Thomas 1952; Soda Lake, Thomas 3308.

2. Osmaronia Greene, Pittonia 2: 191. 1891.

1. Osmaronia cerasiformis (Torr. & Gray) Greene, Pittonia 2: 191. 1891.

Local distribution: Shaded slopes and canyons throughout the Santa

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Cruz Mountains, but more common on the eastern slopes than on the western. February through April.

General distribution: Southern British Columbia southward to San Luis Obispo County in the Coast Ranges and to Tulare County in the Sierra Nevada.

Specimens examined: Mission Hills, Bolander 1867; Presidio, Rattan, no date; San Andreas Dam, Dudley, Mar. 18, 1900; Pilarcitos Canyon, Oberlander 37; Portola Valley, Dudley 43; Pescadero Creek, Mason, July 14, 1921; Los Trancos Creek, Wiggins 3365; Black Mt., McMurphy, Apr. 30, 1910; Swanton, Rich, Mar. 1, 1912.

54. MALACEAE

Leaves deciduous, elliptic to broadly ovate, finely tomentose abaxially; petals 8-10 mm. long.....1. Amelanchier.
Leaves evergreen, oblong to oblong-lanceolate, usually glabrous; petals about 4 mm. long.....2. Photinia.

1. Amelanchier Medic. Phil. Bot. 1: 155. 1789.

1. Amelanchier pallida Greene, Fl. Franciscana 53. 1891.

Local distribution: Occasional along streams and on moist slopes, San Francisco southward, less frequent on the western slopes of the Santa Cruz Mountains than on the eastern. April and May.

General distribution: Western Oregon south through the Coast Ranges and Sierra Nevada to San Diego County.

Specimens examined: San Mateo Canyon, Abrams, Apr. 27, 1909; Searsville Dam, Stinchfield 145; Page Mill Rd., Dudley, July 6, 1903; Black Mt., Dudley, June 6, 1903; Alma - Soda Springs Rd., Ferris 2079; 6 miles west of Gilroy, Bacigalupi, May 6, 1922.

2. Photinia Lindl. Trans. Linn. Soc. 13: 103. 1821.

1. Photinia arbutifolia (Ait.) Lindl. Trans. Linn. Soc. 13: 103. 1821.

Local distribution: Throughout the Santa Cruz Mountains and

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surrounding lowlands, common as a chaparral component, as a member of the understory of open oak - madrone woods, and as isolated shrubs. June and July.

General distribution: Siskiyou County south through the Coast Ranges to the southern end of Baja California, in the Sierra Nevada as far south as Fresno County, on some of the Channel Islands, and on Cedros Island.

Specimens examined: San Francisco, Brandegee, no date; Bakers Beach, Dudley, Dec. 7, 1904; Sweeney Ridge, Oberlander 281; Palo Alto, Baker, July 10, 1903; San Antonio Creek, Randall 332; Foothills west of Los Gatos, Heller 7218; Near Bielawski Lookout, Thomas 3443; Waddell Creek, Thomas 2766; Near Hester School, Thomas 2493.

55. MIMOSACEAE

Stamens united at the base, 2-3 cm. long; leaves bipinnately compound, the ultimate divisions 8-12 mm. long.....1. Albizzia.
Stamens distinct, under 5 mm. long; leaves reduced to phyllodia or if bipinnately compound, the ultimate divisions about 4 mm. long. 2. Acacia.

1. Albizzia Dur. Mag. Tosc. 4: 11. 1772.

1. Albizzia lophantha (Willd.) Benth. Lond. Journ. Bot. 3: 86. 1844.

Local distribution: Becoming established on moist slopes in San Francisco and perhaps elsewhere. Flowering at all seasons of the year.

General distribution: Native of Australia, commonly cultivated, and occasionally escaped in California.

Specimens examined: San Francisco, Howell 31918 (CAS); Near Pt. Lobos, Thomas 7334; Lake Merced, Raven 6574 (CAS).

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2. Acacia Mill. Gard. Dict. ed. 4. 1754.

Leaves not reduced to phyllodia.....1. A. decurrens.
Leaves reduced to phyllodia, occasionally juvenile leaves with a few pinnae.
  Flowers in spikes, often several spikes in the axils of nonsickle-shaped phyllodia.....2. A. longifolia.
  Flowers in glomerulate heads racemosely arranged in the axils of sickle-shaped phyllodia.....3. A. melanoxylon.

1. Acacia decurrens Willd. Sp. Pl. 4: 1072. 1805.

Local distribution: Widely planted as an ornamental and becoming naturalized. January through March.

General distribution: Native in Australia, widely planted in California, occasionally found as an escape.

Specimens examined: Bayview Hills, Howell 32400 (CAS); Near Big Basin, Thomas 1321; Jamison Road, Thomas 3679.

2. Acacia longifolia Willd. Sp. Pl. 4: 1052. 1805.

Local distribution: Common as an ornamental tree, occasionally becoming established. February and March.

General distribution: Native of Australia, widely planted and becoming naturalized.

Specimens examined: Near Lake Merced, Rubtzoff 2305 (CAS); Santa Cruz, Thomas 2811; Near Soquel Creek, Thomas 2847.

3. Acacia melanoxylon R. Br. in Ait. Hort. Kew. 5: 462. 1813.

Local distribution: Commonly planted and occasionally naturalizing. February and March.

General distribution: Native of Australia, occasionally becoming established in California.

Specimens examined: Presidio, Raven 6459 (CAS); Near Sea Cliff Beach State Park, Thomas 1427.

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THE VASCULAR PLANTS OF THE SANTA CRUZ MOUNTAINS OF CENTRAL CALIFORNIA

PART II

A DISSERTATION

SUBMITTED TO THE DEPARTMENT OF BIOLOGICAL SCIENCES

AND THE COMMITTEE ON GRADUATE STUDY

OF STANFORD UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

By

John Hunter Thomas

November 1958

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Acacia verticillata Willd. (Sp. Pl. 4: 1049. 1805) is widely planted and at Lake Merced in San Francisco occasionally produces seedlings. (Thomas 7306). It may be distinguished from the other local species of Acacia by its whorled, needle-like leaves.

56. FABACEAE

Leaves palmately compound, leaflets usually 5 or more...1. Lupinus.
Leaves none, trifoliolate, or variously pinnately compound.
  Shrubs or trees.
    Stems spiny.
      Leaflets 9 or more; flowers white or pale pink; trees. 2. Robinia.
      Leaflets 1-3 or the leaves reduced to spines; flowers rose-colored or yellowish; shrubs.
        Leaflets 1-3; flowers rose-colored.....3. Pickeringia.
        Leaves reduced to acicular spines; flowers yellow. 4. Ulex.
    Stems not spiny.
      Leaflets 9 or more; flowers white or pale pink; trees. 2. Robinia.
      Leaflets 1-5; flowers yellow at least in part; shrubs.
        Flowers over 1 cm. long; inflorescence not umbellate; pods dehiscent; mature plants usually at least 2 m. tall.
          Calyx 2-lipped; branchlets angular in cross section. 5. Cytisus.
          Calyx 1-lipped; branchlets round in cross section. 6. Spartium.
        Flowers under 1 cm. long; inflorescence more or less unbellate; pods indehiscent; mature plants rarely more than 1 m. tall.....7. Lotus.
  Plants herbaceous, annual, biennial, or perennial.
    Leaves trifoliolate.
      Herbage punctate-dotted.....8. Psoralea.
      Herbage not punctate-dotted.
        Stamens distinct; flowers about 2 cm. long, bright yellow; inflorescence racemose.....9. Thermopsis.
        Stamens diadelphous; flowers usually less than 2 cm. long, of various colors; inflorescence various.
          Pods spirally coiled.....10. Medicago.
          Pods not spirally coiled.
            Flowers in elongate racemes.....11. Melilotus.
            Flowers solitary, in umbels, or in dense heads.
              Flowers in dense heads, subtended by an involucre or not; leaflets denticulate...12. Trifolium.
              Flowers solitary or in few-flowered umbels, the umbels bracteate; leaflets entire. 7. Lotus.

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Leaves with more than 3 leaflets (if less than 3, the leaf bearing a tendril.
Pods breaking transversely into 1-seeded segments.
13. Ornithopus.
Pods indehiscent or dehiscent, but not breaking into 1-seeded segments.
Pods indehiscent, bur-like, covered with uncinate bristles; herbage glandular-viscid.....14. Glycyrrhiza.
Pods dehiscent, variously pubescent, but lacking uncinate bristles.
Leaves without tendrils.
Flowers white, cream, or purple; inflorescence an elongate spike, sometimes somewhat capitate, not bracteate.....15. Astragalus.
Flowers yellow, often marked with red; inflorescence umbellate or the flowers solitary, usually bracteate.....7. Lotus.
Leaves with well-developed or reduced tendrils.
Style not flattened, with a tuft of ring or hairs.
16. Vicia.
Style more or less flattened, bearded along the adaxial surface.
Wings of the corolla free from the keel.
17. Lathyrus.
Wings of the corolla adherent to the keel for about $\frac{1}{2}$ their length.
Pods 1-2-seeded; seeds biconvex.
18. Lens.
Pods many-seeded; seeds globose.
19. Pisum.

1. Lupinus L. Sp. Pl. 721. 1753.

Plants perennial.
Plants herbaceous, aerial stems annual, arising from a woody caudex.
Keels glabrous.
Leaflets large, 10-20 cm. long; stems usually fistulose; herbage sparsely hairy..1. L. polyphyllus var. grandifolius.
Leaflets smaller, usually under 5 cm. long; stems not fistulose; herbage densely pubescent.
Pubescence of the stem appressed.
2a. L. formosus var. formosus.
Pubescence of the stem spreading.
2b. L. formosus var. bridgesii.
Keels pubescent along the free margins.
Keels pubescent from the claws to the center of the blades; leaflets 4-10 cm. long.
Herbage more or less glabrous.
3a. L. latifolius var. latifolius.
Herbage villous.....3b. L. latifolius var. dudleyi.

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Keel pubescent from the claws to the tip of the blade; leaflets 2-3.5 cm. long.....4. L. variicolor.

Plants shrubby, the aerial stems perennial, woody.

Banners glabrous.

Petals usually yellow; herbage sparsely pubescent to glabrate; inflorescences over 10 cm. long.

5a. L. arboreus var. arboreus.

Wings blue, the banner mainly yellow; herbage spreading villous; inflorescences under 10 cm. long.

5b. L. arboreus var. eximius.

Banners pubescent.

Leaflets about equalling or longer than the petioles; petioles rarely over 2 cm. long; keel with a few scattered cilia or glabrous. Plants of coastal and inland sand dunes.

6. L. chamissonis.

Leaflets shorter than the petioles; lower petioles often several times as long as the leaflets; keel usually ciliate. Plants of chaparral, canyon slopes, rocky and open ridges.

Plants usually 1-1.5 m. tall.

7a. L. albifrons var. albifrons.

Plants usually under 0.4 m. tall.

7b. L. albifrons var. collinus.

Plants annual or rarely biennial.

Flowers not verticillate.

Herbage densely hispid-hairy.....8. L. hirsutissimus.

Herbage glabrate or with appressed pubescence.

9. L. truncatus.

Flowers verticillate (at least below).

Seeds 2 per pod; pods more or less elliptic; cotyledons sessile.

Inflorescences becoming secund; flowers spreading at anthesis.

10. L. densiflorus.

Inflorescences not becoming secund; flowers erect at anthesis.

11. L. subvexus.

Seeds more than 2 per pod; pods elongate; cotyledons petiolate.

Keels ciliate on both margins near the claws.

12. L. succulentus.

Keels ciliate above near the acumen or glabrous.

Pedicels 3-7 mm. long.

Largest leaflets over 5 mm. wide; pods 7.5-8.5 mm. wide.

13. L. affinis.

Largest leaflets under 5 mm. wide; pods under 6.5 mm. wide.

14. L. nanus.

Pedicels 1-3 mm. long.

Keels glabrous or rarely with a few cilia.

Banners 7-8.5 mm. long; pods 7-9 mm. wide.

15. L. pachylobus.

Banners 5-6.5 mm. long; pods under 5 mm. wide.

16. L. bicolor.

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Keels distinctly and copiously pubescent.
Leaflets glabrous adaxially; reflexed portion of the banners shorter than the appressed portion.
17. L. micranthus.
Leaflets pubescent on both surfaces; reflexed portion of the banner longer than the appressed portion.
16. L. bicolor.

1. Lupinus polyphyllus Lindl. var. grandifolius (Lindl. ex Agardh) Torr. & Gray, Fl. N. Amer. 1: 375. 1840.

Local distribution: Low moist areas along lagoons and in marshes. April through June.

General distribution: Humboldt County south to central Santa Cruz County; other varieties of this species extend northward into Canada and Alaska.

Specimens examined: San Pedro, Elmer 4444; Ano Nuevo Pt., Ferris 1980; Mason, May 21, 1921; Camp Evers, Thomas 3345; Zayante Valley, Dudley, May 1893; Near Mt. Hermon, Bacigalupi 1485.

2a. Lupinus formosus Greene var. formosus, Fl. Franciscana 42. 1891.

Local distribution: Open woods, grasslands, and fields, northern San Mateo County southward. December through August.

General distribution: Oregon south to northern Baja California through cismontane California.

Specimens examined: Millbrae, Dudley, May 17, 1893; La Honda, Dudley, Dec. 13, 1894; Stanford, Dudley, Aug. 9, 1893; Black Mt., Elmer 4296; Los Altos, Wolf 2331; Near Campbell, Heller 8514; Foothills west of Los Gatos, Heller 7385; Near Glenwood, Thomas 3185; Near Felton, Dudley, June 26, 1897.

2b. Lupinus formosus Greene var. bridgesii (Wats.) Greene, Fl. Franciscana 42. 1891.

Local distribution: Woods and rocky areas, San Francisco southward.

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May and June.

General distribution: Klamath County, Oregon, south to northern Baja California, through the Coast Ranges and Sierra Nevada foothills.

Specimens examined: Bayview Hills, Eastwood 347 (CAS); San Bruno Mt., Smith 1439; Baden, Dudley, June 19, 1908; Near San Mateo, Dudley, May 1894; Coal Mine Ridge, Barry 212; Black Mt., Dudley, July 6, 1903.

3a. Lupinus latifolius Agardh var. latifolius, Syn. Gen. Lup. 18. 1835.

Local distribution: Grassy slopes, wooded areas, and on disturbed road embankments, northern San Mateo County southward. December through June.

General distribution: Throughout most of cismontane California except the Central Valley.

Specimens examined: Crystal Springs Lake, Baker 470; Half Moon Bay Rd., Heller 8562; Woodside, Elmer 4593; Coal Mine Ridge, Barry 86; Near Stanford, Dudley, May 10, 1897; Foothills west of Los Gatos, Heller 7299; Swanton, Rich, Spring 1912; Near Summit of Santa Cruz - Los Gatos Highway, Thomas 3169; San Lorenzo Rd., Dudley, May 7, 1893; Near Boulder Creek, Thomas 1632; Santa Cruz, Thompson, June 22, 1903; Soquel Creek, Ferris 2017; Near Pajaro Rd., Thomas 3264.

3b. Lupinus latifolius Agardh var. dudleyi Smith in Jepson, Man. Fl. Pl. Calif. 530. 1925.

Local distribution: Known only from the vicinity of Montara Mountain in San Mateo County. March through May.

General distribution: Endemic.

Specimens examined: San Pedro Creek, Dudley, May 14, 1899; Montara Mt., Dudley, Mar. 17, 1900 (type); Mar. 17, 1900.

4. Lupinus variicolor Steud. Nom. 2: 78. 1841.

Local distribution: Open grasslands and coastal bluffs, San Francisco southward. March through June.

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General distribution: Near the coast, Humboldt County south to northern Monterey County.

Specimens examined: Presidio, Dudley, Apr. 29, 1902; Marine Hospital, Greene, May 27, 1887; Golden Gate Park, Dudley, Apr. 14, 1895; South San Francisco, Congdon, May 24, 1881; San Bruno, Suksdorf 351; San Andreas Reservoir, Dudley, Mar. 18, 1900; Pescadero, Grant 938; Swanton, Rich, May 1912; San Vicente Road, Hesse 1639; Santa Cruz, Thompson, June 23, 1903.

Hybrids between L. variicolor and L. arboreus occur occasionally, as for example Smith 47184 from near Montara Mountain.

5a. Lupinus arboreus Sims var. arboreus, Bot. Mag. 18: pl. 682. 1803.

Local distribution: Most common in sandy soils near the coast, San Francisco southward. March through September.

General distribution: Vancouver Island, British Columbia, south to Ventura County, usually near the coast.

Specimens examined: San Francisco, Curran, June 1886; Holiday Hill, Rattan, 1887; Lake Merced, Abrams 1617; South San Francisco, Suksdorf 344; Pescadero, Leitholt, July 29, 1894; Swanton, Rich, May 12, 1912; Scott Creek, Thomas 1725; Ben Lomond, Thompson, May 27, 1902; Santa Cruz, Hichborn 315; Robroy, Thomas 3063.

5b. Lupinus arboreus Sims var. eximius (Davy) Smith in Jepson, Man. Fl. Pl. Calif. 531. 1925.

Local distribution: Known from the vicinity of Montara Mountain and Lake Pilarcitos. March through June.

General distribution: Known from Marin and northern San Mateo counties.

Specimens examined: Montara Mt., Smith 3503, 3544; Near Seal Cove, Dudley, Mar. 17, 1900.

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6. Lupinus chamissonis Eschsch. Mem. Acad. St. Petersb. 10: 288. 1826.

Local distribution: Coastal sand dunes and inland sand deposits, San Francisco southward. March through August.

General distribution: Marin County south along the coast to Los Angeles County and in southern Solano County.

Specimens examined: San Francisco, Wolf 2338; Jones, July 15, 1881; Lake Merced, Abrams, May 1901; Mt. Hermon, Hawbecker 70; Swanton, Rich, Spring 1912; Sunset Beach State Park, Thomas 3089; Palm Beach, Thomas 1601.

7a. Lupinus albifrons Benth. ex Lindl. var. albifrons, Bot. Reg. 19: pl. 1642. 1833.

Local distribution: Chaparral, brush-covered canyon slopes, and an invader of road embankments, northern San Mateo County southward. March through July.

General distribution: Josephine County, Oregon, south through the Coast Ranges and the Sierra Nevada foothills to Los Angeles County.

Specimens examined: Near Crystal Springs Lake, Randall 199; Crystal Springs Lake, Baker 341; San Mateo Canyon, Abrams 38; Belmont, Elmer 4643; Near Campbell, Heller 10249; Los Gatos, Dudley, Apr. 17, 1910; Loma Prieta, Hichborn, May 8, 1920; Llagas Post Office, Dudley, June 7, 1909; Below Saratoga Summit, Thomas 4708; Eccles, Dudley, June 26, 1897; Glenwood, Davis, Sept. 1907; Ben Lomond Ridge, Ferris 1993; Santa Cruz, Jones 2332; 10 miles south of Santa Cruz, Applegate 5343.

7b. Lupinus albifrons Benth. ex Lindl. var. collinus Greene, Fl. Franciscanus 46. 1891.

Local distribution: Open exposed slopes and rocky summits from San Francisco south to Black Mountain. March and April.

General distribution: Coast Ranges, Lake County south to San Luis Obispo County.

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Specimens examined: Presidio, Heller 6592; Twin Peaks, Thomas 4833; Ocean View, Dudley, Mar. 20, 1897; San Bruno Hills, Elmer 4642; Ferris 2131; Thomas 4833; Black Mt., Dudley, July 6, 1903; Dudley, Apr. 14, 1900.

8. Lupinus hirsutissimus Benth. Trans. Hort. Soc. 1: 141. 1833.

Local distribution: Chaparral, brush-covered slopes, and occasionally on road embankments, southern San Mateo County southward. Latter half of March through June.

General distribution: Coast Ranges from southern San Mateo and Santa Clara counties south to northern Baja California.

Specimens examined: Stevens Creek, Smith 45141; Swanton, Rich, May 23, 1912; Near Big Basin, Kimber & Roush; Ferris 2160; Upper San Lorenzo Rd., Dudley, May 7, 1893.

9. Lupinus truncatus Nutt. ex Hook. & Arn. Bot. Beechey 336. 1838-1839.

Local distribution: Known locally only from near Santa Cruz. June and July.

General distribution: Santa Cruz County south to northern Baja California.

Specimen examined: Santa Cruz, Jones 2332.

10. Lupinus densiflorus Benth. Trans. Hort. Soc. 1: 410. 1835.

Local distribution: Fairly common on moist slopes, grasslands, and occasionally on such disturbed areas as railroad embankments and fills, Crystal Springs Lakes region southward. April through September.

General distribution: Humboldt and Butte counties southward to San Diego County, in the Sacramento Valley, Inyo County, and the western portion of the Mojave Desert.

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Specimens examined: Crystal Springs Lake, Dudley, Apr. 21, 1894; San Mateo Canyon, Smith 1442; Near Stanford, Baker 475; Los Altos, Thomas 5668; Permanente Creek, Mason, Apr. 2, 1917; Guadalupe Reservoir, Thomas 3927; Near Lexington, Dudley, Sept. 11, 1906; Foothills west of Los Gatos, Heller 7385; Gilroy, Elmer 4791; Pajaro River, Thomas 3261.

Lupinus densiflorus is an exceedingly variable species with respect to the size of the various parts of the plants, the color of the flowers, and the amount, kind, and distribution of pubescence. Smith (1918) recognized twenty-six varieties within the species, seven of which occur in the Santa Cruz Mountains according to his lists of specimens. Despite the variability, L. densiflorus is easily recognized by its whorls of 2-seeded secund pods.

11. Lupinus subvexus Smith, Bull. Torr. Bot. Club 44: 405. 1917.

Local distribution: Known from San Francisco and from south of San Jose, in the latter locality probably growing in serpentine soil. April through June.

General distribution: Oregon south to San Luis Obispo County, eastward to Modoc, Lassen, and Butte counties.

Specimen examined: 4 miles south of San Jose, Rattan, May 1886.

Jepson (1936, p. 279) cited a specimen collected by Tidestrom in San Francisco as belonging to this species.

12. Lupinus succulentus Dougl. ex Koch, Wochenschr. Gärt. & Pfl. 4: 277. 1861.

Local distribution: San Francisco southward, growing in grasslands and areas of clay soils. April through June.

General distribution: Coast Ranges from Mendocino County south to Baja California, in the Sacramento Valley, and on most of the Channel Islands.

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Specimens examined: Hunters Pt., Raven 6644 (CAS); San Pedro, Elmer 4681; San Mateo Ravine, Dudley, Apr. 21, 1894; La Honda Summit, Dudley, May 19, 1900; Portola, Elmer 4827; Stanford, Abrams 2359; Black Mt., Dudley, May 3, 1895; Monte Bello Ridge, Thomas 5680; Los Altos, Dudley, Apr. 8, 1894; Saratoga, Abrams 5260; Edenvale, Thomas 4763.

13. Lupinus affinis Agardh, Syn. Gen. Lup. 20. 1835.

(L. carnosulus Greene, Bull. Calif. Acad. 6: 144. 1886.)

Local distribution: Grassy slopes and fields, Crystal Springs southward. April and May.

General distribution: Marion County, Oregon, south through the Coast Ranges to northern Monterey County.

Specimens examined: Crystal Springs Lake, Baker 473; San Mateo Ravine, Dudley, Apr. 21, 1894; Stanford, Abrams, Apr. 1898; Page Mill Rd., Dudley, Apr. 26, 1914; Wrights Station, Abrams 10925; Dudley, Apr. 21, 1895; Foothills west of Los Gatos, Heller 7298.

14. Lupinus nanus Dougl. ex Benth. Trans. Hort. Soc. 1: 409. 1835.

(L. nanus var. latifolius Benth. ex Torr. Pacif. R. Rep. 4: 81. 1857; L. vallicola Heller, Muhlenbergia 4: 40. 1908; L. apricus Greene, Bot. Leafl. 2: 67. 1910.)

Local distribution: Common in grasslands throughout the Santa Cruz Mountains and often on coastal dunes. March through May.

General distribution: Southern British Columbia south to southern California.

Specimens examined: Lake Merced, Heller 8452; Ocean View, Dudley, Apr. 29, 1894; South San Francisco, Smith 1413; San Bruno Mt., Thomas 4834; Pescadero, Dudley, Apr. 17, 1896; Stanford, Kraus, Apr. 12, 1893; Baker 610; Permanente Creek, Mason, Apr. 21, 1917; Campbell, Borthwick 55; Foothills west of Los Gatos, Heller 7294a; Guadalupe Canyon, Mason & Borthwick, Mar. 20, 1921; Near Eagle Rock, Thomas 4080; Near Glenwood, Thomas 1444; Santa Cruz, Jones 2666; Sunset Beach State Park, Thomas 1604.

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15. Lupinus pachylobus Greene, Pittonia 1: 65. 1887.

Local distribution: Rare on the eastern slopes of the Santa Cruz Mountains, growing in grasslands from San Francisco south to Los Gatos. March and April.

General distribution: Sonoma and Napa counties south to Santa Clara and Alameda counties in the Coast Ranges and from Shasta County south to Fresno County in the Sierra Nevada foothills.

Specimens examined: Bayview Hills, Howell 32380 (CAS); Woodside to Crystal Springs Rd., Bacigalupi, 1922; San Antonio Creek, Dudley, Mar. 19, 1898; Los Gatos, Heller 10379.

16. Lupinus bicolor Lindl. Bot. Reg. 13: pl. 1109. 1827.

Local distribution: A common spring annual of grasslands, pastures, cultivated fields, open areas in woods and brush-covered slopes, and sometimes forming extensive stands in much disturbed areas. March through May.

General distribution: Southern British Columbia south through Washington, Oregon, and California to northern Baja California, in southern Arizona and adjacent Sonora, and on the Channel Islands.

Specimens examined: Presidio, Dudley, Apr. 15, 1895; Mission Hills, Michener & Bioletti, May 1893; San Bruno Hills, Elmer 4536; Colma, Hoover 4054; Crystal Springs Lake, Abrams, Apr. 10, 1904; Sawyer Ridge, Oberlander 560; Stanford, Abrams 5065; McMurphy, Apr. 22, 1911; 5 miles south of Los Altos, Thomas 5701; Edenvale, Ferris 807; San Martin, Abrams 5179; Near Glenwood, Abrams 10932; Near Felton, Dudley, Apr. 17, 1903; Near Santa Cruz, Heller 6554; Soquel Valley, Thomas 1392; 3.5 miles west of Watsonville, Thomas 3105.

Lupinus bicolor is a variable species in which numerous subspecies and varieties have been proposed (Smith, 1923; Dunn, 1955, pp. 148-160). The following key will aid in distinguishing the varieties which occur locally.

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Keel glabrous, rarely with a few cilia.....L. bicolor var. pipersmithii (Heller) Smith, Bull. Torr. Bot. Club 50: 380. 1923.

Keel distinctly ciliate on the upper margin near the acumen.

Abaxial calyx-lip tridentate, the lobes usually about 3 mm. long. L. bicolor var. trifidus (Torr.) Smith, l. c. 386.

Abaxial calyx-lip entire to tridentate, the lobes less than 1 mm. long.

Plants much branched from the base, prostrate to decumbent, rarely suberect; verticils commonly 1; banners usually over 8 mm. long.....L. bicolor var. umbellatus. (Greene) Smith, l. c. 377.

Plants with a few basal branches, erect to suberect, rarely prostrate; verticils usually several, remote or not; banners usually less than 8 mm. long.

Banners often not reflexed; acumen blunt; flowers 4-6 mm. long. L. bicolor var. microphyllus (Wats.) Smith, l. c. 382.

Banners reflexed; acumen slender; flowers 6-8 mm. long. L. bicolor var. tridentatus Eastw. l. c. 377.

17. Lupinus micranthus Dougl. ex Lindl. Bot. Reg. 15: pl. 1251. 1829.

Local distribution: Open grassland, San Francisco southward.

April and May.

General distribution: Southern British Columbia south to San Diego County.

Specimens examined: San Francisco, Dudley, Apr. 1893; San Bruno Hills, Abrams 7054; Coal Mine Ridge, Barry 124; Stanford, Smith 1409; Permanente Canyon, Daniel, Apr. 24, 1915; Los Gatos, Heller 10246; Scott Creek, Ferris 2012; 3.5 miles north of Boulder Creek, Thomas 1635.

2. Robinia L. Sp. Pl. 722. 1753.

1. Robinia pseudo-acacia L. Sp. Pl. 722. 1753.

Local distribution: Occasional as an escape from cultivation.

April and May.

General distribution: Native in eastern United States, widely planted as an ornamental, occasionally escaped from cultivation elsewhere.

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Specimen examined: Near Boulder Creek, Thomas 1778.

Cassia tomentosa L. f. (Suppl. 231. 1781) occasionally becomes established in Golden Gate Park from seed and spreads by underground parts, as for example Raven 6808 (CAS). Cassia tomentosa is native in tropical America, flowers locally in May, and may be distinguished from Robinia by its shrubby habit, yellow flowers, and densely pubescent twigs and leaf rachises.

3. Pickeringia Nutt. in Torr. & Gray, Fl. N. Amer. 1: 389. 1840.

1. Pickeringia montana Nutt. in Torr. & Gray, Fl. N. Amer. 1: 389. 1840.

Local distribution: Chaparral throughout the Santa Cruz Mountains, commonly associated with Adenostoma fasciculatum, Arctostaphylos spp., Quercus durata, Q. dumosa, Prunus ilicifolia, and Photinia arbutifolia.

General distribution: Lake County south through the Coast Ranges to northern Baja California and in the Sierra Nevada from Mariposa County southward.

Specimens examined: Belmont, Rattan, May 1882; Kings Mt., McMurphy 80; West of Los Gatos, Heller 7426; Sierra Azule Ridge, Ferris 3619; Swanton, Rich, Spring 1912; Below Bielawski Lookout, Thomas 3449.

4. Ulex L. Sp. Pl. 741. 1753.

1. Ulex europaeus L. Sp. Pl. 741. 1753.

Local distribution: Locally established on overgrazed hills and in disturbed habitats near the ocean. February through July.

General distribution: Native of Europe, widely introduced into

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other temperate regions, on the Pacific Coast ranging from British Columbia south to central California.

Specimens examined: San Francisco, Nevins, Mar. 3, 1929; Visitacion Valley, Rubtzoff 3149 (CAS); New Years Pt., Ferris 2119; Scott Valley, Howell 28921 (CAS).

5. Cytisus L. Sp. Pl. 739. 1753.

Stems villous, leafy, the leaves not remote; flowers in clusters of 3 or more.....1. C. monspessulanus.
Stems more or less glabrous, usually leafless or with the leaves few and remote; flowers usually solitary or in pairs.
2. C. scoparius.

1. Cytisus monspessulanus L. Sp. Pl. 740. 1753.

Local distribution: Roadsides and moist open slopes, often displacing the native vegetation. March through July.

General distribution: Native of southern Europe, introduced and spreading in the Pacific States.

Specimens examined: San Francisco, Raven 8890 (CAS); 4 miles west of La Honda, Wiggins 3790; Boulder Creek, Thomas 1770; Bielawski Lookout, Thomas 2828; Soquel Valley, Thomas 1395.

2. Cytisus scoparius (L.) Link, Enum. Hort. Ber. 2: 241. 1822.

Local distribution: Escaped from gardens and naturalized along roads, on open slopes, and along the borders of chaparral. April through June.

General distribution: Native of Europe, widely established in temperate regions.

Specimens examined: Presidio, Raven 10602 (CAS); Lone Mt., Howell 32485 (CAS); 5 miles southeast of Saratoga Summit, Thomas 1839.

6. Spartinum L. Sp. Pl. 708. 1753.

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1. Spartinum junceum L. Sp. Pl. 708. 1753.

Local distribution: Occasional as an escape from cultivation. April through June.

General distribution: Native in Europe, sparingly introduced into central California.

Specimen examined: Near Guadalupe Creek, Thomas 5575.

7. Lotus L. Sp. Pl. 773. 1753.

Stipules attached by a broad base, not leaflet-like.
Bracts closely subtending the inflorescence.
Plants nearly glabrous; claws of the petals exserted. 1. L. formosissimus.
Plants somewhat villous; claws of the petals not exserted. 2. L. torreyi.
Bracts at some distance below the inflorescence.
Young stems and branches glabrous.....3. L. crassifolius.
Young stems and branches hirsute to villous...4. L. stipularis.
Stipules reduced to glands.
Plants annual.
Peduncles at least 5 mm. long, bracteate, the bracts occasionally lacking in L. strigosus.
Flowers yellow, fading to pink or rose; bracts lacking or 1-3-foliolate; peduncle with 1-5 flowers; rachis of the leaves usually flattened.
Flowers 1-3 per peduncle; bracts lacking or 1-3-foliolate; leaflets 3-9; styles hairy at the base of the stigmas; seeds rugulose-tuberculate.....5. L. strigosus.
Flowers 1-5 per peduncle; bracts 1-foliate; leaflets 4-6; styles glabrous; seeds smooth.....6. L. salsuginosus.
Flowers white or pinkish, fading to pink or rose; bracts 1 or 3 foliolate; peduncle with only 1 flower; rachis of the leaves usually round.
Bracts 1-foliate; calyx teeth longer than the tube; herbage villous-pubescent to glabrate; leaflets 3. 7. L. purshianus.
Bracts 3-foliolate; calyx-teeth shorter than the tube; herbage usually glabrous; leaflets 3-5. 8. L. micranthus.
Peduncles less than 5 mm. long or the flowers sessile, not bracteate.
Calyx-teeth longer than the tube; pods 0.5-1 cm. long, densely villous.....9. L. humistratus.
Calyx-teeth about equalling the tube; pods 1-1.5 cm. long, sparsely pubescent.....10. L. subpinnatus.

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Plants perennial.
Pods dehiscent; seeds numerous; peduncles usually at least 5 cm. long.....11. L. corniculatus.
Pods indehiscent; seeds 2-3; peduncles under 3 cm. long.
Inflorescences bracteate, pedunculate; leaves villous-tomentose to strigose.
Leaves villous-tomentose; peduncles 2-8 mm. long; calyx 4-5 mm. long; pods pubescent.....12. L. eriophorus.
Leaves strigose, glabrate in age; peduncles 10-25 mm. long; calyx 6 mm. long; pods glabrous..13. L. benthamii.
Inflorescences bractless, sessile or pedunculate; leaves strigose to glabrous.
Leaves essentially glabrous; inflorescences sessile, 1-4-flowered.....14. L. scoparius.
Leaves strigose; inflorescences pedunculate, 2-5-flowered; peduncles 6-20 mm. long.....15. L. junceus.

1. Lotus formosissimus Greene, Pittonia 2: 147. 1890.

(Hosackia gracilis Benth. Trans. Linn. Soc. 17: 365. 1837.)

Local distribution: Moist areas along the coast and inland in boggy ground. March through July.

General distribution: Usually near the coast, Vancouver Island, British Columbia south to northern Monterey County.

Specimens examined: Ocean View, Cannon, May 1892 (CAS); Near San Bruno, Dudley, May 2, 1893; Pilarcitos Canyon, Oberlander 268; Near Pescadero, Crum 1701; Pigeon Pt., Wolf 3703; Camp Evers, Thomas 1670; Watsonville, Rattan, Apr. 1885.

2. Lotus torreyi (Gray) Greene, Pittonia 2: 146. 1890.

Local distribution: Rare in Santa Cruz County, growing in moist boggy areas. June through August.

General distribution: Lane County, Oregon, south through the Coast Ranges to Santa Cruz County and through the Sierra Nevada to Tulare County.

Specimens examined: Swanton, Rich, Spring 1912; Mt. Hermon, Cox, Aug. 2, 1908; Santa Cruz, Thompson, June 27, 1903.

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3. Lotus crassifolius (Benth.) Greene, Pittonia 2: 147. 1890.

Local distribution: Dry ridges and about the edges of chaparral, usually along the summits of the Santa Cruz Mountains, occasionally occurring as a weed in hilltop vineyards. May and June.

General distribution: Washington south to San Diego County through the Coast Ranges and the Sierra Nevada foothills.

Specimens examined: Black Mt., Elmer 4695; Thomas 5698; Alma Soda Springs, Heller 7489; Sierra Azule Rd., Ferris 2076; Mt. Umunhum, Davis, May 9, 1920; Near Bielawski Lookout, Hesse 1095.

4. Lotus stipularis (Benth.) Greene, Pittonia 2: 147. 1890.

Local distribution: Occasional in moist areas in coniferous woods and on shaded slopes. April through July.

General distribution: Mendocino County south to northern Monterey County in the Coast Ranges.

Specimens examined: Between Butano and Pescadero Creeks, Dudley, June 7, 1895; Kings Mt., Randall 196; Loma Prieta Rd., Dudley, May 30, 1893; 2.3 miles southwest of Eagle Rock, Thomas 4019; China Grade, Hesse 277.

5. Lotus strigosus (Nutt.) Greene, Pittonia 2: 141. 1890.

(L. rubellus (Nutt.) Greene, Pittonia 2: 141. 1890.)

Local distribution: Usually in sandy soils, San Francisco southward. March through September.

General distribution: Marin and Sutter counties south through the Coast Ranges and the Sierra Nevada foothills to northern Baja California.

Specimens examined: San Francisco, Greene, May 27, 1893; Near Lake Merced, Dudley, May 11, 1901; Searsville, Davis, Apr. 10, 1903; Stanford, Dudley, Apr. 17, 1893; Near Los Gatos, Heller 7375; Swanton, Rich, Spring 1912; Near Big Basin, Rose 35226; Glenwood Highway, Thomas 2887; Bear Creek, Hesse 1052; Quail Hollow, Thomas 4892; Near Felton, Dudley, Apr. 17, 1904; Ben Lomond Mt., Dudley, Mar. 29, 1899.

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6. Lotus salsuginosus Greene, Pittonia 2: 140. 1890.

(Hosackia maritima Nutt. in Torr. & Gray, Fl. N. Amer. 1: 326. 1838.)

Local distribution: Known only from southern Santa Cruz County, growing in loose gravelly soil, to be expected elsewhere. April and May.

General distribution: Coast Ranges from Santa Clara and Santa Cruz counties south to northern Baja California.

Specimen examined: About 4 miles east of Watsonville, Thomas 1555.

7. Lotus purshianus (Benth.) Clem. & Clem. Rocky Mt. Fl. 183. 1914.

(Hosackia americana (Nutt.) Piper, Contr. U. S. Nat. Herb. 11: 366. 1906.)

Local distribution: A common annual of grassy slopes, shaded woods, and disturbed areas. April through October.

General distribution: British Columbia east to North Dakota, south to northern Mexico and Texas.

Specimens examined: San Francisco, Rose 35185 (CAS); Crystal Springs Lake, Elmer 4971; Woodside, Dutton, Apr. 3, 1900; Searsville, Applegate 115; Stanford, Stinchfield 256; Near Alviso, Dudley, July 18, 1903; Castle Rock, Thomas 3430; Foothills west of Los Gatos, Heller 7526; 1 mile south of Gilroy, Thomas 4253; Swanton, Rich, June 10, 1912; Hilton Airport, Thomas 3571; Blooms Grade, Thomas 2371; Camp Evers, Thomas 3346; Santa Cruz, Thompson, June 23, 1903.

8. Lotus micranthus Benth. Trans. Linn. Soc. 17: 367. 1837.

(Hosackia parviflora Benth. Bot. Reg. 15: under pl. 1257. 1829.)

Local distribution: Common on open grassy slopes, edges of woods, and in disturbed areas, San Francisco southward. April through June.

General distribution: British Columbia south through Washington, Oregon, and cismontane California to northern Baja California.

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Specimens examined: San Francisco, Raven 6678 (CAS); Sawyer Ridge, Oberlander 812; Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Kings Mt., Dudley, June 11, 1906; Jasper Ridge, Kimber & Roush, Apr. 11, 1918; Coal Mine Ridge, Barry 59; Stanford, Abrams 1654; Black Mt., Abrams, May 1901; Los Gatos Creek, Dudley, Apr. 2, 1895; Saratoga Summit, Thomas 2977; Zayante, Dudley, May 4, 1893; Glenwood, Davis, Sept. 1907; Santa Cruz, Jones 2266; Near Eagle Rock, Thomas 5033.

9. Lotus humistratus Greene, Pittonia 2: 139. 1890.

(Hosackia brachycarpa Benth. Pl. Hartw. 306. 1848.)

Local distribution: Common on grassy slopes, sandy soils, and in moister areas in chaparral. March through July.

General distribution: Jackson and Josephine counties, Oregon, south through California to northern Baja California, eastward to New Mexico and Sonora.

Specimens examined: Pt. Lobos, Cannon, July 9, 1899 (CAS); Upper Crystal Springs Lake, Oberlander 758; Crystal Springs Lake, Dudley, Apr. 21, 1894; Belmont, Elmer 4722; Woodside serpentine, Dutton, Mar. 25, 1900; Stanford, Dudley, May 3, 1893; Stevens Creek, Dudley, June 1, 1902; Los Altos, Randall 195; Wrights Station, Dudley, May 29, 1893; Near Los Gatos, Heller 7392.

10. Lotus subpinnatus Lag. Gen. & Sp. Pl. 23. 1816.

Local distribution: Common in grassland, on wooded slopes, and in chaparral. March through June.

General distribution: Douglas County, Oregon, south through the Coast Ranges and the foothills of the Sierra Nevada to northern Baja California; also in Chile.

Specimens examined: Presidio, Heller 5698; Crystal Springs Reservoir, Dudley, Oct. 10, 1909; Belmont, Elmer 4741; Kings Mt. Rd., Randall 198; Woodside serpentine, Dutton, Mar. 25, 1900; Jasper Ridge, Thomas 5614-A; Coal Mine Ridge, Barry 24; Stanford, Mason 98; Edenvale, Abrams 5188; Saratoga-Big Basin Rd., Abrams 5266; Santa Cruz, Thompson, June 1, 1902; Robroy, Thomas 3056; Sunset Beach State Park, Thomas 1609.

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11. Lotus corniculatus L. Sp. Pl. 775. 1753.

Local distribution: Becoming very common along roads, low adobe fields, and in disturbed areas. June through August.

General distribution: Native of Europe, becoming very common and widespread in the Pacific States.

Specimens examined: San Francisco, Thomas 7272; San Bruno, Baumann 56; San Gregorio, Thomas 4270; Pescadero, Thomas 4271; Stanford, Thomas 6819; Moffett Field, Thomas 7242; Sunnyvale, Ferris & Bacigalupi 2788; Alviso, Thomas 5321.

12. Lotus eriophorus Greene, Erythea 1: 207. 1893.

(Hosackia tomentosa Hook. & Arn. Bot. Beechey 137. 1832.)

Local distribution: Sandy soils or on open slopes near the coast, San Francisco southward. May through November.

General distribution: Coast Ranges from southern Sonoma County south to northern Baja California.

Specimens examined: San Francisco, Jones 3339; Lake Merced, Abrams 1629; Tunitas Road, Dudley, June 9, 1906; Laurel, Smith 2896; Santa Cruz, Jones 2331; Soquel - San Jose Rd., Thomas 2498; Soquel, Thompson, May 1, 1902.

13. Lotus benthamii Greene, Pittonia 2: 148. 1890.

(Hosackia cytisoides Benth. Trans. Linn. Soc. 17: 366. 1837.)

Local distribution: Occasional in rocky soils in western San Mateo County. March and April.

General distribution: Coastal, Sonoma County south to southern Monterey County.

Specimens examined: Montara Mt., Dudley, Mar. 17, 1900; San Gregorio, Zschokke, Apr. 22, 1923; Swanton, Rich, Mar. 10, 1912.

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14. Lotus scoparius (Nutt.) Ottley, Univ. Calif. Pub. Bot. 10: 227. 1923.

(Hosackia glabra (Vogel) Torr. Bot. Wilkes Exp. 274. 1873.)

Local distribution: A common plant of chaparral and dry open hills. May through October.

General distribution: Coast Ranges and the Sierra Nevada from Humboldt and Plumas counties south to northern Baja California.

Specimens examined: San Francisco, Rose 41279; Holiday Hill, Rattan, Mar. 1887; San Francisco - San Mateo Co. line, Bacigalupi 2732; Cahill Ridge, Oberlander 269; Belmont, Elmer 4447; Coal Mine Ridge, Barry 204; Stanford, Randall 193; Foothills west of Los Gatos, Heller 7485; Swanton, Rich, May 1912; Beilawski Lookout, Thomas 3445; Glenwood, Davis, Sept. 1907; Powder Mill Gulch, Thompson, July 6, 1902.

15. Lotus junceus (Benth.) Greene, Pittonia 2: 148. 1890.

Local distribution: Occasional in rocky soils and along the edges of chaparral. May through July.

General distribution: Coast Ranges, Mendocino County south to San Luis Obispo County.

Specimens examined: Kings Mt., Randall 194; Swanton, Rich, May 1912; Big Basin, Pendleton, no date; Shockley, June 7-8, 1919.

8. Psoralea L. Sp. Pl. 762. 1753.

Stems not creeping; petioles usually under 8 cm. long.
  Calyx nearly regular, the lobes triangular.....1. P. physodes.
  Calyx distinctly irregular, the lobes linear to lanceolate.
    Inflorescence longer than the leaves; corolla about 1 cm. long; stems glabrous or nearly so.....2. P. macrostachya.
    Inflorescence shorter than the leaves; corolla 1.5 cm. long; stems pubescent.....3. P. strobilina.
Stems creeping; petioles usually over 10 cm. long..4. P. orbicularis.

1. Psoralea physodes Dougl. ex Hook. Fl. Bor. Amer. 1: 136. 1831.

Local distribution: Frequent as a member of the herbaceous under-

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story in oak - madrone woods and less frequent in shaded areas in chaparral. March through July.

General distribution: Southern British Columbia and eastern Washington south to southern California.

Specimens examined: Sierra Morena, Roush, Mar. 31, 1918; Crystal Springs Lake, Heller 4270; Near Redwood City, Dudley, May 30, 1894; Coal Mine Ridge, Barry 153; Foothills west of Los Gatos, Heller 7417; Loma Prieta, Thomason, June 7, 1902; Saratoga Summit, Thomas 3312; Swanton, Rich, Spring 1912; near Watsonville, Thomas 1557.

2. Psoralea macrostachya DC. Prod. 2: 220. 1825.

Local distribution: Restricted in the Santa Cruz Mountains to the region of Wrights Station to New Almaden. June through October.

General distribution: Coast Ranges of California and central Sierra Nevada south to northern Baja California.

Specimens examined: Wrights Station, Dudley, Sept. 29, 1894; Loma Prieta, Knoche, Aug. 12, 1896; New Almaden, Ferris 2035.

Specimens from the Santa Cruz Mountains are referable to P. douglasii Greene (Erythea 3: 99. 1895), but as Abrams suggested (1944, p. 554) P. douglasii should probably be reduced to a subspecies under P. macrostachya.

3. Psorealea strobilina Hook. & Arn. Bot. Beachey 332. 1838-1839.

Local distribution: Usually restricted to serpentine outcroppings, occasionally found in San Mateo and Santa Clara counties. May through September.

General distribution: Contra Costa County south to Santa Clara County.

Specimens examined: Guadalupe Valley, Leitholt, July 22, 1893; Near Lexington, Dudley, Sept. 11, 1906; Los Gatos, Howell 30020 (CAS); New Almaden, Dudley, July 22, 1893.

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4. Psoralea orbicularis Lindl. Bot. Reg. 23: pl. 1971. 1837.

Local distribution: Occasional in wet ground, usually in the open, Crystal Springs Lakes southward. May through July.

General distribution: Siskiyou County south to San Diego County through the Coast Ranges and in the central Sierra Nevada.

Specimens examined: Sawyer Ridge, Oberlander 286; Near Eagle Rock, Thomas 6020; Santa Cruz, Thompson, June 27, 1903; Watsonville, Hayward, July 5, 1929.

9. Thermopsis R. Br. in Ait. Hort. Kew. 3: 3. 1811.

1. Thermopsis macrophylla Hook. & Arn. Bot. Beechey 329. 1836.

Local distribution: Occasional in open areas in chaparral and mixed evergreen forests, Crystal Springs south to central Santa Cruz County. Latter part of March through July.

General distribution: Southwestern Oregon south through the Coast Ranges to San Diego County, California.

Specimens examined: Crystal Springs Lake, Elmer 4824; Ben Lomond Ridge, Ferris 1996; Near Warrenella, Thomas 3388; Canyon west of Zayante Valley, Dudley, April 17, 1904; Santa Cruz, Thompson, June 27, 1903.

Pubescence of the leaves varies from densely wooly-tomentose to sparsely cancescent. A smaller silky-canescent form was described as T. velutina Greene (Erythea 3: 19. 1895), but the two are nearly sympatric and intergrade. This species closely resembles a lupine at first glance but may readily be distinguished by its trifoliolate leaves.

10. Medicago L. Sp. Pl. 778. 1753.

Flowers blue; plants perennial.....1. M. sativa.
Flowers yellow; plants usually annual.
  Pods not spirally coiled except at the tip, black at maturity.
    2. M. lupulina.

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Pods spirally coiled throughout their length, greenish or brownish at maturity.
Margins of the pods with bristles.
Leaflets with a small brownish spot at about the center.
3. M. arabica.
Leaflets lacking such a spot.
4a. M. polymorpha var. vulgaris f. vulgaris.
Margins of pods without bristles.
4b. M. polymorpha var. vulgaris f. tuberculata.

1. Medicago sativa L. Sp. Pl. 778. 1753.

Local distribution: Common as a weed in disturbed areas and along roads and highways, commonly grown as a forage plant. May through September.

General distribution: Native of Europe, widely grown as a forage plant and widely established.

Specimens examined: San Francisco, Dudley, May 1897; Lower Crystal Springs Lake, Oberlander 382; Redwood City, Thomas 4428; Stanford, Dudley, July 1, 1893; 6 miles north of Boulder Creek, Thomas 4314A; Near Watsonville, Thomas 2423.

2. Medicago lupulina L. Sp. Pl. 779. 1753.

Local distribution: Weeds of disturbed areas, orchards, and cultivated fields. April through July.

General distribution: Native of Eurasia, widely introduced into other parts of the world.

Specimens examined: San Francisco, Bacigalupi, June 7, 1924; Salt marsh near Palo Alto, Hichborn, May 13, 1920; Stanford, Dudley, June 1903; Stevens Creek Canyon, Abrams 4241; Edenvale, Thomas 4949; Swanton, Rich, Spring 1912; Santa Cruz, Thompson, May 27, 1902.

3. Medicago arabica (L.) Hudson, Fl. Angl. 288. 1762.

Local distribution: Occasional on open grassy slopes and in disturbed areas. April through June.

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General distribution: Native of southwestern Europe and Asia Minor, introduced into the United States and southern Canada.

Specimens examined: San Francisco, Thomas 7188; San Andreas Lake, Oberlander 1007; Stanford, Dudley, Apr. 18, 1898; Santa Cruz, Ferris 165.

4a. Medicago polymorpha L. var. vulgaris (Benth.) Shinners f. vulgaris, Rhodora 58: 310. 1956.

(M. apiculata Willd. Sp. Pl. 3: 1414. 1802; M. hispida Gaertner, Fruct. 2: 349. 1791.)

Local distribution: Disturbed areas, roadsides, and open grasslands, common. Latter part of March through June.

General distribution: Native of Europe, widely naturalized.

Specimens examined: San Francisco, Clark, July 1886; South end of Lake Merced, Dudley, May 11, 1901; San Gregorio Creek, Thomas 3827; Palo Alto, Wiggins 3391; Stanford, Dudley, Apr. 4, 1895; Los Gatos, Thomas 3993; Near Glenwood, Thomas 2864; Pajaro River, Thomas 1540.

4b. Medicago polymorpha L. var. vulgaris (Benth.) Shinners f. tuberculata (Gordon) Shinners, Rhodora 58: 310. 1956.

(M. hispida Gaertner var. confinis (Koch) Burnat, Fl. Alpes Mar. 2: 106. 1896.)

Local distribution: Disturbed areas and on grassy slopes. February through June.

General distribution: Native of Europe, widely introduced into other parts of the world.

Specimens examined: Pilarcitos Canyon, Oberlander 921; Stanford, Abrams, Apr. 28, 1904; Los Gatos, Thomas 3992; Between Morgan Hill & Gilroy, Bacigalupi, May 6, 1922; Santa Cruz, Thomas 1254.

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11. Melilotus Mill. Gard. Dict. ed. 4. 1754.

Petals white.....1. M. alba.
Petals yellow.
Flowers about 5 mm. long; pods pubescent.....2. M. officinalis.
Flowers about 2.5 mm. long; pods glabrous.....3. M. indica.

1. Melilotus alba Desv. ex Lam. Encycl. 4: 63. 1797.

Local distribution: Fairly common in disturbed areas. February through November.

General distribution: Native of Eurasia, widely established in temperate regions.

Specimens examined: San Francisco, Thomas 7283; Lower Crystal Springs Lake, Oberlander 404; Alviso, Thomas 5312; Stanford, Tompkins, no date; Near Moffett Field, Thomas 7231; Eagle Rock, Thomas 3694; Pajaro River, Thomas 3224.

2. Melilotus officinalis (L.) Lam. Fl. Franc. 2: 594. 1778.

Local distribution: Occasional as a weed in disturbed areas, rarely collected. May through August.

General distribution: Native of Europe, widely introduced into other temperate regions.

Specimens examined: San Francisco, Howell 31266 (CAS), 32638 (CAS).

3. Melilotus indica (L.) All. Fl. Ped. 1: 308. 1785.

Local distribution: A common weed of disturbed areas, fallow fields, and orchards. April through October.

General distribution: Native of Eurasia, widely naturalized in North America, and other temperate regions.

Specimens examined: San Francisco, Dudley, May 1897; Thomas 7282; San Andreas Valley, Thomas 314; Crystal Springs Lake, Elmer 4278; Stanford, Dudley, July 1893; Mouth of Pajaro River, Thomas 1592.

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12. Trifolium L. Sp. Pl. 764. 1753.

Inflorescences subtended by an involucre (reduced to a narrow ring in T. depauperatum).
Corollas becoming conspicuously inflated as the pods mature.
Calyx-teeth glabrous.
Corollas 1-3 cm. long, greenish or yellowish, occasionally tinged with purple in age or upon drying; stems usually stout.
Corollas 1.5-3 cm. long; lower calyx-teeth shorter than to about equaling the calyx-tube.
1a. T. fucatum var. fucatum.
Corollas 1-1.5 cm. long; calyx-teeth all longer than the calyx-tube.....1b. T. fucatum var. flavulum.
Corollas under 1 cm. long, yellowish or purplish; stems slender.
Involucres reduced to a narrow, entire ring.
2. T. depauperatum.
Involucres divided into lobes, the lobes entire to divided.
3. T. amplectens.
Calyx-teeth plumose.
Inflorescences 1-1.5 cm. in diameter; corollas not white-tipped, about equaling the calyx...4. T. barbigerum.
Inflorescences 1.5-3 cm. in diameter; corollas often white-tipped, much longer than the calyx.
5. T. grayi.
Corollas not becoming inflated as the pods mature.
Involucres cup- or bowl-shaped.
Calyx-lobes trifid, these lobes often again trifid or bifid, the ultimate segments subulate.
6. T. cyathiferum.
Calyx-lobes usually entire, rarely bifid, sometimes erose.
Involucres glabrous or occasionally with a few hairs abaxially; calyx 3-3.5 mm. long; calyx-lobes 0.5-1.5 mm. long, broadly deltoid, scarious-margined, the margins erose and ciliate; calyx-tube glabrous abaxially.
7. T. microdon.
Involucres villous; calyx 3.5-4.5 mm. long; calyx-lobes 1.5-2.2 mm. long, narrowly deltoid, the margins more or less entire; calyx-tube villous abaxially.
8. T. microcephalum.
Involucres flat.
Plants perennial; some calyx-lobes cleft into long subulate divisions; divisions about equal.
9. T. wormskjoldii.
Plants annual; calyx-lobes entire or with small lateral teeth.
Plants glandular-pubescent...10. T. obtusiflorum.
Plants not glandular-pubescent.
Calyx-lobes abruptly narrowed at the tip, often with 2 small lateral teeth.11. T. tridentatum.
Calyx-lobes gradually narrowed to the tip, without lateral teeth.

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Calyx-tube 20-nerved; corollas about 2 times as long as the calyx, showy.
12. T. variegatum.
Calyx-tube 10-nerved; corolla little exceeding the calyx, not showy.13. T. oliganthum.
Inflorescences not subtended by an involucre, occasionally subtended by the uppermost leaves.
Calyx-tubes becoming corky-thickened, the tubes filled and the pods embedded.....14. T. angustifolium.
Calyx-tubes not becoming corky-thickened, pods not embedded.
Flowers on short pedicels, reflexed in age.
Corollas yellow.
Flowers 2.5-3.5 mm. long; banners conspicuously diagonally striate; inflorescences 5-15-flowered, 5-7 mm. in diameter.....15. T. dubium.
Flowers 3.5-4.5 mm. long; banners not conspicuously diagonally striate; heads 20-30-flowered, 8-10 mm. in diameter.....16. T. campestre.
Corollas white, pink, or purple.
Plants perennial. Introduced.
Stems creeping and rooting at the nodes; corollas white, rarely pink.....17. T. repens.
Stems more or less erect, not rooting at the nodes; corollas pink to purple.
Corollas purple; flowers 5-6 mm. long; heads 1-1.4 cm. in diameter.....18. T. carolinianum.
Corollas pink; flowers 7-10 mm. long; heads 2-3 cm. in diameter.....19. T. hybridum.
Plants annual. Native.
Peduncles pilose at least at the top.
Leaves narrow, deeply notched at the top.
20a. T. bifidum var. bifidum.
Leaves broader, shallowly notched at the top.
20b. T. bifidum var. decipiens.
Peduncles glabrous.
Calyx-teeth entire.....21. T. gracilentum.
Calyx-teeth denticulate and often ciliate.
22. T. ciliolatum.
Flowers sessile or subsessile, not reflexed in age.
Corollas red; inflorescences cylindrical, 1.5-2 cm. in diameter; plants annual.....23. T. incarnatum.
Corollas purple or red (if red, the inflorescence ovoid to globose, 2-3 cm. in diameter and the plants perennial; inflorescences ovoid to globose, 0.5-3 cm. in diameter; plants annual or perennial.
Plants perennial; inflorescences 2-3 cm. in diameter, closely subtended by the upper leaves; corollas red.
24. T. pratense.
Plants annual; inflorescences under 2 cm. in diameter, closely subtended by the upper leaves or not; corollas purple.

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Heads closely subtended by the upper leaves.
25. T. macraei.
Heads distant from the upper leaves.
Corollas at least 1.5 times as long as the calyx.
26. T. dichotomum.
Corollas about equaling the calyx.
27. T. albopurpureum.

1a. Trifolium fucatum Lindl. var. fucatum, Bot. Reg. 22: pl. 1883. 1836.

Local distribution: Low moist areas, especially common on coastal bluffs, less frequently inland, occasionally found as a weed. March through May.

General distribution: Lane County, Oregon, south to southern California, west of the Cascade--Sierra Nevada axis.

Specimens examined: Golden Gate Park, Rattan, 1878; Near San Francisco, Dudley, May 1897; San Bruno Hills, Abrams 7062; Pilar Pt., Dudley, Mar. 17, 1900; Near Pescadero, Dudley, Apr. 19, 1896; Mayfield, Dudley, May 11, 1902; San Jose, Elmer 4735; Near Blooms Grade, Thomas 3143; Santa Cruz, Stinchfield 169.

1b. Trifolium fucatum Lindl. var. flavulum (Greene) Jepson, Fl. W. Mid. Calif. 310. 1901.

Local distribution: Open grassy areas where water has been plentiful during the winter and early spring, usually away from the immediate coast. April and May.

General distribution: British Columbia south to southern California west of the Cascade--Sierra Nevada axis, possibly introduced into British Columbia, Washington, and Oregon.

Specimens examined: Bayview Hills, Eastwood, May 14, 1920; Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Back of San Mateo, Heller 8560; Woodside, Abrams 2424; Stanford, Smith 1408; Between Saratoga and Los Gatos, Pendleton 721; Foothills west of Los Gatos, Heller 8505; San Jose, Elmer 47351.

Some plants combine the characters of the two varieties, as for

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example Thomas 7148 from Jasper Ridge. The corollas are about 1 cm. long and the lower calyx-teeth are shorter than the tube. On Jasper Ridge this plant is very common and almost a weed in low moist areas, especially where cows have overgrazed and have trampled the soil during the rainy season.

2. Trifolium depauperatum Desv. Journ. Bot. 4: 69. 1814.

Local distribution: Rare in grasslands. March and April.

General distribution: Curry and Jackson counties, Oregon, south to Santa Cruz and Fresno counties through the Coast Ranges, margins of the Sacramento Valley, and Sierra Nevada foothills; also in Chile.

Specimen examined: Near Glenwood, Thomas 3849.

3. Trifolium amplectens Torr. & Gray, Fl. N. Amer. 1: 319. 1838.

(T. stenophyllum Nutt. Journ. Acad. Phila. 1: 151. 1848; T. hydrophilum Greene, Man. Bay Reg. 100. 1894; T. truncatum Greene, Proc. Acad. Phila. 47: 546. 1896.)

Local distribution: A common species of grasslands, San Francisco southward. April through June.

General distribution: Coast Ranges from Sonoma County south to northern Baja California, the Sacramento and northern San Joaquin valleys, and the Sierra Nevada foothills from Butte County south to Kern County.

Specimens examined: Near Presidio, Dudley, Apr. 14, 1895; Hunters Pt., Mason 4376; San Bruno Mt., Ferris 2139; Near Pescadero, Dudley, Apr. 19, 1896; Woodside to Crystal Springs Reservoir, Dudley, May 1894; Menlo Park, Dudley, Apr. 11, 1894; Stanford, Dudley, Apr. 12, 1895; San Jose, Elmer 4627; Uvas Road, Abrams 13825; Near Saratoga Summit, Thomas 2974; Glenwood, Rossbach 687; Sweets Gulch, Thompson, Apr. 12, 1902.

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4. Trifolium barbigerum Torr. Pacif. R. Rep. 4: 79. 1857.

Local distribution: Grasslands from San Francisco southward, most common east of the crests of the Santa Cruz Mountains. March through June.

General distribution: Curry County, Oregon, southward in the Outer Coast Ranges to Monterey County.

Specimens examined: Presidio, Dudley, Apr. 29, 1902; Baden, Dudley, May 14, 1889; San Bruno Hills, Abrams 7059; Pilarcotis Lake, Abrams 5581; Near Pescadero, Dudley, Apr. 17, 1896; Near Woodside, McMurphy, May 8, 1906; Jasper Ridge, Abrams, May 5, 1904; Near Stanford, Abrams 2386; Near Alma, Heller 7842; Between Scott and Mill creeks, Thomas 4072.

5. Trifolium grayi Lola, Nuov. Giorn. Bot. Ital. 15: 189. 1883.

Local distribution: Grasslands, mainly near the coast or west of the Santa Cruz Mountains. March through June.

General distribution: Coast Ranges from Del Norte County south to San Luis Obispo County and in the Sierra Nevada foothills from Sacramento County south to Tuolumne County.

Specimens examined: Potrero Bottoms, San Francisco, Kellogg & Brandon 138; Pebble Beach, Vestal, June 15, 1937; Big Basin, Dudley, June 15, 1897; Jamison Creek, Hesse 598; Hilton Airport, Thomas 5524; Near Glenwood, Rossbach, Apr. 17, 1938.

6. Trifolium cyathiferum Lindl. Bot. Reg. 13: under pl. 1070. 1827.

Local distribution: Known locally only from Edenvale in the Santa Clara Valley. May through June.

General distribution: British Columbia south to Santa Clara County in the Coast Ranges and to Mono County in the Sierra Nevada, east to Utah and Idaho.

Specimen examined: Edenvale, Rattan, no date.

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7. Trifolium microdon Hook. & Arn. Bot. Misc. 3: 180. 1833.

Local distribution: Grassy slopes and open fields, San Francisco southward, most common on the eastern slopes of the Santa Cruz Mountains. Latter part of March through July.

General distribution: British Columbia south to San Luis Obispo County in the Coast Ranges and to El Dorado County in the Sierra Nevada; also on some of the Channel Islands and in Chile.

Specimens examined: Presidio, Dudley, Apr. 14, 1893; Potrero, San Francisco, Bacigalupi, Spring 1922; Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Sawyer Ridge, Oberlander 742; Belmont School, Dudley, Apr. 3, 1897; Portola, Elmer 5628; Stanford, Stinchfield 148; Permanente Canyon, Daniels, Apr. 24, 1915; Foothills west of Los Gatos, Heller 7331; 5 miles south of San Jose, Kimber & Roush, Apr. 23, 1918; Glenwood, Davis, Sept. 1907.

8. Trifolium microcephalum Pursh, Fl. Amer. Sept. 2: 478. 1814.

Local distribution: A common clover of grassy areas. April through June.

General distribution: British Columbia south to Baja California, east to Montana, Nevada, and Arizona, on some of the Channel Islands, and on Guadalupe Island.

Specimens examined: San Francisco, Michener & Bioletti, May 1892; San Francisco Watershed Reserve, Oberlander 924; Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Pescadero Creek, Dudley, June 12, 1905; Menlo Heights, Abrams 5096; Coal Mine Ridge, Barry 26; Stanford, Dudley, Apr. 18, 1895; Los Gatos Creek, Dudley, Apr. 19, 1895; Forest Grove, Dudley, Apr. 21, 1895; Foothills west of Los Gatos, Heller 8507; Near Castle Rock, Thomas 5199; Big Basin, Dudley, May 29, 1897; Hilton Airport, Thomas 4051; Near Eagle Rock, Thomas 4020; Santa Cruz, Jones 2230; Near Soquel, Thompson, May 8, 1902.

9. Trifolium wormskjoldii Lehm. Ind. Sem. Hort. Ham. 17. 1825.

Local distribution: Moist coastal bluffs and swampy or marshy areas inland, San Francisco southward. April through May.

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General distribution: British Columbia south to Mexico, east to Colorado and New Mexico.

Specimens examined: Presidio, Dudley, Apr. 29, 1902; San Francisco, Greene, May 27, 1893; Lake Merced, Dudley, May 11, 1901; North of San Bruno, Dudley, May 1, 1893; Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Arroyo de los Frijoles, Ferris 1974; Mayfield, Dudley, Apr. 4, 1905; Glenwood, Dudley, June 20, 1909; Camp Evers, Thomas 1679.

10. Trifolium obtusiflorum Hook. Bot. Beechey 331. 1838-1839.

Local distribution: Southern Santa Clara and Santa Cruz counties, often growing in sandy soils. June and July.

General distribution: Douglas County, Oregon, south through the Coast Ranges and the Sierra Nevada foothills to northern Baja California.

Specimens examined: Llagas Post Office, Dudley, June 8, 1909; Near Eccles, Dudley, June 26, 1897; China Grade, Abrams 5265; Jamison Creek, Hesse 588; Between Boulder Creek and Santa Cruz, Cunningham 7; Ben Lomond sand hills, Hesse 1586; Santa Cruz, Jones 2263.

11. Trifolium tridentatum Lindl. Bot. Reg. 13: under pl. 1070. 1827.

Local distribution: A very common clover of grasslands, rocky areas, and in disturbed areas. Latter part of March through May.

General distribution: Vancouver Island south to at least Rosario, Baja California, on the Channel Islands, and perhaps introduced into Arizona.

Specimens examined: Presidio, Dudley, Apr. 14, 1895; San Francisco, Bolander, Apr. 3. 1867; Near Lake Merced, Heller 8450; San Andreas Lake, Abrams 2319; Cahill Ridge, Oberlander 652; Belmont, Elmer 4716; Woodside, Dutton, Apr. 3, 1900; Jasper Ridge, Kimber & Roush, May 2, 1918; Coal Mine Ridge, Barry 71; Stanford, Baker 483; Monte Bello Rd., Dudley, Apr. 14, 1900; Campbell, Borthwick 54; Foothills west of Los Gatos, Heller 7326; 5 miles south of San Jose, Kimber & Roush; Apr. 23, 1918; Edenvale, Thomas 4786; Swanton, Rich, Spring 1912; Near Eagle Rock, Thomas 4021; Big Basin, Dudley, May 29, 1897; Near Santa Cruz, Heller 6553; Soquel, Thompson, May 8, 1902; Sunset Beach State Park, Thomas 1608.

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12. Trifolium variegatum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 317. 1838.

Local distribution: A common species of grasslands and grassy areas in woods. Latter part of March through June.

General distribution: British Columbia south to northern Baja California, east to western Montana, Utah, and Arizona.

Specimens examined: Bayview Hills, Howell 32250 (CAS); Crystal Springs Reservoir, Dudley, Apr. 21, 1894; San Andreas Lake, Dudley, Mar. 18, 1900; Kings Mt., Abrams 5564; Jasper Ridge, Vestal, Apr. 24, 1947; Portola, Elmer 4685; Stanford, Baker 493; Permanente Canyon, Daniel, Apr. 24, 1915; 3 miles south of San Jose, Thomas 4798; Near Alma, Heller 7841; Big Basin, Dudley, May 29, 1897; Between Big Basin and Boulder Creek, Thomas 2923; Lower Zayante, Dudley, May 6, 1893; Camp Evers, Thomas 3347.

13. Trifolium oliganthum Steud. Nom. 2: 707. 1841.

Local distribution: Open grasslands, occasional, but probably more common than the local collections would indicate. Latter part of March through May.

General distribution: British Columbia south to San Luis Obispo and Madera counties.

Specimens examined: Bayview Hills, Howell 32383 (CAS); Stanford, Abrams 2298; Permanente Canyon, Daniel, Apr. 24, 1915; Foothills west of Los Gatos, Heller 7406; Near Eagle Rock, Thomas 4074.

14. Trifolium angustifolium L. Sp. Pl. 769. 1753.

Local distribution: Known locally only from Santa Cruz County. May and June.

General distribution: Introduced into Douglas County, Oregon, and into Santa Cruz County, native of Europe.

Specimens examined: Larkin Valley, Tweedy, June 13, 1951 (CAS); May 1951 (CAS); 2 miles northwest of Santa Cruz, Hesse 2512.

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15. Trifolium dubium Sibth. Fl. Oxon. 231. 1794.

Local distribution: A weed of lawns and gardens, rarely collected. May and June.

General distribution: Native of Europe, widely established in North America.

Specimens examined: Russian Hill, San Francisco, Rose 57088 (CAS); Stanford, Dudley, May 15, 1903, June 3, 1909.

16. Trifolium campestre Schreb. in Sturm, Deutsch. Fl. 16: pl. 13. 1804.

Local distribution: Occasional as a weed in lawns. May and June.

General distribution: Native of Europe, introduced into various parts of the United States.

Specimens examined: Lone Mt., San Francisco, Howell 32539 (CAS); Stanford, Dudley, June 3, 1909.

17. Trifolium repens L. Sp. Pl. 767. 1753.

Local distribution: A common weed of lawns, gardens, and disturbed areas. April through October.

General distribution: Native of Europe, widely introduced into temperate regions.

Specimens examined: Lake Merced, Howell 31295 (CAS); Cahill Ridge, Oberlander 271; Palo Alto, Thomas 4926; Stanford, Dudley, May 1894; Camp Evers, Thomas 3339; Near Santa Cruz, Thomas 3608.

18. Trifolium carolinianum Michx. Fl. Bor. Amer. 2: 58. 1803.

Local distribution: Known only from one specimen collected in San Francisco. Probably flowering in April and May.

General distribution: Native from Kansas east to Virginia, south to Texas and Florida, rare as an introduced weed in central California.

Specimen examined: San Francisco, DS 116042.

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19. Trifolium hybridum L. Sp. Pl. 766. 1753.

Local distribution: Occasional as a weed in disturbed areas, rarely collected. May through July.

General distribution: Native of Europe, widely introduced into North America.

Specimens examined: San Francisco, Thomas 7271; Raven 6920 (CAS); Stanford, Dudley; June 12, 1897; Basin Way near Boulder Creek, Hesse 1536.

20a. Trifolium bifidum Gray var. bifidum, Proc. Amer. Acad. 6: 522. 1865.

Local distribution: Grassy slopes and openings in woods, occasionally found along roadsides, San Francisco southward, but more common to the east of the crests of the Santa Cruz Mountains. April and May.

General distribution: Coast Ranges from Humboldt County south to Monterey and San Benito counties, in the Sacramento Valley, and from Butte County south to Mariposa County in the Sierra Nevada foothills.

Specimens examined: Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Woodside serpentine, Dutton, Mar. 3, 1900; Coal Mine Ridge, Barry 123; Portola, Elmer 4798; Permanente Creek, Dudley, Apr. 23, 1899; Alma, Pendleton 723; Foothills west of Los Gatos, Heller, Apr. 12, 1904; Saratoga Summit, Thomas 3115A.

20b. Trifolium bifidum Gray var. decipiens Greene, Fl. Franciscana 1: 24. 1891.

Local distribution: A common species of grassy slopes and fields, often growing under oaks. April and May.

General distribution: Washington south to northern Baja California, mainly in the Coast Ranges, but also in the Sierra Nevada foothills in Butte and El Dorado counties.

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Specimens examined: Hunters Pt., Mason 4373; Baden Creek, Dudley, May 14, 1899; Crystal Springs Lake, Dudley, Apr. 21, 1894; Half Moon Bay Rd., Heller 8559; Jasper Ridge, Kimber & Roush, May 2, 1918; Stanford, Dudley, Apr. 12, 1895; Foothills west of Los Gatos, Heller 7304; Big Basin, Dudley, May 29, 1897; Glenwood, Davis, Sept. 1907.

The varieties of Trifolium bifidum often grow together.

21. Trifolium gracilentum Torr. & Gray, Fl. N. Amer. 1: 316. 1838.

Local distribution: Common on grassy slopes and fields and often a weed in disturbed areas, San Francisco southward. March through May.

General distribution: British Columbia south to northern Baja California and on Guadalupe Island.

Specimens examined: San Francisco, Rattan, May 1, 1878; Hunters Pt., Mason 4370; San Francisco Watershed Reserve, Oberlander 654; Stanford, Dudley, Apr. 12, 1895; Saratoga, Borthwick, Apr. 1920; Los Gatos, Heller 7378; Near Alma, Dudley, Apr. 21, 1895; Edenvale, Thomas 4772; Gilroy, Elmer 4902; Saratoga Summit, Thomas 1622; Glenwood, Davis, Sept. 1907; Soquel, Thompson, May 1, 1902; Capitola, Pendleton, May 1908; Sunset Beach, Thomas 1611.

22. Trifolium ciliolatum Benth. Pl. Hartw. 304. 1848.

Local distribution: Occasional in grasslands and wooded foothills. March through May.

General distribution: Washington south to San Diego County and on some of the Channel Islands.

Specimens examined: Crystal Springs Lake, Oberlander 787; Portola, Elmer 4789; Stanford, Dudley, Apr. 12, 1895; Foothills west of Los Gatos, Heller 8506; Near Wrights, Dudley, Apr. 21, 1895; Near Almaden Canyon, Thomas 3933; Big Basin, Dudley, June 13, 1905; Blooms Grade, Thomas 1815; Santa Cruz, Thompson, May 15, 1902.

23. Trifolium incarnatum L. Sp. Pl. 769. 1753.

Local distribution: Occasional in disturbed areas, rarely collected. April through June.

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General distribution: Native of Europe, widely introduced into the United States.

Specimens examined: Stanford, Dudley, Apr. 20, 1902; Bacigalupi, May 8, 1922; Pescadero, Sokol 88; Near Soda Lake, Thomas 3315.

24. Trifolium pratense L. Sp. Pl. 768. 1753.

Local distribution: Lawns and disturbed areas, occasional throughout the Santa Cruz Mountains. May through July.

General distribution: Native of Eurasia, widely introduced into temperate regions.

Specimens examined: San Francisco, Howell 31417 (CAS); Lake Merced, Thomas 7317; Near San Bruno, Thomas 534; Stanford, Dudley, June 3, 1896.

25. Trifolium macraei Hook. & Arn. Bot. Misc. 3: 179. 1833.

Local distribution: Occasional in grasslands, San Francisco southward. April and May.

General distribution: Coastal, Del Norte County south to Santa Barbara County, on some of the Channel Islands, and in Chile.

Specimens examined: Presidio, Dudley, Apr. 29, 1902; Hunters Pt., Mason 4369; 1 mile south of Lake Merced, Dudley, May 11, 1901; Near Baden, Dudley, May 14, 1899; Near Crystal Springs, Smith 1420; San Pedro, Elmer 4812; Alpine School, Dudley, Apr. 19, 1896; Coal Mine Ridge, Barry 72; Black Mt., Abrams 1529; Near Saratoga Summit, Thomas 2982; Santa Cruz Co., Thompson, May 15, 1902.

26. Trifolium dichotomum Hook. & Arn. Bot. Beechey 330. 1838-1839.

Local distribution: Occasional in grasslands and on serpentine soils, San Francisco southward, mainly to the east of the crests of the Santa Cruz Mountains. April and May.

General distribution: Coast Ranges, Humboldt and Siskiyou counties south to Santa Clara County.

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Specimens examined: Ocean View, Rattan, May 3, 1888; San Mateo Canyon, Abrams, May 7, 1910; Palo Alto, Smith 796; Near Alma, Hichborn, May 15, 1920; Foothills west of Los Gatos, Heller 7423; 4 miles south of San Jose, Hoover 3258; Gilroy, Elmer 4909.

27. Trifolium albopurpureum Torr. & Gray, Fl. N. Amer. 1: 313. 1838.

Local distribution: Grassy slopes, northern San Mateo County southward. April through June.

General distribution: British Columbia south to southern California, mainly west of the Cascade - Sierra Nevada axis.

Specimens examined: Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Sweeney Ridge, Oberlander 715; Redwood City, Rose 33172; Woodside, Abrams 2420; Stanford, Dudley, Apr. 23, 1893; Permanente Canyon, Daniel, Apr. 24, 1915; Foothills west of Los Gatos, Heller 7330; Edenvale, Thomas 4770; Gilroy, Elmer 4623.

13. Ornithopus L. Sp. Pl. 743. 1753.

Flowers 1-2 per peduncle; segments of the loments cylindric, round in cross section.....1. O. pinnatus.
Flowers 4 or more per peduncle; segments of the loments elliptic, flattened in cross section.....2. O. roseus.

1. Ornithopus pinnatus (Mill.) Druce, Journ. Bot. 45: 420. 1907.

Local distribution: Known locally only from Graham Hill between Felton and Santa Cruz, where it appears to be spreading. June and July.

General distribution: Native of Europe, sparingly introduced into Santa Cruz County.

Specimens examined: Graham Hill, Hesse 1614 (CAS), 1619, 1803 (CAS).

2. Ornithopus roseus Dufour, Ann. Sci. Nat. 5: 82. 1825.

Local distribution: Known only from along Graham Hill Road near Felton, Santa Cruz County. June and July.

General distribution: Native of Europe, locally established in

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Santa Cruz County.

Specimens examined: Graham Hill Road, Hesse 468 (CAS); Thomas 6039.

Miss Hesse's specimen was collected in 1941 and mine in 1956. Ornithopus roseus has persisted for at least 15 years and must be considered as a member of the California flora.

14. Glycyrrhiza L. Sp. Pl. 741. 1753.

1. Glycyrrhiza lepidota (Nutt.) Pursh, Fl. Amer. Sept. 480. 1814.

Local distribution: Low ground, grassy flats, and along drainage ditches at low elevations on the eastern side of the Santa Cruz Mountains. May through August.

General distribution: British Columbia east to Saskatchewan, south to southern California, Chihuahua, Texas, and Minnesota, and introduced to eastern states.

Specimens examined: Redwood City, Hichborn, June 5, 1920; San Francisquito Creek, Bacigalupi, Aug. 27, 1922; Stanford, Dudley, June 14, 1895.

15. Astragalus L. Sp. Pl. 755. 1753.

Plants annual.
  Pods about as broad as long, 3-4 mm. long; corollas about 3 mm. long. 1. A. gambellianus.
  Pods several times as long as broad, 10-15 mm. long; corollas 7-9 mm. long.....2. A. tener.
Plants perennial.
  Pods 7-9 mm. long; flowers in dense racemes. 3. A. pycnostachyus.
  Pods 3-5 cm. long, inflated and papery in age; flowers in rather loose racemes.....4. A. nuttallii var. virgatus.

1. Astragalus gambellianus Sheldon, Minn. Bot. Stud. 1: 21. 1894.

Local distribution: A common species of grasslands and serpentine

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soils, more common to the east of the crests of the Santa Cruz Mountains than to the west. April and May.

General distribution: Josephine and Jackson counties, Oregon, southward through the Coast Ranges and the Sierra Nevada foothills to northern Baja California.

Specimens examined: Hunters Pt., Mason 4366; Crystal Springs Lake, Dudley, May 8, 1906; San Andreas Valley, Oberlander 786; Hills back of Redwood City, James 1758; Woodside, Hichborn, Apr. 19, 1920; Jasper Ridge, Kimber & Roush, Apr. 25, 1918; Coal Mine Ridge, Barry 60; Stanford, Elmer 4493; Monte Bello, Dudley, May 4, 1905; Thomas 5707; Foothills west of Los Gatos, Heller 7357; Edenvale, Thomas 4773; Almaden Canyon, Bacigalupi 1337; Saratoga Summit, Thomas 2978; Near Boulder Creek, Hesse 1264.

2. Astragalus tener Gray, Proc. Amer. Acad. 6: 206. 1864.

Local distribution: Known locally only from saline areas in San Francisco and from the salt marshes east of Mayfield, but probably more common. April.

General distribution: Sonoma County south to Los Angeles County along the coast and in low alkaline areas inland.

Specimens examined: San Francisco, Kellogg & Harford 192 (CAS); Mayfield, Dudley, Apr. 4, 1905.

3. Astragalus pycnostachyus Gray, Proc. Amer. Acad. 6: 527. 1864.

Local distribution: Salt marshes and salt flats, central San Mateo County, occasionally inland. June through August.

General distribution: Coastal, Humboldt County south to central San Mateo County.

Specimens examined: Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Pescadero, Leitholt, July 1894; San Gregorio, Congdon, Aug. 11, 1897; Thomas 7372.

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4. Astragalus nuttallii (Torr. & Gray) Howell var. virgatus (Gray) Barneby, Aliso 4: 135. 1958.

(A. franciscanus Sheldon, Minn. Bot. Stud. 1: 135. 1894.)

Local distribution: Usually in sandy soil of coastal bluffs, San Francisco south to southern San Mateo County. April through October.

General distribution: Near the coast, Mendocino County south to southern San Mateo County.

Specimens examined: Golden Gate Park, Jones, July 17, 1897; Lands End, Walker 1777; Ocean View, Rattan, Apr. 1888; Heller 8385; South San Francisco, Demaree 10376; San Francisco - San Mateo Co. line, Bacigalupi 2731; Mussel Rock, Dudley, Oct. 4, 1909; Pescadero, Dudley, Apr. 17, 1896.

16. Vicia L. Sp. Pl. 734. 1753.

Flowers borne on peduncles.
  Flowers small, 3-8 mm. long.
    Pods pubescent, 2-seeded.....1. V. hirsuta.
    Pods glabrous (rarely with a few scattered hairs), 3-8-seeded.
      Pods under 1.5 cm. long, rounded on each end.
        2. V. tetrasperma.
      Pods over 2.5 cm. long, acute at each end.
        3. V. exigua.
  Flowers larger, at least 10 mm. long.
    Flowers purple-red or yellowish; pods pubescent or glabrous.
      Pods glabrous; herbage sparsely pubescent. Native plants.
        4. V. gigantea.
      Pods pubescent; herbage densely silky-villous, the pubescence of the stems appressed or ascending.
        5. V. benghalensis.
    Flowers blue, purple, or lavender; pods usually glabrous.
      Flowers usually 10 or more per inflorescence.
        Pubescence of the stems spreading; herbage villous.
          6. V. villosa.
        Pubescence of the stems appressed; herbage sparsely pubescent.....7. V. dasycarpa.
      Flowers rarely more than 6 per inflorescence.
        Leaflets oblong, ovate or elliptic.
          Leaflets not truncate....8a. V. americana var. oregana.
          Leaflets truncate.....8b. V. americana var. truncata.
        Leaflets linear.....8c. V. americana var. linearis.
Flowers more or less sessile in the leaf axils.
  Leaflets 4-7 cm. long, tendrils absent or much reduced; flowers 2.5-3 cm. long.....9. V. faba.

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Leaflets usually under 3 cm. long, tendrils well developed; flowers usually 1-2.5 cm. long.
Flowers 1-1.8 cm. long; leaflets linear to oblanceolate-elliptic; pods black at maturity.....10. V. angustifolia.
Flowers 2-2.5 cm. long; leaflets obovate; pods brown at maturity. 11. V. sativa.

1. Vicia hirsuta (L.) Gray, Nat. Arr. Brit. Pl. 2: 614. 1821.

Local distribution: Occasional in grassy areas and along roads. May through July.

General distribution: Native of Europe, North Africa, and western Asia, widespread as a weed in other temperate regions.

Specimens examined: San Francisco, King, July 1915; Little Basin, Thomas 1831.

2. Vicia tetrasperma (L.) Moench, Meth. 148. 1794.

Local distribution: Occasional as a weed along roads and highways. May through August.

General distribution: Native of Europe, naturalized in the United States.

Specimens examined: Near Pescadero, Hesse 1681; Between Mt. Hermon and Olympia, Hesse 461; Olympia, Hesse 508 (CAS).

3. Vicia exigua Nutt. in Torr. & Gray, Fl. N. Amer. 1: 272. 1838.

(V. hassei Wats. Proc. Amer. Acad. 25: 129. 1890.)

Local distribution: Occasional in open wooded areas, not commonly collected. March through May.

General distribution: Southern Oregon south through the Coast Ranges to Baja California, eastward to western Texas, on some of the Channel Islands, and on Guadalupe Island.

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Specimens examined: Bear Gulch, Abrams 1573; Stanford, Atkinson, Mar. 12, 1900; Palo Alto, Dudley, May 1893; San Jose, Kleeberger, May 1872 (CAS); Near Boulder Creek, Hesse 923 (CAS); Rancho del Oso, Thomas 1741.

4. Vicia gigantea Hook. Fl. Bor. Amer. 1: 157. 1839.

Local distribution: Usually near the coast in moist, partly shaded habitats, San Francisco southward, rarely on the eastern slopes of the Santa Cruz Mountains. Latter half of March through July.

General distribution: Along or near the coast from southern Alaska to San Luis Obispo County.

Specimens examined: San Francisco, Dudley, May 10, 1897; Colma, Rattan, Apr. 1885; Cahill Ridge, Oberlander 968; Pescadero, Elmer 4445; Coal Mine Ridge, Barry 196; Swanton, Rich, Apr. 8, 1912; Zayante, Dudley, May 6, 1893; San Lorenzo River, Thomas 2899; Santa Cruz, Thompson, June 23, 1903; Powder Mill Gulch, Thompson, July 6, 1902; Near Watsonville, Baker 1954.

5. Vicia benghalensis L. Sp. Pl. 736. 1753.

Local distribution: Occasional in disturbed areas, along roadsides and on exposed stream banks, San Francisco southward. April through June.

General distribution: Native of southern Europe and northern Africa, occasional as an introduction into California.

Specimens examined: San Francisco, Howell 31388 (CAS); Burlingame, Howell 13886 (CAS); Ano Nuevo, Eastwood & Howell 5263; Stanford, Thomas 5731; Near Boulder Creek, Hesse 495 (CAS); Near Felton, Howell 19069 (CAS); Watsonville, Thomas 1965.

6. Vicia villosa Roth, Tent. Fl. Germ. 2: 182. 1789.

Local distribution: Common as a weed along highways and along the edges of grasslands. May through August.

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General distribution: Native in Europe, introduced into the United States and southern Canada.

Specimens examined: San Francisco, Faix, June 14, 1920 (CAS); Near Stanford, Wolf 3737; Alviso, Thomas 7252; Uvas Rd., Ferris 3723; Swanton, Rich, May 12, 1912; Brookdale, Bacigalupi, May 18, 1926; Ben Lomond, Thompson, May 27, 1902; Alba Grade, Thomas 4316; Near Santa Cruz, Hesse 988; Hilton Airport, Thomas 4341.

7. Vicia dasycarpa Tenore, Viagg. Abruzz. 81. 1829.

Local distribution: Occasional along roads and in disturbed areas. April through June.

General distribution: Native of Europe and North Africa, introduced into the United States.

Specimens examined: San Francisco, Thomas 7335; Hunters Pt., Raven, Apr. 19, 1954 (CAS); Stanford, Thomas 7212; Near Mt. Hermon, Thomas 1666.

Occasional specimens have pubescent pods (Stanford, Thomas 7215; Edenvale, Thomas 4948) and perhaps represent hybrids between V. dasycarpa and V. benghalensis as suggested by Howell (1949, pp. 177-178).

8a. Vicia americana Muhl. ex Willd. var. oregana (Nutt.) Nels. Man. Bot. Rocky Mts. 301. 1909.

Local distribution: Probably the most common variety of this species locally, growing in brush-covered areas, along roadsides, and in open woods. March through May.

General distribution: British Columbia south to southern California, east to the Rocky Mountains.

Specimens examined: Twin Peaks, Thomas 4868; Lake Merced, Heller 8449; Seal Cove, Dudley, Mar. 17, 1900; Page Mill Rd., Hesse 2211; Coal Mine Ridge, Barry 48; Stanford, Dudley, Apr. 1893.

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8b. Vicia americana Muhl. ex Willd. var. truncata (Nutt.) Brewer, Bot. Calif. 1: 158. 1876.

Local distribution: Fairly common on wooded or brush-covered slopes. March through May.

General distribution: British Columbia south to southern California, east to Minnesota and Missouri.

Specimens examined: San Francisco, Dudley, May 1897; San Bruno, Dudley, May 14, 1899; Cahill Ridge, Oberlander 122; Spanishtown, Leitholt, Mar. 28, 1894; Stanford, Abrams 2362; Bielawski Lookout, Thomas 2829.

8c. Vicia americana Muhl. ex Willd. var. linearis (Nutt.) Wats. Proc. Amer. Acad. 11: 134. 1835.

Local distribution: Occasional in wooded areas and on grassy slopes. December through May.

General distribution: British Columbia south to northern Baja California, east to the Rocky Mountains.

Specimens examined: Lake Merced, Dudley, May 11, 1901; La Honda, Dudley, Dec. 13, 1894; Woodside, Applegate 139; Jasper Ridge, Hichborn 42; Near Palo Alto, Dudley, May 1893; Swanton, Rich, Mar. 7, 1912.

9. Vicia faba L. Sp. Pl. 737. 1753.

Local distribution: Occasional as an escape from cultivation. April through July.

General distribution: Native of Eurasia, escaped from cultivation in temperate regions.

Specimens examined: Hunters Pt., Raven 6635 (CAS); Portola Valley, Hichborn 151; Stanford, Abrams, Apr. 1898; Loma Prieta Ridge, Dudley, July 22, 1893.

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10. Vicia angustifolia L. Amoen. Acad. 4: 105. 1759.

Local distribution: Fairly common in disturbed areas, on grassy slopes, and along the edges of woods. April through June.

General distribution: Native of Europe, widely introduced into North America.

Specimens examined: Ocean View, Rattan, May 9, 1885; Moss Beach, Wiggins 8163; Portola Valley, Randall 217; Stanford, Thomas 7210; Alma, Hichborn, May 9, 1920; Below Saratoga Summit, Thomas 3413; Hilton Airport, Thomas 3124; Olympia, Thomas 1663.

Plants with wide leaves and flowers which are 1.5-1.8 cm. long have been called V. angustifolia var. segetalis (Thuill.) Koch (Syn. 197. 1835). This variety is often difficult ti distinguish from the typical one.

11. Vicia sativa L. Sp. Pl. 736. 1753.

Local distribution: Occasional along roadsides, fields, and disturbed areas. April through July.

General distribution: Native of Europe, widely introduced into other temperate regions.

Specimens examined: Bayview Hills, Howell 32259 (CAS); Near Stanford, Randall 216; Near Hilton Airport, Thomas 3359; La Selva Beach, Thomas 3044; Pajaro River, Thomas 3227.

17. Lathyrus L. Sp. Pl. 729. 1753.

Leaflets 2, tendrils well developed.
- Petioles with a broad wing; plants perennial; inflorescences 5-15-flowered.....1. L. latifolius.
- Petioles with a narrow wing; plants annual; inflorescences 1-5-flowered.
  - Pods pubescent; herbage villous-hirsute; inflorescence 2-5-flowered. 2. L. odoratus.
  - Pods glabrous; herbage glabrous; inflorescence 1-3-flowered.
    - Flowers solitary, about 1.5 cm. long; pods about 3 cm. long. 3. L. cicera.

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Flowers 1-3, 2.5-3 cm. long; pods 7-10 cm. long.
4. L. tingitanus.
Leaflets 4 or more, tendrils well developed or not.
Tendrils much reduced, not branching or twining.
Herbage densely silky-pubescent; stipules exceeding the leaflets in size. Sand dune plants.
5. L. littoralis.
Herbage sparsely pubescent; stipules smaller than the leaflets.
Inland plants.....6. L. torreyi.
Tendrils branched and twining.
Stems winged.....7. L. jepsonii ssp. californicus.
Stems angled, but not winged.
Calyx-tubes and herbage pubescent.
Plants usually under 3 dm. tall, the internodes usually under 3 cm. long, erect rather than scandent.
8a. L. vestitus ssp. vestitus.
Plants usually over 4 dm. tall, the internodes usually over 5 cm. long, scandent.8b. L. vestitus ssp. puberulus.
Calyx-tubes and herbage glabrous.
8c. L. vestitus ssp. bolanderi.

1. Lathyrus latifolius L. Sp. Pl. 733. 1753.

Local distribution: Occasional as an escape from cultivation, usually in disturbed areas and along roads. June through August.

General distribution: Native of Europe, established in the Pacific States and elsewhere in North America.

Specimens examined: Hunters Pt., San Francisco, Howell 31438 (CAS); Near Pescadero, Thomas 7366; Near Felton, Howell 19602 (CAS); Thomas 3370, 3371; San Jose - Soquel Rd., Thomas 2488.

2. Lathyrus odoratus L. Sp. Pl. 732. 1753.

Local distribution: Occasional along roadsides. June through July.

General distribution: Native of Italy, occasional as an escape from cultivation in California.

Specimens examined: San Francisco, Howell 31487 (CAS); Near Big Basin, Thomas 3414; Laurel, Abrams 13818.

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3. Lathyrus cicera L. Sp. Pl. 730. 1753.

Local distribution: Known only from southern San Mateo County near Saratoga Summit where it grows as a weed along roadsides. May and June.

General distribution: Native of the Mediterranean Region, introduced into San Mateo County.

Specimens examined: Near Saratoga Summit, Hesse 1886 (CAS), 2212.

4. Lathyrus tingitanus L. Sp. Pl. 732. 1753.

Local distribution: A weed of roadsides, occasional. May through September.

General distribution: Native of the Mediterranean Region, occasional as an escape in the United States and Mexico.

Specimens examined: San Francisco, Howell 31368 (CAS); San Gregorio, Abrams & Wiggins 421; Near Aptos, Balls 7916, May 13, 1948 (CAS).

5. Lathyrus littoralis (Nutt. ex Torr. & Gray) Endl. Rep. Sp. Nov. 1: 722. 1842.

Local distribution: Coastal sand dunes, San Francisco southward. April through July.

General distribution: Along the coast from Vancouver Island, British Columbia, south to northern Monterey County.

Specimens examined: Lake Merced, Congdon, July 11, 1893; Greene, June 9, 1887; Salada, Hall 11957; Half Moon Bay, Wiggins 11201; Pescadero, Sokol 109; Unsworth, May 1924 (CAS); Ano Nuevo Pt., Vestal, May 1925; Waddell Creek, Thomas 1716; Eastwood & Howell 6073; Watsonville, Elmer 4390.

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6. Lathyrus torreyi Gray, Proc. Amer. Acad. 7: 337. 1867.

Local distribution: Known only from Santa Cruz County, usually growing in shade of coniferous forests, fairly rare. May through June.

General distribution: Pierce County, Washington, south through the Coast Ranges to Santa Clara and Santa Cruz counties.

Specimens examined: Big Basin, Dudley, Sept. 1901, June 5, 1897; Ben Lomond, Thompson, May 27, 1902; Ben Lomond Canyon, Van Dyke, Apr. 17, 1931 (CAS); Laurel, Smith 3748; San Lorenzo Rd., Dudley, May 7, 1893; Near Felton, Howell 19599 (CAS); Mt. Hermon, Townsend, June 1943 (CAS).

7. Lathyrus jepsonii Greene ssp. californicus (Wats.) Hitchc. Univ. Wash. Pub. Bot. 15: 20. 1952.

(L. watsonii White, Bull. Torr. Bot. Club 21: 447. 1894.)

Local distribution: Rare locally, known from southern San Mateo and northern Santa Clara counties on the eastern slopes of the Santa Cruz Mountains, usually on brush-covered slopes; known also as a weed from San Francisco. April through June.

General distribution: Humboldt and Siskiyou counties south through the Coast Ranges and the Sierra Nevada foothills to San Luis Obispo and Tulare counties.

Specimens examined: Kings Mt., Randall 190; Near Cooleys Landing, Dudley, June 5, 1906; Near Menlo Park, Dudley, May 12, 1897; Stanford, Dudley, June 6, 1906.

8a. Lathyrus vestitus Nutt. ex Torr. & Gray ssp. vestitus, Fl. N. Amer. 1: 276. 1838.

Local distribution: Most common on open grassy slopes and ridges,

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San Francisco southward to northern Santa Cruz County. March through May.

General distribution: Coast Ranges from Lake County south to northern Monterey County.

Specimens examined: Ocean View, Dudley, Mar. 20, 1897; San Bruno Hills, Elmer 8454; Rollins 3012; Ferris 2148; About 4 miles below Saratoga Summit, Thomas 1627.

8b. Lathyrus vestitus Nutt. ex Torr. & Gray ssp. puberulus (White ex Greene) Hitchc. Univ. Wash. Pub. Bot. 15: 18. 1952.

(L. violaceus Greene, Erythea 1: 105. 1893.)

Local distribution: The most common subspecies of this species locally, usually growing in woods, along the edges of chaparral, and along road and highway embankments. October through April.

General distribution: Coast Ranges from Humboldt County south to Los Angeles County.

Specimens examined: Lands End, Thomas 4258; Mission Hills, Dudley, May 1, 1897; Cahill Ridge, Oberlander 781; Pilarcitos Lake, Abrams 5578; La Honda, Bacigalupi, Apr. 29, 1923; Woodside, Applegate 140; Stanford, Abrams 2360; Stevens Creek, Randall 191; Foothills west of Los Gatos, Heller 7283; Bielawski Lookout, Thomas 1519; Swanton, Rich, Apr. 8, 1912; Soquel Valley, Thomas 1392; Capitola, Abrams 3049.

8c. Lathyrus vestitus Nutt. ex Torr. & Gray ssp. bolanderi (Wats.) Hitchc. Univ. Wash. Pub. Bot. 15: 19. 1952.

Local distribution: Usually growing in at least partial shade along the edges of woods, in clearings, and along streams. January through May.

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General distribution: Douglas County, Oregon, south through the Outer Coast Ranges to San Luis Obispo County.

Specimens examined: Lake Merced, Abrams 1577; Dudley, May 10, 1901; Crystal Springs Lake, Abrams 2342; Half Moon Bay, Heller 8583; Pescadero Creek, Dudley, June 6, 1895; Kings Mt., Leitholt, Mar. 26, 1894; Stanford, Dudley, May 14, 1901.

18. Lens Mill. Gard. Dict. ed. 4. 1754.

1. Lens culinaris Medic. in Vorles. Churpf. Phys. Ges. 2: 361. 1787.

Local distribution: Rare as a weed in San Francisco. June.

General distribution: Native of Europe, widely grown as a crop and occasionally found as a weed in California, the eastern part of the United States, and in other temperate regions.

Specimen examined: San Francisco, Howell 32625 (CAS).

19. Pisum L. Sp. Pl. 727. 1753.

1. Pisum sativum L. Sp. Pl. 727. 1753.

Local distribution: Rare as an escape from cultivation. June.

General distribution: Native of Eurasia, widely grown and occasionally escaped from cultivation.

Specimens examined: San Francisco, Howell 31421 (CAS), 32249 (CAS).

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57. GERANIACEAE

Upper sepal spurred, the spur adnate to the pedicel; petals unequal.
1. Pelargonium.
Upper sepal not spurred; petals equal.
Anthers 10; beak of fruit arched when mature; leaves rounded in outline.
2. Geranium.
Anthers 5; beak of fruit forming a spiral when mature; leaves ovate to oblong in outline (rounded in E. macrophyllum)..3. Erodium.

1. Pelargonium L'Her. Geran. 43. 1787.

Stems not succulent; leaves lobed or divided.
Petals less than 1 cm. long; stems slender, glabrous or nearly so.
1. P. grossularioides.
Petals more than 1 cm. long; stems stout, soft villous.
2. P. vitifolium.
Stems succulent; leaves usually not lobed or divided.
3. P. zonale.

1. Pelargonium grossularioides Ait. Hort. Kew. 2: 420. 1789.

Local distribution: Sparingly introduced on the cliffs near Pebble Beach. May through July.

General distribution: Native of South Africa, locally established in central California.

Specimens examined: Pebble Beach, Mason, June 2, 1921.

2. Pelargonium vitifolium Ait. Hort. Kew. 2: 425. 1789.

Local distribution: Well established along roadsides between Pescadero and Pigeon Point. March through December, but flowering plants can probably be found at all times of the year.

General distribution: Native of South Africa, occasionally naturalized in temperate regions.

Specimens examined: San Francisco, Raven 2726 (CAS); Near Pescadero, Howell 10864; Between Pigeon Pt. and Pescadero, Wiggins 3675; One mile north of Pigeon Pt., Thomas 4289; Pigeon Pt., Wolf 3704.

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3. Pelargonium zonale (L.) Ait. Hort. Kew. 2: 424. 1789.

Local distribution: Known as an escape in vacant lots and in disturbed areas in San Francisco. Flowering plants can usually be found at all times of the year.

General distribution: Native of South Africa, widely grown as a garden ornamental, occasionally found as an escape in central California.

Specimens examined: San Francisco, Raven 2723 (CAS), 3987 (CAS).

2. Geranium L. Sp. Pl. 676. 1753.

Plants annual or occasionally biennial; roots slender.
Sepals not cuspidate; carpel-bodies glabrous.....1. G. molle.
Sepals cuspidate; carpel-bodies pubescent.
Carpel-bodies short-hirsute, the trichomes of uniform length; seeds with rounded pits; inflorescence glandular.
2. G. dissectum.
Carpel-bodies villous, the trichomes of different lengths; seeds with elongated pits; inflorescence rarely glandular.
3. G. carolinianum.
Plants perennial; roots thick.....4. G. retrorsum.

1. Geranium molle L. Sp. Pl. 682. 1753.

Local distribution: Disturbed grasslands throughout the area. February through June.

General distribution: Native of Europe, widely introduced into temperate regions.

Specimens examined: Jasper Ridge, Thomas 5005; Empire Grade, Hesse 2152.

Despite the fact that G. molle is widely distributed in central California, except for the above-cited collections, there are no other specimens of this species from the Santa Cruz Mountains in the Dudley Herbarium. This fact is mentioned only to point out a concrete example

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of a widespread phenomenon, namely that local plants, especially weedy ones, are often very poorly represented in herbaria.

2. Geranium dissectum L. Amoen. Acad. 4: 282. 1760.

Local distribution: Grassy slopes, pastures, and disturbed habitats; the most common species of this genus locally. April through October.

General distribution: Probably native of Europe, widely introduced into other temperate regions.

Specimens examined: Land's End, Thomas 4251; San Mateo, Elmer 4730; San Gregorio, Keck 4727; Stanford, Dudley, May 14, 1896; Guadalupe Creek, Thomas 4967; Swanton, Rich, May, 1912; Santa Cruz, Thompson, June 6, 1903; Pajaro River, Thomas 1593.

3. Geranium carolinianum L. Sp. Pl. 682. 1753.

Local distribution: Occasional on wooded slopes and in other shaded areas. April through October.

General distribution: Throughout most of the United States.

Specimens examined: San Francisco, Brandegee, no date; Stanford, Dudley, May 14, 1896.

4. Geranium retrorsum L'Her. ex DC. Prod. 1: 644. 1824.

Local distribution: Known locally from one specimen from the Presidio, but to be expected elsewhere. May through September.

General distribution: Native of New Zealand, sparingly naturalized in central California.

Specimen examined: Presidio, Bioletti, May 1891.

3. Erodium L'Her. ex Ait. Hort. Kew. 2: 414. 1789.

Leaves simple, pinnatifid or nearly entire.
  Leaves pinnatifid, adult leaves several times as long as broad, not cordate at base. Common species.

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Concavities at summit of fruit subtended by 1 fold; fruit usually hairy throughout; beak of fruit 5-9 cm. long. ..... 1. E. obtusiplicatum.
Concavities at summit of fruit subtended by 2 folds; fruit glabrous above the folds; beak of fruit usually over 9 cm. long. ..... 2. E. botrys.
Leaves palmately lobed, adult leaves about as long as broad, cordate at base. Rare ..... 3. E. macrophyllum.
Leaves pinnately compound.
Leaflets pinnately lobed; sepals bearing 1 or 2 bristles at the apex; claws of petals ciliate ..... 4. E. cicutarium.
Leaflets toothed; sepals lacking bristles; claws of petals glabrous. ..... 5. E. moschatum.

1. Erodium obtusiplicatum (Maire, Weiller, & Wilczek) Howell, Leafl. West. Bot. 5: 68. 1947.

Local distribution: Common in disturbed areas and on grassy slopes throughout the Santa Cruz Mountains and adjacent lowlands. March through May.

General distribution: Native of North Africa, widely distributed in the Pacific States, Chile, and probably in other temperate regions.

Specimens examined: Searsville, Dudley, 1898; Stanford, Abrams 1134; Saratoga Summit, Thomas 2943; Near Corralitos, Thomas 1284.

2. Erodium botrys (Cav.) Bertol. Amoen. Ital. 35. 1819.

Local distribution: Very common throughout the Santa Cruz Mountains, on grassy slopes, especially pastures, and in disturbed habitats. March through July.

General distribution: Native of the Mediterranean region, now almost cosmopolitan as a weed.

Specimens examined: San Bruno Mt., Thomas 4848; Sawyer Ridge, Oberlander 339; Stanford, Rust 77; Camp Evers, Thomas 1677; Santa Cruz, Thomas 1381; Robroy, Thomas 3047.

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3. Erodium macrophyllum Hook. & Arn. Bot. Beechey 327. 1837.

Local distribution: Known locally from only one small individual collected at Pebble Beach near Pescadero. April.

General distribution: Southern Oregon south through the Coast Ranges to northern Baja California.

Specimen examined: Pebble Beach, Dudley, Apr. 17, 1896.

Jepson (1936, p. 407) stated that G. macrophyllum is "An extremely rare plant, both as to stations and individuals."

4. Erodium cicutarium (L.) L'Her. ex Ait. Hort. Kew. 2: 414. 1789.

Local distribution: Very common in pastures, grassy slopes, and disturbed areas. Latter part of February through November.

General distribution: Native of southern Europe, widely introduced into other temperate regions.

Specimens examined: Twin Peaks, Thomas 4876; Lake Merced, Michener & Bioletti, Nov. 1892; Stanford, Randall 147; Edenvale, Thomas 4779; Near Glenwood, Thomas 2861; Eagle Rock, Thomas 4726.

5. Erodium moschatum (L.) L'Her. ex Ait. Hort. Kew. 2: 414. 1789.

Local distribution: Most common in moist soil of disturbed areas, but also growing in grassy fields. February through October.

General distribution: Native of the Mediterranean region, widely introduced.

Specimens examined: Stanford, Abrams, Mar. 6, 1898; Camp Evers, Thomas 1676; Santa Cruz, Thomas 1196.

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58. OXALIDACEAE

1. Oxalis L. Sp. Pl. 433. 1753.

Petals white or lavender.
- Plants with stout, vertical, woody stems; flowers in umbels. Introduced species.....1. O. rubra.
- Plants with slender, creeping rootstocks; flowers solitary. Native species of the redwood forest.....2. O. oregana.

Petals yellow.
- Leaves all basal; plants somewhat succulent; flowers at least 1.5 cm. long.....3. O. pes-caprae.
- Leaves cauline; plants not succulent; flowers under 1.2 cm. long.
  - Pedicels sparingly pubescent, the hairs more or less appressed or ascending; rootstocks slender. Introduced species. 4. O. corniculata.
  - Pedicels usually densely pubescent, the hairs spreading; root fusiform, woody. Native grassland species. 5. O. pilosa.

1. Oxalis rubra St. Hil. Fl. Bras. Mer. 1: 124. 1825.

Local distribution: Locally established in vacant lots in San Francisco. June through August.

General distribution: Native of Brazil, sparingly introduced in the San Francisco Bay Region.

Specimen examined: 2 miles from the sea, San Francisco, Rossi 60.

2. Oxalis oregana Nutt. in Torr. & Gray, Fl. N. Amer. 1: 211. 1838.

Local distribution: Restricted to the damp, shaded floor of the Redwood-Douglas Fir forest, commonly associated with Asarum caudatum and Viola sempervirens. February through September.

General distribution: Olympic Peninsula south through the Coast Ranges and the western slope of the Cascades to Monterey County.

Specimens examined: San Francisco Watershed Reserve, Oberlander 182; Pescadero Creek, Davis, May 1, 1903; Kings Mt., Baker 325; Jasper Ridge, Paulson, Apr. 1915; Congress Springs, Smith, Apr. 2, 1906; Big Basin, Dudley, Sept. 23, 1905; Swanton, Rich, Mar. 1, 1912; Santa Cruz, Jones 2274; Near Aptos, Thomas 2584.

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3. Oxalis pes-caprae L. Sp. Pl. 434. 1753.

(O. cernua Thunb. Diss. Oxalis 14. 1781.)

Local distribution: Along or near the coast in moist soil, also escaping from cultivation and becoming established in parkings and lawns. March through June.

General distribution: Native of South Africa, now common in other temperate regions as an escape.

Specimens examined: Near Colma, Abrams & Wiggins 176; Santa Clara, Hichborn, Apr. 18, 1920; Waddell Creek, Thomas 2747; Santa Cruz, Hesse 285; Ellicott, Thomas 1290.

This species has gone under the name of O. cernua in California for the past 30 years. Adamson and Salter (1950, p. 524) cite O. cernua as a synonym of O. pes-caprae. As this is a species of South African origin I have followed these two authors.

The northward migration of O. pes-caprae from southern California has occurred within the last 35 years. Wiggins (1932) apparently first noted its establishment in the San Francisco Bay area. It has since become very common along the coast or where it is reached by ocean fogs. Oxalis pes-caprae is perennial and once established is hard to get rid of as the rootstocks bear bulblets at each node. The plants thus reproduce vegetatively as well as sexually.

4. Oxalis corniculata L. Sp. Pl. 435. 1753.

Local distribution: Common as a lawn weed and in disturbed habitats near gardens. February through November.

General distribution: Native of Europe, now widely introduced into temperate regions.

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Specimens examined: Near Montara, Skoss 129 (DAV); Pescadero, Dudley, Feb. 9, 1895; Stanford, Smith 80.

5. Oxalis pilosa Nutt. in Torr. & Gray, Fl. N. Amer. 1: 212. 1838.

Local distribution: Open grassy slopes in sandy soils, mainly on the western side of the crest of the Santa Cruz Mountains, common along coastal bluffs; often found with Ranunculus californicus, Oenothera ovata, Anagallis arvensis, and Fragaria californica.

General distribution: Coastal belt, Humboldt County south to San Diego County, in Mohave County, Arizona, and from the southeastern corner of Arizona to Chihuahua, Mexico.

Specimens examined: Lake Merced, Howell 11423; Montara Mt., Ferris 1764; Peters Creek, Ferris 748; Swanton, Dudley, May 12, 1912; Near Glenwood, Thomas 2865; Mt. Hermon, Pratt 69; Santa Cruz, Elmer 4516; Near Watsonville, Thomas 1273.

59. TROPAEOLACEAE

1. Tropaeolum L. Sp. Pl. 345. 1753.

1. Tropaeolum majus L. Sp. Pl. 345. 1753.

Local distribution: Escaped from cultivation in San Francisco and probably elsewhere. Flowering during the summer months.

General distribution: Native of South America, widely grown as a garden ornamental, occasionally found as an escape.

Specimens examined: Pt. Lobos, Rubtzoff 3560 (CAS); Lone Mt., Howell 32608 (CAS).

60. LINACEAE

Petals blue or blue-tinged, drying bluish, 10-15 mm. long; styles 5; mature capsules 5-10 mm. long. Introduced plants..1. Linum.
Petals white to pink, drying rose-colored, 2-7 mm. long; styles 3; mature capsules less than 3 mm. long. Native plants.....2. Hesperolinon.

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1. Linum L. Sp. Pl. 277. 1753.

Leaves lanceolate; petals usually 1.5 cm. long; mature capsules 7-10 mm. long.....1. L. usitatissimum.
Leaves linear; petals about 1 cm. long; mature capsules about 5 mm. long. 2. L. bienne.

1. Linum usitatissimum L. Sp. Pl. 277. 1753.

Local distribution: Occasional along roadsides and in disturbed places at lower elevations. March through July.

General distribution: Introduced from Europe and now widely distributed throughout the United States, Japan, and other temperate regions.

Specimens examined: San Bruno Hills, Jones, Apr. 1921 (CAS); Pescadero, Bacigalupi, June 30, 1924; Woodside, Abrams, Mar. 1898; Stanford, Thomas 3038; Whitehouse Road, Thomas 3517B.

This species is grown commercially for linen fiber and linseed oil. Along the coast in southern San Mateo County are extensive fields of flax.

2. Linum bienne Mill. Gard. Dict. ed. 8. 1768.

(L. angustifolium Huds. Fl. Angel. ed. 2. 134. 1778.)

Local distribution: Occasionally found along roads, in disturbed areas, and in fallow fields and vineyards. May through August.

General distribution: Adventive from Europe and now sparingly introduced into other temperate regions.

Specimens examined: Montara Pt., Copeland 3307 (CAS); Glenwood, Ferris 11142; Thomas 3184.

The character which is used in some manuals to separate L. usitatissimum and L. bienne, namely that of ciliate septa in L. bienne and non-ciliate ones in L. usitatissimum, does not hold in our material. Both are somewhat ciliate. The size of petals and capsules and the shape of the leaves offer the best characters for separating this pair of species.

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2. Hesperolinon (Gray) Small, N. Amer. Flora 25: 84. 1907.

I am indebted to Dr. Helen Sharsmith of the University of California for pointing out to me the validity of Hesperolinon as a genus distinct from Linum. Linum is sometimes partially woody, has unappendaged petals, is 5-carpellate, has staminodia, and has a wide geographical and ecological range. Hesperolinon is not woody, has appendaged petals, is 2- or 3-carpellate, lacks staminodia, and is restricted, except for one species, to serpentine and chaparral of the Coast Ranges and Sierra foothills of central California.

Sepals glabrous on the abaxial surface; inflorescence not congested.
Petals 2-3.5 mm. long, basal lobes of petals obsolete.
1. H. micranthum.
Petals 5-7 mm. long, basal lobes prominent.....2. H. spergulinum.
Sepals pubescent on the abaxial surface; inflorescence congested, the terminal flower usually nearly sessile.....3. H. congestum.

1. Hesperolinon micranthum (Gray) Small, N. Amer. Flora 25: 85. 1907.

Local distribution: Occasional on dry ridges and slopes, usually on serpentine or in chaparral in the lower hills on the eastern side of the Santa Cruz Mountains. May through June.

General distribution: Arid Transition and Upper Sonoran Zones from Oregon to northern Baja California.

Specimens examined: San Carlos, Bacigalupi 2823; Jasper Ridge, Mason, May 18, 1921; Los Gatos, Heller 7427.

2. Hesperolinon spergulinum (Gray) Small, N. Amer. Flora 25: 86. 1907.

Local distribution: Occasional on rocky or grassy slopes on the eastern slopes of the Santa Cruz Mountains. June and July.

General distribution: Central Coast Ranges from Glen and Mendocino counties south to San Benito County.

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Specimens examined: Crystal Springs Lake, Elmer 4422; Bald Peak, Dudley 4197; Red Mountain, Elmer 4432.

3. Hesperolinon congestum (Gray) Small, N. Amer. Flora 25: 86. 1907.

Local distribution: Serpentine slopes in San Francisco and San Mateo counties, mainly on the eastern side of the mountains. May through June.

General distribution: A narrowly distributed endemic from the Tiburon Peninsula, Marin County, south through San Mateo County.

Specimens examined: Laurell Hill Cemetary, Congdon, May 22, 1882; Crystal Springs Lake, Keck 5035; Redwood City, Abrams 7497; Woodside, Dutton, April 29, 1900.

61. ZYGOPHYLLACEAE

1. Tribulus L. Sp. Pl. 386. 1753.

1. Tribulus terrestris L. Sp. Pl. 387. 1753.

Local distribution: Known at present only from San Francisco and from the vicinity of Gilroy in the southern part of the Santa Clara Valley, but to be expected elsewhere, especially along highways and in disturbed areas where the ground is hard-packed. April through September.

General distribution: Native of Europe, common throughout the United States in drier climates and in other temperate regions such as Japan and South Africa.

Specimens examined: Embarcadero, San Francisco, Howell 31458 (CAS); Gilroy, Thomas 4354.

62. RUTACEAE

1. Ptelea L. Sp. Pl. 118. 1753.

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1. Ptelea crenulata Greene, Pittonia 1: 216. 1888.

Local distribution: Known locally only from the foothills west of Gilroy. April through June.

General distribution: Mainly in the Inner Coast Ranges and Sierra Nevada foothills from Shasta County south to Santa Clara and Tulare counties.

Specimens examined: Uvas Road near Gilroy Waterworks, Lorraine, May 12, 1923.

This species is characteristic of the drier Inner Coast Ranges and Sierra Nevada foothills and represents, as does Fraxinus dipetala, an extension into the drier parts of the Outer Coast Range. Interestingly enough, Sharsmith (1945) does not list this species as occurring in the Mount Hamilton Range. It does occur on Mount Diablo.

63. SIMAROUBACEAE

1. Ailanthus Desf. Mem. Acad. Paris 1786: 265. pl. 8. 1789.

1. Ailanthus altissima (Mill.) Swingle, Journ. Wash. Acad. 6: 495. 1916.

Local distribution: Common as seedlings and small trees near or in the vicinity of trees of this species planted as ornamentals and often becoming a considerable nuisance, especially in the cultivated fields. June.

General distribution: Native of China and escaping from cultivation throughout the United States.

Specimen examined: Stanford University, Thomas 4588.

64. POLYGALACEAE

1. Polygala L. Sp. Pl. 701. 1753.

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1. Polygala californica Nutt. in Torr. & Gray, Fl. N. Amer. 1: 671. 1840.

Local distribution: Occasionally found in coniferous forests and on open slopes on the western side of the mountains. Latter part of April through July.

General distribution: Josephine County, Oregon, south through the Siskiyou Mountains and the Coast Ranges to San Luis Obispo County and on some of the Channel Islands.

Specimens examined: Near Lagoon of Arroyo de los Frijoles, Ferris 1968; Butano Ridge, Mason, July 1921; Big Basin, Dudley, June 5, 1895; Soquel Gulch, Thompson, May 8, 1902.

65. EUPHORBIACEAE

Plants small shrubs.....1. Croton.
Plants herbaceous.
  Plants densely stellate-pubescent.....2. Eremocarpus.
  Plants not stellate-pubescent.
    Flowers not subtended by an involucre.....3. Mercurialis.
    Flowers subtended by an involucre.....4. Euphorbia.

1. Croton L. Sp. Pl. 1004. 1753.

1. Croton californicus Muell. Arg. in A. DC. Prod. 12^2: 691. 1866.

Local distribution: Known only from the sand dunes and sandstone cliffs in the western part of San Francisco. June through November.

General distribution: Coastal California from San Francisco and Contra Costa counties south to northern Baja California. Several other varieties extend eastward into the deserts.

Specimens examined: San Francisco, Congdon, July 11, 1893; Sand dunes, San Francisco, Olsson-Seffer, 1904; Lands End, San Francisco, McMinn 306.

Croton californicus reaches its northern limit in the Outer Coast Ranges in San Francisco, but is absent from the rest of the Santa Cruz Mountains area. The type locality is San Francisco.

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2. Eremocarpus Benth. Bot. Sulph. 53. 1844.

1. Eremocarpus setigerus (Hook.) Benth. Bot. Sulph. 53. 1844.

Local distribution: Dry ground of fallow fields, open slopes, stream bottoms, and disturbed areas on both slopes of the Santa Cruz Mountains, but most common in the Santa Clara Valley, often growing with Trichostema lanceolatum. June through September.

General distribution: Washington and western Idaho south through Oregon and California to northern Baja California.

Specimens examined: San Francisco Watershed Reserve, Oberlander 325; Stanford University, Randall 142; Felt Lake, Abrams 5127; Saratoga Summit, Rose 41457; 10 miles northwest of Gilroy, Thomas 4378; Hilton Airport, Thomas 3572.

3. Mercurialis L. Sp. Pl. 1035. 1753.

1. Mercurialis annua L. Sp. Pl. 1035. 1753.

Local distribution: Known locally only from cultivated fields in northern San Mateo County. August through November.

General distribution: Native of Europe, occasionally becoming established in Canada and the United States.

Specimens examined: 3 miles south of Rockaway Beach, Abrams & Wiggins 179, 180; Pedro Valley, Wiggins 11194, 11195; Thomas 5502, 5503.

This species was first collected in San Mateo County by Abrams and Wiggins in 1930 (Wiggins, 1932, p. 4). Mercurialis annua, as of 1945, still grew in the area in which it was originally found. It apparently has not become a very serious pest, perhaps due to the fact that it depends "almost entirely upon human agencies to distribute the seed" (loc. cit., p. 4). As of Nov. 1955, San Pedro Valley was very rapidly becom-

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ing filled with houses and humanity. Brussel Sprouts and Mercurialis annua seem doomed in this valley.

4. Euphorbia L. Sp. Pl. 450. 1753.

At least the lower cauline leaves alternate (or decussate in E. lathyris); plants usually erect; stipules lacking; plants umbellately branched above.
  Glands lacking horns; cauline leaves serrate.
    Carpels tuberculate near the summit; umbel rays usually 3.
      1. E. spathulata.
    Carpels not tuberculate; umbel rays usually 5.
      2. E. helioscopia.
  Glands with horns; cauline leaves entire or crenulate.
    Coarse, glaucous plants, usually 0.5-1 m. tall; cauline leaves decussate or the lower alternate; carpels over 7 mm. long.
      3. E. lathyris.
    Plants slender, usually under 0.4 m. tall; cauline leaves alternate; carpels under 5 mm. long.
      Carpels with slender longitudinal ridges; seeds with 2-4 conspicuous pits.....4. E. peplus.
      Carpels lacking ridges; seeds with numerous pits.
        5. E. crenulata.
All leaves opposite; plants usually prostrate; stipules present; plants not umbellately branched above.
  Capsules and herbage pubescent.....6. E. supina.
  Capsules and herbage glabrous.....7. E. serpyllifolia.

1. Euphorbia spathulata Lam. Encycl. 2: 428. 1788.

Local distribution: Serpentine and grassy slopes, rarely on shaded ones, throughout the Santa Cruz Mountains area, but more common on the eastern side of the crest. March through June.

General distribution: Southern Washington south to southern California, east to Minnesota, Iowa, and Alabama, also in South America where it may have been introduced.

Specimens examined: Crystal Springs Lake, Mason 117; Near Redwood City, Abrams 7501; Stanford, Dudley, May 15, 1895; Near Alma, Rattan, May 3, 1885; Oak Hill Cemetery, Thomas 4955; Near Gilroy, Lang, June 6, 1922; Rancho del Oso, Thomas 1735.

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2. Euphorbia helioscopia L. Sp. Pl. 459. 1753.

Local distribution: Occasionally established in fallow fields, deserted gardens, and other disturbed areas. April through September.

General distribution: Widely introduced into temperate North America, native of Europe.

Specimens examined: Twin Peaks, Howell 21595; Santa Cruz, Hesse 1060.

3. Euphorbia lathyris L. Sp. Pl. 457. 1753.

Local distribution: Widely distributed along the margins of the Santa Cruz Mountains in moist shaded situations, often along streams. February through November.

General distribution: Native of Europe, widely introduced into temperate regions.

Specimens examined: Pescadero Creek, Dudley, Apr. 18, 1894; Alpine Creek Road, Wolf 3734; Stanford, Dudley, May 1894; Swanton, Rich, Feb. 8, 1912; Near Zayante, Beetle 1681.

4. Euphorbia peplus L. Sp. Pl. 456. 1753.

Local distribution: A common weed of gardens and other well-watered, disturbed habitats. February through August.

General distribution: Native of Europe, widely introduced into temperate regions.

Specimens examined: Between Pescadero and San Gregorio, Dudley, Mar. 26, 1894; Stanford, Dudley, Mar. 4, 1897; Santa Clara, Leeds, 1891; Near Felton, Thomas 1893.

5. Euphorbia crenulata Engelm. Bot. Mex. Bound. 192. 1859.

Local distribution: Shaded woods, less frequently in open pastures. February through November.

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General distribution: Western Oregon south through the Coast Ranges and Sierra Nevada to Orange County, east to southwestern Colorado.

Specimens examined: San Francisco, Jones 3249; Ocean View, Dudley, Mar. 24, 1895; Near Colma, Abrams 1576; Montara Mountains, Dudley, Mar. 17, 1900; Pescadero Beach, Wiggins 5090A; Coal Mine Ridge, Barry 148; Stevens Creek, Dudley, June 1, 1902; Swanton, Rich, Feb. 10, 1912; Bloom's Grade, Thomas 1810; Glenwood, Davis, Sept. 1907.

6. Euphorbia supina Raf. Amer. Month. Mag. 2: 119. 1817.

Local distribution: Common as a weed of lawns, gardens, and other moist disturbed habitats, but generally poorly collected. June through November.

General distribution: Native of the eastern part of North America, introduced into the Pacific States.

Specimens examined: Palo Alto, Thomas 3650; Basin Way, Hesse 2131; Boulder Creek, Hesse 1223.

7. Euphorbia serpyllifolia Pers. Syn. Pl. 2: 14. 1806.

Local distribution: Low areas which are submerged or very wet during the spring. May through November.

General distribution: From southern British Columbia east to Michigan, south to southern California, northern Mexico, Texas, and Iowa.

Specimens examined: Crystal Springs Lake, Abrams 2990; Stanford, Dudley, Nov. 6, 1897; Near Alviso, Dudley, July 18, 1903.

66. CALLITRICHACEAE

1. Callitriche L. Sp. Pl. 969. 1753.

Small, inconspicuous aquatic plants such as Callitriche are seldom collected. The specimens cited below, therefore, reflect inadequate collecting rather than rarity of the species.

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Fruit sessile.
Emersed leaves obovate to spatulate; fruit with 2 bracts.
Styles shorter than the fruit.....1. C. palustris.
Styles about twice as long as the fruit....2. C. bolanderi.
All leaves linear, submersed; fruit bractless.
3. C. hermaphroditica.
Fruit distinctly pedicellate.....4. C. marginata.

1. Callitriche palustris L. Sp. Pl. 969. 1753.

Local distribution: Margins of lakes in northern San Mateo County, and to be expected elsewhere. March through August.

General distribution: Of nearly cosmopolitan distribution in the Northern Hemisphere and in South America.

Specimen examined: San Andreas Lake, Elmer 4279 (JEPS).

2. Callitriche bolanderi Hegelm. Bot. Ver. Brandenb. 10: 114. 1868.

Local distribution: Edges of quiet ponds and lakes and on the adjacent muddy banks, throughout the Santa Cruz Mountains. March through May.

General distribution: British Columbia south, mainly west of the Cascades, to central California and the southern Sierra Nevada.

Specimens examined: San Bruno Creek, Dudley, Mar. 18, 1900; New Years Pt., Mason, May 29, 1921; Portola Valley, Dudley, Apr. 23, 1904; Near Stanford, Abrams, Apr. 23, 1904; Camp Evers, Hesse 602.

3. Callitriche hermaphroditica L. Cent. Pl. 1: 31. 1755.

Local distribution: Freshwater ponds and quiet streams. May through September.

General distribution: Alaska south to California, eastward to the Atlantic, also in Eurasia.

Specimen examined: Gilroy, Jepson 13818 (JEPS).

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4. Callitriche marginata Torr. Pacif. R. Rep. 4: 135. 1857.

Local distribution: Margins of pools in mud, on moist soil, and on open slopes near springs. February through April.

General distribution: Coast Ranges from Humboldt County south to San Diego County and in the Sierra Nevada foothills.

Specimens examined: Belmont, Greene, Apr. 1886; Hilton Airport, Thomas 3770; Camp Evers, Thomas 3364A.

At Hilton Airport C. marginata grows on small patches of bare moist soil and is easily overlooked. When growing on moist soil, the pedicels are curved so that the fruit is appressed to the soil surface or it may even be pushed below the surface.

67. LIMNANTHACEAE

1. Limnanthes R. Br. Phil. Mag. III. 2: 70. 1833.

1. Limnanthes douglasii R. Br. Phil. Mag. III. 2: 70. 1833.

Local distribution: Throughout the Santa Cruz Mountains, but not common; along streamlets and springs in open meadows. Latter half of March through May.

General distribution: Coast Ranges from Humboldt County south to northern Monterey County.

Specimens examined: San Bruno, Dudley, May 1, 1893; San Francisco Watershed Reserve, Oberlander 612; Pescadero, Grant 943; Stanford University, Applegate 62; 3 miles west of Coyote, Rollins, Apr. 1, 1942; Boulder Creek - Big Basin Road, Ferris 2000.

Flower color is variable in plants from this area. Along the coast, as at Pescadero, the flowers are deep yellow. Others approach var. nivea Mason (Univ. Calif. Pub. Bot. 25: 477. 1952) in having white flowers. Dried specimens are often hard to assign either to var. douglasii or to var. nivea as the colors fade.

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68. ANACARDIACEAE

1. Rhus L. Sp. Pl. 265. 1753.

1. Rhus diversiloba Torr. & Gray, Fl. N. Amer. 1: 218. 1838.

Local distribution: Throughout the Santa Cruz Mountains and adjacent coastal areas. Latter part of March through May.

General distribution: Washington south, west of the Cascades, to northern Baja California through the Coast Ranges and the lower western slopes of the Sierra Nevada.

Specimens examined: San Francisco, Rattan, 1877; Stanford University, McMurphy 56; Los Gatos, Heller 7327; Carnadero Creek, Thomas 4370; Waddell Creek, Thomas 1761.

Rhus diversiloba is an exceedingly variable species, not only with respect to the size, shape and amount of pubescence of the leaves but also with respect to its growth form. Within the species are to be found plants which are less than half a meter high, shrubs, small trees, and climbing vines. One vine growing on Arbutus menziesii measured twelve meters in length when pulled down and a portion of the terminal part of the plant still remained in the tree. The stem of the poison oak was about 2 cm. in diameter at the base. Plants of poison oak occur as part of the understory of oak-madrone woods, redwood-douglas fir forests, and occasionally in stands of redwoods. They are also to be found in disturbed areas such as road embankments, on open slopes, and, as at Sunset Beach, on the low stabilized coastal sand dunes. The autumn foliage lends color to the landscape second to that of no other species in the local flora.

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69. CELASTRACEAE

1. Euonymus L. Sp. Pl. 197. 1753.

1. Euonymus occidentalis Nutt. ex Torr. Pacif. R. Rep. 4: 74. 1856.

Local distribution: Moist, shaded areas in redwood - douglas fir forests, usually along or near streams and lake banks. April through June.

General distribution: From near Vancouver, Washington, south through the Coast Ranges to the Santa Cruz Mountains and through the Sierra Nevada to Plumas County.

Specimens examined: Pilarcitos Creek, Oberlander 617; San Andreas Lake, Elmer 4280; Butano Creek, Elmer 4317 (CAS); Searsville Lake, Benson 2132; Big Basin, Dudley, June 5, 1897; San Vicente Creek, Thomas 3392; Felton, Dudley, Oct. 3, 1896.

70. ACERACEAE

1. Acer L. Sp. Pl. 1055. 1753.

Leaves palmately lobed; flowers polygamous; petals present. 1. A. macrophyllum.
Leaves trifoliolate; flowers dioecious; petals absent. 2. A. negundo var. californica.

1. Acer macrophyllum Pursh, Fl. Amer. Sept. 1: 267. 1814.

Local distribution: Along streams and on moist wooded slopes often well up a hillside from the stream. Occasionally as along Skyline Drive near Saratoga Summit, Acer macrophyllum occurs in fairly pure stands far removed from streams. Latter half of March through May.

General distribution: Coastal British Columbia south through the Coast Ranges, Cascades, and Sierra Nevada to northern Baja California, but absent from the Central Valley of California.

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Specimens examined: South Pilarcitos Lake, Oberlander 583; Portola, Elmer 4509; Searsville, Abrams 2314; Stevens Creek, Dudley, June 1, 1902; San Jose, Patterson, Mar. 18, 1906; Waterman Gap, Thomas 2951.

2. Acer negundo L. var. californica (Torr. & Gray) Sarg. Garden & Forest 4: 148. 1891.

Local distribution: Along the lower portions of major streams where the gradient is not steep, usually below 500 feet elevation, throughout the area, but not abundant. March through April.

General distribution: Siskiyou County south through the Coast Range and the Sacramento Valley to Riverside County, most common in the central part of the range.

Specimens examined: San Francisco Watershed Reserve, Oberlander 117; La Honda, Wolf 1809; Stanford University, Abrams 2365; Waddell Creek, Thomas 2933; Aptos, Dudley, Oct. 13, 1902; Pajaro River near Watsonville, Dudley, Sept. 10, 1909.

71. HIPPOCASTANACEAE

1. Aesculus L. Sp. Pl. 344. 1753.

1. Aesculus californica (Spach) Nutt. in Torr. & Gray, Fl. N. Amer. 1: 251. 1838.

Local distribution: A characteristic tree of dry slopes throughout the Santa Cruz Mountains and its foothills from sea level to about 3000 feet. On exceedingly dry south exposures it is restricted to ravines and draws. It is commonly associated with Quercus agrifolia, Diplacus aurantiacus, Artemisia californica, and Rhus diversiloba. Latter part of April through June.

General distribution: Coast Ranges and Sierra Nevada foothills from Siskiyou County south to Los Angeles County.

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Specimens examined: Sawyer Ridge, Oberlander 190; Crystal Springs Lake, Elmer 4258; Coal Mine Ridge, Barry 184; Los Gatos foothills, Heller 7451; Below Saratoga Summit, Thomas 1999; Soda Lake, Thomas 3314.

Aesculus californica changes markedly as the growing season progresses. Leaves appear in the latter part of March, transforming bare trees into lush green. By the beginning of June, the inflorescences stand out like white or flesh-colored candles. By the end of July or the first part of August the leaves have usually fallen and in place of each inflorescence there are 1 to several chestnuts. Germination is good and it is not uncommon to find several dozen seedlings by the next spring. Of these, however, only a very few, sometimes none, survive. The growth form of the mature tree is variable. On more exposed slopes the branches depart close to the ground; no main trunk is formed. In more favorable localities, a small tree with a rounded crown results.

72. RHAMNACEAE

Petals absent or if present not clawed, greenish; fruit berry-like, not lobed.....1. Rhamnus.
Petals present, clawed, white, blue, or purplish; fruit a capsule, usually somewhat 3-lobed.....2. Ceanothus.

1. Rhamnus L. Sp. Pl. 193. 1753.

Leaves 3-7 cm. long; petals present; berries black.
  Leaves essentially glabrous abaxially.
    1a. R. californica ssp. californica.
  Leaves distinctly tomentulose abaxially.
    1b. R. californica ssp. tomentella.
Leaves usually under 3 cm. long; petals none or minute; berries red.
  Small branches divaricate, somewhat spinescent; leaves 10-17 mm. long. Common.....2a. R. crocea ssp. crocea.
  Small branches not divaricate, not spinescent; leaves 18-30 mm. long. Rare.....2b. R. crocea ssp. ilicifolia.

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1a. Rhamnus californica Esch. ssp. californica, Mem. Acad. St. Petersb. 10: 285. 1823.

Local distribution: A common shrub from San Francisco southward, in chaparral, wooded areas, and on brush-covered slopes. May through July.

General distribution: Coast Ranges from Siskiyou County south to Orange County.

Specimens examined: Presidio, Heller 5675; San Francisco, Brandegee, Oct. 1888; Baden, Dudley, May 14, 1899; Pilarcitos Stone Dam, Elmer 4772; Sweeney Ridge, Oberlander 246; Kings Mt., Wolf 1473; Coal Mine Ridge, Barry 221; Near Stanford, Wiggins 3310; Near Gianone, Thomas 3520; Jamison Creek Road, Thomas 4225.

1b. Rhamnus californica Esch. ssp. tomentella (Benth.) Wolf, Monog. Santa Ana Bot. Gard. 1: 70. 1938.

Local distribution: Open hillsides and in chaparral, southern San Mateo County southward. May and June.

General distribution: Coast Ranges and Sierra Nevada foothills from Trinity and Shasta counties south to Los Angeles and Mariposa counties, also in northern Baja California.

Specimens examined: Kings Mt., Boring, Aug. 25, 1897; Stevens Creek Rd., Randall 324; Los Gatos Creek, Dudley, Sept. 29, 1894; Foothills west of Los Gatos, Heller 7464; Below Saratoga Summit, Thomas 2000; Hilton Airport, Thomas 3618A; Saratoga to Azule Station, McMinn 826.

2a. Rhamnus crocea Nutt. ssp. crocea, in Torr. & Gray, Fl. N. Amer. 1: 261. 1838.

Local distribution: A common shrub of chaparral and oak-madrone woods, San Francisco southward, mainly on the eastern slopes of the Santa Cruz Mountains. February through May.

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General distribution: Coast Ranges from Lake County south to northern Baja California.

Specimens examined: Cahill Ridge, Oberlander 967; Woodside serpentine, Dutton, Feb. 18, 1900; Searsville Lake, Wolf 407; Coal Mine Ridge, Barry 238; Stanford, Baker 609; Black Mt., Applegate 63; Permanente Creek, Wolf 3717; Near Alma, Heller 7345; Guadalupe Canon, Mason & Borthwick, Mar. 20, 1921; Llagas Post Office, Dudley, June 7, 1909.

2b. Rhamnus crocea Nutt. ssp. ilicifolia (Kell.) Wolf, Monog. Rancho Santa Ana Bot. Gard. 1: 39. 1938.

Local distribution: Known in the Santa Cruz Mountains only from near Llagas Post Office. March through June.

General distribution: Siskiyou County south through the Coast Ranges and Sierra Nevada foothills to northern Baja California, and in the desert ranges of southern California, eastward to Arizona.

Specimen examined: Llagas Post Office, Dudley, June 9, 1909.

2. Ceanothus L. Sp. Pl. 195. 1753.

Leaves alternate; stipules thin, deciduous; stomata of the leaves not sunken into pits; fruits lacking horns, but often crested or ridged.
- Leaves 3-veined from the base.
  - Plants with spinose branchlets....1. C. incanus.
  - Plants lacking spinose branchlets, but the branchlets often divergent and stiff.
    - Leaves entire, usually deciduous. 2. C. integerrimus.
    - Leaves with serrate or glandular-denticulate margins.
      - Flowers white; leaves shiny and varnished on the adaxial surface. Rare.....3. C. velutinus var. laevigatus.
      - Flowers blue to purple, rarely whitish. Common.
        - Leaves pale on the abaxial surface, the adaxial surface plane; branchlets rigid and divaricate, not angled. 4. C. sorediatus.
        - Leaves green on the abaxial surface, the adaxial surface depressed above the major veins; branchlets usually flexible, ascending, angled. 5. C. thyrsiflorus.
- Leaves 1-veined from the base, occasionally the first pair of lateral veins more prominent than the others.

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Leaves entire.....2. C. integerrimus.
Leaves variously denticulate.
Leaves glandular-papillate adaxially, 2-5 cm. long. Common.
6. C. papillosus.
Leaves not glandular-papillate adaxially, usually under 2 cm. long. Rare.
Leaf margins conspicuously revolute.
7. C. dentatus.
Leaf margins not revolute, often undulate.
8. C. foliosus.
Leaves opposite; stipules more or less conical, corky, persistent; stomata of the leaves sunken into pits; fruit with horns.
Flowers white.
Mature leaves entire. Common....9. C. cuneatus.
Mature leaves with at least a few teeth. Rare.
10. C. ferrisae.
Flowers blue.....11. C. ramulosus.

1. Ceanothus incanus Torr. & Gray, Fl. N. Amer. 1: 265. 1838.

Local distribution: Known locally from near Lake Merced in San Francisco and from the northern half of Santa Cruz County, growing on open ridges or in moist, non-shaded areas. May and June.

General distribution: Coast Ranges from Humboldt County south to northern Monterey County.

Specimens examined: Between Ocean View and Lake Merced, Dudley, May 7, 1904; Lake Merced, Walker 2322; Swanton, Rich, Apr. 1912; Big Basin, McMinn 255; Glenwood, Michener & Bioletti, 1893; Near Ben Lomond, Ferris 1994; Near Felton, Ferris 2008; Lower Zayante, Dudley, May 6, 1893.

2. Ceanothus integerrimus Hook. & Arn. Bot. Beechey 329. 1840.

Local distribution: A variable species known locally from near Portola, Loma Prieta, and Ben Lomond, growing as a member of the chaparral. May and June.

General distribution: Coast Ranges from Humboldt County south to Ventura County, also in Eldorado County.

Specimens examined: Portola, Elmer 4479; Loma Prieta, Dudley, May 30, 1893; Davis 137; Ben Lomond, Brandegee 28, 29; Ben Lomond - Bonny Doon Road, Ferris 2004.

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Plants of this species have either 1- or 3-veined leaves. When the leaves are 3-veined, the lateral veins are not as prominent as the median one. Narrow-leaved, 1-veined specimens have been called C. andersonii Parry (Proc. Davenp. Acad. 5: 172. 1889). Occasional plants with glandular-serrate margins are probably hybrids between C. integerrimus and C. papillosus. Examples of this are: Boulder Creek, Hesse 299, 324; Ben Lomond, Brandegee 59.

3. Ceanothus velutinus Dougl. ex. Hook. var. laevigatus (Hook.) Torr. & Gray, Fl. N. Amer. 1: 686. 1840.

Local distribution: Known in the Santa Cruz Mountains from only one specimen from Swanton. March and April.

General distribution: British Columbia south, mainly in the Coast Ranges, to Santa Cruz County.

Specimen examined: Swanton, Rich, Spring 1912.

4. Ceanothus sorediatus Hook. & Arn. Bot. Beechey 328. 1840.

Local distribution: Common from northern San Mateo County southward mainly on the eastern slopes of the Santa Cruz Mountains, growing in chaparral and along the edges of woods. April through June.

General distribution: Coast Ranges from Humboldt County south to Orange County.

Specimens examined: Baden, Dudley, May 14, 1899; Crystal Springs Lake, Edwards, Apr. 1917; Portola, Elmer 4479; Coal Mine Ridge, Barry 82; Stanford, Baker 516; Black Mt., Abrams, Apr. 1898; Los Gatos, Applegate 5346; Foothills west of Los Gatos, Heller 7293; Loma Prieta, Elmer 4252; Near Glenwood, Heller 6557; Near Mt. Madona, Dudley, Mar. 11, 1901.

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5. Ceanothus thyrsiflorus Esch. Mem. Acad. St. Petersb. 10: 285. 1826.

Local distribution: A common shrub from San Francisco southward on both slopes of the Santa Cruz Mountains, usually on moist wooded hills. March through May.

General distribution: Coos and Douglas counties, Oregon, south through the Coast Ranges to Santa Barbara County.

Specimens examined: Mission Hills, Congdon, Apr. 23, 1893; San Francisco, Kellogg, May 28, 1870; Lake San Andreas, Elmer 4603; San Andreas to Pilarcitos, Dudley, May 14, 1899; San Gregorio to Pescadero, Dudley, Mar. 25, 1894; Kings Mt., Abrams 2463; Woodside, McMurphy 12; Black Mt., Dudley, May 2, 1903; Rancho del Oso, Thomas 1729; Swanton, Rich, Spring 1912; Big Basin, Dudley, Apr. 16, 1904; Blooms Grade, Thomas 1822; Between Ben Lomond and Brookdale, McMinn 1226; Zayante Creek, Dudley, Apr. 2, 1908; Soquel, Thompson, May 1, 1902.

Hybrids with C. sorediatus are occasionally encountered (McMinn, 1942, p. 213).

6. Ceanothus papillosus Torr. & Gray, Fl. N. Amer. 1: 268. 1838.

Local distribution: Common from Kings Mountain and Woodside southward, mainly west of the crests of the Santa Cruz Mountains, growing in chaparral and along the borders of woods and forests. April and May.

General distribution: Kings Mountain and Woodside, San Mateo County, south to San Luis Obispo County.

Specimens examined: Southern boundary, San Francisco watershed reserve, Oberlander 522; Kings Mt., McMurphy 13; Abrams 2412; Alma Soda Springs, Heller 8633; Near Wrights, Davis 133; Loma Prieta Peak, Elmer 4259; Bielawski Lookout, Thomas 1522; Big Basin, Dudley, June 7, 1895; Empire Grade, Gould 690; Near Eagle Rock, Ferris 1998; Near Boulder Creek, Thomas 1784; Ben Lomond, Brandegee, May 1890; Santa Cruz, Thompson, Apr. 12, 1902; Aptos Hills, Rattan, Apr. 12, 1884.

Hybrids between C. papillosus and C. thyrsiflorus are frequently found and may be called C. X regius (Jeps.) McMinn (Ceanothus 268. 1942). The leaves tend to have 3 main veins from the base and few papillae.

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Examples are: Glenwood Highway, Thomas 1439; Santa Cruz Big Trees, Brandegee 57.

Ceanothus papillosus also forms hybrids with C. sorediatus. The branches tend to be rigid and divaricate, the leaves 3-veined from the base, and with or without papillae on the adaxial surface. The following specimens are examples: Kings Mt., Smith 868; Dudley, May 17, 1902.

Specimens of C. papillosus with reduced leaves and fewer papillae resemble C. dentatus Torr. & Gray, as for example, Dudley, May 30, 1893, from Loma Prieta.

7. Ceanothus dentatus Torr. & Gray, Fl. N. Amer. 1: 268. 1838.

Local distribution: Rare in Santa Cruz County, known from Larkin Valley southward. March to June.

General distribution: Southern Santa Cruz County south to northern Monterey County, also in northern San Luis Obispo County.

Specimen examined: Between Soquel and Watsonville, McMinn 1229a, 1229b.

8. Ceanothus foliosus Parry, Proc. Davenp. Acad. 5: 172. 1889.

Local distribution: Rare in the Santa Cruz Mountains, growing in chapparral. April and May.

General distribution: Coast Ranges from Humboldt County south to Santa Clara and Santa Cruz counties.

Specimen examined: Mt. Madonna, Keck 4555.

9. Ceanothus cuneatus (Hook.) Nutt. in Torr. & Gray, Fl. N. Amer. 1: 267. 1838.

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Local distribution: The most common species of Ceanothus in chaparral, frequently forming dense, almost impenetrable thickets. Latter part of February through August.

General distribution: Oregon, west of the Cascades, south through the Coast Ranges and Sierra Nevada foothills to northern Baja California.

Specimens examined: Sawyer Ridge, Oberlander 499; Portola, Elmer 4578; Coal Mine Ridge, Barry, May 22, 1939; Stanford, Baker 301; Monte Bello, Dudley, Mar. 16, 1895; Foothills west of Los Gatos, Heller 7267; Near Loma Prieta, Davis, May 9, 1920; Thomas 2854; Near Glenwood, Heller 6560; Big Basin, McMinn 42; Boulder Creek, Brandegee, 1889; Ben Lomond sand hills, Howell 14766; Aptos Hills, Rattan, Apr. 12, 1884.

10. Ceanothus ferrisae McMinn, Madroño 2: 89. 1933.

Local distribution: Occasional in the Santa Cruz Mountains in Santa Cruz and Santa Clara counties, growing in chaparral. January through March.

General distribution: Restricted to the Santa Cruz and Mount Hamilton ranges of central California.

Specimens examined: Los Gatos Creek, Dudley, Oct. 11, 1902; Near Mt. Hermon, McMinn 1698.

11. Ceanothus ramulosus (Greene) McMinn, Madroño 5: 14. 1939.

Local distribution: Occasional in the Santa Cruz Mountains. March and April.

General distribution: Mendocino County south in the Coast Ranges to San Luis Obispo County.

Specimens examined: Near Ben Lomond, Thomas 1461, 1460.

Additional collections have been made at Scott Valley and Big Basin (McMinn, 1942, p. 251). McMinn (loc. cit., p. 242) considers large-leaved, blue-flowered specimens such as these to be intermediate between C. ramulosus and C. cuneatus.

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73. MALVACEAE

Carpels with horns.....1. Modiola.
Carpels lacking horns.
  Bracts lacking.....2. Sidalcea.
  Bracts present.
    Bracts united basally, the lobes ovate to orbicular; anthers scattered on the tube.....3. Lavatera.
    Bracts not united, but sometimes adnate to the calyx, linear to ovate; anthers near the top of the tube.
      Plants not usually stellate-pubescent. Introduced plants. 4. Malva.
      Plants densely stellate-pubescent. Native plants.
        Petals in bud glabrous, except toward the base, white to pink, or rose.....5. Malacothamnus.
        Petals in bud stellate-pubescent abaxially, usually yellowish. 6. Sida.

1. Modiola Moench, Meth. 619. 1794.

1. Modiola caroliniana (L.) G. Don, Gen. Hist. Pl. 1: 466. 1831.

Local distribution: A weed of disturbed areas, not common. April through August.

General distribution: Introduced into California, South Africa, and the Hawaiian Islands; native in the southeastern portion of the United States, Central America, and South America.

Specimens examined: San Francisco, Eastwood, May 1918 (CAS); Golden Gate Park, Rubtzoff 2829 (CAS).

2. Sidalcea Gray ex Benth. Pl. Hartw. 300. 1848.

Plants annual; stipules divided into narrow segments. 1. S. diploscypha.
Plants perennial; stipules entire.
  Leaves thin, vitiform; plants 1-2 m. tall.....2. S. malachroides.
  Leaves thick, round in outline or deeply parted; plants usually under 5 dm. tall.....3. S. malvaeflora.

1. Sidalcea diploscypha (Torr. & Gray) Gray ex Benth. Pl. Hartw. 300. 1848.

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Local distribution: Occasional on serpentine outcroppings or in shallow clay soils from Redwood City south to the vicinity of Gilroy, mainly in the eastern foothills of the Santa Cruz Mountains. Latter part of April and May.

General distribution: Coast Ranges and Sierra Nevada foothills from Humboldt and Shasta counties south to San Luis Obispo and Mariposa counties.

Specimens examined: Serpentine Hills back of Redwood City, Abrams 7498; Redwood Highlands, Bacigalupi, Mar. 25, 1922; Woodside serpentine, Dutton, Apr. 17, 1900; Stanford, Applegate 56; 4 miles south of San Jose, Rattan, May 1, 1887; 2 miles from Gilroy on Almaden Road, Ferris, May 6, 1922.

2. Sidalcea malachroides (Hook. & Arn.) Gray, Proc. Amer. Acad. 7: 332. 1868.

Local distribution: Apparently rare in the Santa Cruz Mountains, known only from near the coast in Santa Cruz County. May and June.

General distribution: Along or near the coast from Curry County, Oregon, south to central Monterey County.

Specimen examined: Santa Cruz, Bevans, May 10, 1932 (CAS).

Hitchcock (1957, p. 77) does not cite Bevans' specimen, but does list one collected by Bolander in 1872 from the Santa Cruz Mountains. No indication is made in Hitchcock's monograph as to where the latter specimen now reposes.

3. Sidalcea malvaeflora (DC.) Gray ex Benth. Pl. Hartw. 300. 1848.

Local distribution: A very common perennial of open grassy slopes and coastal bluffs. Latter part of February through June.

General distribution: A widespread species, ranging from northern

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Oregon south through the Coast Ranges and Sierra Nevada foothills to northern Baja California.

Specimens examined: Ocean View, Dudley, Mar. 24, 1895; Twin Peaks, Hoover 2805; Colma, Abrams 1602; San Bruno Hills, Elmer 4637; Belmont, Rollins 2949; Montara, Dudley, Mar. 17, 1900; Pescadero, Wiggins 5097; Pigeon Pt., Howell 10974; Stanford, Baker 611 (isotype of ssp. laciniata); Saratoga, Borthwick 71; Guadalupe Canyon, Mason & Borthwick, May 20, 1921; Canada Valley near Gilroy, Sheldon, Apr. 3, 1915; Swanton, Rich, May 12, 1912; Near Saratoga Summit, Thomas 2947; Near Glenwood, Thomas 3192; Soquel Valley, Thomas 1403.

Hitchcock (1957) has recently recognized twelve subspecies and several varieties in this species. Two occur in the Santa Cruz Mountains: S. malvaeflora ssp. malvaeflora and S. malvaeflora ssp. laciniata Hitchc. (Univ. Wash. Pub. Biol. 18: 30. 1957). They may be separated by the following key:

Cauline leaves usually dissected into linear segments.
S. malvaeflora ssp. laciniata.
Cauline leaves not dissected into linear segments, rather orbicular to reniform, shallowly 7-9-lobed, often divided 3/4 to 4/5 of their length.....S. malvaeflora ssp. malvaeflora.

Numerous intergrades exist between these two subspecies. The former is more common inland, while the latter is more common along the coast.

3. Lavatera L. Sp. Pl. 690. 1753.

Bracts longer than the calyx, broadly ovate to orbicular; leaves densely pubescent on both sides.....1. L. arborea.
Bracts shorter than the calyx, deltoid to broadly ovate; leaves less pubescent abaxially than adaxially.
Plants annual herbs; petals under 2 cm. long; leaves 3-5-lobed, the margins crenate.....2. L. cretica.
Plants perennial shrubs; petals over 3 cm. long; leaves 5-7-lobed, the margins coarsely dentate.....3. L. assurgentiflora.

1. Lavatera arborea L. Sp. Pl. 690. 1753.

Local distribution: Coastal bluffs and sand dunes along the coast from San Francisco to northern San Mateo County and in heavy soils in

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northern Santa Clara County. May through July.

General distribution: Native of Europe, established in Mendocino County, in central California, and in San Diego County.

Specimens examined: San Francisco, Wolf 594; Lands End, Armanini 17; Half Moon Bay, Newman 30; Pebble Beach, Wiggins 8050; Bayshore and Embarcadero Rd., Barton, July 23, 1946.

2. Lavatera cretica L. Sp. Pl. 690. 1753.

Local distribution: San Francisco and northern San Mateo County, but to be expected elsewhere in fallow fields and disturbed roadsides. March through November, probably to be found in flower at all times of the year.

General distribution: Native of Europe, established in central California as a weed.

Specimens examined: Marina, San Francisco, Howell 11342; Presidio, Bacigalupi & Ferris 2714; Golden Gate Park, Howell 20913A (RSA); Washington and Buchanan Streets, San Francisco, Rose, June 10, 1928 (RSA); Between Princeton and Miramar, Wiggins 11202; East slope of San Bruno Mt., Thomas 4241.

3. Lavatera assurgentiflora Kell. Proc. Calif. Acad. 1: 14. 1854.

Local distribution: San Francisco and probably farther south, along the coast where it is used as a windbreak and has become established. To be found in flower at all times of the year.

General distribution: Native of the Channel Islands, widely used as a windbreak and subsequently established from central California south to southern California.

Specimens examined: Cliff House, Parish, Nov. 1881; Stokes, Jan. 1895; Lone Mt., Kellogg & Harford 1.

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4. Malva L. Sp. Pl. 687. 1753.

Bracts linear, acute; fruit pubescent; petals barely longer than the calyx.....1. M. parviflora.
Bracts lanceolate to broadly ovate; fruit glabrous; petals at least twice as long as the calyx.
Petals about 2-3 times as long as the calyx; bracts ovate. 2. M. nicaeensis.
Petals about 4-5 times as long as the calyx; bracts oblong-lanceolate. 3. M. sylvestris.

1. Malva parviflora L. Amoen Acad. 3: 416. 1756.

Local distribution: A common weed of fields, gardens, orchards, and in disturbed areas. March through October.

General distribution: Native of Europe, widely established in North America.

Specimens examined: Marina, San Francisco, Abrams 12911; East Palo Alto, Wiggins 3392; Stanford, Dudley, July 1893; Alviso, Abrams, Oct. 20, 1906; Near Edenvale, Thomas 4951; Swanton, Rich, May 1912; Santa Cruz, Thomas 1189.

2. Malva nicaeendis All. Fl. Ped. 2: 40. 1785.

Local distribution: A common, poorly collected weed of disturbed areas along roads and highways, in fields, and in river and stream beds. April through November.

General distribution: Native of Europe, widely introduced into the western part of the United States.

Specimens examined: Fort Mason, Howell 21900; Pebble Beach, Hesse 1347; East Palo Alto, Wiggins 3387; Stanford, Dudley, Nov. 1896; 3 miles south of Los Gatos, Thomas 3990; Watsonville, Thomas 1967.

3. Malva sylvestris L. Sp. Pl. 689. 1753.

Local distribution: Occasional in vacant lots, probably poorly collected. April through October.

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General distribution: Native of Europe, widely distributed in North America.

Specimens examined: Marina, San Francisco, Abrams 13395; 13405; San Jose, Smith 4011.

5. Malacothamnus Greene, Leafl. Bot. Obs. 1: 208. 1906.

Abaxial leaf surface densely covered with shaggy-tomentose stellate scales, the epidermis usually not visible in mature leaves. 1. M. arcuatus.

Abaxial leaf surface covered with stellate scales, the epidermis clearly visible.....2. M. hallii.

1. Malacothamnus arcuatus (Greene) Greene, Leafl. Bot. Obs. 1: 208. 1906.

Local distribution: Northern San Mateo County south, mainly on the eastern side of the crest of the Santa Cruz Mountains, at least to the vicinity of Loma Prieta; commonly growing in chaparral or in oak-madrone woods in rocky soils. May through September.

General distribution: Endemic in the Santa Cruz Mountains.

Specimens examined: Sawyer Ridge, Oberlander 258; Crystal Springs Lake, Randall 249; Belmont, Congdon, July 27, 1897; 2½ miles west of La Honda, Wolf 3746; Alviso, Thomas 5309; Near Stanford, Wiggins 8544; Black Mt., Dudley, Nov. 15, 1897; San Antonio Creek, Dudley, May 21, 1898; Santa Clara, Leeds, 1891; Loma Prieta, Dudley, Nov. 1, 1903; China Grade, Abrams 6383; Slope of Loma Prieta, Hesse 971.

The specimen from Alviso appears to be out of the normal range of this species. It grew in a disturbed habitat at the edge of a Salicornia salt marsh in company with many other weedy plants including Lycium halimifolium. Its occurrence at Alviso probably represents an introduction.

2. Malacothamnus hallii (Eastw.) Kearney, Leafl. West. Bot. 6: 134. 1951.

Local distribution: Known in the Santa Cruz Mountains only from the vicinity of Uvas and Llagas creeks in southern Santa Clara County; grow-

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ing with Salvia mellifera and Adenostoma fasciculatum, often on road embankments. June through August.

General distribution: Inner Coast Ranges from Mount Diablo south to southern Santa Clara County, mainly on the western slopes of the Diablo and Mount Hamilton ranges, also on the eastern slope of the Santa Cruz Mountains in southern Santa Clara County.

Specimens examined: Madrone to Llagas Creek, Dudley, June 10, 1909; Calero Dam, Ferris & Bacigalupi 12495.

6. Sida L. Sp. Pl. 683. 1753.

1. Sida leprosa (Ort.) K. Schum. var. hederacea (Dougl.) K. Schum. Mart. Fl. Bras. 12: 342. 1891.

Local distribution: Occasional in heavy alkaline and adobe soils, Santa Clara Valley, and as a weed in San Francisco. July through October.

General distribution: Washington and western Idaho south through Oregon and California to the southern end of Baja California, east to Utah, Nevada, and Texas, then south to the state of Queretaro in Mexico, also on the Revillagigedo Islands and Guadalupe Island; introduced into Australia as a weed.

Specimens examined: San Francisco, Howell 31280 (CAS); Stanford, Abrams 1017; Lake Lagunita, Dudley, Oct. 4, 1895; Alviso, Thomas 5319.

74. STERCULIACEAE

1. Fremontodendron Cov. Contr. U. S. Nat. Herb. 4: 74. 1893.

1. Fremontodendron californicum (Torr.) Cov. ssp. crassifolium (Eastw.) Thomas, Leafl. West. Bot. 7: 224. 1955.

Local distribution: Known from three localities: Butano Ridge,

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Big Basin, and Loma Prieta, growing on rocky chaparral slopes. May through August.

General distribution: This subspecies occurs in the Santa Cruz Mountains, Alameda County, and near Salinas in Monterey County, and has been reported from Tehama County. The range of the species is from Shasta County through the Coast Ranges and Sierra Nevada foothills to the Mexican Border and in Gila County, Arizona.

Specimens examined: Butano Creek, Dudley, Dec. 29, 1897; Loma Prieta, Elmer 5015; On hills above Big Basin Park, north of Governor's Camp, Reed, May 1, 1918 (CAS, type of Fremontia crassifolia Eastw.); Big Basin, Eastwood, Sept. 30, 1916 (CAS).

75. HYPERICACEAE

1. Hypericum L. Sp. Pl. 783. 1753.

Petals usually twice as long as the sepals; stems erect, plants not prostrate mats.
  Leaves oval, 2-3 cm. long, usually with clasping base; sepals ovate, 3-4 mm. long.....1. H. formosum var. scouleri.
  Leaves oblong, 1-2 cm. long, base not clasping; sepals lanceolate, 5-6 mm. long.....2. H. perforatum.
Petals about equalling the sepals or shorter; stems prostrate or ascending, plants often forming dense mats.
  3. H. anagalloides.

1. Hypericum formosum H. B. K. var. scouleri (Hook.) Coult. Bot. Gaz. 11: 108. 1886.

Local distribution: Known only from a spring near the top of Loma Prieta. June through October.

General distribution: Southern British Columbia and western Montana south to San Diego County and Arizona.

Specimens examined: Loma Prieta, Dudley, July 22, 1893; Spring on Loma Prieta, Ferris 3625.

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2. Hypericum perforatum L. Sp. Pl. 785. 1753.

Local distribution: Occasional in disturbed habitats throughout the Santa Cruz Mountains. June through September.

General distribution: Native of Europe, but now occurring as a cosmopolitan weed in such temperate regions as the United States, Australia, New Zealand, Chile, and the Cape Region of South Africa.

Specimens examined: Saratoga, Rice, Sept. 1922; Ben Lomond Mt., Thomas 3407.

3. Hypericum anagalloides Cham. & Schlecht. Linnaea 3: 127. 1828.

Local distribution: Low, moist or swampy ground along the coast or in inland bogs as at Camp Evers. Latter part of March through July.

General distribution: Southern British Columbia and Montana south through Idaho, Oregon, western Nevada, and California to northern Baja California.

Specimens examined: Pebble Beach, Wolf 3729; Swanton, Rich, Apr. 1912; Ben Lomond Mt., Hesse 1562; Camp Evers, Thomas 3336; Santa Cruz, Thompson, June 27, 1903.

76. ELATINACEAE

1. Elatine L. Sp. Pl. 367. 1753.

1. Elatine triandra Schkuhr var. brachysperma (Gray) Fassett, Rhodora 41: 374. 1939.

Local distribution: Lake margins and vernal pools. April through June.

General distribution: Washington and Oregon south to southern California, also found in Illinois and Ohio and from southern California east to Texas.

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Specimens examined: Mt. Lake, Jepson 13447 (JEPS); Pilarcitos Lake, Davy 5d (JEPS); Southwest of Eagle Rock, Hesse 1291.

77. FRANKENIACEAE

1. Frankenia L. Sp. Pl. 331. 1753.

1. Frankenia grandifolia Cham. & Schlecht. Linnaea 1: 35. 1826.

Local distribution: Upper limits of salt marshes, on dikes and leaves, and on coastal bluffs, along the coast and the margins of San Francisco Bay. May through November.

General distribution: Along the coast from Marin County south to Punta Prieta, Baja California, and on the Channel Islands and Guadalupe Island.

Specimens examined: Salt marshes at Palo Alto, Stinchfield 251; San Gregorio Creek, Thomas 1142; Palm Beach, McMinn 260.

Where plants are subjected to the action of waves at high tide, they become somewhat woody, gnarled, and shrubby.

78. CISTACEAE

1. Helianthemum Mill. Gard. Dict. abr. ed. 4, 1754.

Flowers few; inflorescence very leafy; low and spreading plants, somewhat matted.....1a. H. scoparium var. scoparium.
Flowers numerous; inflorescence almost leafless; tall, erect, rush-like plants.....1b. H. scoparium var. vulgare.

1a. Helianthemum scoparium Nutt. in Torr. & Gray var. scoparium, Fl. N. Amer. 1: 152. 1838.

Local distribution: Mainly on the western slopes of the Santa Cruz Mountains on dry rocky slopes, sandy areas, or sometimes in chaparral. April through August.

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General distribution: Mendocino County south along the coast to northern Monterey County and on Santa Cruz and Santa Rosa islands.

Specimens examined: Crystal Springs Lake, Oberlander 225; 4 miles south of Glenwood, Rossbach 783; Ben Lomond Sand Hills, Thomas 1864; Santa Cruz, Jones 2236.

This variety is often a rapid colonizer of dry, disturbed areas such as road banks and cuts.

1b. Helianthemum scoparium Nutt. var. vulgare Jepson, Man. Fl. Pl. Calif. 641. 1925.

Local distribution: Mainly on the eastern slopes of the Santa Cruz Mountains. April through September.

General distribution: Lake County south through the Coast Ranges, away from the ocean, to San Luis Obispo County, thence south both along the coast and in the interior to Ensenada, Baja California, also in the central Sierra Nevada foothills and on some of the Channel Islands.

Specimens examined: Jasper Ridge, Dudley, Apr. 15, 1898; Black Mt., Applegate 50; Loma Prieta, Elmer 5081; Big Basin, Thomas 2433.

79. VIOLACEAE

1. Viola L. Sp. Pl. 933. 1753.

Inner surface of petals white, blue, violet, or purple.
  Inner surface of petals violet-purple, lateral petals with a tuft of elongated hairs at base; spur conspicuous, 4-5 mm. long. Growing on grassy slopes.....1. V. adunca.
  Inner surface of lateral petals purple, others white, lateral petals with a tuft of clavate hairs at base; spur shallow, scarcely 2-3 mm. long. Growing on wooded slopes....2. V. ocellata.
Inner surface of petals yellow except for veining.
  Leaves narrowed or truncate at base, rarely subcordate.
    Rootstalks deep-seated; leaves broadly ovate, the bases sometimes cordate; flowers 1-2 cm. long. Growing on open or shaded grassy slopes.....3. V. pedunculata.

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Rootstalks shallow; upper leaves elongate or ovate-lanceolate, lower ones broader; flowers usually 1 cm. or less long. Associated with Quercus and Pinus where these species occur with chaparral.....4. V. quercetorum.

Leaves distinctly cordate at base.

Stems creeping, stoloniferous, evergreen. Growing in Redwood forests.....5. V. sempervirens.

Stems erect from stout horizontal rootstalks, not evergreen. Growing along shaded stream banks.....6. V. glabella.

1. Viola adunca J. E. Smith in Rees, Cycl. 37: no. 63. 1817.

Local distribution: Open fields and hillsides on the western side of the Santa Cruz Mountains from near sea level to about 2000 feet elevation. February through April.

General distribution: Alaska and Yukon south and southeast to California, Arizona, New Mexico, and the Great Lakes region, then northeast to Labrador. This range includes all subspecific entities.

Specimens examined: Presidio fields, Dudley, Apr. 14, 1895; Montara Mts., Ferris 1767; Pescadero, Wiggins 5091A; Bonny Doon, Thompson, Apr. 14, 1902.

This violet is readily distinguished from the others by its violet color and prominent spur.

2. Viola ocellata Torr. & Gray, Fl. N. Amer. 1: 142.1838.

Local distribution: Throughout the Santa Cruz Mountains on shaded wooded slopes, mainly with Arbutus menziesii and various species of Quercus. March through June.

General distribution: Coast Ranges from Douglas County, Oregon, south to Monterey County.

Specimens examined: Cahill Ridge, Oberlander 353; Pescadero Creek near Bloomquists Mill, Mason 3696; Los Gatos Canyon, Dudley, Apr. 19, 1893; Uvas Creek, Wiesendanger 1503 (DAV); Felton, Gould 705; Aptos, Rattan, Mar. 12, 1884.

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3. Viola pedunculata Torr. & Gray, Fl. N. Amer. 1: 141. 1838.

Local distribution: Open grassy hillsides. March through April.

General distribution: Sonoma and Napa counties south through the Coast Ranges to northern Baja California and in the Sierra Nevada from Tulare County south.

Specimens examined: Bernal Heights, Mason 1270; South San Francisco, Baker 347; Foothills, Stanford University, Applegate 48; San Martin, Abrams 5180; Swanton, Rich, Spring 1912; Greyhound Rock, Ferris 2125.

4. Viola quercetorum Baker & Clausen, Leafl. West. Bot. 5: 101. 1948.

(Viola purpurea of authors, in part.)

Local distribution: Known from only a few localities where it is associated with chaparral, various species of Quercus, Pinus attenuata, and P. sabiniana. March through May.

General distribution: Coast Ranges and Sierra Nevada foothills from Mendocino and Plumas counties south to the Mexican Border; also known from Josephine County, Oregon.

Specimens examined: Sierra Azule Ridge, Davis, May 9, 1920; Pine Flat, Ben Lomond Mt., Dudley, Mar. 30, 1899.

5. Viola sempervirens Greene, Pittonia 4: 8. 1899.

Local distribution: Redwoods or redwood - douglas fir forests. January through October.

General distribution: Southern British Columbia south through Washington and Oregon on the western side of the Cascades and through the Outer Coast Ranges of California to Monterey County.

Specimens examined: La Honda, Mason 3668; Swanton, Rich, Mar. 1, 1912; Aptos Creek, Rattan, Apr. 1884.

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6. Viola glabella Nutt. ex Torr. & Gray, Fl. N. Amer. 1: 142. 1838.

Local distribution: Moist stream banks in redwood - douglas fir forests. March through May.

General distribution: Coastal southern Alaska from Kodiak south along the coast and in the coastal ranges to Monterey County, in the Sierra Nevada from Mono to Tulare counties, and in eastern Oregon, eastern Washington, northern Idaho, and Montana.

Specimens examined: La Honda, Mason 3672; Rancho del Oso, Thomas 2930; Aptos, Dudley, Oct. 13, 1902.

80. LOASACEAE

1. Mentzelia L. Sp. Pl. 516. 1753.

Petals 20-35 mm. long.....1. M. lindleyi.
Petals less than 5 mm. long.
  Bracts ovate, concealing flowers and lower portions of capsules; outer filaments dilated; seeds not grooved at the angles. 2. M. micrantha.
  Bracts linear-lanceolate, not concealing flowers and lower parts of capsules; filaments not dilated; seeds grooved at the angles. 3. M. dispersa.

1. Mentzelia lindleyi Torr. & Gray, Fl. N. Amer. 1: 533. 1840.

Local distribution: Occasionally found in the Santa Clara Valley and adjoining foothills. April through August.

General distribution: Solano County south through the Inner Coast Ranges and adjacent valleys to Monterey County, also known from near Gardenville, Humboldt County.

Specimens examined: Serpentine hills east of the mouth of Almaden Canyon, Bacigalupi 1328; Hills 4 miles south of San Jose, Rattan, May 1, 1887; Almaden Ridge, Howell 1900 (CAS); Edenvale, Thomas 4760; Uvas Creek, Griffen 154 (UC).

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2. Mentzelia micrantha (Hook. & Arn.) Torr. & Gray, Fl. N. Amer. 1: 535. 1840.

Local distribution: On dry hillsides and in disturbed areas throughout Santa Clara County and in the drier parts of Santa Cruz County. Latter part of April through August.

General distribution: Trinity County south through the Inner North Coast Ranges and the Outer and Inner South Coast Ranges to northern Baja California, also on the Channel Islands and Guadalupe Island.

Specimens examined: Black Mt., Elmer 4588 (UC); Permanente Canyon, Bacigalupi, May 22, 1922; Loma Prieta, Dudley, May 29, 1894; Saratoga Summit, Thomas 1955; Quail Hollow, Hesse 1927.

Mentzelia micrantha is the most common member of this genus in the Santa Cruz Mountains.

3. Mentzelia dispersa Wats. Proc. Amer. Acad. 11: 137. 1876.

Local distribution: Known locally from the vicinity of Alma Soda Springs and Loma Prieta Ridge in Santa Clara County. May through August.

General distribution: Washington, east of the Cascade Mountains, Idaho, and Montana south, west of the Rocky Mountains, to Colorado, Nevada, and San Diego County.

Specimens examined: Alma Soda Springs, Heller 7503 (UC); Loma Prieta, Ridge, Dudley, July 22, 1893.

This species is typically one belonging on dry slopes and chaparral of the Inner Coast Ranges and the interior. It is to be expected only rarely in the Santa Cruz Mountains.

81. DATISCACEAE

1. Datisca L. Sp. Pl. 1037. 1753.

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1. Datisca glomerata (Presl) Baillon, Hist. Pl. 3: 407. 1871.

Local distribution: On open banks of creeks and in the stream beds at lower elevations in the Santa Cruz Mountains. May through August.

General distribution: Humboldt and Siskiyou counties south through the Sierra Nevada and adjacent parts of Nevada and the Coast Ranges to the Sierra Juarez of northern Baja California, absent from the Central Valley of California.

Specimens examined: San Francisquito Creek, Stinchfield 257; Near Stevens Creek, Randall 134; Santa Cruz, Jones 2334; Jamison Creek, Thomas 6845.

82. THYMELAEACEAE

1. Dirca L. Sp. Pl. 358. 1753.

1. Dirca occidentalis Gray, Proc. Amer. Acad. 8: 631. 1873.

Local distribution: On moist wooded hillsides, often with Arbutus menziesii and Quercus agrifolia, sometimes forming thickets, San Mateo and northern Santa Clara counties. January through March.

General distribution: In the counties surrounding San Francisco Bay: Marin, Contra Costa, Alameda, San Mateo, and Santa Clara counties, and in Sonoma County.

Specimens examined: Montara Mts., Dudley, Mar. 17, 1900; San Andreas Lake, Rose 33222; Foothills near Stanford University, Baker 309.

Anderson (1892, p. 125) lists Dirca occidentalis from Santa Cruz County. This appears to be the only record of its occurrence in this county. Anderson may have found Dirca in the Santa Cruz Mountains and assumed that it also occurred in Santa Cruz County itself.

An announcement of a field trip to the Big Basin region of Santa

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Cruz County on August 25, 1957, held as part of the annual meeting of the American Institute of Biological Sciences at Stanford University, listed Dirca from the Basin. This represents an error.

83. LYTHRACEAE

1. Lythrum L. Sp. Pl. 446. 1753.

Petals 4-6 mm. long; flowers pedicellate; seeds linear-lanceolate. 1. L. californicum.
Petals 1-2 mm. long; flowers sessile to subsessile; seeds ovoid. 2. L. hyssopifolia.

1. Lythrum californicum Torr. & Gray, Fl. N. Amer. 1: 482. 1840.

Local distribution: Occasional in the Santa Clara Valley from southern San Mateo County southward. June through September.

General distribution: Lake and Colusa counties south to northern Baja California, southeast and east to Texas and Mexico through southern Nevada, Arizona, and New Mexico.

Specimens examined: Menlo Park, Abrams 2219; Sunnyvale, Bacigalupi & Ferris 2790; Santa Clara, Leeds, 1891.

2. Lythrum hyssopifolia L. Sp. Pl. 447. 1753.

(Lythrum adsurgens Greene, Pittonia 2: 12. 1889.)

Local distribution: Moist places where water has stood during the spring, throughout the Santa Cruz Mountains and adjoining plains. April through October.

General distribution: Temperate regions on all continents.

Specimens examined: Lake Merced, Rose 35585; Crystal Lake, Abrams 2991; Pescadero Beach, Wiggins 12195; Woodside, Dudley, June 12, 1906; Searsville Lake, Abrams 5113; Mt. View Landing, Dudley, July 18, 1903; Mt. Hermon, Mason 4005; 5.5 miles east of Watsonville, Thomas 3286.

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84. MYRTACEAE

1. Eucalyptus L'Her. Sert. Angl. 18: t. 20. 1788.

1. Eucalyptus globulus Labill. Voy. 1: 153. 1799.

Local distribution: This species has been extensively planted all through the Santa Cruz Mountains and adjacent lowlands to form wind breaks and as an ornamental. Occasionally seedlings are to be found, as in the Presidio in San Francisco, near Burlingame, Stanford, and probably elsewhere.

General distribution: Native of Australia, widely planted in California and other warm temperate regions.

Specimens examined: Stanford, Wiggins 3356; Southeastern part of Santa Cruz County, Thomas 3269.

Schneider (1949) discussed the establishment of Eucalyptus globulus in California from naturally distributed seeds. Howell (1949, p. 197) lists Eucalyptus viminalis Labill. (Nov. Holl. Pl. 2: 12. 1806) as occurring occasionally and spontaneously in Marin County. I have not observed seedlings of this species in the area covered by this flora. Eucalyptus viminalis is commonly planted and occasional seedlings are to be expected. Eucalyptus viminalis has smooth capsules in clusters of 3, while those of E. globulus are single and wrinkled.

85. ONAGRACEAE

Capsule indehiscent.
  Petals small, less than 8 mm. long, pink or red; leaves lanceolate, sinuate; calyx-lobes not persistent. Plants of dry land. 1. Gaura.
  Petals large, 10 mm. or more long, yellow; leaves orbicular to ovate; calyx-lobes persistent. Aquatic plants.....2. Jussiaea.
Capsule dehiscent.

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Sepals deciduous after flowering; capsule several times as long as broad.
Seeds comose.
Flowers large; petals red; calyx-tube at least 1 cm. long. 3. Zauschneria.
Flowers small; petals white to lavender; calyx-tube lacking or very short.....4. Epilobium.
Seeds not comose.
Anthers basifixed or nearly so; petals white, lavender, or red.
Calyx-lobes not reflexed; petals not clawed. 5. Boisduvalia.
Calyx-lobes reflexed with the tips united by twos or fours; petals usually clawed.....6. Clarkia.
Anthers versatile; petals yellow.....7. Oenothera.
Sepals persistent after flowering; capsules to twice as long as broad. 8. Ludwigia.

1. Gaura L. Sp. Pl. 347. 1753.

1. Gaura sinuata Nutt. ex Seringe in DC. Prod. 3: 44. 1828.

Local distribution: Rare in fields in southern San Mateo County. May and June.

General distribution: Native of Oklahoma, Arkansas, Texas, and the states of Coahuila and Tamaulipas, Mexico, sparingly introduced into central and southern California, and Alabama and South Carolina.

Specimen examined: Los Trancos and San Francisquito creeks, Abrams 13687.

2. Jussiaea L. Sp. Pl. 388. 1753.

1. Jussiaea repens L. var. peploides (H. B. K.) Griseb. Cat. Pl. Cubens. 107. 1866.

(J. californica (Wats.) Jepson, Fl. West. Mid. Calif. 326. 1901.)

Local distribution: Known locally from the lakes and marshes in San Francisco and in southern Santa Cruz County, but to be expected elsewhere in similar habitats. June through November.

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General distribution: Oregon south through California, Mexico, and Central America to South America.

Specimens examined: Lake Merced, Howell 31847 (CAS); Pinto Lake, Hesse 1420; Hayward, July 10, 1929; Kelly Lake, Dudley, Oct. 11, 1908; Watsonville, Dudley, Oct. 10, 1908.

3. Zauschneria Presl, Rel. Haenk. 2: 28. 1831.

1. Zauschneria californica Presl, Rel. Haenk. 2: 28. 1831.

Local distribution: Dry foothills and mountains throughout the Santa Cruz Peninsula, on poor or rocky soil in chaparral, areas where Artemisia californica is dominant, and in serpentine areas. July (occasionally earlier) through November.

General distribution: The typical subspecies, which is the only one in the Santa Cruz Mountains, ranges from Mendocino and Lake counties south through the Coast Ranges into northern Baja California.

Specimens examined: Guadalupe Valley, Dudley, July 22, 1893; Coal Mine Ridge, Barry 194; Hills back of Los Gatos, Heller 7211 (isotype of Z. eastwoodae Moxley); Mt. Umunhum, Ferris 2088; Eureka Canyon, Thomas 2494; Eagle Rock, Thomas 3489.

The plants in the Santa Cruz Mountains are variable with respect to pubescence and flower size. The pubescence varies from tomentose to slightly glandular-villous. The calyx-tube with calyx-lobes and petals varies from 2 to 4 cm. in length. Zauschneria californica is able to invade the rocky soil of some steep highway embankments. Artificial plantings of this attractive late-flowering species might be attempted in order to cover up the ugly scars left on so many hillsides.

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4. Epilobium L. Sp. Pl. 347. 1753.

Plants annual, usually growing in dry ground; epidermis exfoliating readily.
  Plants usually under 2.5 dm. tall, puberulent throughout; floral tube about 1 mm. long.....1. E. minutum.
  Plants usually over 3 dm. tall, pubescent above; floral tube over 2 mm. long.....2. E. paniculatum.
Plants perennial, usually growing in moist ground or in low areas where water has stood; epidermis not exfoliating.
  Plants producing turions, under 4 dm. tall, unbranched. 3. E. halleanum.
  Plants not producing turions, often over 4 dm. tall, usually branched.
    Petals 6-10 mm. long, red to purple; leaves usually opposite.
      Herbage densely pubescent..4. E. watsonii.
      Herbage sparsely pubescent.5. E. franciscanum.
    Petals 2-6 mm. long, white to pink or rose; upper leaves usually alternate.
      Upper portion of the stem and inflorescence glandular with spreading hairs; inflorescence usually dense with numerous flowers.....6. E. adenocaulon var. occidentale.
      Upper portion of the stem and inflorescence not glandular (occasionally slightly so), pubescence of incurved hairs; inflorescence usually open, few-flowered. 7. E. californicum.

1. Epilobium minutum Lindl. ex Hook. Fl. Bor. Amer. 1: 207. 1834.

Local distribution: Occasional in chaparral, and in areas where Pinus attenuata is common. April and May.

General distribution: British Columbia south to San Luis Obispo County in the Coast Ranges and to Mariposa County in the Sierra Nevada, east to western Montana and Nevada.

Specimens examined: Ravine west of San Mateo, Dudley, May 14, 1899; Between Woodside and Crystal Springs Lake, Dudley, Apr. 27, 1909; Woodside, Abrams 2403; Stevens Creek, Ferris 2165; Foothills west of Los Gatos, Heller 7400; Near Alma, Heller 7346; Near Eagle Rock, Thomas 4805; Ben Lomond Sand Hills, Thomas 1877; Loma Prieta, Thompson, May 8, 1902.

2. Epilobium paniculatum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 490. 1840.

Local distribution: Common throughout the Santa Cruz Mountains and

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adjacent lowlands in fields, rocky ridges, serpentine, and in disturbed areas, almost always in dry ground. May through October.

General distribution: British Columbia south to southern California, east to Montana, South Dakota, Colorado, and New Mexico.

Specimens examined: Mt. Lake, Abrams 2203; Lower Crystal Springs Lake, Oberlander 298; Woodside serpentine, Dutton, May 6, 1900; Coal Mine Ridge, Barry 198; Stanford, Dudley, Sept. 19, 1895; Santa Clara, Leeds, 1891; Lyndon Gulch, Dudley, Sept. 9, 1906; About 1 mile south of Gilroy, Thomas 4369; Glenwood, Davis, Sept. 1907; 1 mile north of Felton, Thomas 1161.

Epilobium paniculatum is a variable species in which several varieties and forms may be recognized. The following key will serve as a means of distinguishing the varieties and forms:

Floral-tube in mature flowers over 6 mm. long.
E. paniculatum var. jucundum (Gray) Trelease,
(Rep. Mo. Bot. Gard. 2: 85. 1891.)
Floral-tube in mature flowers under 6 mm. long.
Floral-tube about 4 mm. long.
E. paniculatum f. laevicaule (Rydb.) St. John,
(Fl. S. E. Wash. 275. 1937.)
Floral-tube 2-3 mm. long.
Pedicels and capsules somewhat glandular-pubescent.
E. paniculatum var. paniculatum.
Pedicels and capsules densely glandular-pubescent.
E. paniculatum f. adenocladon Hausskn.
(Monog. Epilob. 247. 1884.)

Epilobium paniculatum var. paniculatum and E. p. f. adenocladon are the most common subspecific entities locally.

Although this is an annual species, the stems often become very woody toward the base. A stem between 1 and 1.5 cm. in diameter at the base is not uncommon.

3. Epilobium halleanum Hausskn. Monog. Epilob. 261. 1884.

Local distribution: Known locally only from the bog at Camp Evers, where it grew in boggy ground near a willow thicket. April and May.

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General distribution: British Columbia south to Santa Cruz County and to the central Sierra Nevada, southeast to Montana, Wyoming, and Colorado.

Specimen examined: Camp Evers, Thomas 1672.

This species hitherto has not been known south of Marin County (Howell, 1949, p. 198).

4. Epilobium watsonii Barbey in Brewer & Wats. Bot. Calif. 1: 219. 1876.

Local distribution: Known locally only from the marsh at Camp Evers in central Santa Cruz County, but to be expected occasionally elsewhere. June and July.

General distribution: Wet areas, Sonoma County south to San Luis Obispo County.

Specimen examined: Camp Evers, Thomas 3337.

Mason (1957, p. 607) stated that Epilobium watsonii is the "most common species in this area." Specimens from the Santa Cruz Mountains do not bear this out. Among the wet-habitat Epilobiums, E. franciscanum, E. californicum, and E. adenocaulon are much more common.

Intermediates between E. watsonii and E. franciscanum occur, for example: Pebble Beach, Mason, June 1, 1921.

5. Epilobium franciscanum Barbey in Brewer & Wats. Bot. Calif. 1: 220. 1876.

Local distribution: Along or near the coast in bogs, marshes, and low moist areas. Latter part of April through June.

General distribution: Washington south through Oregon, west of the Cascades, to Monterey County, commonly near the coast.

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Specimens examined: Lake Merced, Hall 1774; Near Ocean View, Heller 8377; Colma, Abrams 1618; Baden, Dudley, May 1, 1893; Pebble Beach, Dudley, Apr. 18, 1896; Pigeon Pt., Thomas 4292; San Jose, Rattan, 1877; Swanton, Rich, Spring 1912; Camp Evers, Hesse 983; La Selva Beach, Thomas 3046.

6. Epilobium adenocaulon Hausskn. var. occidentale Trelease, Rep. Mo. Bot. Gard. 2: 95. 1891.

Local distribution: Common in low, moist areas where water has stood during the spring, along streams, and in boggy areas. June through October.

General distribution: British Columbia south to central California and southeast to Utah.

Specimens examined: Crystal Springs Reservoir, Dudley, Sept. 21, 1902; Searsville, Abrams 1022; Portola Valley, Randall 261; Stanford, Dudley, July 17, 1897; Stevens Creek, Atkinson, July 1901; Black Mt., Randall 262; Loma Prieta, Dudley, July 22, 1893; Glenwood, Dudley, June 20, 1909; Santa Cruz, Thompson, June 20, 1903.

7. Epilobium californicum Hausskn. Monog. Epilob. 260. 1884.

Local distribution: Moist areas along streams, springs, and on wet, shaded ground. May through September.

General distribution: Washington south through the Cascades, Coast Ranges, and Sierra Nevada to northern Baja California.

Specimens examined: Stevens Creek Road, Randall 260; Foothills west of Los Gatos, Heller 7444; Loma Prieta, Elmer 4999; Big Basin, Thomas 3545; Bracken Brae, Hesse 1697.

Epilobium californicum differs from E. adenocaulon var. occidentale in having a more open, less congested inflorescence, minute incurved pubescence in the inflorescence, and generally no glandular pubescence. Often plants have some of the characters of both species. A more realistic approach would be to consider E. californicum a subspecific unit of E. adenocaulon.

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5. Boisduvalia Spach, Hist. Veg. Phan. 4: 383. 1835.

Capsules septicidal, septa separating from the valves of the capsule. ..... 1. B. densiflora.
Capsules loculicidal, septa remaining attached to the valves of the capsule.
Capsules straight, 5-8 mm. long; bracts ovate-oblong; petals 2-4 mm. long..... 2. B. glabella.
Capsules with the tips curved away from the stem, 6-10 mm. long; bracts linear; petals 1.5-2 mm. long..... 3. B. stricta.

1. Boisduvalia densiflora (Lindl.) Wats. Bot. Calif. 1: 233. 1876.

Local distribution: Low moist areas in which water stands during the early part of the growing season, throughout the Santa Cruz Mountains. Latter part of June through September.

General distribution: Victoria Island, British Columbia, south through Washington, western Idaho, Oregon, Nevada, and California to northern Baja California.

Specimens examined: San Andreas Lake, Oberlander 1042; Crystal Springs Lake, Elmer 4273; Alviso, Elmer 4964; Hilton Airport, Thomas 3462; Head of Aptos Creek, Abrams 3047.

A minor variant, Boisduvalia densiflora var. imbricata Greene (1891, p. 225) has the bracts of the inflorescence conspicuously imbricate and concealing the flowers and capsules. In Boisduvalia densiflora var. densiflora the flowers and fruits are not hidden. Boisduvalia densiflora var. imbricata ranges with the typical variety. Specimens examined: Crystal Springs Reservoir, Dudley, Sept. 21, 1902; Coal Mine Ridge, Ferris 2044; Kellogg's Lake, Dudley, Oct. 11, 1908.

2. Boisduvalia glabella (Nutt.) Walp. Repert. 2: 89. 1843.

Local distribution: Low wet meadows and margins of pools in the Santa Clara Valley and bordering foothills. June through September.

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General distribution: Southern Saskatchewan southwest through North Dakota, Montana, Idaho, Utah, southeastern Washington, Oregon, and then south through California to San Diego County.

Specimens examined: Coal Mine Ridge, Ferris 2049; Stanford University, Randall 255; Between Gilroy and Morgan Hill, Abrams 5666.

An intergrade between Boisduvalia glabella and B. g. var. campestris Jepson, collected in 1893 by K. Brandegee at Mount Eden, is listed by Munz (1941, p. 145) as coming from San Mateo County. This specimen was undoubtedly collected in Alameda County.

3. Boisduvalia stricta (Gray) Greene, Fl. Francisc. 225. 1891.

Local distribution: Known only from New Almaden. May to August.

General distribution: Southern Washington and adjacent Idaho south through Oregon and northwestern Nevada to Santa Clara and Madera counties.

Specimen cited: New Almaden, Torrey 109 (GH, type of Oenothera torreyi Wats.).

This species has been collected fairly frequently in the Mount Hamilton Range.

6. Clarkia Pursh, Fl. Amer. Sept. 1: 260. 1814.

Stamens 4; hypanthium over 10 mm. long.
  Hypanthium about 15 mm. long; petals about twice as long as broad; plants usually over 2 dm. tall.
    1. C. concinna.
  Hypanthium about 25 mm. long; petals about as long as broad; plants usually under 2 dm. tall....2. C. breweri.
Stamens 8; hypanthium under 10 mm. long.
  Petals distinctly clawed, the claw equalling the limb.
    Petals 6-12 mm. long, the claw with a pair of teeth near the base, the limb lanceolate to rhomboid, often obscurely 3-lobed; rachis of the inflorescence reflexed. Rare.
      3. C. rhomboidea.
    Petals 10-20 mm. long, the claw lacking teeth, the limb deltoid to rhomboid; rachis of the inflorescence straight. Common.
      4. C. unguiculata.

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Petals not clawed, or the claw very short.
Rachis of the inflorescence reflexed; corollas 5-12 mm. long.
Petals white to cream-colored, unmarked, under 1 cm. long; hypanthium 0.5-1.5 mm. long.
5. C. epilobioides.
Petals colored, or if pale then flecked with purple, over 1 cm. long; hypanthium 1-3 mm. long.
6. C. modesta.
Rachis of the inflorescence straight; petals 5-30 mm. long.
Leaves ovate, obovate, elliptic, or oblanceolate, usually 2-3 times as long as broad; plants often prostrate to decumbent. Coastal plants.
Petals 25-30 mm. long; leaves elliptic to broadly lanceolate; capsules usually pedicellate. Common.
7b. C. rubicunda ssp. blasdalei.
Petals 5-15 mm. long; leaves elliptic, ovate, or oblanceolate; capsules sessile. Rare.
Petals 5-11 mm. long, unspotted. San Francisco and northern San Mateo County.
8. C. davyi.
Petals 10-15 mm. long, usually with a reddish spot. Santa Cruz, southward.
9. C. prostrata.
Leaves linear to lanceolate, usually 5 or more times as long as broad; plants usually erect. Plants usually inland.
Capsules always sessile, mature ones 1-2 cm. long, distinctly quadrangular in cross-section, immature ones 8-ribbed, less than 8 times as long as broad.
Petals 15-25 mm. long; stamens shorter than the mature stigma, free from the stigma.
10a. C. purpurea ssp. viminea.
Petals under 15 mm. long; stamens about equalling the mature stigma, connivent to it.
10b. C. purpurea ssp. quadrivulnera.
Capsules or some of them almost always pedicellate, the pedicels to 4 cm. long, mature capsules 1.5-4 cm. long, rounded to quadrangular in cross-section, immature capsules 10 or more times as long as broad.
Mature stigmas elevated above the stamens.
Sepals 12-20 mm. long; hypanthium over 4 mm. long. Common.....7a. C. rubicunda ssp. rubicunda.
Sepals 4-5 mm. long; hypanthium 1-3 mm. long. Rare, known only from the Presidio in San Francisco.
11. C. franciscana.
Mature stigmas not elevated above the stamens.
12. C. affinis.

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1. Clarkia concinna (Fisch. & Mey.) Greene, Pittonia 1: 140. 1887.

Local distribution: Occasional, San Francisco southward to the vicinity of Loma Prieta on the eastern slopes of the Santa Cruz Mountains, usually in open woods. May through June.

General distribution: Coast Ranges from Humboldt and Siskiyou counties south to Santa Clara County and in Butte and Yuba counties.

Specimens examined: Stevens Creek, Atkinson, July 1901; Near Saratoga, Pendleton 346 (UC); Abrams 5256; Near Congress Springs, Heller 7412; Loma Prieta, Dudley, no date.

2. Clarkia breweri (Gray) Greene, Pittonia 1: 141. 1887.

Local distribution: Known locally only from Loma Prieta, growing in rocky ground. May and June.

General distribution: Mainly in the Inner Coast Ranges from Alameda County south to San Benito County and in adjacent Monterey County, also on Loma Prieta on the eastern slope of the Santa Cruz Mountains.

Specimen examined: Slope of Loma Prieta Cone, Dudley, May 30, 1893.

3. Clarkia rhomboidea Dougl. in Hook. Fl. Bor. Amer. 1: 214. 1834.

Local distribution: Known locally only from near Santa Cruz. May and June.

General distribution: A widespread species ranging from Washington south to northern Baja California, eastward to Idaho, Utah, and Arizona.

Lewis and Lewis (1955, p. 352) list this species as being in Santa Cruz County, but do not cite a specimen. Their distribution may (p. 349) shows a dot in the vicinity of Santa Cruz.

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4. Clarkia unguiculata Lindl. Bot. Reg. 23: pl. 1981. 1937.

(C. elegans Dougl. in Lindl. Bot. Reg. 19: pl. 1575. 1833.)

Local distribution: One of the more common species of Clarkia in the Santa Cruz Mountains from southern San Mateo County southward, usually in open woods or in grasslands. May through August.

General distribution: Coast Ranges from Mendocino and Lake counties south to northern San Diego County and in the Sierra Nevada at low elevations from Butte County south to Kern County.

Specimens examined: Alpine School, Elmer 4293; Coal Mine Ridge, Barry 166; Near Stanford, Randall 258; Devils Canyon, Leithold, Aug. 13, 1894; Black Mt., Dudley, July 6, 1903; Campbell Creek, Thomas 4191; Los Gatos Canyon, Heller 7482; San Jose serpentine, Dutton, Apr. 30, 1900; Near Bielawski Lookout, Thomas 3438; Camp Evers, Hesse 624; Near Felton, Dudley, Oct. 3, 1896; Santa Cruz, Jones 2255.

5. Clarkia epilobioides (Nutt.) Nels. & Macbr. Bot. Gaz. 65: 60. 1918.

Local distribution: Rare in the Santa Cruz Mountains, known from San Francisco and from near Redwood City and to be expected elsewhere in open woods and along the borders of chaparral. April and May.

General distribution: Coast Ranges, San Francisco southward to the vicinity of Rosario, Baja California.

Specimen examined: Redwood City hills, Hoover 4904.

6. Clarkia modesta Jepson, Man. Fl. Pl. Calif. 673. 1925.

Local distribution: Rare, known only from the vicinity of Los Gatos, associated with oaks and Pinus sabiniana. April through July.

General distribution: Inner Coast Ranges from Lake and Glenn counties south to Santa Barbara County and in the Sierra Nevada foothills from Stanislaus and Mariposa counties south to Tulare County.

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Lewis and Lewis (1955, p. 325) indicated that this species occurs in Santa Clara County and their distribution map (p. 328) shows a cross near Los Gatos. No specimen is cited.

7a. Clarkia rubicunda (Lindl.) Lewis & Lewis ssp. rubicunda, Madroño 12: 34. 1953.

Local distribution: Grasslands and grassy areas in oak woodlands, San Francisco southward. April through August.

General distribution: Coast Ranges from Marin County south to southern Monterey County and in central Alameda County.

Specimens examined: Lake Merced, Lewis & Lewis 857; San Miguel Hills, Raven 11022; Crystal Springs Lakes, Elmer 4310; Near Pescadero Creek, Mason, July 14, 1921; Kings Mt., Abrams, Aug. 26, 1907; Woodside serpentine, Dutton, Apr. 17, 1900; Corte de Madera Creek, Dudley, May 31, 1903; Coal Mine Ridge, Barry 159; Near Stanford, Dudley, June 14, 1895; Black Mt., Dudley, July 6, 1903; Foothills west of Los Gatos, Heller 7479; Near New Almaden, Ferris 2031; Swanton, Rich, Spring 1912; Big Basin, Dudley, Aug. 23, 1900; Saratoga Summit, Thomas 3428; Santa Cruz, Thompson, June 16, 1903; Head of Aptos Creek, Abrams 3057; Watsonville, Elmer 5053.

7b. Clarkia rubicunda (Lindl.) Lewis & Lewis ssp. blasdalei (Jepson) Lewis & Lewis, Univ. Calif. Pub. Bot. 20: 271. 1955.

Local distribution: Coastal bluffs, San Francisco southward. June through October.

General distribution: Along the coast from Marin County south to northern San Luis Obispo County and along the San Francisco Bay in Alameda and Contra Costa counties.

Specimens examined: Mussel Rock, Dudley, Oct. 4, 1909; 3 miles south of San Gregorio, Wolf 566; Pebble Beach, Vestal, June 15, 1937; Pigeon Pt., Wiggins 8933; Santa Cruz, Thompson, July 3, 1903; Seabright, Hichborn, July 14, 1920.

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8. Clarkia davyi (Jepson) Lewis & Lewis, Madroño 12: 33. 1953.

Local distribution: Sandy soils of coastal bluffs, San Francisco and northern San Mateo County. Latter part of May and June.

General distribution: Near the coast from Del Norte County south to northern San Mateo County.

Specimens examined: Near Ocean View, Heller 8384; Walker 1142 (UC); Congdon, June 11, 1889.

9. Clarkia prostrata Lewis & Lewis, Madroño 12: 36. 1953.

Local distribution: Known locally only from sea bluffs at Santa Cruz. June.

General distribution: Along the coast from the vicinity of Santa Cruz south to southern San Luis Obispo County and on Santa Rosa Island.

Specimen cited: Lewis & Lewis (1955, p. 298) cite a specimen from Santa Cruz, Jones, 1881, but do not indicate to which herbarium it belongs. Clarkia prostrata may now be extinct in Santa Cruz County as it has not been collected since 1881.

10a. Clarkia purpurea (Curtis) Nels. & Macbr. ssp. viminea (Dougl.) Lewis & Lewis, Univ. Calif. Pub. Bot. 20: 303. 1955.

Local distribution: Dry open grasslands, San Francisco southward, May through the first part of July.

General distribution: Western Oregon south through the Coast Ranges to Santa Clara and Santa Cruz counties, occasionally found in the Sierra Nevada from Shasta County south to Fresno County, and in southern California from Ventura County to San Bernardino and Orange counties.

Specimens examined: Lake Merced, Dudley, May 11, 1901; Pescadero-La Honda Rd., Mason, July 3, 1921; Peters Creek, Dudley, June 18, 1905; Stanford, Abrams 1657; Foothills west of Los Gatos, Heller 7446; Near Big Basin, Lewis & Lewis 500 (UC); Locatelli Ranch, Thomas 6044.

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10b. Clarkia purpurea (Curtis) Nels. & Macbr. ssp. quadrivulnera (Dougl.) Lewis & Lewis, Univ. Calif. Pub. Bot. 20: 305. 1955.

Local distribution: Grasslands and open wooded areas, San Francisco southward, more common than the preceding subspecies. April through July.

General distribution: Washington and Oregon, mainly west of the Cascades, south through the California Coast Ranges and foothills of the Sierra Nevada to northern Baja California, also in central Arizona.

Specimens examined: Lake Merced, Brandegee, June 1907; Near Ocean View, Heller 8382; Near La Honda, Dudley, July 30, 1894; Near Redwood City, Dudley, May 30, 1894; Woodside serpentine, Dutton, Apr. 17, 1900; Alpine Road, Dudley, May 31, 1903; Coal Mine Ridge, Barry 145; Near Stanford, Randall 267; Black Mt., Applegate 208; Foothills west of Los Gatos, Heller 7445; Glenwood, Dudley, June 20, 1909; Big Basin, Dudley, June 5, 1897; Hilton Airport, Thomas 3460; Near Santa Cruz Big Trees, Dudley, May 15, 1893.

Intermediates between the two subspecies of this species are often encountered.

11. Clarkia franciscana Lewis & Raven, Brittonia 10: 7. 1958.

Local distribution: Endemic in San Francisco, known only from a serpentine slope at the east end of the Presidio. Latter part of June and July.

General distribution: Endemic in San Francisco.

Specimens examined: Presidio, Brandegee, July 11, 1907 (CAS); Howell 31668 (CAS); Raven 9321 (isotype, CAS).

12. Clarkia affinis Lewis & Lewis, Madroño 12: 34. 1953.

Local distribution: Open woods, known from the vicinity of Stanford southward, mainly east of or along the crest of the Santa Cruz Mountains. April and June.

General distribution: Mainly in the Inner Coast Ranges from Lake

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and Colusa counties southward to Ventura County.

Specimens examined: Near Stanford, Abrams, Apr. 1898; Cannon, Apr. 14, 1900; Near Cupertino, Atkinson, Apr. 1900; Stevens Creek, Pendleton 782 (UC); Uvas-Almaden Road, Mason 6947; Mt. Charlie Road, Thomas 3320.

7. Oenothera L. Sp. Pl. 346. 1753.

Stigma linearly 4-lobed; petals over 2.5 cm. long.
Petals 3.5-5 cm. long; cauline leaf blades at least 1/3 as wide as long and strongly crinkled...1. O. X erythrosepala.
Petals 2.5-4 cm. long; cauline leaf blades usually less than 1/4 as wide as long, tending to be plane.
Sepal tips 3-6 mm. long; buds attenuate; sepals 3-3.5 cm. long. 2a. O. hookeri ssp. hookeri.
Sepal tips 1-2.5 mm. long; buds blunt; sepals mostly 2-2.5 cm. long. 2b. O. hookeri ssp. montereyensis.
Stigma spherical or capitate; petals 2 cm. long or less.
Ovary party sterile above, sterile portion 1-12 cm. long; plants cespitose to very short-stemmed.
Capsule winged, under 1 cm. long; annuals; leaves less than 1 cm. wide, sessile.....3. O. graciliflora.
Capsule not winged, over 1 cm. long; perennials; leaves 1-4 cm. wide, distinctly petiolate.....4. O. ovata.
Ovary fertile above; plants not cespitose.
Capsules terete in cross-section; leaves 1-4 mm. wide, generally linear-oblong.
Capsules 15-25 mm. long, not beaked; stems densely pubescent with short appressed or incurved hairs. Plants of coastal sand dunes or inland sand deposits. 5a. O. contorta var. strigulosa.
Capsules usually over 25 mm. long; stems glabrous or with spreading pubescence. Inland plants, usually growing in non-sandy soils.....5b. O. contorta var. epilobioides.
Capsules quadrangular in cross-section; leaves 5-15 mm. wide.
Flowers small, petals 2-4 mm. long.
Stems semi-prostrate; cauline leaves oblong-lanceolate, obtuse, sessile, but not clasping. Plants of sand dunes and sandy soil.....6a. O. micrantha var. micrantha.
Stems erect or ascending; cauline leaves oblong-ovate to broadly ovate, acute, with subcordate clasping base. Inland plants, usually in non-sandy soils. 6b. O. micrantha var. jonesii.
Flowers larger, petals 5-9 mm. long. 7. O. cheiranthifolia.

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1. Oenothera X erythrosepala Borb. Magyar Bot. Lapok. 2: 245. 1903.

Local distribution: Occasional in the Santa Cruz Mountains. June and July.

General distribution: Growing spontaneously throughout much of the United States and southern Canada, Europe, Asia, South America, Africa, and New Zealand.

Specimens examined: Golden Gate Park, Eastwood, July 8, 1915 (CAS); Howell 32964 (CAS).

2a. Oenothera hookeri Torr. & Gray ssp. hookeri, Fl. N. Amer. 1: 493. 1840.

Local distribution: Occasional in disturbed and low moist areas, usually away from the coast. May through August.

General distribution: Coast Ranges and Sacramento Valley from Lake and Sutter counties south to Santa Barbara County. Oenothera hookeri ranges from Washington south to Mexico and east to Kansas and western Texas.

Specimens examined: Lake Merced, Heller 5704; Colma, Abrams 1582; Cahill Ridge, Oberlander 1008; Redwood City, Brandegee, no date; Sargents, Abrams 6313; Near Alma, Rattan, May 3, 1885; Near Big Basin, Thomas 3502.

2b. Oenothera hookeri Torr. & Gray ssp. montereyensis Munz, El Aliso 2: 14. 1949.

Local distribution: Along or near the coast on bluffs, in moist pastures, and in meadows. June through October.

General distribution: Along or near the coast from Half Moon Bay, San Mateo County, south to Morro Bay, San Luis Obispo County.

Specimens examined: Lands end, Rubtzoff 3559 (CAS); Salada Beach, Sutliff, June 16, 1921 (CAS); Pescadero, Mason, June 2, 1921; Dudley, July 29, 1894; Near Swanton, Shockley, Sept. 1919; Santa Cruz, Jones, June 1881; Seabright, Hichborn, July 14, 1920.

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3. Oenothera graciliflora Hook. & Arn. Bot. Beechey 341. 1838.

Local distribution: Occasional, serpentine outcroppings, rocky ground, and open grassy slopes; eastern foothills of the Santa Cruz Mountains from Crystal Springs southward. February through April.

General distribution: Josephine County, Oregon, south through the Coast Ranges and Sierra Nevada foothills to Los Angeles County.

Specimens examined: Spring Valley Lake, Edwards, Mar. 1917; 2 miles north of Woodside, Abrams 6396; Woodside serpentine, Dutton, Feb. 25, 1900; Kings Mt., Mason, Mar. 8, 1917; Stanford Campus, McMurphy, Apr. 1, 1906; Hills back of Los Gatos, Dudley, Apr. 16, 1893; San Jose, Rattan, Apr. 1884; San Juan Bautista Hills, south of San Jose, Knoche, Feb. 3, 1900.

4. Oenothera ovata Nutt. in Torr. & Gray, Fl. N. Amer. 1: 507. 1840.

Local distribution: A common plant of open grassy slopes and meadows, occasionally in serpentine soils. Latter half of February through June.

General distribution: Coast Ranges from Josephine County, Oregon, south to San Luis Obispo County.

Specimens examined: San Francisco, Rubtzoff 3107 (CAS); San Bruno Mt., Thomas 4839; Near Woodside, Dudley, Mar. 16, 1900; Stanford, Elmer 4626; Swanton, Rich, Mar. 7, 1912; 1 mile southeast of mouth of Waddell Creek, Thomas 1302; Arano Gulch, Thompson, Mar. 30, 1902; 1 mile north of Felton, Thomas 1454; New Brighton, Thomas 1420.

Young leaves of Oenothera ovata make a passable substitute for lettuce, but, according to one Italian resident of Boulder Creek, have a mild physic action.

5a. Oenothera contorta Dougl. ex Hook. var. strigulosa (Fisch. & Mey.) Munz, Bot. Gaz. 85: 255. 1928.

Local distribution: Common on well-stabilized coastal sand dunes

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and on inland marine sand deposits, San Francisco south, absent from the eastern slopes of the Santa Cruz Mountains. March through June.

General distribution: Coastal counties from Humboldt County south to Santa Barbara County and on Santa Rosa Island.

Specimens examined: Presidio, Rose 33149; West of Lake Merced, Dudley, May 1, 1901; Lake Merced, Rose 41282; Bonnie Doon, Dudley, Mar. 30, 1899; Ben Lomond Sand Hills, Rose 33240; Thomas 1652; About 3.5 miles west of Watsonville, Thomas 3103; Sunset Beach State Park, Thomas 3073.

Plants of this variety usually have appressed pubescence throughout; occasionally, however, there are divergent trichomes toward the base of the plant.

The two varieties of this species have different ecological requirements. Oenothera contorta var. strigulosa occurs not more than eight miles from the ocean and always in sandy soil, while O. c. var. epilobioides occurs on both sides of the crest of the Santa Cruz Mountains, but in soils with some humus.

5b. Oenothera contorta Dougl. ex Hook. var. epilobioides (Greene) Munz, Bot. Gaz. 85: 256. 1928.

Local distribution: Occasional in areas of bare soil with some humus, at all altitudes and on both sides of the crest of the Santa Cruz Mountains. April through June.

General distribution: Douglas County, Oregon, south, west of the Cascades, through cismontane California to the vicinity of Rosarito in Baja California, also in Chile.

Specimens examined: Stanford, Dudley, June 12, 1893; Swanton, Rich, Spring 1912; Bielawski Lookout, Thomas 1514; Jamison Creek Rd., Thomas 2990; Near Mt. Hermon, Hesse 1260.

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6a. Oenothera micrantha Hornem. ex Spreng. var. micrantha, Syst. 2: 228. 1825.

Local distribution: Mainly on coastal, well-stabilized sand dunes, and on inland sand deposits, San Francisco southward. May and June.

General distribution: Bodega Point, Marin County, south to northern Baja California, usually near the coast.

Specimens examined: Presidio, Rose 33148; Lake Merced, Abrams 1621; San Pedro, Elmer 4813; Sunset Beach State Park, Thomas 3084.

6b. Oenothera micrantha Hornem. ex Spreng. var. jonesii (Levl.) Munz, Amer. Journ. Bot. 19: 778. 1932.

Local distribution: Dry or bare ground, usually not in sand, along the borders of chaparral and occasionally in deserted orchards and vineyards, Santa Clara and Santa Cruz counties. April through July.

General distribution: Throughout California, east of the Sierra Nevada, from northern California south to northern Baja California.

Specimens examined: Foothills west of Los Gatos, Heller 7337; Near Loma Prieta, Hichborn, May 8, 1920; Big Basin, Dudley, June 7, 1895; Empire Grade, Thomas 3471; Glenwood, Dudley, June 19, 1909; Boulder Creek, Thomas 1780; Santa Cruz, Jones 2231 (isotype).

7. Oenothera cheiranthifolia Hornem. ex Spreng. Syst. 2: 228. 1825.

(O. spiralis Hook. Fl. Bor. Amer. 1: 213. 1833.)

Local distribution: A common plant of coastal sand dunes from San Francisco south, often growing with Convolvulus soldanella, Cakile spp., and Abronia spp. April through July; occasional plants to be found with flowers at most times of the year.

General distribution: Coastal sand dunes from Coos County, Oregon,

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south to Point Conception, Santa Barbara County, and on Santa Rosa and Santa Cruz islands.

Specimens examined: Lands End, McMinn 309; Lake Merced, Abrams 1587; San Francisco - San Mateo Co. line, Bacigalupi 2742; San Pedro, Elmer 4942; Pescadero, Abrams 4250; Swanton, Rich, Spring 1912; Santa Cruz, Thomas 1200A; Del Mar, Hichborn 322; Near mouth of Pajaro River, Thomas 1585.

Our plants are referable to the typical variety, O. cheiranthifolia var. cheiranthifolia. Oenothera cheiranthifolia var. suffruticosa Wats. extends from Santa Barbara County south to northern Baja California.

8. Ludwigia L. Sp. Pl. 118. 1753.

1. Ludwigia palustris (L.) Ell. Bot. S. C. & Ga. 1: 211. 1821.

Local distribution: Occasional in the Santa Cruz Mountains, along the edges of ponds and puddles. June through September.

General distribution: A widespread species of North America and Europe.

Specimen examined: Camp Evers, Hesse 1396.

Our specimen may be referred to L. palustris var. pacifica Fern. & Griscom (1935, p. 176), a variety which occurs from Vancouver Island, British Columbia, south to central California in the Coast Ranges, at least to the Santa Cruz Mountains. I have seen no specimens from south of the Santa Cruz Mountains.

86. HALORAGIDACEAE

Leaves finely dissected; aerial leaves sometimes entire; stamens 8. ..... 1. Myriophyllum.
Leaves entire; stamen 1..... 2. Hippuris.

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1. Myriophyllum L. Sp. Pl. 992. 1753.

Floral leaves entire or toothed.....1. M. exalbescens.
Floral leaves dissected.....2. M. verticillatum.

1. Myriophyllum exalbescens Fern. Rhodora 21: 120. 1919.

Local distribution: Lakes, ponds, and reservoirs, often locally abundant, throughout the Santa Cruz Mountains. July through September.

General distribution: Southern Alaska, Hudson Bay, Newfoundland, and Greenland south to California, New Mexico, Kansas, Indiana, and Connecticut.

Specimens examined: Mt. Lake, Abrams 2201; 8 miles south of San Francisco, Wolf 2173; Felt Lake, Dudley, Oct. 1898.

2. Myriophyllum verticillatum L. Sp. Pl. 992. 1753.

Local distribution: San Andreas Lake and Upper Crystal Springs Lake and to be expected in other lakes and reservoirs. Probably to be found with flowers or young inflorescences at all times of the year.

General distribution: British Columbia south to California, east to the Atlantic Ocean, also in Europe and North Africa.

Specimen examined: Southern end of San Andreas Lake, Thomas 5513.

In 1955 Myriophyllum verticillatum was very abundant in San Andreas Lake in a band 10 to 20 feet wide in water between about 5 and 10 feet deep. Until several years ago, the lake level fluctuated considerably, but during the past several years it has remained fairly constant. It has been during the period of lake level stability that M. verticillatum has become abundant. During 1955 a crew of about 10 men was kept busy constantly cutting out the plants. Since then, the lake level has been

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lowered and the infestation has, at least temporarily, been reduced. My collection, cited above, was collected on Dec. 6, 1955. Young inflorescences were present on many plants. I have seen no other specimens of this species south of San Mateo County in the Coast Ranges.

2. Hippuris L. Sp. Pl. 4. 1753.

1. Hippuris vulgaris L. Sp. Pl. 4. 1753.

Local distribution: Known definitely only from one specimen from northern San Mateo County, but to be expected occasionally in shallow ponds. July through September.

General distribution: Circumpolar, south to the Mediterranean, Caucasus, Tibet, California, New Mexico, and the northeastern part of the United States; also in southern South America.

Specimen examined: West Twin Pond, Dudley, Oct. 4, 1909.

Hippuris vulgaris possibly reaches its southern limit of distribution in the Coast Ranges in the Santa Cruz Mountains.

87. ARALIACEAE

Erect perennial herbs; leaves pinnate.....1. Aralia.
Vines; leaves simple, palmately lobed.....2. Hedra.

1. Aralia L. Sp. Pl. 273. 1753.

1. Aralia californica Wats. Proc. Amer. Acad. 11: 144. 1876.

Local distribution: Deeply shaded slopes and along shaded streams, often in dense redwood forests. July through August.

General distribution: Douglas County, Oregon, south, mainly through

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the Outer Coast Ranges to the Santa Ana Mountains of southern California and in the Sierra Nevada from Plumas to Mariposa County.

Specimens examined: Stevens Creek, Randall 6; Loma Prieta, Elmer 4987; New Almaden, Ferris 2033; Alba Road, Thomas 3467.

2. Hedra L. Sp. Pl. 202. 1753.

1. Hedra helix L. Sp. Pl. 202. 1753.

Local distribution: Becoming established in disturbed areas, rarely flowering locally.

General distribution: Native of Europe, widely used as an ornamental and becoming established in California, in Virginia, and probably in other temperate regions.

Specimens examined: Presidio, Howell 32678 (CAS); Golden Gate Park, Raven 6470 (CAS).

88. UMBELLIFERAE

Fruits variously spiny, bristly, or with scales or papillae.
- Bracts of the involucre spine-tipped; fruit scaly...1. Eryngium.
- Bracts of the involucre not spine-tipped, or the bracts lacking; fruit not scaly.
  - Mature fruits linear, at least 4 times as long as broad including the beak.
    - Plants annual; beak long.....2. Scandix.
    - Plants perennial; beak short.....3. Osmorhiza.
  - Mature fruits not linear, not more than twice as long as broad.
    - Umbels sessile or nearly so; plants annual.
      - Herbage scabrous; fruits with uncinate bristles and tubercles. 4. Torilis.
      - Herbage glabrous; fruits papillate.....5. Apiastrum.
    - Umbels pedunculate; plants annual or perennial.
      - Flowers yellow or purple; plants perennial.6. Sanicula.
      - Flowers white or pinkish; plants annual except one species of Daucus.
        - Involucre lacking or occasionally of one bract; fruit with a prominent beak.....7. Anthriscus.
        - Involucre present; fruits lacking a prominent beak.
          - Rays unequal, longer than the bracts.8. Caucalis.
          - Rays equal, shorter than the bracts..9. Daucus.

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Fruits not spiny, bristly, or with scales or papillae, often pubescent.
Fruits not winged, more or less round in cross section or flattened laterally.
Leaves simple.
Plants glabrous, or if pubescent, not stellate; perennial, stems creeping.....10. Hydrocotyle.
Plants stellate-pubescent; annual; stems erect or ascending. 11. Bowlesia.
Leaves compound.
Divisions of the leaves linear to filiform.
Flowers yellow; plants usually over 1.5 m. tall; involucre and involucels lacking; leaves with a licorice taste. 12. Foeniculum.
Flowers white to pink; plants usually under 1.5 m. tall; involucre and involucels present; leaves not with licorice taste.....13. Perideridia.
Divisions of the leaves lanceolate to ovate.
Flowers yellow.
Stylopodium absent; plants caulescent, perennial. Introduced.....14. Petroselinum.
Stylopodium low, conical; plants usually acaulescent. Native.....15. Tauschia.
Flowers white to pink.
Umbels nearly sessile; the rays usually longer than the peduncles; plants annual.....16. Apium.
Umbels not sessile; the peduncles longer than the rays; plants biennial or perennial.
Plants of wet habitats; some part of the fruit corky-thickened.
Leaves once-pinnate; ribs slender. 17. Berula.
Leaves 2-3-pinnate; ribs thick.
Rays over 3 cm. long; leaflets lanceolate. 18. Cicuta.
Rays under 3 cm. long; leaflets ovate. 19. Oenanthe.
Plants of dry habitats; fruit not corky-thickened.
Bracts conspicuously divided into filiform segments. 20. Ammi.
Bracts inconspicuous or lacking, not divided into filiform segments.
Plants 2-3 m. tall; stems with red spots. 21. Conium.
Plants under 1 m. tall; stems not with red spots. 22. Ligusticum.
Fruit winged, not terete in cross section, more or less flattened dorsally.

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Leaves pinnate.
Leaflets 3; flowers white.....23. Heracleum.
Leaflets more than 5; flowers yellow or red..24. Pastinaca.
Leaves 2-3-pinnatifid.
Flowers yellow; leaf divisions usually fine..25. Lomatium.
Flowers white; leaf divisions coarse.....26. Angelica.

1. Eryngium L. Sp. Pl. 232. 1753.

Involucral bracts entire, lacking marginal teeth. Plants mainly of coastal bluffs.....1. E. armatum.
Involucral bracts not entire, with 2 or more spine-like teeth. Inland plants.....2. E. aristulatum.

1. Eryngium armatum (Wats.) Coult. & Rose, Bot. Gaz. 13: 141. 1888.

Local distribution: Along the coast on coastal bluffs. April through June.

General distribution: Along the coast and the margins of bays from Humboldt County south to northern San Luis Obispo County.

Specimens examined: Pebble Beach, Mason, June 2, 1921; Pigeon Pt., Thomas 4282; Santa Cruz, Hesse 987; Jones 2288.

2. Eryngium aristulatum Jepson, Erythea 1: 62. 1893.

Local distribution: Areas where water has stood during the spring, mainly in the Santa Clara Valley. May through October.

General distribution: Coast Ranges from Humboldt County south to San Luis Obispo County and in the Sierra Nevada.

Specimens examined: Jasper Ridge, Vestal, Summer 1926; Stanford, Dudley, June 24, 1897; Palo Alto, Abrams 2232; Stevens Creek, Atkinson, July 1901; Between Gilroy and Morgan Hill, Abrams 5667.

2. Scandix L. Sp. Pl. 256. 1753.

1. Scandix pectin-veneris L. Sp. Pl. 256. 1753.

Local distribution: A common weed of gardens, moist disturbed areas,

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and in meadows. March through May.

General distribution: Native of Eurasia, adventive throughout most of the United States and southern Canada and in other temperate regions.

Specimens examined: Lone Mt., Howell 32465 (CAS); Near Burlingame, Thomas 4830; Stanford, Hichborn, Apr. 22, 1920; Los Altos, Thomas 514; Saratoga, Smith 42001; Near mouth of Pajaro River, Thomas 1594.

3. Osmorhiza Raf. Journ. Phys. 89: 257. 1819.

Involucel lacking.....1. O. chilensis.
Involucel conspicuous.....2. O. brachypoda.

1. Osmorhiza chilensis Hook. & Arn. Bot. Beechey 26. 1830.

Local distribution: Moist woods, usually in deep shade, commonly with Arbutus menziesii, Quercus kelloggii, Q. wislizenii, and Pseudotsuga menziesii. April through September.

General distribution: Newfoundland and Quebec south to New Hampshire, in the Great Lakes region, from Alaska south to southern California and east to Arizona, Colorado, western South Dakota, Montana, and Alberta, also in southern Argentina and Chile.

Specimens examined: Near La Honda, Dudley, July 30, 1894; Alpine School House, Elmer 4285; Kings Mt., Dudley, May 27, 1893; Coal Mine Ridge, Barry 116; Black Mt. Road, Dudley, June 5, 1895; Near Saratoga, Thomas 4008; Above Wrights, Dudley, Apr. 19, 1895; Foothills west of Los Gatos, Heller 7430; Castle Rock, Thomas 3433; Waddell Creek, Thomas 1749; Swanton, Rich, Spring 1912; Glenwood, Dudley, June 20, 1909; Davis, Sept. 1907.

2. Osmorhiza brachypoda Torr. ex Durand, Journ. Acad. Phila. 3: 89. 1855.

Local distribution: Known locally only from Castle Rock Ridge in northern Santa Cruz County, growing in shaded woods, to be expected occasionally elsewhere. May and June.

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General distribution: Coast Ranges from Contra Costa and Santa Clara counties south to San Diego County, Sierra County southward on the western slopes of the Sierra Nevada, and in central Arizona.

Specimen examined: Castle Rock Ridge, Hesse 2208.

4. Torilis Adans. Fam. Pl. 2: 99. 1763.

1. Torilis nodosa (L.) Gaertn. Fruct. 1: 82. 1788.

Local distribution: Usually in shaded areas, along stream banks, in grassy clearings, and at the edges of woods, most common in the lowlands in the eastern part of the area covered by this flora. May and June.

General distribution: Native of Europe, widely introduced into the southern part of the United States and in Oregon and California, also in South America.

Specimens examined: Embarcadero, San Francisco, Howell 31392 (CAS); Above Millbrae, Dudley, May 19, 1893; Woodside to Crystal Springs, Dudley, May 1894; Stanford, Abrams 1642; San Francisquito Creek, Dudley, July 13, 1894; Saratoga, Pendleton 792.

5. Apiastrum Nutt. in Torr. & Gray, Fl. N. Amer. 1: 643. 1840.

1. Apiastrum angustifolium Nutt. in Torr. & Gray, Fl. N. Amer. 1: 644. 1840.

Local distribution: Sandy or rocky soils, occasionally on serpentine, open hills, and in chaparral, also quite common on stabilized coastal sand dunes. Latter part of February through May.

General distribution: Coast Ranges from Glenn County south to northern Baja California, in the Sierra Nevada foothills from Sacramento

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County to Calaveras County, also on most of the Channel Islands, on Cedros Island, and in Pima County, Arizona.

Specimens examined: Crystal Springs Lake, Elmer 4461; Woodside, Dutton, Feb. 11, 1900; San Francisquito Creek at Palo Alto, Dudley, May 12, 1894; Ridge west of Los Gatos, Heller 7468; Hills near Los Gatos, McMurphy, May 1, 1906; Swanton, Rich, Spring 1912; 7 miles north of Davenport, Hesse 935; Sunset Beach, Thomas 3077.

6. Sanicula L. Sp. Pl. 235. 1753.

Basal leaves subentire, lobed or divided or trifoliolate.
- Herbage and bracts yellowish-green; plants more or less prostrate; bracts much longer than the umbels.....1. S. arctopoides.
- Herbage and bracts bright green; plants erect; bracts shorter than the umbels.
  - Leaves subentire to 3-parted, rarely divided further, somewhat succulent; fruit with bristles only above. Plants of coastal sea bluffs in San Francisco.....2. S. maritima.
  - Leaves deeply 3-5-parted, often laciniate, not succulent; fruit with bristles all over. Plants of inland habitats.
    - Plants usually over 3 dm. tall; the leaf margins serrate to lobed, not laciniate; plants usually branched above. 3. S. crassicaulis.
    - Plants usually under 3 dm. tall; the leaf margins laciniate; plants usually branched below.....4. S. laciniata.

Basal leaves pinnatifid or compound.
- Rachis of the leaves toothed.....5. S. bipinnatifida.
- Rachis of the leaves not toothed.
  - Fruit with some uncinate prickles; plants with taproots. 6. S. bipinnata.
  - Fruit lacking uncinate prickles; plants with a globose tuberous root.....7. S. tuberosa.

1. Sanicula arctopoides Hook. & Arn. Bot. Beechey 141. 1832.

Local distribution: Open grassy slopes, windswept summits of coastal hills, and coastal bluffs, often growing with Ranunculus californicus, Lomatium caruifolium, and Sidalcea malvaeflora. March and April.

General distribution: Along or near the coast from Vancouvers Island, British Columbia, south to Santa Barbara County.

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Specimens examined: Twin Peaks, Rose 42001; Colma, Abrams 1598; Ocean View, Dudley, 1893; San Bruno Mt., Ferris 2138; Montara Mt., Dudley, Mar. 17, 1900; Near Pescadero, Dudley, Apr. 17, 1896; Sweeney Ridge, Oberlander 30; Swanton, Rich, Mar. 7, 1912; Boony Doon-Davenport Road, Bacigalupi, Mar. 29, 1922.

2. Sanicula maritima Kell. ex Wats. Bot. Calif. 2: 451. 1880.

Local distribution: Known only from near the coast in San Francisco, probably now extinct in San Francisco. March through May.

General distribution: San Francisco and Alameda Counties and along the coast in San Luis Obispo County.

Specimens examined: Potrero, San Francisco, Cannon, Mar.-May 1891; San Francisco, Brandegee, Apr. 1893.

3. Sanicula crassicaulis Poepp. ex DC. Prod. 4: 84. 1830.

Local distribution: Fairly common throughout the Santa Cruz Mountains, usually away from the coast on shaded slopes, commonly under Quercus agrifolia, Arbutus menziesii, Lithocarpus densiflora, and Pseudotsuga menziesii. February through June.

General distribution: Southern Vancouver Island, British Columbia, south through Washington and Oregon, mainly west of the Cascades, and through the Coast Ranges and Sierra Nevada foothills of California to northern Baja California; also in Chile.

Specimens examined: San Francisco, Brandegee, no date; Bayview Hills, Howell 32302 (CAS); Sawyer Ridge, Oberlander 611; Portola Valley, Randall 420; Coal Mine Ridge, Barry 134; Searsville Lake, Henderson, Apr. 12, 1920; Stanford, Elmer 4502; Black Mt., Randall, Apr. 25, 1908; Foothills west of Los Gatos, Heller 8508; Swanton, Rich, Spring 1912; California Redwood Park, Schockley, June 7-8, 1919; Foot of Blooms Grade, Thomas 1987; Near Glenwood, Thomas 3187; 2-3 miles west of Santa Cruz, Thomas 1494.

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4. Sanicula laciniata Hook. & Arn. Bot. Beechey 347. 1838.

Local distribution: Occasional in San Mateo and northern Santa Clara counties, in oak--madrone woods or at the edges of chaparral. April and May.

General distribution: Along or near the coast from Coos County, Oregon, south to Santa Barbara County.

Specimens examined: Cahill Ridge, Oberlander 796; San Francisquito ridges, Dudley, May 23, 1894.

5. Sanicula bipinnatifida Dougl. ex Hook. Fl. Bor. Amer. 1: 258. 1832.

Local distribution: Common in the Santa Cruz Mountains and adjacent lowlands in oak - grassland, serpentine soils, open slopes and in sandy soil of inland sand deposits, San Francisco southward. Latter part of February through May.

General distribution: Vancouver Island, British Columbia, south, west of the Cascades, through the Coast Ranges and Sierra Nevada foothills to northern Baja California.

Specimens examined: Presidio, Eastwood 258; Sand Hills, San Francisco, Brandegee, no date; San Bruno Hills, Rollins 3100; Sawyer Ridge, Oberlander 991; Half Moon Bay, Dudley, Mar. 26, 1894; Woodside, Dutton, Feb. 11, 1900; Coal Mine Ridge, Barry 230; Stanford, Abrams 2370; Foothills west of Los Gatos, Heller 7284; Almaden Canyon, Bacigalupi 1327; 3 miles south of San Jose, Rust 107; Edenvale, Thomas 4765; Bonny Doon, Thompson, Apr. 14, 1902; Near Glenwood, Thomas 2863.

6. Sanicula bipinnata Hook. & Arn. Bot. Beechey 347. 1838.

Local distribution: Foothills of the Santa Cruz Mountains along the eastern slope in Santa Clara County, growing in oak - grassland in partial shade. March and April.

General distribution: Coast Ranges and lower elevations of the

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western slopes of the Sierra Nevada from Mendocino and Butte counties south to Los Angeles County.

Specimens examined: Stanford, Abrams 5066; Foothills near Stanford, Baker 496; Foothills west of Los Gatos, Heller 7268; East slope of Loma Prieta, Hesse 1483.

7. Sanicula tuberosa Torr. Pacif. R. Rep. 4: 91. 1857.

Local distribution: Rare, known definitely only from the Woodside serpentine. March through May.

General distribution: Coast Ranges from Curry County, Oregon, south to northern Baja California and in the foothills of the Sierra Nevada.

Specimen examined: Woodside serpentine, Dutton, Mar. 11, 1900.

7. Anthriscus Hoffm. Gen. Umbell. 38. 1814.

1. Anthriscus scandicina (Weber) Mansf. Repert. Sp. Nov. 46: 309. 1939.

Local distribution: Moist areas along stream banks, grassland, in oak - madrone woods, on sand hills, and in disturbed areas, San Francisco southward. April through the first half of June.

General distribution: Native of Europe, introduced into Oregon and California and along the eastern seaboard from Nova Scotia to Virginia.

Specimens examined: Presidio, Rose 33145; Crystal Springs Lake, Oberlander 735; Sawyer Ridge, Oberlander 60; Kings Mt., Dudley, June 9, 1906; Coal Mine Ridge, Barry 242; Stanford, Ferris 2178; Near Saratoga, Thomas 4009; Hills west of Los Gatos, Howell 11829; Near Llagas Post Office, Dudley, June 7, 1909; Swanton, Rich, Spring 1912; Ben Lomond Sand Hills, Hesse 1266.

8. Caucalis L. Sp. Pl. 240. 1753.

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1. Caucalis microcarpa Hook. & Arn. Bot. Beechey 348. 1838.

Local distribution: Borders of chaparral, open slopes, and in oak - madrone woods, San Francisco southward. April through June.

General distribution: Southern British Columbia south to northern Baja California and Sonora, east to western Idaho, Utah, and Arizona.

Specimens examined: Lake Merced, Dudley, May 11, 1901; Rubtzoff 2395 (CAS); Near Golden Gate Park, Rattan, Apr. 10, 1877; Lone Mt., San Francisco, Rattan, 1878; Sawyer Ridge, Oberlander 937; Hills southwest of San Mateo, Dudley, May 13, 1906; Coal Mine Ridge, Barry 65; Black Mt., Dudley, June 8, 1895; Foothills west of Los Gatos, Heller 7469; 7 miles north of Davenport, Hesse 934.

9. Daucus L. Sp. Pl. 242. 1753.

Plants lacking a fleshy taproot; annuals; divisions of the bracts of the involucre oblong; plants usually under 0.5 m. tall.
1. D. pusillus.

Plants with a fleshy taproot; biennials; divisions of the bracts of the involucre linear; plants usually over 0.5 dm. tall.
2. D. carota.

1. Daucus pusillus Michx. Fl. Bor. Amer. 1: 164. 1803.

Local distribution: Fairly common on grassy slopes, rocky and serpentine areas, and on coastal bluffs, San Francisco southward. April through June.

General distribution: British Columbia south to Baja California and Sonora, east to the Atlantic Ocean.

Specimens examined: San Francisco, Curran, July 1883; Pt. Lobos, Raven 6926 (CAS); Lake Merced, Dudley, May 11, 1901; Sawyer Ridge, Oberlander 206; San Mateo Creek, Dudley, May 14, 1899; Woodside, Dutton, Apr. 3, 1900; Stanford, Atkinson, Apr. 1900; Mouth of Almaden Canyon, Bacigalupi 1333; Mt. Charlie Rd., Thomas 3317; Santa Cruz, Rose 35222; Sunset Beach, Thomas 3274.

Plants from along the coast, from coastal bluffs, and inland marine sand deposits are usually stouter and have more compact inflorescences.

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2. Daucus carota L. Sp. Pl. 242. 1753.

Local distribution: Occasional as a plant of disturbed areas, road sides, and coastal bluffs. May through November.

General distribution: Native of Europe, widely introduced as a weed.

Specimens examined: Near San Antonio Creek, Randall 413; Wrights - Loma Prieta Road, Ferris 3620; Santa Cruz Pt., Bacigalupi 1484.

10. Hydrocotyle L. Sp. Pl. 234. 1753.

Leaves peltate.....1. H. verticillata.
Leaves not peltate, but reniform.
Terrestrial; fruit sessile; adaxial leaf surface with long trichomes on the veins.....2. H. sibthorpioides.
Aquatic; fruit stipitate; leaves glabrous.....3. H. ranunculoides.

1. Hydrocotyle verticillata Thunb. Diss. Hydrocot. 2. 1798.

Local distribution: Muddy ground along streams, ponds, and marshes, San Francisco southward. June through September.

General distribution: Throughout much of the United States, south to Mexico, in the West Indies, and in South America.

Specimens examined: Mt. Lake, San Francisco, Thompson, Nov. 28, 1902; Crystal Springs Lake, Elmer 4960 (POM); Thompson & Herre, Sept. 21, 1902; Boulder Creek, Hesse 3130; Santa Cruz, Thompson, June 29, 1903; Watsonville, Hayward, July 1, 1929.

Plants with peduncles equalling the leaves and with long pedicels have been called H. verticillata var. triradiata (Rich) Fern. (Rhodora 41: 437. 1939).

2. Hydrocotyle sibthorpioides Lam. Encycl. 3: 153. 1789.

Local distribution: Growing as a lawn weed in San Mateo, and probably to be expected elsewhere. April and May.

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General distribution: Native of Asia and Africa, introduced as a weed into the eastern part of the United States and into San Mateo County.

Specimens examined: San Mateo, Scott, Apr. 10, 1950; Bevan, May 4, 1951.

3. Hydrocotyle ranunculoides L. f. Suppl. 177. 1781.

Local distribution: Growing in soggy humus soil at the edges of ponds and lakes and in fresh water marshes, San Francisco southward. February through October.

General distribution: Widely distributed in the United States, Central America, and South America.

Specimens examined: Ingelside, San Francisco, Elmer 4657; Corte de Madera, McMurphy, Oct. 1, 1905; Coal Mine Ridge, Ferris 2046; Near Alviso, Dudley, Oct. 24, 1909; Camp Evers, Hesse 327; Thomas 3353; Santa Cruz, Thompson, June 29, 1903; Watsonville Slough, Hayward, June 27, 1929.

11. Bowlesia Ruiz & Pav. Fl. Peruv. Prod. 44. 1794.

1. Bowlesia incana Ruiz & Pav. Fl. Peruv. 3: 28. 1802.

Local distribution: Occasional in moist, open grassy areas, in oak - madrone woods, or on brush-covered slopes, commonly with Nemophila and Montia. March through May.

General distribution: Coast Ranges and Sierra Nevada foothills, from Sonoma and Amador counties south to northern Baja California, east to Texas and Louisiana, thence south to Sonora, Mexico; also in South America.

Specimens examined: Near Presidio, Rattan, 1878; Golden Gate Park, Raven 6557 (CAS); San Francisco Watershed Reserve, Oberlander 963; La Honda, Baker 510; Purisima Creek, Dudley, Mar. 27, 1894; Stanford University, Dudley, May 1, 1902; Swanton, Rich, Apr. 1912.

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12. Foeniculum Adans. Fam. Pl. 2: 101. 1763.

1. Foeniculum vulgare Mill. Gard. Dict. ed. 8. no. 1. 1768.

Local distribution: A common weed of disturbed areas, along fences and roads, but seldom collected. May through October.

General distribution: Native of the Mediterranean region, widely introduced into temperate and subtropical regions.

Specimens examined: Bayview Hills, Howell 32401 (CAS); Upper Crystal Springs Lake, Oberlander 385; Searsville, Abrams 1025; Near Mayfield, Randall 415; About 4 miles north of Santa Cruz, Thomas 4568.

13. Perideridia Reichenb. Handb. 219. 1837.

Plants with a fleshy tuberous root; styles long, slender.
1. P. gairdneri.
Plants with a number of woody roots arranged in a cluster; style short, the base thick and conical.....2. P. kelloggii.

1. Perideridia gairdneri (Hook. & Arn.) Mathias, Brittonia 2: 244. 1936.

Local distribution: Occasional in open grassy areas and in moist flats along the coast. June through September.

General distribution: Widespread in western United States and southern Canada from near sea level to over 10,000 feet, from British Columbia south to southern California, east to Montana, South Dakota, Colorado, and New Mexico.

Specimens examined: Near Pebble Beach, Hesse 1344; Ano Nuevo Pt., Wiggins & Ferris 9295; Palo Alto, Halsey, Sept. 15, 1908; Big Basin, Dudley, Sept. 23, 1905; Santa Cruz, Jones 2291.

2. Perideridia kelloggii (Gray) Mathias, Brittonia 2: 244. 1936.

Local distribution: Occasional in grasslands and on wooded or brush covered slopes. June through August.

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General distribution: Coast Ranges from Humboldt and Trinity counties south to Santa Cruz and San Benito counties, and in the Sierra Nevada as far south as Mariposa County.

Specimens examined: San Francisco, Congdon, Aug. 1893; Hunters Pt., Howell 32787 (CAS); Belmont, Congdon, July 27, 1897; Near Crystal Springs Lake, Randall 411; Foothills west of Los Gatos, Heller 7535; Empire Grade, Thomas 3477; Ridge, head of Aptos Creek, Abrams 3027.

14. Petroselinum Hoffm. Gen. Umbell. 78. 1814.

1. Petroselinum crispum (Mill.) Mansfeld, Repert. Sp. Nov. 46: 307. 1939.

Local distribution: Known from San Francisco and central Santa Cruz County as weeds. June through August.

General distribution: Native of Europe, widely established in other parts of the world.

Specimens examined: Sutro Heights, Howell 32922 (CAS); Near Hilton Airport, Thomas 3560.

The second collection cited above grew in a garden, but was very definitely spreading. Petroselinum crispum, parsley, is to be expected elsewhere as an occasional weed.

15. Tauschia Schlecht. Linnaea 9: 607. 1834.

Bracts of the involucre conspicuous; fruit about 4-7 mm. long.
1. T. hartwegi.
Bracts of the involucre inconspicuous; fruit about 3-5 mm. long.
2. T. kelloggii.

1. Tauschia hartwegi (Gray) Macbr. Contr. Gray Herb. 56: 32. 1918.

Local distribution: Occasional in northern Santa Clara County, usually on wooded slopes and to be expected farther south. April and May.

General distribution: Coast Ranges from Contra Costa County south

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to Los Angeles County and in the foothills of the Sierra Nevada from Butte County south to Fresno County.

Specimens examined: Stanford, Kraus, May 3, 1893; Black Mt., Randall, Apr. 25, 1908; Clarita Vineyard, Elmer 4441.

2. Tauschia kelloggii (Gray) Macbr. Contr. Gray Herb. 59: 29. 1919.

Local distribution: Known so far only from San Mateo County, commonly in grassland, along the edges of chaparral, and on wooded slopes. Latter part of March through May.

General distribution: Josephine and Jackson counties, Oregon, south through the Coast Ranges at least as far as Monterey County, and in the Sierra Nevada at low elevations from Butte to Kern counties.

Specimens examined: Pilarcitos Canyon, Oberlander 163; Crystal Springs Lake, Elmer 4928; San Mateo Ravine, Dudley, Apr. 21, 1894; Calera Valley, Dudley, May 14, 1899.

16. Apium L. Sp. Pl. 264. 1753.

1. Apium graveolens L. Sp. Pl. 264. 1753.

Local distribution: Usually in heavy moist soils and in salt marshes. July through October.

General distribution: Native of Europe, widely grown and locally established.

Specimens examined: Presidio swamp, Cannon, no date (CAS); Alemany Blvd. near Bayshore, Howell 31769 (CAS); Palo Alto, Abrams 1024; Mt. View - Alviso Rd., Ferris 2064; San Antonio Creek, Randall 410; Santa Cruz, Thompson, July 2, 1903.

17. Berula Hoffm. ex Bess. Enum. Pl. Volh. 44. 1822.

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1. Berula erecta (Huds.) Coville, Contr. U. S. Nat. Herb. 4: 115. 1893.

Local distribution: San Francisco and San Francisco Watershed Reserve. July and August.

General distribution: Widely distributed in North America from British Columbia to Ontario, south to Baja California, New Mexico, and Illinois; also in Eurasia.

Specimens examined: Fort Point, Cannon, 1891 (CAS); Lake Merced, Rubtzoff 2768 (CAS); 3078 (CAS).

Oberlander (1953, p. 151) reported this species from the San Francisco Watershed Reserve. He apparently did not prepare a specimen.

18. Cicuta L. Sp. Pl. 255. 1753.

1. Cicuta douglasii (DC.) Coult. & Rose, Contr. U. S. Nat. Herb. 7: 95. 1900.

Local distribution: Occasional along sloughs and marshes, poorly collected. June through August.

General distribution: Widespread in western North America from Alaska south to British Columbia and Alberta, thence south to southern California, Arizona, and New Mexico, also in northern Mexico.

Specimens examined: Mayfield to Mt. View, Carey, Mar. 30, 1918; Watsonville, Hayward, July 5, 1929.

Cicuta bolanderi Wats. (Proc. Amer. Acad. 11: 139. 1876), which occurs in salt marshes from central to southern California, is to be expected locally. It differs from C. douglasii in having very oily fruits and the intercostal intervals equalling or wider than the ribs, while C. douglasii has fairly non-oily fruits and the intercostal spaces are narrower than the ribs.

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19. Oenanthe L. Sp. Pl. 254. 1753.

1. Oenanthe sarmentosa Presl in DC. Prod. 4: 138. 1830.

Local distribution: Fairly common along or near the coast, along San Francisco Bay, and occasionally inland in marshes. May through October.

General distribution: Middleton Island, Alaska, southward, mainly along or near the coast to southern California, but occasionally inland.

Specimens examined: San Francisco, Brandegee, no date; San Miguel Hills, Rubtzoff 2539 (CAS); Lake Merced, Bacigalupi 1496; West of San Bruno, Dudley, Aug. 20, 1919; Baden Brook, Dudley, May 14, 1899; Alpine School, Elmer 4690; Searsville Lake, Abrams 7349; Alviso, Thomas 5316; Mayfield to Mountain View, Carey, May 30, 1918; Swanton, Rich, Spring 1912; Davenport Landing, Thomas 3647; Camp Evers, Thomas 3356; Santa Cruz, Thompson, June 20, 1903; Watsonville, Hayward, July 31, 1928.

20. Ammi L. Sp. Pl. 243. 1753.

1. Ammi visnaga (L.) Lam. Fl. Franc. 3: 402. 1778.

Local distribution: Known locally only from the vicinity of Saratoga, but probably to be expected elsewhere in the Santa Clara Valley. June through September.

General distribution: Native of Eurasia, introduced into Oregon and California, in the southern part of the United States, and in other temperate regions.

Specimen examined: Foothills, south of Moody Road, Dudley, Nov. 1903.

According to Jepson (1936, p. 619), "This species was collected at Saratoga in September, 1893 (Davy 248) and must, therefore, have been introduced prior thereto. Collected again in 1912 (Jepson 5156) and yet again in 1920 (H. A. Dutton), its slow spread has, apparently been con-

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fined essentially to one locality."

21. Conium L. Sp. Pl. 243. 1753.

1. Conium maculatum L. Sp. Pl. 243. 1753.

Local distribution: A common weed of fields, disturbed areas, and along creeks. June through August.

General distribution: Native of Eurasia and North Africa, widely introduced into other parts of the world.

Specimens examined: Lone Mt., Howell 32495 (CAS); San Mateo, Elmer 4951; Kings Mt., Abrams 2243; Coal Mine Ridge, Abrams 5110; Stanford, Randall 412; Santa Cruz, Thompson, July 2, 1903; Sunset Beach, Thomas 3279.

22. Ligusticum L. Sp. Pl. 250. 1753.

1. Ligusticum apiifolium (Nutt.) Gray, Proc. Amer. Acad. 7: 347. 1868.

Local distribution: San Francisco and northern San Mateo County, often on windswept grassy summits or with shrubby vegetation in exposed areas. April through June.

General distribution: Western Washington south through the Coast Ranges to San Mateo County.

Specimens examined: Mission Hills, Congdon, Apr. 25, 1893; Twin Peaks, Thomas 4886; Near Oceanview, Heller 8372; San Bruno Mt., Vestal, May 19, 1926; San Mateo, Elmer 4803.

23. Heracleum L. Sp. Pl. 249. 1753.

1. Heracleum maximum Bartr. Trav. 344. 1791.

Local distribution: Common on moist slopes, wooded slopes, at the edges of brush, and on coastal bluffs. April through July.

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General distribution: Widespread in North America from Alaska to California, east to Labrador and Georgia; also in Siberia.

Specimens examined: Bakers Beach, Raven 393 (CAS); San Miguel Hills, Rubtzoff 3188 (CAS); Pilarcitos Creek Dam, Elmer 5073; Coal Mine Ridge, Barry 262; San Francisquito Creek, Davis, Apr. 1903; Page Mill Road, Applegate 225; San Antonio Creek, Randall 416; Below Saratoga Summit, Thomas 3118; 1 mile south of Olympia, Thomas 1889.

24. Pastinaca L. Sp. Pl. 262. 1753.

1. Pastinaca sativa L. Sp. Pl. 262. 1753.

Local distribution: Occasional in bottom lands as an escape from cultivation. April and June.

General distribution: Native of Europe, widely established in temperate North America.

Specimens examined: San Miguel Hills, San Francisco, Rubtzoff 2992 (CAS); Cary's Ranch, Mayfield to Mt. View, Abrams 6878; Boulder Creek, Walker 834 (JEPS).

25. Lomatium Raf. Journ. Phys. 89: 101. 1819.

Plants usually over 3 dm. tall; leaf divisions coarse; fruits glabrous. 1. L. californicum.
Plants usually under 3 dm. tall; leaf divisions fine; fruit glabrous or pubescent.
  Bracts of the involucre obovate.
    Petiolules of the primary leaflets shorter than the compound blade; cauline leaves usually several; the wings usually broader than the body of the fruit.....2. L. utriculatum.
    Petiolules of the primary leaflets longer than or as long as the compound blade; cauline leaves usually 1 (occasionally more); the wings usually narrower than the body of the fruit. 3. L. caruifolium.
  Bracts of the involucre not obovate, usually oblong.
    Petals glabrous; fruit oblong.....4. L. macrocarpum.
    Petals pubescent; fruit nearly orbicular.....5. L. dasycarpum.

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1. Lomatium californicum (Nutt.) Math. & Const. Bull. Torr. Bot. Club 69: 246. 1942.

Local distribution: Occasional, usually on shaded slopes. April and May.

General distribution: Southwestern Oregon south through the Coast Ranges to Ventura County.

Specimens examined: Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Permanente Creek, Dudley, Apr. 30, 1899.

2. Lomatium utriculatum (Nutt.) Coult. & Rose, Contr. U. S. Nat. Herb. 7: 215. 1900.

Local distribution: Open grassy slopes and ridges, occasionally on serpentine. March through April.

General distribution: Southern British Columbia south to southern California, west of the Cascades, through the Coast Ranges and Sierra Nevada foothills of California.

Specimens examined: Mt. Davidson, Clark, May 25, 1933 (CAS); Crystal Springs Lake, Elmer 4794; Alpine Grade, Ferris 741; Coal Mine Ridge, Barry 50; Stanford, Dudley, May 9, 1899; Mouth of Almaden Canyon, Bacigalupi 1331; 1 mile southwest of Saratoga Summit, Thomas 2973.

3. Lomatium caruifolium (Hook. & Arn.) Coult. & Rose, Contr. U. S. Nat. Herb. 7: 216. 1900.

Local distribution: Grassy slopes and fields, often on the wind-swept summits, less frequently in the low heavy soil in the Santa Clara Valley. March and April.

General distribution: Coast Ranges from Humboldt and Trinity counties south to Santa Barbara County.

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Specimens examined: Near Golden Gate Park, Rattan, Apr. 10, 1877; Bernal Heights, Mason 1262; Hunters Pt., Mason 4373; San Bruno Hills, Abrams 7055; 1 mile west of Brisbane, Rollins 3009; Crystal Springs Lake, Baker 426; Near San Mateo, Dudley, Mar. 26, 1894; Black Mt., Dudley, Apr. 14, 1900; 3 miles south of San Jose, Thomas 4793.

4. Lomatium macrocarpum (Hook. & Arn.) Coult. & Rose, Contr. U. S. Nat. Herb. 7: 217. 1900.

Local distribution: Commonly growing on open serpentine outcroppings, northern San Mateo County southward on the eastern slopes of the Santa Cruz Mountains. April and May.

General distribution: British Columbia south to San Luis Obispo and Kern counties, east to Nevada, northern Utah, Wyoming, North Dakota, and Manitoba.

Specimens examined: Crystal Springs Lake, Elmer 4926; San Mateo Ravine, Dudley, Apr. 21, 1894; Between Woodside and Crystal Springs Lake, Abrams, Apr. 10, 1904; Tuff Hill, Cannon, Apr. 18, 1900; Black Mt., Dudley, July 6, 1903; Guadalupe Hills, near San Jose, Patterson, Apr. 15, 1907.

5. Lomatium dasycarpum (Torr. & Gray) Coult. & Rose, Contr. U. S. Nat. Herb. 7: 218. 1900.

Local distribution: Common in rocky soil of ridges, serpentine outcroppings, and chaparral, San Francisco southward. Latter half of February through May.

General distribution: Coast Ranges, Humboldt County south to San Diego County.

Specimens examined: Mission Hills, Rattan, no date; San Bruno Mt., Thomas 4273; Crystal Springs Lake, Abrams 2447; Sawyer Ridge, Oberlander 606; West of Redwood City, Dudley, May 19, 1906; Woodside serpentine, Dutton, Feb. 18, 1900; Stanford, Kraus, Mar. 24, 1893; Foothills west of Los Gatos, Heller 7265; Near New Almaden, Constance 2079; Almaden Canyon, Bacigalupi 1332; Near Loma Prieta, Thomas 3980; Eagle Rock, Thomas 3691; Between Gilroy and Corralitos, Jepson 14300 (JEPS).

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26. Angelica L. Sp. Pl. 250. 1753.

Leaves densely tomentose on the abaxial surface. Plants of coastal bluffs.....1. A. hendersoni.
Leaves villous to scabrous on the abaxial surface. Inland plants. 2. A. tomentosa.

1. Angelica hendersoni Coult. & Rose, Bot. Gaz. 13: 80. 1888.

Local distribution: Coastal bluffs in San Francisco and along the coast in San Mateo County. April through June.

General distribution: Along the coast from southern Washington to San Mateo County.

Specimens examined: Lake Merced, Rubtzoff 3403 (CAS); Mussel Rocks, Rose 37467 (RSA); Near Mussel Rock, Dudley, Oct. 4, 1909; Near Pescadero, Mason, June 2, 1921.

2. Angelica tomentosa Wats. Proc. Amer. Acad. 11: 141. 1876.

Local distribution: Brush-covered slopes, occasionally to be found from northern San Mateo County southward. July through October.

General distribution: Coast Ranges from Coos County, Oregon, south to Santa Cruz County, and in the mountains of southern California.

Specimens examined: Crystal Springs Lake, Elmer 4998; Stanford, Dudley, July 1893; Black Mt., Abrams, Sept. 1902; Stevens Creek, Abrams 3001; Above Raymonds, Dudley, Sept. 1906; Santa Cruz, Thompson, July 2, 1903.

Conioselinum chinense (L.) B. S. P. (Prelim. Cat. N. Y. 22. 1888) was reported from the Mission Hills in San Francisco by Greene (1894, p. 154). This species is probably no longer to be found in San Francisco. It has glabrous leaves while those of Angelica are variously pubescent.

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89. CORNACEAE

1. Cornus L. Sp. Pl. 117. 1753.

Inflorescence cymose; large, conspicuous, white bracts absent; shrubs.
Branches of the inflorescence glabrous or with a few appressed hairs; petals strap-shaped; leaves with few appressed hairs on the abaxial surface, veins not prominent; drupe white. 1. C. glabrata.
Branches of the inflorescence pubescent, either with appressed or spreading hairs; petals ovate-oblong; leaves with spreading hairs on the abaxial surface, veins prominent; drupe bluish. 2. C. californica.
Inflorescence capitate; large, conspicuous, white bracts present; trees. 3. C. nuttallii.

1. Cornus glabrata Benth. Bot. Sulph. 18. 1844.

Local distribution: Along or near streams on the eastern slopes of the Santa Cruz Mountains at low elevations. Latter part of March through June.

General distribution: Southern Oregon south through the Coast Ranges to San Diego County.

Specimens examined: Crystal Springs, Eastwood 344 (CAS); Los Trancos Creek, Wolf 2326; Black Mt., Dudley, June 3, 1900; Page Mill Road, Wiggins 9220; Los Altos, Campbell, Sept. 1918.

The type locality of this species is listed in the original description as San Francisco.

2. Cornus californica C. A. Mey. Bull. Acad. St. Petersb. Phys.-Math. 3: 372. 1845.

Local distribution: Along streams and moist shaded slopes throughout the Santa Cruz Mountains from near sea level to about 2500 feet. April through the first half of June.

General distribution: Southern British Columbia south through

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Washington, northern Idaho, Oregon, and California to San Diego County.

Specimens examined: San Francisco, Rattan, 1867; Pescadero Creek, Dudley, June 8, 1895; San Mateo Creek, Dudley, Apr. 21, 1894; Loma Prieta, Dudley, Oct. 12, 1902; New Almaden, Ferris 2034; Waddell Creek, Dudley, Sept. 23, 1901; Zayante Creek, Wolf 11118.

3. Cornus nuttallii Audubon ex Torr. & Gray, Fl. N. Amer. 1: 652. 1840.

Local distribution: Definitely known from only one locality, 1 mile below the summit of the Santa Cruz - Los Gatos Highway in Santa Cruz County. April through June.

General distribution: British Columbia south through the Cascades, the Coast Ranges to southern Monterey County, and through the Sierra Nevada and the mountains of southern California to San Diego County; also in west central Idaho.

Specimens examined: Santa Cruz - Los Gatos Highway, Tilden, Apr. 14, 1946; Thomas 3331.

If this were the only locality for Cornus nuttallii south of the Golden Gate, I would hesitate to include it as part of the native flora. However, in the Dudley Herbarium there is a specimen (Ferris 3645) from Upper San Antonio Canyon, Monterey County which, according to the collector, appeared to have grown there without the aid of man. Behr (1891, p. 4) reported that "Near the formerly well known Russ Gardens there were extensive marshes abounding especially about their borders in interesting plants. Here grew the large-flowered dogwood (Cornus nuttallii),....." Russ Gardens was in San Francisco. In addition, there is an unverified report of a tree from Ben Lomond Mountain in Santa Cruz County. I was told of this by a man who works as a gardener in Boulder Creek. Flowering dogwoods are not trees that are easily mistaken.

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My specimen, cited above, came from a tree that grows at the edge of an abandoned orchard in a small ravine. It is shaded on three sides by Pseudotsuga menziesii and Arbutus menziesii. The tree is perhaps 30-35 feet tall and consists of seven trunks, some 12-15 inches in diameter at the base. Flower and seed production are copious, but no seedlings have been observed. Local residents indicated that this tree had always been in the area within their memory and that of their parents. Occasional trees south of the Golden Gate probably represent fortuitous dispersal.

90. GARRYACEAE

1. Garrya Dougl. Bot. Reg. 20: pl. 1686. 1834.

Leaves densely tomentose beneath, margins undulate.....1. G. elliptica.
Leaves glabrous or sometimes sparingly pubescent, blades flat.
2. G. fremontii.

1. Garrya elliptica Dougl. Bot. Reg. 20: pl. 1686. 1834.

Local distribution: Occasional in chaparral. December through April.

General distribution: Coast Ranges from central Oregon south to San Luis Obispo County, and on Santa Cruz Island.

Specimens examined: Cahill Ridge, Oberlander 47; Portola, Elmer 4469; Coal Mine Ridge, Barry 222; Los Altos, Rose 33085; East slope of the Santa Cruz Mountains on Watsonville Road, Dudley, Mar. 11, 1901; Eagle Rock, Thomas 3693.

A recent number of Curtis's Botanical Magazine (Turrill, 1954, pl. 220) contains a good colored plate, history of the discovery, description, and affinities of Garrya elliptica.

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2. Garrya fremontii Torr. Pacif. R. Rep. 4: 136. 1857.

Local distribution: Known only from Loma Prieta, Loma Prieta Ridge, and Mount Umunhum at an altitude of about 3000 feet or above and as a component of chaparral. November through April.

General distribution: Southern Washington south through the Sierra Nevada to Tulare County and in the Coast Ranges to Monterey County; also in the mountains of southern California.

Specimens examined: Loma Prieta, Ferris 2049; Vicinity of Loma Prieta, Thomas 2851; Mt. Umunhum, Thomas 3967.

Garrya fremontii is typically an Inner Coast Range and inland species. It occurs in the Santa Cruz Mountains only where the habitat is similar to that of the Inner Coast Ranges.

91. PYROLACEAE

1. Pyrola L. Sp. Pl. 396. 1753.

1. Pyrola picta Smith f. aphylla (Smith) Camp, Bull. Torr. Bot. Club 67: 464. 1940.

Local distribution: Rare in the Santa Cruz Mountains, known only from Butano Ridge, Big Basin, and the adjoining territory where it is associated with Arbutus menziesii, Pseudotsuga menziesii, and Lithocarpus densiflora. June through July.

General distribution: British Columbia south to Idaho, Washington, Oregon, and to San Diego County.

Specimens examined: Pescadero, Elmer 4297; Butano Ridge, Mason, July 3, 1921; Big Basin, McCracken, June 1912.

Specimens from the Santa Cruz Mountains usually have no leaves. I

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have seen only one specimen with foliage leaves, and even then, there was only one small leaf.

92. MONOTROPACEAE

Corolla sympetalous; flower parts pubescent.....1. Hemitomes.
Petals united only at the base; flowers parts glabrous.
2. Pleuricospora.

1. Hemitomes Gray, Pacif. R. Rep. 6: 80. 1853.

1. Hemitomes congestum Gray, Pacif. R. Rep. 6: 81. 1858.

Local distribution: Very rare in redwood - douglas fir forests and known definitely only from Butano Ridge, Big Basin, and Brookdale. May through June.

General distribution: Olympic Mountains, Washington, south to the northern Sierra Nevada and the Santa Lucia Mountains in Monterey County.

Specimen examined: Butano Ridge, Ferris 3878.

Jepson (1939, p. 65) cites two additional specimens from the Santa Cruz Mountains. These are: Brookdale, Booth, and Big Basin, Reed.

2. Pleuricospora Gray, Proc. Amer. Acad. 7: 369. 1868.

1. Pleuricospora fimbriolata Gray, Proc. Amer. Acad. 7: 369. 1868.

Local distribution: Rare in the Santa Cruz Mountains and known only from Butano Ridge, Big Basin, and the area west of Felton in the redwoods. June.

General distribution: British Columbia south through Washington and Oregon to Tulare County in the Sierra Nevada and to Santa Cruz County in the Coast Ranges.

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Specimens examined: Between Pescadero Creek and Butano, Dudley, June 7, 1895; Big Basin, Elmer 5075; Waddell Creek, Dudley, June 2, 1897.

Pleuriscopora fimbriolata reaches its southern limit in the Coast Ranges in Santa Cruz County. A large disjunction exists in its range to the north. It is not found between southern San Mateo County and Humboldt County.

93. ERICACEAE

Corolla of separate petals; leaves resinous-dotted abaxially.
1. Ledum.
Corolla of united petals; leaves not resinous-dotted.
Corolla funnelform to campanulate, over 3 cm. long.
2. Rhododendron.
Corolla urceolate, 1 cm. long or less.
Fruit a capsule; calyx becoming fleshy; small, weak-stemmed shrubs, usually in moist forests.....3. Gaultheria.
Fruit a berry, or drupe-like; calyx not becoming fleshy; trees and shrubs with hard stems and branches.
Cells of the ovary many-seeded; surface of ovary granular; leaves usually over 6 cm. long; large trees.
4. Arbutus.
Cells of the ovary with a single seed; surface of the ovary glabrous or glandular, not granular; leaves usually less than 6 cm. long; shrubs, rarely small trees.
5. Arctostaphylos.

1. Ledum L. Sp. Pl. 391. 1753.

1. Ledum glandulosum Nutt. ssp. columbianum (Piper) Hitchc. var. australe Hitchc. Leafl. West. Bot. 8: 8. 1956.

Local distribution: Known only from the vicinity of Boulder Creek in Santa Cruz County. July.

General distribution: Bogs and swamps, usually along or near the coast from Clatsop County, Oregon, south to Santa Cruz County.

Specimens examined: Near Boulder Creek, Hesse 303; Boulder Creek, Reed, July 18, 1920 (JEPS).

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This variety reaches its southern limit of distribution in Santa Cruz County.

2. Rhododendron L. Sp. Pl. 392. 1753.

Leaves thick, coriaceous, evergreen, brown abaxially; stamens 10, not exserted.....1. R. macrophyllum.
Leaves thin, deciduous, green abaxially; stamens 5, exserted.
2. R. occidentale.

1. Rhododendron macrophyllum D. Don ex G. Don, Gen. Hist. Pl. 3: 843. 1834.

Local distribution: Occasional in southern San Mateo County and Santa Cruz County, usually near the coast or occasionally inland as on Butano Ridge, Pine Mountains, and at Bonny Doon. April through July.

General distribution: Coastal British Columbia south to Santa Cruz County.

Specimens examined: Swanton, Rich, Spring 1912; California Redwood Park, Shockley, June 7-8, 1919; Summit of Pine Mt., McMinn 264; Bonny Doon, Bacigalupi, Mar. 29, 1922; Scott Valley, Dudley, no date.

I have seen no specimens from south of Santa Cruz County. However, Brandegee (1890) reported R. macrophyllum from "the mountains three miles back of Monterey."

Miss Vesta Hesse of Boulder Creek has told me that this species grows in Big Basin just below Woodwardia Falls and that it is quite common on Butano Ridge.

2. Rhododendron occidentale (Torr. & Gray) Gray, Bot. Calif. 1: 458. 1876.

Local distribution: Along creeks and about the edges of moist

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meadows, either in shade or in the open, from Pescadero Creek to the vicinity of Santa Cruz usually within 10 miles of the coast. May through July.

General distribution: Douglas County, Oregon, south to San Diego County in the Coast Ranges and to Fresno County in the Sierra Nevada.

Specimens examined: Pescadero Creek, Dudley, June 6, 1895; Butano Creek, Elmer 4298; Swanton, Rich, Spring 1912; Big Basin, McMinn 45; Santa Cruz, Jones 2235.

3. Gaultheria L. Sp. Pl. 395. 1753.

1. Gaultheria shallon Pursh, Fl. Amer. Sept. 284. 1814.

Local distribution: Occasional in the understory of redwood - douglas fir forests and less frequently in broad-leaf - douglas fir forests; more common on the western slopes of the Santa Cruz Mountains. April through July.

General distribution: Southern Alaska, from the vicinity of Sitka south, west of the Cascades, to San Luis Obispo County.

Specimens examined: kKings Mt., Atkinson, Nov. 1, 1902; Lower part of Pescadero Creek, Dudley, Mar. 24, 1894; Swanton, Rich, May 1912; San Vicente Creek, Thomas 3403; Big Trees, Stinchfield 152.

Gaultheria shallon was reported from "rocky summits of Mission Hills," San Francisco (Brandegee, 1891, p. 363). This species, which in the northern part of its range is often 4, 5, or more feet tall, rarely gets over 2 feet tall in the Santa Cruz Mountains.

4. Arbutus L. Sp. Pl. 395. 1753.

1. Arbutus menziesii Pursh, Fl. Amer. Sept. 282. 1814.

Local distribution: Wooded slopes throughout the Santa Cruz

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Mountains, most commonly associated with Lithocarpus densiflora, Pseudotsuga menziesii, and Quercus spp., but occasionally forming pure but small stands. March through May.

General distribution: Southern British Columbia south through the Coast Ranges to San Diego County and in the Sierra Nevada from Nevada to Mariposa counties.

Specimens examined: Woodside, Applegate 315; Page Mill Road, Dudley, Mar. 27, 1904; Morgan Hill, Briton, Apr. 2, 1908; Santa Cruz Mts., Dudley, Dec. 3, 1893; 2 miles south of Felton, Thomas 2905.

Eastwood (1896a, p. 99) reported this species from San Francisco.

Arbutus menziesii is one of the handsomest trees in the Coast Ranges. The white flowers begin to appear in March. By August they have been replaced by clusters of bright red berries. In early summer the old layers of bark peel, leaving the trunk a pale green color which soon changes through successive shades to a rich reddish brown. Only on old trunks and branches do the layers of bark remain for more than a year or two.

5. Arctostaphylos Adans. Fam. Pl. 2: 165. 1763.

Arctostaphylos is a difficult genus taxonomically and one which has evolved rapidly during the Pliocene and Pleistocene (Stebbins, 1950, p. 558) and is probably still undergoing rapid evolution. The rapid evolution has resulted in many small isolated populations which are morphologically distinct, for example Arctostaphylos silvicola and A. glutinosa, and in widespread variable populations, as for example A. crustacea and A. glandulosa. In order to satisfactorily determine a specimen of Arctostaphylos it is essential that adequate field notes be taken. Field

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notes should include the following: 1. presence or absence of a burl, 2. height of the shrub and general habit, whether prostrate, procumbent, or erect, 3. pubescence, bloom, and/or viscidness of the leaves, twigs, young ovaries, and mature fruits, and 4. position of the nascent inflorescences, whether erect or drooping.

Flowers 4-merous; leaves 12-20 mm. long, glossy on both surfaces; erect shrubs, 0.5-1.5 m. tall.....1. A. sensitiva.
Flowers 5-merous.
Leaves, petioles, and young branches glaucous; nutlets united into one stone; shrubs or small trees, 2-3 m. tall. Eastern slopes of the Santa Cruz Mountains from the vicinity of Los Gatos south to Loma Prieta.....2. A. glauca.
Leaves, petioles, and young branches not glaucous; nutlets separable.
Low, procumbent or prostrate shrubs. San Francisco and the San Bruno Mountains.
Leaves elliptic, 1-2 cm. long, rounded at the base, petiolate. San Francisco.....3. A. franciscana.
Leaves oblong-elliptic, 2.5-3 cm. long, deeply cordate at the base, sessile and clasping. San Bruno Hills. 4b. A. andersonii var. imbricata.
Erect shrubs.
Leaves auriculate or deeply cordate at the base, sessile, clasping; plants not stump sprouting, killed by fire.
Leaves nearly glabrous adaxially; nascent inflorescences more or less erect.
Leaves 4-6 cm. long. Crystal Springs southward. 4a. A. andersonii var. andersonii.
Leaves 2.5-3 cm. long. San Bruno Hills. 4b. A. andersonii var. imbricata.
Leaves canescent adaxially; nascent inflorescences drooping. Northwestern Santa Cruz Co., growing on Montereyshale. 5. A. glutinosa.
Leaves usually acute, rounded, truncate, or subcordate at the base (if auriculate or deeply cordate, then not sessile and clasping).
Plants not stump sprouting, killed by fire.
Young twigs with long or short bristly hairs. Northern Santa Cruz Co., growing on Monterey shale. 5. A. glutinosa.
Young twigs canescent, lacking bristly hairs.
Leaves oblong, ovate to oval, rounded to auriculate at the base.
Leaves rounded at the base. Eastern slopes of the Santa Cruz Mountains from Mt. Umunhum south to Loma Prieta. 6. A. canescens.

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Leaves auriculate to deeply cordate at the base. Northern Santa Cruz Co., growing on Monterey shale.....5. A. glutinosa.

Leaves lanceolate to ovate-lanceolate, usually cuneate at the base. Marine sand deposits, Santa Cruz Co.....7. A. silvicola.

Plants sprouting from an enlarged burl, not killed by fire.

Stomata present on both leaf surfaces in approximately equal numbers; leaf bases rounded to truncate, rarely subcordate; young twigs usually with long glandular hairs.....8. A. glandulosa.

Stomata restricted to the abaxial leaf surfaces; leaf bases rounded, truncate, to subcordate; young twigs not glandular.

Young twigs almost always densely setose-bristly, the individual trichomes 1-3 times as long as the diameter of the twig; shrubs 2-3 m. tall. San Mateo Co. southward.

9a. A. crustacea var. crustacea.

Young twigs not setose-bristly; shrubs usually under 1 m. tall. Lake Merced, San Francisco.

9b. A. crustacea var. rosei.

1. Arctostaphylos sensitiva Jepson, Madroño 1: 85. 1923.

Local distribution: Sparse chaparral, dry open ridges, and inland marine sand deposits, Crystal Springs southward on the western slopes of the Santa Cruz Mountains to the vicinity of Mount Hermon, commonly growing with Pinus attenuata, Adenostoma fasciculata, Dendromecon rigida, and other species of Arctostaphylos. January through May.

General distribution: Coast Ranges from Marin County south to central Santa Cruz County.

Specimens examined: Cahill Ridge, Oberlander 521; Southwest of Crystal Springs Reservoir, Dudley, Mar. 10, 1906; Butano Ridge, Dudley, Dec. 29, 1897; Big Basin, Dudley, June 7, 1895; Pine Mt., Thomas 3728; Bonnie Doon, Dudley, Mar. 29, 1899; Near Felton, Lewis, Apr. 4, 1908; Mt. Hermon, Mason 3997.

2. Arctostaphylos glauca Lindl. Bot. Reg. 21: pl. 1791. 1836.

Local distribution: Chaparral on the eastern slopes of the Santa

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Cruz Mountains from Los Gatos southward, often forming dense, nearly pure stands. January and February.

General distribution: Coast Ranges from Contra Costa County south to northern Baja California.

Specimens examined: Los Gatos, Brandegee, June 1899; Parry, Mar. 1888; Mt. Umunhum, Thomas 5521; Loma Prieta, Elmer 4513; Uvas Creek, near New Almaden, Howell 1933.

3. Arctostaphylos franciscana Eastw. Bull. Torr. Bot. Club 32: 201. 1905.

Local distribution: Serpentine outcroppings, San Francisco and adjacent San Mateo County. December through April.

General distribution: Endemic in San Francisco and adjacent San Mateo County.

Specimens examined: Laurel Hill Cemetery, Ferris & Bacigalupi, Oct. 7, 1922; Eastwood, June 6, 1912.

4a. Arctostaphylos andersonii Gray var. andersonii, Proc. Amer. Acad. 11: 83. 1876.

(A. regismontana Eastw. Leafl. West. Bot. 1: 77. 1933.)

Local distribution: A common species of Arctostaphylos from Crystal Springs southward along the crests of the Santa Cruz Mountains, usually above 1000 feet in elevation, to the vicinity of Mt. Madona. November through March.

General distribution: Endemic to the Santa Cruz Mountains.

Specimens examined: Near Crystal Springs Lakes, Dudley, May 8, 1906; Pescadero Creek, Dudley, June 12, 1905; Butano Ridge, Dudley, Dec. 29, 1897; Woodside, Elmer 304; Kings Mt., Hoover 4768; Empire Grade, Thomas 2805; Alba Road, Thomas 1336; Big Basin, Thomas 2437; Dudley, Sept. 20, 1901; Aptos, Rattan, 1880; Mt. Madona Rd., Thomas 2742, 2743; Near Mt. Madona, Dudley, Mar. 11, 1901.

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4b. Arctostaphylos andersonii Gray var. imbricata (Eastw.) Adams ex McMinn, Ill. Man. Calif. Shrubs 418. 1939.

Local distribution: A local variety found only on the wind swept summits of the San Bruno Hills, growing among rocks. February and March.

General distribution: Endemic.

Specimens examined: San Bruno Hills, Campbell & Meiere, Feb. 15, 1915 (CAS, type); San Bruno Mt., Raven 1383.

5. Arctostaphylos glutinosa Schreiber, Amer. Mid. Nat. 23: 620. 1940.

Local distribution: Known only from a small area in Santa Cruz County on the ridge between Scott and Mill creeks, southwest of Eagle Rock, growing in chaparral on Monterey shale with Pinus attenuata, Adenostoma fasciculatum, Dendromecon rigida, Quercus chrysolepis, and Arctostaphylos glandulosa. March and April.

General distribution: Known only from the above locality.

Specimens examined: 2 miles southwest of Eagle Rock, Wieslander 890 (isotype); 4½ miles southwest of Eagle Rock, Hesse 1402; 1.7 miles south-southwest of Eagle Rock, Thomas 4077, 4078, 4079.

6. Arctostaphylos canescens Eastw. Proc. Calif. Acad. 1: 84. 1897.

Local distribution: Chaparral along the crests of the Santa Cruz Mountains from Mt. Umunhum southward to Loma Prieta. February through April.

General distribution: Southwestern Oregon south, mainly through the Coast Ranges to Loma Prieta in Santa Clara County.

Specimens examined: Loma Prieta, Thomas 2552; Dudley, Oct. 11, 1902; Hesse 1041.

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7. Arctostaphylos silvicola Jepson & Wieslander, Erythea 8: 101. 1938.

Local distribution: Marine sand deposits in Santa Cruz County, growing with Pinus ponderosa, P. attenuata, Adenostoma fasciculatum, Ceanothus spp., Eriodictyon californicum, Dendromecon rigida, and Quercus agrifolia. November through March.

General distribution: Endemic in Santa Cruz County.

Specimens examined: Bonnie Doon, Yates, Feb. 3, 1935; Dudley, Mar. 29, 1899; Pine Flat, Dudley, Mar. 30, 1899; Between Scotts Valley and Glenwood, Abrams 10930; Ben Lomond, Brandegee, June 1889; Ben Lomond sand hills, Thomas 2776; Near Felton, Dudley, June 27, 1897; Thomas 2803; Mt. Hermon, Wieslander 701.

8. Arctostaphylos glandulosa Eastw. Proc. Calif. Acad. 1: 82. 1897.

Local distribution: Occasional in chaparral in the Santa Cruz Mountains. February through April.

General distribution: Coos County, Oregon, south through the Coast Ranges to Orange County.

Specimens examined: Mt. Umunhum, Thomas 3968; Loma Prieta, Abrams 3068, 3070; 2.3 miles southwest of Eagle Rock, Thomas 4013.

None of the above specimens is typical Arctostaphylos glandulosa. Specimens from the type locality, Mount Tamalpais, Marin County, have evidently stomatiferous adaxial leaf surfaces, distinctly glandular-hairy twigs, and rounded to obtuse leaf bases. Plants from the Santa Cruz Mountains have some stomata adaxially, but fewer than plants from elsewhere, very sparsely glandular-hairy twigs, and truncate, obtuse, or rounded leaf bases. Arctostaphylos glandulosa and A. crustacea need much more careful study.

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9a. Arctostaphylos crustacea Eastw. var. crustacea, Leafl. West. Bot. 1: 74. 1933.

Local distribution: A widely occurring chaparral species from the Crystal Springs Lake region south through the Santa Cruz Mountains. February through May.

General distribution: Santa Cruz and Contra Costa counties south through the Coast Ranges to Los Angeles County.

Specimens examined: San Andreas Lake to Pescadero, Dudley, May 14, 1899; Kings Mt., McMurphy 7; Near Searsville, Babcock, Feb. 23, 1895; Black Mt., Dudley, Feb. 15, 1896; Castle Rock Ridge, Abrams, Oct. 7, 1906; Foothills west of Los Gatos, Heller 7250; Loma Prieta, Hichborn, May 9, 1920; Deer Creek, Thomas 2825; Above Big Basin, Copeland, July 29, 1939; Bonnie Doon, Wiggins 5094; Graham Hill Road, Thomas 2800; Aptos, Rattan 1880; Larkin Valley, Thomas 2727, 2728; Watsonville, Eastwood 11138.

Plants with densely white-tomentose abaxial leaf surfaces have been called A. crustacea var. tomentosiformis Adams (Journ. E. Mitchell Sci. Soc. 56: 54. 1940). Numerous intergrades occur between this variety and the typical variety, which has glabrous to pubescent abaxial leaf surfaces.

9b. Arctostaphylos crustacea Eastw. var. rosei (Eastw.) McMinn, Ill. Man. Calif. Shrubs 413. 1939.

Local distribution: Known only from the vicinity of Lake Merced in San Francisco. February through April.

General distribution: Endemic in San Francisco.

Specimens examined: Near Lake Merced, Abrams 13698; Howell 11773.

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94. VACCINIACEAE

1. Vaccinium L. Sp. Pl. 349. 1753.

Leaves thick, leathery, margins dentate; filaments hairy. Common.
1. V. ovatum.
Leaves thin, margins entire; filaments glabrous. Rare.
2. V. parvifolium.

1. Vaccinium ovatum Pursh, Fl. Amer. Sept. 290. 1814.

Local distribution: Throughout the mountainous area of the Santa Cruz Peninsula. Latter part of February through June.

General distribution: British Columbia south through the Coast Ranges to Santa Barbara County and on Santa Cruz and Santa Rosa islands.

Specimens examined: San Bruno Hills, Rollins 3003; Pescadero Creek, Randall 140; Summit Springs, Applegate 307; Chalks, Dudley, Dec. 1, 1899; Santa Cruz, Jones 2272.

Vaccinium ovatum shows a wide range of habitats in the Santa Cruz Mountains. Most commonly it is the conspicuous shrubby species in the understory of redwood - douglas fir forests. In some localities, as at Pine Mountain and the Chalks, it is part of the chaparral, but the individual plants are often no more than ½ m. tall compared with a height of 2 m. or more in the forests. Leaf size is reduced in chaparral areas. The fruit is edible and one occasionally finds a stand in which there is a heavy crop.

A minor variant of Vaccinium ovatum, which has glaucous berries, has been called V. ovatum var. saporosum Jepson (Man. Fl. Pl. Calif. 751. 1925) and ranges with the typical variety, V. ovatum var. ovatum. The character separating V. o. var. saporosum is difficult to determine in most cases as the majority of the herbarium sheets of this species were collected in flower. An example of V. o. var. saporosum is Thomas 3507

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from the Chalks in northwestern Santa Cruz County.

2. Vaccinium parvifolium Smith in Rees, Cycl. 36: no. 3. 1817.

Local distribution: Redwood - douglas fir forests in southern San Mateo and northern Santa Cruz counties on the western slopes of the Santa Cruz Mountains. March through June.

General distribution: Coastal southern Alaska south along the coast to the Santa Cruz Mountains and Fresno County in the Sierra Nevada.

Specimens examined: Pescadero Creek, Smiley, Mar. 30, 1912; Butano Creek, Elmer 4924; Gazos Creek, Dudley, Dec. 31, 1901; Big Basin, Howell 1531 (CAS).

Vaccinium parvifolium reaches its southern limit in the Coast Ranges in the Santa Cruz Mountains. As of now, the southernmost known station is in Big Basin.

95. PRIMULACEAE

Stems elongate; leaves not in basal rosettes.
- Leaves borne in a whorl at the summit of the stem, leaves 4 cm. or more long; plants with tuberous rootstocks.....1. Trientalis.
- Leaves not whorled, under 2 cm. long; plants lacking tuberous rootstocks.
  - Corollas lacking; capsule valvate; leaves fleshy..2. Glaux.
  - Corollas present; capsule circumscissile; leaves not fleshy.
    - Leaves opposite; corolla conspicuous.....3. Anagallis.
    - Leaves alternate; corolla minute.....4. Centunculus.

Stems short; leaves in a basal rosette.
- Corolla lobes not reflexed at anthesis, shorter than the calyx; scapes under 4 cm. tall, slender.....5. Androsace.
- Corolla lobes reflexed at anthesis, longer than the calyx; scapes over 5 cm. long, stout.....6. Dodecatheon.

1. Trientalis L. Sp. Pl. 344. 1753.

1. Trientalis latifolia Hook. Fl. Bor. Amer. 2: 121. 1838.

Local distribution: Shaded slopes, moist woods, or occasionally in

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the open, from northern San Mateo County southward. Latter part of March through June.

General distribution: Southern British Columbia south through the Cascades, Coast Ranges, and Sierra Nevada to San Luis Obispo County and Mariposa County.

Specimens examined: Crystal Springs, Kellogg & Brannon, no date; Pescadero Creek, Dudley, May 1, 1903; Coal Mine Ridge, Barry 87; Swanton, Rich, Spring 1912; Blooms Grade, Thomas 3150; Loma Prieta School House, Dudley, May 30, 1893; Soquel Gulch, Thompson, May 8, 1902.

2. Glaux L. Sp. Pl. 207. 1753.

1. Glaux maritima L. Sp. Pl. 207. 1753.

Local distribution: Known from one specimen collected in the Palo Alto salt marsh, but to be expected elsewhere in salt marshes and on coastal sand dunes. May through June.

General distribution: A widespread species, in saline areas in North America, Europe, and Asia.

Specimen examined: Palo Alto, Halsey, Nov. 30, 1908.

3. Anagallis L. Sp. Pl. 148. 1753.

1. Anagallis arvensis L. Sp. Pl. 148. 1753.

Local distribution: Common throughout the Santa Cruz Mountains and adjacent flat lands in disturbed areas, along roadsides, overgrazed pastures, gardens, and coastal sand dunes. Plants with flowers can be found at most times of the year.

General distribution: Native of Europe, widely introduced into temperate regions.

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Specimens examined: Montara Mt., Dudley, Mar. 17, 1900; Sweeney Ridge, Oberlander 98; Woodside, Dutton, Feb. 27, 1900; Stanford, Dudley, May 14, 1896; Coastal sand dunes at Waddell Creek, Thomas 2767; Watsonville, Thomas 1670.

A blue-flowered form, Anagallis arvensis L. forma azurea Heyl. (Uppsala Univ. Arssk. 1945: 256. 1945), is to be expected occasionally.

4. Centunculus L. Sp. Pl. 116. 1753.

1. Centunculus minimus L. Sp. Pl. 116. 1753.

Local distribution: So far, known only from Ano Nuevo Point and Basin Way near Boulder Creek, but to be expected elsewhere in wet grassy flats and along the margins of ponds. April through July.

General distribution: Semicosmopolitan in temperate parts of Europe, and North and South America.

Specimens examined: Ano Nuevo Point, Abrams & Wiggins 443; Basin Way, Hesse 1932.

5. Androsace L. Sp. Pl. 141. 1753.

1. Androsace acuta Greene, Man. Bot. San Francisc. Bay 238. 1894.

Local distribution: Known from only two localities in Santa Clara County, Stanford and the serpentine hills at Edenvale. March through May.

General distribution: Southwestern Oregon south through the Coast Ranges to northern Baja California, also in the southern Sierra Nevada of Kern County.

Specimens examined: Foothills near Stanford, Kraus, Apr. 12, 1893; Edenvale, Abrams 6399.

On April 2, 1955, I collected intensively on the serpentine hills

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at Edenvale in the Santa Clara Valley. I was able to find about a dozen plants of Androsace by carefully sorting a large amount of collected material. The scarcity of the collections of Androsace acuta is probably due to its inconspicuousness and rarity.

6. Dodecatheon L. Sp. Pl. 144. 1753.

Rice-grain bulblets present at flowering time; filament tube lacking a yellow spot below each anther.
  Flowers 5-merous.....1a. D. hendersonii ssp. hendersonii.
  Flowers 4-merous.....1b. D. hendersonii ssp. cruciatum.
Rice-grain bulblets lacking; filament tube with a yellow spot below each anther.
  Anthers 3.5-5 mm. long, the tips acute to obtuse; pollen sacs usually yellow.....2a. D. clevelandii ssp. sanctarum.
  Anthers 1.5-4 mm. long, the tips retuse to obtuse; pollen sacs dark. 2b. D. clevelandii ssp. patulum.

1a. Dodecatheon hendersonii Gray ssp. hendersonii, Bot. Gaz. 11: 233. 1886.

Local distribution: Wooded slopes and on serpentine, southern San Mateo County south to the vicinity of Guadalupe Creek and Edenvale on the eastern slopes of the Santa Cruz Mountains. February through the first half of April.

General distribution: Southern British Columbia south through the Cascades, Coast Ranges, and Sierra Nevada to Monterey and Fresno counties, also in the San Bernardino Mountains of southern California.

Specimens examined: Coal Mine Ridge, Barry 16; Guadalupe Reservoir, Thompson 1510; Edenvale, Abrams 6403.

1b. Dodecatheon hendersonii Gray ssp. cruciatum (Greene) Thompson, Contr. Dud. Herb. 4: 131. 1953.

Local distribution: Wooded slopes and serpentine outcroppings as

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far south as central Santa Cruz County and northern Santa Clara County, usually away from the ocean. Latter half of February through April.

General distribution: Sonoma and Napa counties south to Santa Cruz and Santa Clara counties.

Specimens examined: West of Golden Gate Park, Rattan, Feb. 22, 1877; Montara Mts., Dudley, Mar. 17, 1900; San Francisco Watershed Reserve, Oberlander 524; Woodside, Elmer 4560; Stanford, Abrams 2266; Page Mill Road, Randall, Mar. 9, 1908; Bean Creek drainage, Thomas 1432; Near Bielawski Lookout, Thomas 1524; Near Glenwood, Thomas 2871; Jamison Creek Road, Thomas 2910.

2a. Dodecatheon clevelandii Greene ssp. sanctarum (Greene) Abrams, Ill. Fl. Pac. States 3: 342. 1951.

Local distribution: Southern San Mateo County southward. Latter part of January through April.

General distribution: Southern San Mateo County south to Los Angeles County.

Specimens examined: Ano Nuevo Pines, Howell 10981 (CAS); Swanton, Rich, Mar. 7, 1912; Hilton Airport, Thomas 2525; Near Gilroy, Patton, Spring 1921.

According to Thompson (1953, p. 95) the population at Hilton Airport in Santa Cruz County consists of plants which are diploid and plants which are triploid. The diploids and triploids cannot be distinguished by their external morphology. Corolla-lobe color varies from white to lavender in this subspecies.

2b. Dodecatheon clevelandii Greene ssp. patulum (Greene) Thompson, Contr. Dud. Herb. 4: 135. 1953.

Local distribution: Bernal Heights, San Francisco, southward through the foothills on the eastern side of the Santa Cruz Mountains to

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northern Santa Clara County. Latter part of January through March.

General distribution: Foothills of the Sierra Nevada and the adjacent Central Valley from Tehama County south to Kern County and in the Coast Ranges from Yolo County south to San Benito County.

Specimens examined: Bernal Heights, Ferris & Wiggins 8036; Near Woodside, Applegate 324; Foothills near Stanford University, Kraus, May 24, 1893.

As of March 1955, this subspecies still grew on Bernal Heights, the type locality of Dodecatheon patulum Greene var. bernalinum Greene (Erythea 3: 72. 1895). The north and west slopes of Bernal Heights are still intact, the others have been used as a source of earth and rock. The top of the Heights also has been disturbed.

Samolus floribundus H. B. K. (Nov. Gen. & Sp. 2: 224. 1817) has been collected along Elkhorn Slough in Monterey County about 4-5 miles south of the Santa Cruz - Monterey County line by Mason (5904). It is to be expected along Watsonville Slough and in the marshes along the Pajaro River. Samolus floribundus is a widespread species in North and South America. It may be distinguished from other members of the Primulaceae by its half inferior ovary.

96. PLUMBAGINACEAE

Inflorescence capitate, terminating a naked scape; leaves linear. ..... 1. Armeria.
Inflorescence cymose-paniculate; leaves oblong-obovate..... 2. Limonium.

1. Armeria Willd. Enum. Pl. Hort. Berol. 1: 333. 1809.

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1. Armeria maritima (Mill.) Willd. var. californica (Boiss.) Lawr.

Gentes Herbarium 4: 406. 1941.

Local distribution: Low coastal bluffs along the ocean in heavy, mature soil. March through August.

General distribution: Along the coast from Vancouver Island and the San Juan Islands, Washington, south to San Diego County.

Specimens examined: Sand dunes near Lake Merced, Howell 1958 (CAS); San Francisco, Jones 3261; Granada, Eastwood 4712 (CAS); Pescadero, Grant 940; Mt. Hermon, Hesse 454.

Armeria maritima var. californica is most commonly found along the immediate coast, but occasionally in sandy marine inland deposits as at Mount Hermon, which lies about 7 miles inland, and the sand dunes near Lake Merced.

2. Limonium Mill. Gard. Dict. abr. ed. 4. 1754.

1. Limonium californicum (Boiss.) Heller, Cat. N. Amer. Pl. 6: 1898.

Local distribution: Coastal salt marshes and marshes along San Francisco Bay. July through November.

General distribution: Coastal marshes from Humboldt County south to Orange County and on San Clemente Island.

Specimens examined: Near Dumbarton Bridge, Mallory, Oct. 17, 1919; Palo Alto Yacht Harbor, Ferris & Wiggins 11102; Alviso, Thomas 5130.

97. OLEACEAE

1. Fraxinus L. Sp. Pl. 1057. 1753.

Shrubs or small trees, 2-7 m. tall; leaves glabrous; leaflets usually 7; petals 2; flowers perfect.....1. F. dipetala.
Trees, 10-25 m. tall; leaves pubescent; leaflets usually 3-5; petals none; flowers dioecious.....2. F. latifolia.

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1. Fraxinus dipetala Hook. & Arn. Bot. Beechey 362. 1841.

Local distribution: Dry slopes and hillsides in the vicinity of Uvas and Llagas creeks. April through May.

General distribution: Shasta County south to Orange County in the Coast Ranges and to Tulare County in the Sierra Nevada. Fraxinus trifoliata (Torr.) Lewis & Epling, a closely allied species and one which is often reduced to synonymy under F. dipetala, occurs in northern Baja California.

Specimens examined: Uvas road near Gilroy, Abrams 10111; Llagas Post Office, Dudley, June 5, 1909.

Fraxinus dipetala is characteristically a species of the Inner Coast Ranges where it occurs in or along the fringes of chaparral.

2. Fraxinus latifolia Benth. Bot. Sulph. 33. 1844.

Local distribution: Occasional in stream bottoms on the eastern side of the Santa Cruz Mountains and on the lowlands as far south as San Francisquito Creek where it reaches its southern limit of distribution in the Coast Ranges. March through April.

General distribution: Washington and Oregon, mainly west of the Cascades, south to Santa Clara County in the Coast Ranges and to Kern County on the western slopes of the Sierra Nevada.

Specimens examined: Below San Andreas Dam, Oberlander 367; San Mateo, Elmer 4615; San Francisquito Creek, Dudley, June 30, 1906.

The type of this species was collected in San Francisco.

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98. GENTIANACEAE

Calyx campanulate, the lobes reduced to teeth less than 1 mm. long. 1. Microcala.
Calyx not campanulate, divided nearly to the base into linear-lanceolate lobes.....2. Centaurium.

1. Microcala Hoffm. & Link, Fl. Port. 1: 359. 1806.

1. Microcala quadrangularis (Lam.) Griseb. in A. DC. Prod. 9: 63. 1845.

Local distribution: Grassy slopes on the eastern side of the Santa Cruz Mountains. March through June.

General distribution: Western Oregon south to Santa Barbara County, in the Sacramento Valley and adjacent Sierra foothills, and in South America in Peru, Chile, Brazil, and Uruguay.

Specimens examined: Lone Mountain, Bolander, May & July 1867; Stanford University, Atkinson, Mar. 1900; Jasper Ridge, Bacigalupi, Spring 1922.

2. Centaurium Hill, Brit. Herb. 62. 1765.

The following treatment of Centaurium is based on that of Abrams (1951, pp. 351-354) and admittedly is not completely satisfactory. The characters such as presence or absence of rudimentary flowers, petal length, stamen length, and length of pedicels vary considerably. Careful study of the western North American species of this genus is needed and would probably reduce the number of species.

Corolla-lobes under 6 mm. long; anthers under 2 mm. long.
  Rudimentary flowers in the axils of at least the terminal flowers. 1. C. floribundum.
  Rudimentary flowers lacking.
    Flowers sessile or subsessile, pedicels under 0.5 mm. long; corolla-lobes lanceolate, about 3.5 mm. long. 2. C. muhlenbergii.
    At least some flowers long-pedicellate; corolla-lobes ovate, 4-6 mm. long.....3. C. davyi.
Corolla-lobes 8 mm. long or longer; anthers over 3 mm. long. 4. C. trichanthum.

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1. Centaurium floribundum (Benth.) Robinson, Proc. Amer. Acad. 45: 396. 1910.

Local distribution: Known from only one specimen collected along a road in a disturbed habitat near Waterman Gap in Santa Cruz County. The specimens were collected in January, but obviously had persisted from the previous summer.

General distribution: Del Norte County south in the Coast Ranges to Santa Cruz County and in the Sierra Nevada foothills from Butte to Fresno counties.

Specimen examined: Waterman Gap, Thomas 3668.

2. Centaurium muhlenbergii (Griseb.) Wight, Contr. U. S. Nat. Herb. 11: 450. 1906.

Local distribution: Known only from the vicinity of Stanford University and Palo Alto, growing in fields and pastures. June through August.

General distribution: Willamette Valley, Oregon, south probably as far as Santa Clara County and in the foothills of the Sierra Nevada.

Specimens examined: Stanford, Dudley, June 27, 1893; Palo Alto, Dudley, June 20, 1909.

3. Centaurium davyi (Jeps.) Abrams, Ill. Fl. Pac. States 3: 352. 1951.

Local distribution: Widely distributed in grassy or disturbed areas, but not usually abundant, most common along the coast. April through July.

General distribution: Coast Ranges from Mendocino County to San Luis Obispo County and on Santa Cruz Island.

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Specimens examined: Near San Andreas Lake, Oberlander 1103; Near Pescadero, Eastwood & Howell 6060; Ano Nuevo Pt., Abrams & Wiggins 423; Sand Hill Road, Mason, May 15, 1921; Clarita Vineyard, Elmer 4265; Foothills west of Los Gatos, Heller 7424; Swanton, Rich, Spring 1912; San Vicente Creek, Thomas 3394; Santa Cruz, Jones 2256; Loma Prieta, Thompson, June 7, 1902.

This is by far the most common species of Centaurium in the Santa Cruz Mountains.

4. Centaurium trichanthum (Griseb.) Robinson, Proc. Amer. Acad. 45: 397. 1910.

Local distribution: Occasional in the Santa Cruz Mountains on fairly open slopes. May through June.

General distribution: Coast Ranges from Siskiyou to Santa Clara and Santa Cruz counties.

Specimens examined: Belmont, Davy 778 (JEPS); Hills, 4 miles south of San Jose, Rattan, May 1, 1887.

Miss Vesta Hesse has told me that this species grew in Bear Creek Canyon in Santa Cruz County, but a specimen does not exist.

Behr (1891, p. 4) reported Menyanthes trifoliata L. (Sp. Pl. 145. 1753) from marshes near Russ Gardens in San Francisco, a locality which no longer exists. I have seen no specimens of Menyanthes from the area covered by this flora. Menyanthes is sometimes placed in the Gentianaceae or, more commonly, in the Menyanthaceae.

99. APOCYNACEAE

Flowers large, over 2 cm. long, blue; seeds lacking a coma. Introduced plants.....1. Vinca.
Flowers small, under 1 cm. long, white to flesh-colored; seeds with a coma. Native plants.....2. Apocynum.

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1. Vinca L. Sp. Pl. 209. 1753.

1. Vinca major L. Sp. Pl. 209. 1753.

Local distribution: Commonly escaped from cultivation along roads, creek banks, railroad embankments, and other shaded areas. To be found in flower at all times of year.

General distribution: Native of the Mediterranean Region, widely grown as an ornamental and becoming established.

Specimens examined: Cahill Ridge, Oberlander 52; Rancho del Oso, Thomas 2755; Near Sea Cliff Beach State Park, Thomas 2718.

At Rancho del Oso, there is an extensive stand of this species along Waddell Creek. Mr. Theodore Hoover, who owned Rancho del Oso, informed me that the stand was the result of vegetative propagation of one small plant accidently discarded a number of years ago. Most of the spreading is by the rooting of the trailing stems.

2. Apocynum L. Sp. Pl. 213. 1753.

Although four taxa of Apocynum occur in the Santa Cruz Mountains, plants are rare and seldom collected.

Corolla at least twice as long as the calyx.
  Corolla campanulate, about 3 times as long as the calyx-lobes; leaves ovate, not mucronate, glabrous or pubescent. 1. A. pumilum.
  Corolla cylindric, about twice as long as the calyx-lobes; leaves elliptic to broadly lanceolate, often mucronate, glabrous. 2. A. medium var. floribundum.
Corolla less than twice as long as the calyx-lobes.
  Corolla about as long as broad; leaves petiolate, rarely cordate at base.....3. A. cannabinum.
  Corolla longer than broad; leaves glabrous, more or less sessile, especially the lower ones, lower leaves usually cordate at base. 4. A. sibiricum var. salignum.

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1. Apocynum pumilum (Gray) Greene, Man. Bot. San Francisco Bay 240. 1894.

Local distribution: Rare in the Santa Cruz Mountains, known only from exposed slopes or vineyards in southern San Mateo and northern Santa Cruz counties. July through August.

General distribution: Washington south to southern California, east to Montana, Utah, and Nevada.

Specimens examined: La Honda Road, Mason, July 14, 1921; Ben Lomond Mt., Hesse 753.

Pubescent plants, such as the collection cited above from Ben Lomond Mountain, may be referred to A. pumilum (Gray) Greene var. rhomboideum (Greene) Beg. & Bel. (Atti R. Accad. Lincei. V. 2: 98. 1913).

2. Apocynum medium Greene var. floribundum (Greene) Woods. Ann. Mo. Bot. Gard. 17: 113. 1930.

Local distribution: Known only from near Laurel in Santa Cruz County. July through August.

General distribution: Washington south to southern California, east to Montana, Colorado, and Texas and in adjacent Mexico.

Specimen examined: Laurel, Abrams 13820.

3. Apocynum cannabinum L. Sp. Pl. 213. 1753.

Local distribution: Rare in central Santa Cruz County. July through August.

General distribution: Southern Canada, the United States, and northern Mexico.

Specimens examined: Boulder Creek, Hesse 1177; Soquel Road, Hesse 1173.

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The specimen from Soquel, cited above, has pubescent leaves and inflorescences and may be referred to A. cannabium L. var. pubescens (Mitchell) A. DC. (Prod. 8: 440. 1844).

4. Apocynum sibiricum Jacq. var. sälignum (Greene) Fernald, Rhodora 37: 328. 1935.

Local distribution: Known only from the foothills west of Los Gatos. June and July.

General distribution: British Columbia south to southern California, east to Minnesota and Texas.

Specimen examined: Foothills west of Los Gatos, Heller 7518.

100. ASCLEPIDACEAE

1. Asclepias L. Sp. Pl. 214. 1753.

1. Asclepias fascicularis Decne. in DC. Prod. 8: 569. 1844.

Local distribution: Dry slopes and valleys, Santa Clara, Santa Cruz, and southern San Mateo counties. July through September.

General distribution: Washington and Idaho south to northern Utah, Nevada, and northern Lower California.

Specimens examined: Stanford, Randall 7; Mountain View, Thomas 4349; Black Mt., Baker 1547 (CAS); Uvas Creek Road, 10 miles northwest of Gilroy, Thomas 4379; Near Felton, Thompson, July 11, 1903.

101. CONVOLVULACEAE

Parasitic plants; stems orange, lacking chlorophyll.....1. Cuscuta.
Plants not parasitic; stems green, chlorophyll present.
  Corollas large, 2-6 cm. long; flowers subtended by a pair of bracts. 2. Convolvulus.
  Corollas small, under 6 mm. long; flowers not subtended by a pair of bracts.

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Leaves oblong-ovate to broadly lanceolate; stems tufted, not creeping or rooting at the nodes.....3. Cressa.
Leaves suborbicular to reniform; stems creeping, rooting at the nodes.....4. Dichondra.

1. Cuscuta L. Sp. Pl. 124. 1753.

Corollas lacking scales on the inner surface of the corolla-tube; capsules globose or depressed-globose.
Flowers sessile; anthers about 0.5 mm. long, oval; corolla-lobes spreading.....1. C. occidentalis.
Flowers pedicellate; anthers 0.75-1 mm. long, elongate; corolla-lobes reflexed.....2. C. californica.
Corollas with scales on the inner surface of the corolla-tube; capsules depressed-globose to elongate.
Capsule globose to depressed-globose. Occasional.
Corolla-tubes about as broad as long, corolla-lobes about equalling the tube.....3. C. campestris.
Corolla-tubes longer than broad, the corolla-lobes shorter than the tube.....4. C. suaveolens.
Capsule elongate. Common.
Flowers 3-4.5 mm. long; corolla-tubes more or less campanulate. Plants of salt marshes.....5. C. salina var. major.
Flowers 5-6 mm. long; corolla-tubes cylindric. Plants of inland habitats.....6. C. subinclusa.

1. Cuscuta occidentalis Millsp. Field Mus. Pub. Bot. 5: 204. 1923.

Local distribution: Occasional in the Santa Clara Valley, growing on various native and introduced herbs and shrubs. May through August.

General distribution: Washington south to Baja California, east to Utah and Colorado.

Specimens examined: Hills 4 miles south of San Jose, Rattan, May 1, 1887; San Juan Baptiste Hills, Dudley 4018.

2. Cuscuta californica Choisy, Mem. Soc. Geneve 9: 279. 1841.

Local distribution: Occasional in the Santa Cruz Mountains, growing on various native shrubs and herbs. May through August.

General distribution: Oregon south to southern Baja California, east to Nevada and Arizona.

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Specimens examined: San Francisco Watershed Reserve, Oberlander 1040; Near Crystal Springs Lake, Randall 107; Near Boulder Creek, Hesse 1377.

3. Cuscuta campestris Yuncker, Mem. Torr. Bot. Club 18: 138. 1932.

Local distribution: Common on Xanthium strumarium in Lake Lagunita, Stanford University, occasionally on such cultivated plants as Pelargonium, and to be expected on Baccharis, Salix, Franseria, Medicago, and other species. August through October.

General distribution: Washington east to Quebec and Massachusetts, south to South America.

Specimens examined: Lake Lagunita, Stanford, Dudley, Sept. 20, 1897; Abrams 2230; College Terrace, Howe, Sept. 1895.

4. Cuscuta suaveolens Ser. Ann. Sci. Nat. 3: 519. 1840.

Local distribution: Occasional, growing on alfalfa. August through October.

General distribution: Native of South America, widely introduced with alfalfa seeds.

Specimens examined: Near Stanford, Dudley, Oct. 1894; Dudley, Oct. 4, 1895.

5. Cuscuta salina Engelm. var. major Yuncker, Univ. Ill. Biol. Monog. 6: 71. 1921.

Local distribution: Salt marshes along the ocean and San Francisco Bay, commonly parasitic on various species of Salicornia. June through October.

General distribution: Along the coast in salt marshes from British Columbia south to southern California, occasionally in the Central Valley.

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Specimens examined: Bay near Menlo Park, Dudley, Aug. 2, 1895; Cooleys Landing, Abrams, Sept. 30, 1906; Near Mt. View Landing, Dudley, Aug. 7, 1903; Near Alviso, Keck 2473; Thomas 5301; Santa Cruz, Jones, July 1881; Near mouth of Pajaro River, Thomas 2388.

6. Cuscuta subinclusa Dur. & Hilg. Journ. Acad. Phila. 3: 42. 1855.

Local distribution: The most common non-salt marsh species of Cuscuta in the Santa Cruz Mountains, parasitic on a large number of plants including Pickeringia, Baccharis, Aesculus, Rhus, Photinia, Eriogonum, Lupinus, Stachys, Ceanothus, Eriodictyon, Populus, Artemisia, and various grasses. June through November.

General distribution: Southern Oregon south to northern Baja California.

Specimens examined: Kings Mt. Road, Dudley, Oct. 19, 1895; Portola, Dudley, July 21, 1903; Coal Mine Ridge, Barry 206; Stanford, Dudley, Nov. 20, 1893; Black Mt. Road, Randall 108; Loma Prieta Ridge, Abrams 3063; Uvas Road, Thomas 4381; Near Llagas Post Office, Dudley, June 6, 1909; Big Basin, Thomas 6832; Near Big Basin, Thomas 3536; Alba Grade, Thomas 2457.

2. Convolvulus L. Sp. Pl. 153. 1753.

Bracts sepal-like, broadly ovate or broader, closely subtending the flowers.
  Stems and leaves glabrous or nearly so; stems long, twining or trailing, definitely not acaulescent.
    1. C. soldanella.
  Stems and leaves variously pubescent; stems very short or trailing, some plants definitely acaulescent.
    Stems and leaves densely white-pubescent.
      2. C. malacophyllus ssp. collinus.
    Stems and leaves villous-pubescent, often sparsely so, greenish.
      3. C. subacaulis.
Bracts not sepal-like, linear, not closely subtending the flowers.
  Stems and leaves glabrous; leaves usually acute; corollas over 3 cm. long. Native plants.....4. C. occidentalis.
  Stems and leaves pubescent, rarely glabrous; leaves usually obtuse; corollas less than 3 cm. long. Introduced weeds.
    5. C. arvensis.

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1. Convolvulus soldanella L. Sp. Pl. 159. 1753.

Local distribution: Coastal sand dunes and beaches, San Francisco southward. May through July.

General distribution: Along the coast on beaches from Callam County, Washington, south to San Diego County; in central America, Chile, the south Pacific, and in Europe and North Africa.

Specimens examined: Presidio, Congdon, June 9, 1889; New Years Pt., Ferris 2187; Swanton, Rich, Spring 1912; Mouth of Waddell Creek, Crum 1709 (UC); Santa Cruz, Dudley, July 1893; Near Watsonville, Elmer 4462.

2. Convolvulus malacophyllus Greene ssp. collinus (Greene) Abrams, Ill. Fl. Pacif. St. 3: 386. 1951.

Local distribution: Rare in serpentine or in rocky soil on the eastern slopes of the Santa Cruz Mountains in Santa Clara County. May.

General distribution: Coast Ranges from Lake and Napa counties south to Santa Clara and San Benito counties.

Specimens examined: Alamitos, Ferris 3714; New Almaden to Umunhum, Dudley, May 29, 1894; 0.3 miles southwest of Madrone, Belshaw 2264A (UC).

3. Convolvulus subacaulis (Hook. & Arn.) Greene, Man. Bay Reg. 265. 1894.

Local distribution: San Francisco southward, on open grassy slopes, mainly to the east of the crests of the Santa Cruz Mountains. April through June.

General distribution: Coast Ranges from Marin, Napa, and Solano counties south to San Luis Obispo County.

Specimens examined: Presidio, San Francisco, Brandegee, June 1905 (UC); Millbrae, Raven 2234 (CAS); Crystal Springs Lake, Elmer 4826; Half Moon Bay Road, Heller 8557; Near Burlingame, Baker, May 15, 1904; Woodside, Abrams 2399; Coal Mine Ridge, Barry 57; Stanford, Atkinson, Apr.

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1900; Permanente Creek, Daniel, Apr. 24, 1915; Foothills west of Los Gatos, Heller 8567; Almaden Ridge, Howell 1903 (CAS).

4. Convolvulus occidentalis Gray, Proc. Amer. Acad. 11: 89. 1876.

Local distribution: Moist wooded slopes and on brush-covered hills, San Francisco southward. April through July.

General distribution: Coast Ranges from Humboldt County south to Monterey County.

Specimens examined: Twin Peaks, San Francisco, Thomas 4878; Sawyer Ridge, Oberlander 308; Near Crystal Springs Lake, Randall 105; Pescadero, Elmer 4299; San Mateo Creek Road, Dudley, Apr. 21, 1894; Corte de Madera, Zschokke, July 10, 1903; Stanford, Applegate 373; Permanente Creek, Daniel, Apr. 24, 1915; Los Gatos Creek, Abrams 3051; Foothills west of Los Gatos, Heller 7351; Loma Prieta, Dudley, May 30, 1893; Swanton, Rich, Spring 1912; Santa Cruz, Jones 2246; Near Burrell, Thomas 3983.

The corolla color varies from purple through pink to white.

5. Convolvulus arvensis L. Sp. Pl. 153. 1753.

Local distribution: A very common weed of orchards, fallow fields, grasslands, and disturbed areas. May through October.

General distribution: Native of Europe, widely introduced into temperate regions.

Specimens examined: Lone Mt., San Francisco, Howell 11213 (CAS); Sweeney Ridge, Oberlander 343; Menlo Park, Abrams 2223; Stanford, Dudley, June 15, 1897; Permanente Creek, Abrams 6330; Near Cupertino, Heller 8553; Near Lone Hill, Belshaw 2249 (UC); Guadalupe Creek, Thomas 4968; San Jose, Rust 140; Hilton Airport, Thomas 1919; Santa Cruz, Jones 2296; Near Watsonville, Thomas 2425.

3. Cressa L. Sp. Pl. 223. 1753.

1. Cressa truxillensis H. B. K. Nov. Gen. & Sp. 3: 119. 1818.

Local distribution: Occasional in salt marshes along San Francisco

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Bay and in low alkaline areas in the Santa Clara Valley. June through October.

General distribution: Southern Oregon south to southern California, east to Utah and Texas, southward throughout much of Central and South America.

Specimens examined: Cooleys Landing, Abrams, Sept. 29, 1906; Near Alviso, Dudley, July 18, 1903; San Jose, Heller 8936a.

4. Dichondra Forst. Char. Gen. Pl. 39. pl. 20. 1776.

1. Dichondra repens Forst. Char. Gen. Pl. 39. pl. 20. 1776.

Local distribution: Occasional as an escape from cultivation in San Francisco, northern San Mateo County, and probably elsewhere, usually on open grass-covered or wooded slopes near the coast. February through June.

General distribution: Widely used as a lawn plant, occasionally escaped, native of both the new and the old world tropics.

Specimens examined: Between Mt. Sutro and Twin Peaks, Raven 10632 (CAS); Bernal Heights, San Francisco, Mason 3655; San Bruno Mt., Mason 4156.

102. POLEMONIACEAE

Leaves opposite, those of the inflorescence sometimes alternate.
- Leaves entire.....1. Phlox.
- Leaves palmately divided.....2. Linanthus.

Leaves all alternate.
- Corollas funnelform, 1.5-2.5 cm. in diameter; plants perennial. 3. Polemonium.
- Corollas tubular to salverform, 1.5 cm. in diameter or less; plants annual or perennial.
  - Calyx-lobes spiny.
    - Inflorescence densely white-wooly.....4. Eriastrum.
    - Inflorescence not densely white-wooly.....5. Navarretia.
  - Calyx-lobes not spiny.

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Fruiting calyx with a small reflexed lobe in each sinus, calyx growing with the capsule, chartaceous in age. ..... 6. Collomia.
Fruiting calyx lacking reflexed appendages, calyx not growing with the capsule, usually breaking.
Seeds 10-35 per capsule; stamens equally inserted in the throat or tube of the corolla..... 7. Gilia.
Seeds 3 per capsule; stamens unequally inserted in the throat of the corolla..... 8. Allophyllum.

1. Phlox L. Sp. Pl. 151. 1753.

1. Phlox gracilis (Hook.) Greene, Pittonia 1: 141. 1887.

Local distribution: Open grassy slopes throughout the Santa Cruz Mountains. Latter part of February through April.

General distribution: British Columbia south to Mexico, east to Montana, Colorado, and New Mexico, also in South America.

Specimens examined: Kings Mt., McMurphy, Apr. 27, 1907; Alpine Grade, Ferris 742; Coal Mine Ridge, Barry 5; Stanford, Atkinson, Mar. 1900; Near Guadalupe Creek, Thomas 5560; Edenvale, Abrams 6873; Near Saratoga Summit, Thomas 1240.

2. Linanthus Benth. Bot. Reg. 19: under pl. 1622. 1833.

Flowers not in dense heads.
Mature corollas scarcely longer than the calyces. 1. L. pygmaeus.
Mature corollas at least 2 or more times as long as the calyces.
Corollas 2-3 cm. long; calyces 9-15 mm. long; plants usually not branched..... 2. L. dichotomus.
Corollas under 2 cm. long; calyces 4-8 mm. long; plants usually well branched.
Plants usually branched above; corolla-tubes of mature flowers shorter than the calyces; corolla-lobes over $\frac{1}{2}$ the length of the corolla..... 3. L. liniflorus.
Plants usually branched below; corolla-tubes of mature flowers longer than the calyces; corolla-lobes 1/3 or less the length of the corolla..... 4. L. ambiguus.
Flowers in dense heads.
Corolla-tubes about equalling the calyces; corolla-lobes usually about 12 mm. long..... 5. L. grandiflorus.
Corolla-tubes distinctly longer than the calyces; corolla-lobes under 8 mm. long.

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Corolla-lobes 5-8 mm. long.
Calyx-tubes glabrous.
Segments of the bracts linear to awl-shaped; corollas usually multicolored. Inland plants...6. L. androsaceus.
Segments of the bracts spatulate to obovate; corollas yellow. Coastal plants.....7. L. parviflorus.
Calyx-tubes puberulent, often glandular....7. L. parviflorus.
Corolla-lobes 3-5 mm. long.
Plants usually over 2 dm. tall; calyx with a conspicuous hyaline membrane in the sinuses.....8. L. ciliatus.
Plants commonly under 1.5 dm. tall; calyx with an inconspicuous hyaline membrane.
Corollas completely yellow.....9. L. acicularis.
Corollas white, pink, or red, only the throat yellow. 10. L. bicolor.

1. Linanthus pygmaeus (Brand) Howell, Leafl. West. Bot. 2: 100. 1938.

Local distribution: Rare in grasslands and on serpentine soils. April and May.

General distribution: Coast Ranges from Lake County south to Monterey County, in Butte County, from San Bernardino County south to northern Baja California, and on Guadalupe Island.

Specimens examined: Woodside serpentine, Dutton, May 1, 1900; Near Stanford, Dudley, May 1, 1902; Ben Lomond Mt., Hesse 1861.

2. Linanthus dichotomus Benth. Bot. Reg. 19: under pl. 1622. 1833.

Local distribution: Dry hillslopes, serpentine, and sandy soils, southern San Mateo County southward, mainly in the foothills on the eastern slopes of the Santa Cruz Mountains. February through May.

General distribution: California Coast Ranges and Sierra Nevada foothills from Tehama and Butte counties south to northern Baja California, east through the Mojave Desert to Nevada, and in southwestern Arizona.

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Specimens examined: Jasper Ridge, Hichborn, Apr. 12, 1920; Near Searsville Lake, Dudley, Mar. 8, 1896; Stanford, Baker 529; Page Mill Road, Dudley, Apr. 1, 1893; Black Mt., Richardson, Apr. 15, 1906; San Jose, Kohl, Apr. 21, 1917; Edenvale, Abrams 5184; Felton, Brandegee, no date.

3. Linanthus liniflorus (Benth.) Greene, Pittonia 2: 254. 1892.

Local distribution: Dry slopes, serpentine, and borders of chaparral and grasslands, San Francisco southward along the eastern slopes of the Santa Cruz Mountains. April through July.

General distribution: Eastern Washington, eastern Oregon, and adjacent Idaho, western Nevada, and from the Sacramento Valley southward to northern Baja California.

Specimens examined: Mission Hills, San Francisco, Rattan, Apr. 9, 1877; San Francisco, Jones 3262; Hunters Pt., Bacigalupi 2438; Crystal Springs Lake, Elmer 4704; Near Millbrae, Dudley, May 18, 1893; Near San Carlos, Bacigalupi 2822; Woodside, Abrams 2416; Near Searsville, Applegate, May 11, 1895; Stevens Creek, Atkinson, July 1901; Alamitos Creek, Bacigalupi, May 12, 1923.

Linanthus liniflorus is a variable species. The branching in L. liniflorus ssp. liniflorus is usually alternate, while in L. liniflorus ssp. pharnaceoides (Benth.) Mason (in Abrams, Ill. Fl. Pacif. St. 3: 418. 1951) it is commonly opposite. In the typical subspecies the throat of the corolla is 3-4 times as long as the corolla-tube; in ssp. pharnaceoides it is only 1-2 times as long. Numerous intermediates occur. Jepson (1943, p. 209) was of the opinion that the characters used to separate the two subspecies were not significant. Some plants from the Santa Cruz Mountains, for example Oberlander 84 from the San Francisco Watershed Reserve, approach ssp. pharnaceoides.

Plants from San Francisco tend to be more compact, to have shorter internodes, and to branch more freely than those from other areas.

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4. Linanthus ambiguus (Rattan) Greene, Pittonia 2: 256. 1892.

Local distribution: Most common on serpentine outcroppings, less frequent on sandstone, Crystal Springs Lake southward on the eastern slopes of the Santa Cruz Mountains to the vicinity of Gilroy, rarely to the west of the crests of the Mountains. March through June.

General distribution: Coast Ranges from San Mateo and Contra Costa counties south to San Benito County.

Specimens examined: Crystal Springs Lake, Elmer 4913; McMurphy, May 8, 1906; Woodside, Abrams 2415; Woodside serpentine, Dutton, Mar. 25, 1900; Stevens Creek, Dudley, Mar. 5, 1905; Oak Hill, 4 miles south of San Jose, Rattan, May 16, 1896; May 1, 1887; Bacigalupi, May 6, 1922; Edenvale, Thomas 4781; Uvas Creek, Mason 6950; Gilroy - Watsonville Rd., Bacigalupi, May 6, 1922; Jamison Creek, Hesse 750.

The specimen from Jamison Creek fits the description of the species except for the corolla length, which varies in length from 2-2.5 cm.

5. Linanthus grandiflorus (Benth.) Greene, Pittonia 2: 260. 1892.

Local distribution: Dry open ridges, along the crests of the Santa Cruz Mountains from southern San Mateo County southward. May through July.

General distribution: Sonoma County south to Santa Barbara County in the Coast Ranges, eastward to western Merced and Madera counties.

Specimens examined: Near La Honda, Dudley, July 30, 1896; Loma Azule, Dudley, May 1898; Uvas Road, Ferris, May 12, 1923; 2 miles from Gilroy on Almaden Road, Ferris, May 6, 1922; Head of Aptos Creek, Dudley, Oct. 12, 1902.

6. Linanthus androsaceus (Benth.) Greene, Pittonia 2: 258. 1892.

Local distribution: A common species of open grasslands and grassy slopes, usually away from the sea. April through July.

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General distribution: Coast Ranges from Humboldt County south to Monterey County, also in Shasta and Orange counties.

Specimens examined: Crystal Springs Lake, Baker 469; Southwest of San Mateo, Dudley, May 13, 1906; Pescadero - La Honda Rd., Mason, July 14, 1921; Woodside serpentine, Dutton, Apr. 19, 1900; Coal Mine Ridge, Barry 120; Near Stanford, Baker 522; Black Mt., Applegate 344; Permanente Creek, Dudley, Apr. 23, 1899; Los Gatos Hills, McMurphy, May 1, 1906; Foothills west of Los Gatos, Heller 7354; Gilroy Valley, Chamberlin, May 6, 1922; Swanton, Rich, Spring 1912; Big Basin, Mason 3380; 2.2 miles southwest of Eagle Rock, Thomas 4028; Santa Cruz, Thompson, June 1, 1902; Mt. Charlie Rd., Thomas 3318.

7. Linanthus parviflorus (Benth.) Greene, Pittonia 2: 258. 1892.

(L. androsaceus (Benth.) Greene ssp. croceus (Milliken) Mason in Abrams, Ill. Fl. Pacif. St. 3: 430. 1951; L. androsaceus (Benth.) Greene ssp. luteus (Benth.) Mason, loc. cit.; L. rosaceus (Hook. f.) Greene, Pittonia 2: 259. 1892; L. longituba Heller, Muhlenbergia 1: 43. 1904.)

Local distribution: A common species of coastal bluffs, inland marine sand deposits, and grassy slopes, from San Francisco southward. April through June.

General distribution: Mendocino and Tehama counties south through the Coast Ranges to San Diego County and in the foothills of the Sierra Nevada from Butte County to El Dorado County.

Specimens examined: Presidio, Dudley, Apr. 2, 1902; San Francisco, Curran, May 1885; Lake Merced, Rose 42015; San Bruno, Dudley, Apr. 14, 1900; Blenheim, Eastwood, May 19, 1901; Moss Beach, Mason 8314; Pescadero Beach, Ferris 2192; Coal Mine Ridge, Barry 55; Near Stanford, Baker 540; Foothills west of Los Gatos, Heller 7349; New Almaden, Mason 6943; Guadalupe Mines, Parks 488; Hilton Airport, Thomas 4047; Bonny Doon, Ferris 2005; Felton, Dudley, Apr. 17, 1904; Near Glenwood, Ferris 11143.

Linanthus parviflorus is a variable species which can and has been divided ad infinitum by some authors.

8. Linanthus ciliatus (Benth.) Greene, Pittonia 2: 260. 1892.

Local distribution: Known locally only from near Bielawski Lookout

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in northern Santa Cruz County, growing on grassy slopes. May and June.

General distribution: Southern Oregon south through California to southern California, in adjacent Nevada, but absent from the deserts.

Specimens examined: Near Bielawski Lookout, Hesse 1130; 4.7 miles southeast of Saratoga Summit, Thomas 1842.

9. Linanthus acicularis Greene, Pittonia 2: 259. 1892.

Local distribution: Rare in grasslands and on serpentine soils, foothills of the eastern slopes of the Santa Cruz Mountains in southern San Mateo County. April and May.

General distribution: Coast Ranges from Mendocino and Lake counties south to San Mateo and Alameda counties.

Specimens examined: Woodside serpentine, Dutton, Apr. 17, 1900; Coal Mine Ridge, Barry 46.

10. Linanthus bicolor (Nutt.) Greene, Pittonia 2: 260. 1892.

Local distribution: Grasslands, mainly in the foothills of the eastern slopes of the Santa Cruz Mountains, probably often overlooked in collecting. Latter part of March through May.

General distribution: Washington and Oregon, west of the Cascades, south through the California Coast Ranges and Sierra Nevada foothills to southern California.

Specimens examined: Woodside, Abrams 2381; Coal Mine Ridge, Barry 86; Ferris 757; Jasper Ridge, Borthwick, Apr. 12, 1920; Stanford, Dudley, Apr. 30, 1902; Black Mt., Abrams 1530; Foothills west of Los Gatos, Heller 7355; Near Saratoga Summit, Thomas 2937.

3. Polemonium L. Sp. Pl. 162. 1753.

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1. Polemonium carneum Gray, Syn. Fl. 2: 151. 1878.

Local distribution: Known locally only from the vicinity of Pilarcitos Reservoir in northern San Mateo County. May through September.

General distribution: From the Olympic Peninsula, Washington, south through the Coast Ranges and Cascades to San Mateo and Alameda counties.

Specimens examined: Pilarcitos Stone Dam, Elmer 4771; Pilarcitos Canyon, Abrams 5576; Oberlander 580.

4. Eriastrum Woot. & Standl. Contr. U. S. Nat. Herb. 16: 160. 1913.

1. Eriastrum abramsii (Elmer) Mason, Madroño 8: 90. 1945.

Local distribution: Known locally from only two localities, Emerald Lake and Black Mountain, commonly growing with Adenostoma fasciculatum. June and July.

General distribution: Lake County and the Santa Cruz and Mount Hamilton ranges.

Specimens examined: Emerald Lake, Rose 37658 (CAS); Black Mt., Dudley, July 23, 1903; July 6, 1903; Elmer 4586 (type); Pendleton 137.

5. Navarretia Ruiz & Pavon, Fl. Peruv. Prod. 20. 1794.

Basal portion of the bracts broad, ovate.
  Distal segment of the bracts 3-toothed, bracts not digitately divided, distinctly longer than broad; stamens included. 1. N. atractyloides.
  Distal segment of the bracts not 3-toothed; bracts digitately divided, about as broad as long; stamens exserted..2. N. heterodoxa.
Basal portion of the bracts narrow, linear to lanceolate.
  Corollas 10-17 mm. long; corolla-lobes 4-6 mm. long; middle cauline leaves with more or less equally spaced teeth, rarely bipinnate. 3. N. viscidula.

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Corollas 9-12 mm. long; corolla-lobes 1.5-3 mm. long; middle cauline leaves with irregularly spaced divisions, usually bipinnate.
Corollas 9-12 mm. long; stamens 1-4 mm. long; filaments inserted near the base of the corolla-tube; plants usually over 2 dm. tall.....4. N. squarrosa.
Corollas 6-7 mm. long; stamens under 1.5 mm. long; filaments inserted near the middle of the corolla-tube; plants usually under 2 dm. tall.....5. N. mellita.

1. Navarretia atractyloides (Benth.) Hook. & Arn. Bot. Beechey 368. 1838.

Local distribution: Santa Clara and Santa Cruz counties, in rocky or sandy soils, most common on the inland marine sand deposits near Ben Lomond and Felton. May through August.

General distribution: Coast Ranges from Humboldt and Lake counties south to Baja California.

Specimens examined: Wrights, Elmer 5019; Big Basin, Lang, May 26, 1923; Near Jamison Creek, Hesse 930; Glenwood, Dudley, June 19, 1909; Mt. Hermon, Bacigalupi 1488; Ben Lomond Sand Hills, Thomas 6027.

2. Navarretia heterodoxa (Greene) Greene, Pittonia 1: 134. 1887.

Local distribution: Serpentine and rocky chaparral slopes, Crystal Springs Lakes southward. June and July.

General distribution: Coast Ranges from Sonoma and Napa counties south to Santa Cruz and western Santa Clara counties.

Specimens examined: Crystal Springs Lake, Elmer 4282; Oberlander 1090; Hills west of Redwood City, Rose 41269; Near San Carlos, Bacigalupi 2821; Searsville, Dudley, June 14, 1895; Black Mt., Pendleton 1474; Near Los Gatos, Heller 7519.

3. Navarretia viscidula Benth. Pl. Hartw. 324. 1844.

Local distribution: Rare in southern San Mateo and northern Santa Clara counties in the foothills on the eastern slopes of the Santa Cruz

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Mountains, usually on grassy slopes in heavy soil. May and June.

General distribution: Humboldt and Shasta counties south through the Coast Ranges to northern Santa Clara County, in the Sacramento Valley, and south to Tulare County in the Sierra Nevada foothills.

Specimens examined: Searsville Rd., Abrams 5565; Portola Rd., Randall 281; Near Searsville Lake, Dudley, May 27, 1893.

4. Navarretia squarrosa (Esch.) Hook. & Arn. Bot. Beechey 368. 1838.

Local distribution: The most common species of Navarretia in the Santa Cruz Mountains, growing in dry, hard-packed soils, on grassy slopes, and as a weed. June through October.

General distribution: Southern British Columbia south through the Coast Ranges to northern Monterey County and in the Sierra Nevada foothills in El Dorado and Amador counties.

Specimens examined: San Francisco, Kellogg, 1870; Brandegee, Sept. 10, 1885; Mt. Lake, Abrams 2205; Presidio, Bacigalupi & Ferris 2715; San Andreas Lake, Oberlander 921; Crystal Springs Lake, Abrams 2998; Pescadero, Wiggins 12197; Kings Mt., Abrams 4997; Stanford, Dudley, June 24, 1897; San Antonio Creek, Randall 279; Wrights, Elmer 5009; Guadalupe Creek near San Jose, Knoche, July 6, 1896; Swanton, Rich, Spring 1912; Santa Cruz, Jones 2217; Near Castle Rock, Thomas 3432; Near Hilton Airport, Thomas 3556.

5. Navarretia mellita (Greene) Greene, Pittonia 1: 134. 1887.

Local distribution: Occasional in rocky or sandy soils, usually in chaparral or along its borders, central San Mateo County southward. June and July.

General distribution: Coast Ranges from Humboldt County south to northern San Luis Obispo County.

Specimens examined: Belmont, Greene, June 23, 1886 (isotype); Black Mt., Dudley, July 8, 1903; Elmer 5074; Near Eagle Rock, Hesse 963; Big Basin, Thomas 2435.

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6. Collomia Nutt. Gen. 1: 126. 1818.

Leaves pinnately parted or lobed, if entire then the blades wide; corollas under 1.2 cm. long, pink to red-purple....1. C. heterophylla.
Leaves entire, lanceolate to linear; corollas over 2 cm. long, pinkish yellow.....2. C. grandiflora.

1. Collomia heterophylla Hook. Bot. Mag. 56: pl. 2895. 1829.

Local distribution: Fairly common in sandy soils of inland sand deposits, along open creek banks, and on brush-covered slopes. April through July.

General distribution: Vancouver Island, British Columbia, south through the Coast Ranges to Monterey County and through the Sierra Nevada to Tuolumne County.

Specimens examined: Pilarcitos Canyon, Oberlander 816; Near Pescadero Creek, Dudley, June 6, 1895; Mason, July 1921; La Honda Grade, Wolf 3725; near Palo Alto, Dudley, May 1893; Los Gatos Canyon, Dudley, June 22, 1890; Los Gatos, Leeds, May 10, 1889; Congress Springs, Heller 7411; Saratoga - Big Basin Road, Abrams 5271; Big Basin, Dudley, June 5, 1897; Swanton, Rich, Spring 1912; Near Felton, Dudley, Apr. 17, 1904; Loma Prieta, Thompson, May 8, 1902; Soquel Valley, Thomas 1415.

2. Collomia grandiflora Dougl. ex Hook. Bot. Reg. 14: pl. 1174. 1828.

Local distribution: Occasional in the Santa Cruz Mountains, known from near Saratoga and Bielawski Lookout, growing in mixed evergreen forest. May through July.

General distribution: Southern British Columbia south to San Diego County, east to central Montana, central Wyoming, southwestern Colorado, and northern Arizona.

Specimen examined: Bielawski Lookout, Thomas 3439.

Collomia grandiflora has been reported from 4 miles north of Saratoga (Jepson, 1943, p. 171).

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7. Gilia Ruiz & Pavon, Fl. Peruv. Prod. 25. 1794.

Stems conspicuously leafy, the cauline leaves about as large as the basal ones, but reduced gradually upwards.
Inflorescences capitate, usually with 50-100 flowers.
Corolla-lobes linear, 1-2 mm. wide; heads very sparingly floccose at the base or glabrous...1a. G. capitata ssp. capitata.
Corolla-lobes oval, 2.2-3.3 mm. wide; heads densely floccose at the base.
Corollas deep blue-violet; basal leaves bipinnately dissected. Sand dune plants.....1b. G. capitata ssp. chamissonis.
Corollas pale blue-violet; basal leaves pinnately dissected. Inland plants.....1c. G. capitata ssp. staminea.
Inflorescences capitate or glomerulate, usually with less than 25 flowers, or the flowers solitary.
Corollas with purple spots in the throat.
Corollas 11-16 mm. long, 9-14 mm. across. 2. G. tricolor.
Corollas 6-8 mm. long, 3-5 mm. across. 3. G. clivorum.
Corollas lacking purple spots in the throat.
Green part of the calyx-lobes 0.8-1 mm. wide; corollas 6-8 mm. long; capsules with over 24 seeds; plants usually under 3 dm. tall.....3. G. clivorum.
Green part of the calyx-lobes 0.5-0.8 mm. wide; corollas 5-20 mm. long; capsules with 10-18 seeds; plants 1-7 dm. tall. 4. G. achilleaefolia.
Stems not conspicuously leafy, the cauline leaves much smaller than the basal ones.....5. G. tenuiflora.

1a. Gilia capitata Sims ssp. capitata, Bot. Mag. 53: pl. 2698. 1826.

Local distribution: Occasional in the Santa Cruz Mountains. June through July.

General distribution: Coast Ranges from British Columbia south to Santa Cruz County, east to western Idaho.

Specimens examined: Black Mt., Elmer 5078; Alba Grade, Thomas 4319.

1b. Gilia capitata Sims ssp. chamissonis (Greene) Grant, El.Aliso 2: 309. 1950.

Local distribution: Known locally from the sand dunes in San Francisco. April through June.

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General distribution: Coastal sand dunes from Bodega Bay, Sonoma County, south to San Francisco.

Specimens examined: Sand hills, San Francisco, Heller 5662; Golden Gate Park, Rattan 1880; Lake Merced, Dudley, May 11, 1901; Abrams 1586.

1c. Gilia capitata Sims ssp. staminea (Greene) Grant, El Aliso 2: 308. 1950.

Local distribution: Rare in the Santa Cruz Mountains. April and May.

General distribution: Coast Ranges from Sonoma County south to San Benito County and in the San Joaquin Valley from Contra Costa County south to Kern County.

Specimen examined: Boulder Creek, Thomas 1774.

This subspecies also occurs at Cupertino, Pendleton 790 (Grant, 1950, p. 309).

2. Gilia tricolor Benth. Bot. Reg. 19: under pl. 1622. 1833.

Local distribution: Open grasslands, often on serpentine soil, foothills on the eastern side of the Santa Cruz Mountains from Stanford southward. February through April.

General distribution: Coast Ranges from Humboldt and Trinity counties south to San Benito County, in the Sacramento and northern San Joaquin valleys, and in the foothills of the Sierra Nevada from Tehama County south to Tulare County.

Specimens examined: Stanford, Atkinson, Mar. 13, 1900; Dudley, Apr. 12, 1893; Edenvale, Abrams 5183; Thomas 4759; Hills west of Gilroy, Baker 1942 (CAS).

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3. Gilia clivorum (Jepson) Grant, El Aliso 3: 31. 1954.

Local distribution: Open fields and grassy slopes, San Francisco southward. Latter half of March through June.

General distribution: Coast Ranges from Lake and Solano counties south to Ventura County.

Specimens examined: Presidio, Heller 6594; Hunters Pt., Mason 4375; Crystal Springs Lake, Baker 467; Lower Crystal Springs Lake, Oberlander 601; West of Redwood City, Dudley, Mar. 16, 1900; Near Searsville, Applegate 343; Coal Mine Ridge, Barry 43; Black Mt., Dudley, Mar. 19, 1898; Campbell, Heller 8513; Waddell Creek, Thomas 1736; Near Saratoga Summit, Hesse 262; 3.5 miles west of Watsonville, Thomas 3101.

4. Gilia achilleaefolia Benth. Bot. Reg. 19: under pl. 1622. 1833.

Local distribution: A common plant of open slopes, brush-covered areas, chaparral, and shaded oak - woodland. February through July.

General distribution: Coast Ranges from Marin and Contra Costa counties south to Santa Barbara County.

Specimens examined: Woodside serpentine, Dutton, Apr. 19, 1900; Portola, Elmer 4592; Coal Mine Ridge, Barry 104; Near Stanford, Baker 643; Permanente Creek, Abrams 6338; Black Mt., Dudley, June 5, 1895; Foothills west of Los Gatos, Heller 7396; Loma Prieta, Dudley, May 29, 1894; New Almaden, Mason 6933; Hills 4 miles south of San Jose, Rattan, May 1, 1887; Near Madrone Station, Dudley 4083; Swanton, Rich, Spring 1912; Near Saratoga Summit, Thomas 1843; Felton, Mason 3369.

Gilia achilleaefolia is exceedingly variable. Grant (1954, p. 7) has studied this species carefully and has found that "Almost every local population in Gilia achilleaefolia constitutes a separate race with distinctive characters. These races do not group themselves into broad geographical assemblages, as in most species including the related Gilia capitata, but the broader subdivision in the species is rather along ecological lines. The large-flowered races with dense

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heads occupy sunny hillsides in grassland and oak savannah; the small-flowered races with loose cymes occur in the shade of oak woodland or redwood forst; and there are numerous transitional forms in the semi-shade of open oak woods."

5. Gilia tenuiflora Benth. Bot. Reg. 19: under pl. 1622. 1833.

Local distribution: Known locally only from the sand hills near Felton and Ben Lomond. April and May.

General distribution: Coast Ranges from Santa Cruz County south to San Luis Obispo County.

Specimens examined: Vicinity of Felton, Dudley, Apr. 17, 1904; Constance & Macbride 3038A; Thomas 1874.

8. Allophyllum (Nutt.) A. & V. Grant, El Aliso 3: 98. 1955.

1. Allophyllum divaricatum (Nutt.) A. & V. Grant, El Aliso 3: 101. 1955.

(Gilia divaricata Nutt. Journ. Acad. Phila. 1: 155. 1848.)

Local distribution: Occasional in the Santa Cruz Mountains in Santa Clara and Santa Cruz counties, usually above 2000 feet elevation, usually in mixed evergreen and douglas fir forests and along the edges of chaparral. May through September.

General distribution: Coast Ranges, Humboldt County southward at scattered localities to San Bernardino County and in the foothills of the Sierra Nevada.

Specimens examined: Loma Prieta, Dudley, May 30, 1893; Aug. 1903; Near Eagle Rock, Thomas 6042; Hesse 994; Empire Grade, Thomas 3409.

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103. HYDROPHYLLACEAE

Plants herbs.
  Ovary 1-celled.
    Herbage commonly prickly, not viscid or scented; calyces often with appendages in the sinuses.
      Herbage succulent; stems prickly; flowers in terminal cymes. 1. Pholistoma.
      Herbage not succulent; stems usually not prickly; flowers solitary.....2. Nemophila.
    Herbage viscid, scented; appendages lacking.....3. Eucrypta.
  Ovary partially or wholly divided by the placenta.
    Plants lacking tomentose tubers at the base; style not entire.
      Corollas blue, violet, or white, not persistent. 4. Phacelia.
      Corollas yellow, persistent.....5. Emmenanthe.
    Plants with tomentose tubers at the base; style entire. 6. Romanzoffia.
Plants shrubs.....7. Eriodictyon.

1. Pholistoma Lilja ex Lindbl. Bot. Notiser 40. 1839.

Calyx with auricles, enveloping the capsule; mature capsules 5-10 mm. in diameter. Common.....1. P. auritum.
Calyx lacking auricles, not enveloping the capsule; mature capsules 2-4 mm. in diameter. Rare in the Santa Clara Valley. 2. P. membranaceum.

1. Pholistoma auritum (Lindl.) Lilja ex Lindbl. Bot. Notiser 40. 1839.

Local distribution: Mainly on the western side of the Santa Cruz Mountains, commonly growing among grasses in partial shade of Quercus agrifolia and Aesculus californica. March through June.

General distribution: Lake County south through the Coast Ranges to San Diego County and in the Sierra Nevada foothills from Calaveras County south to Kern County, also on San Clemente and Santa Catalina islands.

Specimens examined: South San Francisco, Cannon, Apr. 1892 (CAS); Pescadero Creek, Meyer 376; Stanford, Abrams 2309; Thomas 3794; Stevens Creek, Pendleton 759 (UC); Southwest of Saratoga, Pendleton 900 (UC).

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2. Pholistoma membranaceum (Benth.) Constance, Bull. Torr. Bot. Club 66: 350. 1939.

Local distribution: Occasional in grasslands on open hills in the Santa Clara Valley. Late January through May.

General distribution: Contra Costa County south through the Coast Ranges to the vicinity of Viscaíño Bay, Baja California, from Mariposa County southward, and in the desert mountain ranges of Inyo and San Bernardino counties.

Specimens examined: Hills 4 miles south of San Jose, Rattan, May 1, 1887; Evergreen, Davy 52; Edenvale, Abrams 6400.

2. Nemophila Nutt. ex Barton, Fl. N. Amer. 2: 71. 1822; Journ. Acad. Phila. 2: 179. 1822.

Corollas usually 1 cm. or more in diameter.
  Corollas conspicuously blue-veined, usually blue at least toward the periphery, if black-punctate, the dots toward the center. 1a. N. menziesii var. menziesii.
  Corollas not usually conspicuously blue-veined, usually white, black-punctate toward the periphery. 1b. N. menziesii var. atomaria.
Corollas less than 1 cm. in diameter.
  Auricles in the sinuses of the calyx usually 1/3 as long as the calyx-lobes or longer; corollas marked with blue, purple, or black. Usually growing in unshaded areas. 2. N. pedunculata.
  Auricles less than 1/3 as long as the calyx-lobes; corollas not marked. Usually growing in shaded areas.
    Basal leaves with 5-7 distinct divisions, these petiolulate, orbicular; style 2-3 mm. long. Eastern slopes of the Santa Cruz Mts.....3. N. heterophylla.
    Basal leaves with 5 divisions, these not petiolulate nor orbicular; style to 1.5 mm. long. Both slopes of the Santa Cruz Mts. 4. N. parviflora.

1a. Nemophila menziesii Hook. & Arn. var. menziesii, Bot. Beechey 152. 1833.

Local distribution: San Francisco southward, on open grassy slopes

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or growing in shade, commonly under Quercus agrifolia, Q. lobata, Rhus diversiloba, and Arbutus menziesii. February through April.

General distribution: Mendocino and Shasta counties south to San Diego County through the Coast Ranges, Great Valley, and Sierra Nevada foothills.

Specimens examined: Ocean View, Dudley, Mar. 24, 1895; Lake Merced, Chandler 816; Between Lake Merced and Ocean, Sheldon 10536; Cemeteries, San Mateo Co., Elmer 4737; La Honda, Baker 500; Searsville, Davis, Apr. 1903; Coal Mine Ridge, Barry 1; Stanford, Atkinson, Jan. 1900; Black Mt., Dudley, Mar. 19, 1898; Foothills west of Los Gatos, Heller 7272; New Almaden, Constance 2073; Morgan Hill, Constance & Hoover 2047; Swanton, Rich, Apr. 1912; Bielawski Lookout, Thomas 1518; Deer Ridge Farm, Heller 8436; Chittenden Pass, Knoche, Apr. 9, 1937.

1b. Nemophila menziesii Hook. & Arn. var. atomaria (Fisch. & Mey.) Chandler, Bot. Gaz. 34: 204. 1902.

Local distribution: Northern San Mateo County southward to Santa Clara County, commonly on open grassy slopes. March and April, rarely in flower until June.

General distribution: Coast Ranges from Washington County, Oregon, south to Santa Clara County.

Specimens examined: Colma, Chandler 800; San Andreas Valley, Oberlander 569; Montara Mts., Dudley, Mar. 17, 1900; Half Moon Bay, Leithold, Mar. 28, 1894; Pebble Beach, Dudley, Apr. 17, 1896; Kings Mt., Dudley, Mar. 16, 1900; Portola, Dudley, Apr. 7, 1904; Black Mt., Abrams 1534; Loma Prieta, Elmer 4666.

2. Nemophila pedunculata Dougl. ex Benth. Trans. Linn. Soc. 17: 275. 1835.

Local distribution: San Francisco southward on both sides of the Santa Cruz Mountains, growing commonly in moist, open, grassy areas. February through April.

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General distribution: Vancouver Island, British Columbia, south to northern Baja California, east through Oregon to western Idaho, occasionally found in Nevada.

Specimens examined: San Francisco, Chandler 1800; Lake Merced, Chandler 6073; Kings Mt., Dudley, Mar. 16, 1900; Black Mt., Leithold, Mar. 1894; Head of Stevens Creek, Abrams 7337; Morgan Hill, Constance & Hoover 2048; Jamison Road, Thomas 2963; Hilton Airport, Thomas 3709; Boulder Creek, Hesse 283, 295; Felton, Dudley, Apr. 17, 1904.

3. Nemophila heterophylla Fisch. & Mey. Sert. Petrop. pl. 8, 1846.

Local distribution: San Francisco southward, mainly on the eastern slopes of the Santa Cruz Mountains, commonly growing in shade of Quercus agrifolia, Sambucus sp., Aesculus californica, and Rhus diversiloba with Dentaria californica and Montia perfoliata. January through April.

General distribution: Jackson and Josephine counties, Oregon, south through the Coast Ranges, upper Sacramento Valley, and Sierra Nevada foothills to San Benito and Madera counties.

Specimens examined: San Bruno Hills, Eastwood, Apr. 9, 1922 (CAS); Pilarcitos Canyon, Oberlander 861; Crystal Springs Dam, Dudley, Mar. 26, 1894; Black Mt., Dudley, Apr. 10, 1897; Woodside serpentine, Dutton, Feb. 11, 1900; Stanford, Abrams 2306; Foothills west of Los Gatos, Heller 7292; New Almaden, Constance 2074; Morgan Hill, Constance & Hoover 2049.

4. Nemophila parviflora Dougl. ex Benth. Trans. Linn. Soc. 17: 275. 1835.

Local distribution: San Francisco southward, on both sides of the Santa Cruz Mountains, commonly growing in shade of Sequoia sempervirens and Pseudotsuga menziesii or Quercus agrifolia, Q. kelloggii, Q. wislizenii, Arbutus menziesii, and Rhus diversiloba, with Galium, Montia perfoliata, and Stellaria. March through June.

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General distribution: Coast Ranges from southern British Columbia south to Monterey County, mainly west of the Cascades.

Specimens examined: Mission, San Francisco, Rattan, no date; Pilarcitos Canyon, Oberlander 691; Crystal Springs Lake, Constance 2241; Pescadero Creek, Dudley, May 2, 1903; Stanford, Randall, Mar. 9, 1908; Above Wrights, Dudley, Apr. 19, 1895; Loma Prieta, Dudley, May 30, 1893; Rancho del Oso, Thomas 2927; Swanton, Rich, Spring 1912; Big Basin, Dudley, June 5, 1897; Jamison Creek, Dudley, Mar. 29, 1899; Boulder Creek, Hesse 290; Glenwood, Thomas 2884.

3. Eucrypta Nutt. Journ. Acad. Phila. 1: 159. 1847.

1. Eucrypta chrysanthemifolia (Benth.) Greene, Bull. Calif. Acad. 1: 200. 1885.

Local distribution: Moist ravines on the eastern slopes of the Santa Cruz Mountains from Santa Clara County southward. March through June.

General distribution: Coast Ranges from the vicinity of Tiburon Island, Marin County, and Contra Costa County south to Todos Santos Bay, Baja California.

Specimens examined: Hidden Villa, Dudley, May 21, 1898; Permanente Ravine, Dudley, Apr. 23, 1899.

4. Phacelia Juss. Gen. 129. 1789.

Plants perennial.
- Divisions of the leaves toothed to crenate.....1. P. ramosissima.
- Divisions of the leaves, or the leaves, entire.
  - Corollas 4-5 mm. long; inflorescence glandular; stems usually solitary; cauline leaves or the terminal lobe of the cauline leaves broadly lanceolate to elliptic to broadly ovate.....2. P. nemoralis.
  - Corollas 5-7 mm. long; inflorescences not glandular; stems usually several; cauline leaves or the terminal lobe of the cauline leaves lanceolate to linear-lanceolate.

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Corollas usually blue to purplish; the lobes of the corollas spreading after anthesis; calyx-lobes 7-8 mm. long in fruit, 2-2.5 mm. wide, oblong-lanceolate, not imbricate; basal leaves usually with 1-2 pairs of lateral lobes. 3. P. californica.

Corollas whitish; the lobes of the corollas somewhat incurved after anthesis; calyx-lobes 5-10 mm. long in fruit, 1.5-4 mm. wide, somewhat imbricate, lanceolate to ovate; basal leaves with 3 or more pairs of lateral lobes. 4. P. imbricata.

Plants annual.

Stems and leaves distinctly bristly-hispid, the individual trichomes 2-4 mm. long.

Stamens exserted; corollas 5-7 mm. long and broad. 5. P. malvaefolia.

Stamens included; corollas 2-3 mm. long and broad. 6. P. rattanii.

Stems and leaves variously pubescent or glabrous, not bristly-hispid.

Pedicels 1-5 cm. long in fruit; inflorescences not congested, the flowers very remote from each other in fruit. 7. P. douglasii.

Pedicels under 0.3 cm. long in fruit or the flowers sessile; inflorescences congested, the flowers close together in fruit.

Leaves entire, toothed, or rarely with a pair of small lobes at the base.

Leaves coarsely toothed; corollas tubular-funnelform, usually under 10 mm. long, 5-10 mm. across; corolla-lobes 1.5-2 mm. long.....8. P. suaveolens.

Leaves entire, occasionally with a pair of basal lobes; corollas open-campanulate, 10-18 mm. long, 15-24 mm. across; corolla-lobes 4-5 mm. long.9. P. divaricata.

Leaves pinnatifid, leaflets again pinnatifid or toothed.

Calyx-lobes conspicuously enlarged in fruit, ovate, the veins distinct, glabrous to subglabrous, ciliate on the margins, 8-10 mm. long, 2-5 mm. broad; leaf divisions coarse. Plants of heavy clay soils, mainly in lowlands.....10. P. ciliata.

Calyx-lobes little enlarged in fruit, lanceolate to oblanceolate or obovate, the veins indistinct, densely pubescent, 4-7 mm. long, 0.5-3 mm. broad; leaf divisions fine. Plants of rocky or sandy soils, foothills. 11. P. distans.

1. Phacelia ramosissima Dougl. ex Lehm. Stirp. Pug. 2: 21. 1830.

Local distribution: Coastal sand dunes from San Francisco southward. May through September.

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General distribution: A widespread species, ranging from Washington south to Baja California, east to Idaho, Utah, and Arizona.

Specimens examined: Ano Nuevo Pt., Class collection, Summer 1940; Santa Cruz, Jones 2313; Sunset Beach State Park, Thomas 3281; Near mouth of Pajaro River, Thomas 2403.

2. Phacelia nemoralis Greene, Pittonia 1: 141. 1887.

Local distribution: Wooded slopes from Crystal Springs Lake southward to the vicinity of Loma Prieta. April through August.

General distribution: Vancouver Island, British Columbia, south through the Coast Ranges and Cascades to Santa Cruz and Santa Clara counties.

Specimens examined: Crystal Springs Lake, Elmer 4419; Bear Gulch, Abrams 1575; San Francisquito Creek, Applegate 363; Stanford, Atkinson, Apr. 1900; Mountains west of Palo Alto, Congdon, July 21, 1887; Black Mt., Dudley, June 5, 1895; Permanente Creek, Dudley, Apr. 30, 1899; Foothills west of Los Gatos, Heller 7450; Loma Prieta, Dudley, July 22, 1893; Ben Lomond Mt., Thomas 3472.

3. Phacelia californica Cham. Linnaea 4: 494. 1829.

Local distribution: Usually in rocky soil on open hillsides, coastal bluffs, and canyon slopes, San Francisco south to the vicinity of Santa Cruz. April through September.

General distribution: Coast Ranges from Mendocino County south to western Stanislaus, Santa Cruz, and Santa Clara counties.

Specimens examined: Golden Gate Park, Rattan, Sept. 1, 1880; Lake Merced, Heller 5701; Colma, Abrams 1624; San Bruno Mt., Ferris 2152; 1 mile south of Daly City, Rollins 3018; Crystal Springs Lake, Elmer 4855; 3.5 miles northeast of Halfmoon Bay, Thomas 3832; 2-3 miles west of Santa Cruz, Thomas 1500.

4. Phacelia imbricata Greene, Erythea 1: 127. 1893.

Local distribution: Rocky slopes and road embankments, usually

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away from the coast, northern San Mateo County southward. February through June.

General distribution: Coast Ranges from Humboldt County southward to San Diego County and in the Sierra Nevada at lower elevations from Shasta County south to Kern County.

Specimens examined: San Mateo Reservoir, Dudley, Apr. 21, 1894; Coal Mine Ridge, Barry 173; Stanford, Atkinson, Feb. 1900; Foothills west of Los Gatos, Heller 7415; Near San Jose, Roush & Kimber, Apr. 23, 1918; San Juan Bautista Hills, Dudley, May 27, 1895; San Vicente Creek, Thomas 3396; Boulder Creek, Thomas 1777; Near Glenwood, Thomas 3197.

5. Phacelia malvaefolia Cham. Linnaea 4: 494. 1829.

Local distribution: Usually near the coast on partly shaded slopes. May through the first half of July.

General distribution: Along or near the coast from Curry County, Oregon, south to San Luis Obispo County.

Specimens examined: Pt. Lobos, San Francisco, Howell 4213; Lands End, Walker 1992; Lake Merced, Heller 5702; Between Colma & Lake Merced, Dudley, May 1, 1901; San Bruno Hills, Elmer 4784; San Andreas Lake, Oberlander 579; Near San Mateo, Dudley, May 1894; Near Alpine School House, Dudley, June 19, 1905; Near Kings Mt., Dudley, May 27, 1893; Near mouth of Waddell Creek, Thomas 1743; Swanton, Rich, May 1912; Bonny Doon, Hesse 1325; Soda Lake, Thomas 3312.

6. Phacelia rattanii Gray, Proc. Amer. Acad. 20: 302. 1885.

Local distribution: Occasional in loose sandy soil, woods, chaparral, and areas of disturbance in chaparral, Santa Clara County from the vicinity of Stanford southward, and in central Santa Cruz County on the inland marine sand deposits. May and June.

General distribution: Southern Oregon and adjacent Idaho south through the California Coast Ranges to San Luis Obispo County.

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Specimens examined: Near Stanford, Dudley, May 12, 1899; Elmer 4404 (isotype of P. flaccida Elmer); Page Mill Road, Abrams 7353; San Antonio Creek, Dudley, May 21, 1898; Stevens Creek, Thomas 5714; Uvas Road, Abrams 10112; Near Camp Evers, Hesse 1101; Near Felton, Vestal, May 29, 1947.

7. Phacelia douglasii (Benth.) Torr. Bot. Mex. Bound. 143. 1859.

Local distribution: Known locally only from sandy soil at Lake Merced, from the inland sand deposits in Santa Cruz County, and occasionally from well-stabilized coastal sand dunes. April and May.

General distribution: San Francisco and Contra Costa counties south through the Coast Ranges and San Joaquin Valley to Los Angeles and San Bernardino counties.

Specimens examined: Lake Merced, Tracy 1812; Ewan 8703 (CAS); Near Ben Lomond, Thomas 4903, 1373; Near Felton, Dudley, Apr. 17, 1904.

8. Phacelia suaveolens Greene, Pittonia 1: 223. 1888.

Local distribution: Known locally only from the vicinity of Mount Umunhum and Loma Prieta in Santa Clara County and from Eagle Rock in Santa Cruz County, but to be expected in any recently burned or cleared chaparral. April through July.

General distribution: Coast Ranges from Lake County south to the vicinity of Loma Prieta in Santa Clara County and to Eagle Rock in Santa Cruz County, and in the Sierra Nevada foothills in Amador County.

Specimens examined: Mt. Umunhum, Smith, June 29, 1950 (CAS); Near Loma Prieta, Dudley, Apr. 19, 1895; Loma Prieta summit, Hesse 956; Eagle Rock, Constance & Macbride 3308.

9. Phacelia divaricata (Benth.) Gray, Proc. Amer. Acad. 10: 325. 1875.

Local distribution: Rocky soils, serpentine outcroppings, and

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grasslands, Crystal Springs Lakes southward, east of the crest of the Santa Cruz Mountains. Latter half of February through June.

General distribution: Mendocino and Colusa counties south through the Coast Ranges to Santa Clara and San Benito counties.

Specimens examined: Crystal Springs Lakes, Elmer 4481; Baker 432; Peters Creek, Ferris 1957; La Honda, Brandegee, May 22, 1889; Emerald Lake, Wiggins 11198; Woodside serpentine, Dutton, Feb. 11, 1900; Between Saratoga Summit and Page Mill Road, Dudley, Apr. 17, 1893; Black Mt., Dudley, June 8, 1895; Foothills west of Los Gatos, Heller 8429.

10. Phacelia ciliata Benth. Trans. Linn. Soc. 17: 280. 1835.

Local distribution: Heavy clay and adobe soils, San Francisco southward, but most common in the Santa Clara Valley. March through May, occasionally plants to be found with flowers as late as November.

General distribution: Glenn County southward through the Coast Ranges, Central Valley, and Sierra Nevada foothills to the vicinity of San Quintin Bay, Baja California.

Specimens examined: San Francisco, Rattan, 1880; San Miguel Hills, Rubtzoff 3123 (CAS); Palo Alto, Wiggins 3388; Abrams 2289; Between Mt. View and Los Altos, Abrams 5165; Near San Jose, Parks 492; South of San Jose, Rattan, May 16, 1886.

Albino plants are occasionally encountered, as for instance, Thomas 4748, from Palo Alto.

Phacelia ciliata thrives in fields which have been allowed to lie fallow and in orchards which have not been plowed.

11. Phacelia distans Benth. Bot. Sulph. 36. 1844.

Local distribution: Serpentine outcroppings, sand dunes and deposits, disturbed rocky areas, and occasionally in grasslands, San Francisco southward. March through June.

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General distribution: Mendocino, Glenn, and El Dorado counties south to central Baja California, east to southern Nevada and Arizona, thence southward into Sonora.

Specimens examined: Bakers Beach, Bacigalupi 1821; Lake Merced, Abrams 1597; Lone Mt., Eastwood 218; San Bruno Hills, Heller 8466a; San Pedro, Elmer 4862; San Andreas Lake, Oberlander 719; Woodside serpentine, Dutton, Mar. 25, 1900; Stanford, Abrams, Apr. 1898; Black Mt., Dudley, Apr. 14, 1900; 4 miles south of San Jose, Hoover 3253; Los Gatos, Dudley, Apr. 17, 1910; Loma Prieta, Dudley, Apr. 20, 1895; Edenvale, Abrams 5186; Rancho del Oso, Thomas 1744; Swanton, Rich, Spring 1912; Ben Lomond sand hills, Hesse 1069.

5. Emmenanthe Benth. Trans. Linn. Soc. 17: 281. 1835.

1. Emmenanthe penduliflora Benth. Trans. Linn. Soc. 17: 281. 1835.

Local distribution: Chaparral slopes, mainly those which have been disturbed either by fire or by chaparral clearance. April through July.

General distribution: Tehama County south through the Coast Ranges and Sierra Nevada foothills to northern Baja California, the Mojave and Colorado deserts northward to Mono County, in adjacent Nevada, and in Arizona from Mohave and Gila counties southward to southern Arizona.

Specimens examined: Near Stevens Creek Reservoir, Thomas 5717; Black Mt. Road, Dudley, May 5, 1894; Ridge west of Los Gatos, Heller 7377; Mt. Umunhum, Mason, June 21, 1921; Loma Prieta, Elmer 4993; Quail Hollow, Hesse 1926; Castle Rock, Dudley, Mar. 28, 1899.

6. Romanzoffia Cham. ex Nees, Hor. Phys. Ber. 71. 1820.

1. Romanzoffia suksdorfii Greene, Pittonia 5: 38. 1902.

Local distribution: San Francisco and San Mateo counties south to the Crystal Springs Lakes and in Big Basin (Jepson, 1943, p. 296), usually in shade on moist rocks, bluffs, and ledges with mosses and Sedum. March and April.

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General distribution: Western Washington south in the Coast Ranges to Santa Cruz County.

Specimens examined: San Bruno Mts., Kellogg & Brannon, Apr. 13, 1870; Pilarcitos Canyon, Abrams 5582; Oberlander 966; Crystal Springs Lake, Elmer 4482; San Mateo Canyon, Abrams, Apr. 10, 1904.

7. Eriodictyon Benth. Bot. Sulph. 35. 1844.

1. Eriodictyon californicum (Hook. & Arn.) Torr. Bot. Mex. Bound. 148. 1859.

Local distribution: A common chaparral species, often growing with Castanopsis chrysophylla, Ceanothus papillosus, Arctostaphylos crustacea, and Rhus diversiloba, invading road embankments and cleared areas. April through July.

General distribution: Curry, Josephine, and Jackson counties, Oregon, south to San Luis Obispo County in the Coast Ranges and to Kern County in the Sierra Nevada.

Specimens examined: Lake San Andreas, Elmer 4801; Sweeney Ridge, Oberlander 133; Belmont, Rattan, 1881; Kings Mt., Rose 41288; Stanford, Applegate 358; Black Mt., McMurphy, Apr. 28, 1906; Permanente Creek, Abrams 5143; Foothills west of Los Gatos, Heller 7384; Big Basin, Howell 3030, Alba Grade, Thomas 3383; Upper San Lorenzo River, Dudley, May 7, 1893; Glenwood, Davis, Sept. 1907; Between Felton and Mt. Herman, Constance 3081

Eriodictyon californicum sprouts from the roots after fires as well as seeding itself.

104. BORAGINACEAE

Corollas yellow, orange, or blue.
  Corollas blue (rarely white in Cynoglossum).
    Corollas nearly rotate; stamens with an abaxial appendage.
      1. Borago.
    Corollas with a distinct tube; stamens unappendaged.

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Corollas about 1 cm. across; nutlets depressed-globose, spiny, about 5-6 mm. in diameter; basal leaves ovate, 5-10 cm. wide.....2. Cynoglossum.
Corollas about 0.5 cm. across; nutlets ovoid, smooth, about 2 mm. in diameter; basal leaves spatulate, under 3 cm. wide.....3. Myosotis.
Corollas yellow or orange.....4. Amsinckia.
Corollas white, often yellow at the center.
Herbage conspicuously succulent, glaucous, glabrous; ovary not lobed; plants perennial.....5. Heliotropium.
Herbage not succulent (somewhat so in Allocarya glabra), not glaucous, usually conspicuously pubescent; ovary deeply 4-lobed; plants annual.
Nutlets widely divergent at maturity, with uncinate bristles at least at the tips.....6. Pectocarya.
Nutlets not divergent at maturity, lacking uncinate bristles.
Nutlets with a longitudinal groove on the adaxial surface which is forked at the base.....7. Cryptantha.
Nutlets lacking such a groove, but with an evident attachment scar below the middle and often with a distinct adaxial keel.
Lower leaves opposite.....8. Allocarya.
Lower leaves alternate.
Basal rosette usually not persistent; nutlets with a distinct baso-lateral stipe-like projection. 9. Echidiocarya.
Basal rosette usually present; nutlets lacking a projection.....10. Plagiobothrys.

1. Borago L. Sp. Pl. 137. 1753.

1. Borago officinalis L. Sp. Pl. 137. 1753.

Local distribution: Rare as an escape from gardens. Flowering throughout the year.

General distribution: Native of Europe, occasional as an escape in temperate regions.

Specimens examined: San Francisco, Howell 31389 (CAS); Near Mission, San Francisco, Rattan, Feb. 17, 1877; Colma, Vortriede, May 16, 1928 (CAS); Los Altos, Poirier, no date (UC).

2. Cynoglossum L. Sp. Pl. 134. 1753.

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1. Cynoglossum grande Dougl. ex Lehm. Stirp. Pug. 2: 25. 1830.

Local distribution: Oak - madrone woods, open douglas fir forests, and shrubby slopes throughout the Santa Cruz Mountains. Latter part of February through April.

General distribution: Southern Washington southwest of the Cascade and Sierra Nevada crests to San Luis Obispo and Tulare counties.

Specimens examined: San Andreas Lake, Dudley, May 18, 1900; La Honda, Applegate 378; Butano, Dudley, June 16, 1905; Coal Mine Ridge, Barry 229; Foothills west of Los Gatos, Heller 8482; Swanton, Rich, May 12, 1912; Between Big Basin and Hilton Airport, Thomas 1320; Bean Creek Drainage, Thomas 1435; 3.5 miles from mouth of San Lorenzo River, Thomas 2902.

Mrs. Brandegee (1892, p. 365) stated that this species grew on the Mission Hills and those near Visitacion Bay and that plants were "Formerly abundant but now becoming rare in our limits."

3. Myosotis L. Sp. Pl. 131. 1753.

1. Myosotis sylvatica (Ehrh.) Hoffm. Deutsch. Fl. ed. 1. 61. 1791.

Local distribution: Becoming increasingly common along roadsides and streams in the redwood - douglas fir forests and occasionally found in San Francisco. March through May.

General distribution: Native of Europe, widely grown as a garden ornamental and commonly naturalized.

Specimens examined: Mt. Davidson, San Francisco, Twisselmann 3122 (CAS); Tunitas Creek, Thomas 4687; Pescadero Creek, Ferris 1960; Near Holy City, Thomas 3985; 1 mile southwest of Glenwood, Thomas 3940; San Lorenzo River, 3.5 miles from its mouth, Thomas 2898.

This species is one of the more attractive additions to the native flora.

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4. Amsinckia Lehm. Del. Sem. Hort. Hamb. 7. 1831.

Macbride (1917) recognized 22 species of Amsinckia in North America with five of these represented in the Santa Cruz Mountains area. Brand (1928) described 9 new species from North America, despite the fact that he realized the complexity of the genus. The following is my translation of several sentences from the first paragraph of his paper (loc. cit., p. 210):

> The following, described as "new species" in the genus Amsinckia, carry in part provisional characters. Under them are possibly hybrids and transitional forms. Clarity can only be attained through extensive culture studies, which naturally can only be employed in America. Until this has happened, no alternative remains, but to describe the various forms under the title of "species novae."

Suksdorf in his work on the genus Amsinckia (1931) listed over 20 species as occurring in our area out of over 200 which he recognized in the genus. Peter Kamb (1952) attacked the genus from the cytological viewpoint and found haploid chromosome numbers of 5, 8, 12, 15, and 19. Although he made no realignments in the grouping of entities, Kamb's work indicates the complex biological situation existing in the genus. Recently, Ray and Chisaki (1957) presented a provisional synopsis of the genus in which they recognize 13 species in North America. They cited no specimens, nor do they give adequately detailed ranges. However, on the basis of the ranges given, 7 species can be inferred to occur in the Santa Cruz Mountains area. In view of the fact that the treatment of Ray and Chisaki is provisional and that the authors plan further papers, I am presenting a very conservative treatment.

The material of Amsinckia from the Santa Cruz Mountains area can readily be separated into three quite variable groups. Further separa-

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tion is possible, but in view of the foregoing, it would serve no useful purpose until the basic units in the genus are worked out.

At least 2 of the calyx-lobes usually united; leaves erose-dentate.
Beach and coastal sand dune plants.....1. A. spectabilis.
Calyx-lobes free; leaves entire. Inland plants.
Corollas barely exserted, 4-7 mm. long, the limb 2-3 mm. across; plants appearing grayish-green.....2. A. retrorsa.
Corollas conspicuously exserted, 7-20 mm. long, the limb 3-6 mm. across; plants appearing green.....3. A. intermedia.

1. Amsinckia spectabilis Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 2, 26, 1836.

Local distribution: Coastal sand dunes and beaches from San Francisco to the Pajaro River. March through July.

General distribution: Along the coast from Lincoln County, Oregon, to San Diego County, and as an introduced weed from Illinois to Massachusetts.

Specimens examined: San Francisco, Abrams 1611; Ano Nuevo Pt., Ferris 1983; Mouth of Waddell Creek, Thomas 1713; Sunset Beach, Thomas 3081; Dunes at Watsonville Slough, Thomas 1580.

Specimens of this species which I have examined have the following calyx-lobe connation patterns: all lobes free; two lobes joined, three free; three lobes joined, two free; four lobes joined, one free; or two pairs of joined lobes, one free. The number of fused lobes varies from plant to plant and on one plant may vary from flower to flower.

2. Amsinckia retrorsa Suksdorf, Deutsch. Bot. Monatss. 18: 134. 1900.

Local distribution: Occasional in grassy fields or on open hillsides. March through the first part of July.

General distribution: Washington and Idaho south to Utah, Nevada, and southern California.

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Specimens examined: East Palo Alto, Wiggins 3384; Permanente Creek, Abrams 6331; Hills west of Los Gatos, Heller 8936B; Swanton, Rich, Spring 1912; Big Basin, Randall, July 5, 1930.

3. Amsinckia intermedia Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 2, 26, 1936.

Local distribution: Widely distributed in fields and disturbed areas. March through June.

General distribution: Washington and Idaho south to Baja California, Arizona, and western New Mexico.

Specimens examined: San Mateo Ravine, Dudley, Apr. 27, 1894; Portola, Randall 13; Alviso, Bioletti, 1892; Stanford, Randall 14; Foothills west of Los Gatos, Heller 7347; 7 miles north of New Almaden, Constance 2077; Near Swanton, Thomas 1762; Santa Cruz, Thompson, Apr. 27, 1902; Big Basin Junction, Thomas 3412; Scott's Valley, Thomas 1449; Pajaro River, Thomas 3225.

Amsinckia intermedia has been introduced into other temperate regions and as in England has become a troublesome weed (Dony, 1953).

5. Heliotropium L. Sp. Pl. 130. 1753.

1. Heliotropium curassavicum L. Sp. Pl. 130. 1753.

Local distribution: Along sandy river banks, sea beaches, and becoming increasingly common in disturbed habitats along roads and highways. March through October.

General distribution: Throughout the United States, southern Canada, and Mexico, also on most of the other continents.

Specimens examined: San Francisco, Howell 31659 (CAS); Redwood City, Thomas 4230; Foothills near Stanford, Randall 16; 6 miles southeast of San Jose, Thomas 4350; Along the Pajaro River, Thomas 3218; Near Watsonville, Thomas 2419.

The plants of this species from northern California south to Baja

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California and east to Nevada and the Colorado Desert have been segregated as Heliotropium curassavicum var. oculatum (Heller) Johnston ex Tidestrom (Proc. Biol. Soc. Wash. 48: 42. 1935) on the basis of oblong to spatulate leaves in the midportion of the stem.

6. Pectocarya DC. ex Meisn. Gen. 279. 1840.

Nutlets divergent in pairs; calyx with straight hairs at the apex of the lobes.....1. P. penicillata.
Nutlets not divergent in pairs; calyx with uncinate hairs at the apex of the lobes.....2. P. pusilla.

1. Pectocarya penicillata (Hook. & Arn.) A. DC. Prod. 10: 120. 1846.

Local distribution: Sandy soil of inland marine sand deposits and probably in chaparral and in other dry habitats. April and May.

General distribution: Southern British Columbia south to Baja California, east to Wyoming, Utah, and Arizona.

Specimens examined: Lake Merced, Dudley, May 11, 1901; Stanford University, Elmer 4677; Ben Lomond sand hills, Thomas 1656.

2. Pectocarya pusilla (A. DC.) Gray, Proc. Amer. Acad. 12: 81. 1876.

Local distribution: Chaparral, open woods, and probably on serpentine in southern San Mateo and northern Santa Clara counties and to be expected farther south. April and May.

General distribution: Klickitat County, Washington, south to San Luis Obispo and Kern counties, also in Chile.

Specimens examined: Hills southwest of San Mateo, Dudley, May 13, 1906; Black Mt., Abrams 7352; Page Mill Road, Keck 4350; Jasper Ridge, Rouch & Kimber, May 2, 1918; Permanente Creek, Dudley, Apr. 23, 1899; Morgan Hill, Hoover 2953 (UC).

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7. Cryptantha Lehm. ex Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 35. 1836.

At least some nutlets in each flower papillate or muricate.
  Mature calyx about 1 mm. long; nutlets papillate, under 1 mm. long, one often larger than the others and often smooth. 1. C. micromeres.
  Mature calyx 2-4 mm. long; nutlets muricate, 1.5-2.5 mm. long, all equal in size and equally muricate. 2. C. muricata var. jonesii.
Surface of the nutlets smooth.
  Nutlets usually 1 per flower.
    Hairs on the calyx, especially toward the base, with pallid encrustations, these usually curved; fruiting calyx 2-5 mm. long.....3. C. flaccida.
    Hairs on the calyx lacking encrustations, straight; fruiting calyx 1-2 mm. long.....4. C. microstachys.
  Nutlets usually 4 per flower.
    Nutlets broadly ovoid.....5. C. torreyana var. pumila.
    Nutlets lanceolate to ovate-lanceolate.
      Spikelets usually bractless or with a few bracts near the base, elongate, not dense.....6. C. hispidissima.
      Spikelets bracteate, short, dense. 7. C. leiocarpa.

1. Cryptantha micromeres (Gray) Greene, Pittonia 1: 113. 1887.

Local distribution: Chaparral burns, margins of chaparral, and loose sandy soil of dry ridges. April through June.

General distribution: Coast Ranges from Marin County south to northern Baja California and in the Sierra Nevada foothills from Amador County south to Mariposa County.

Specimens examined: Near Searsville Lake, Hichborn, May 31, 1920; Stanford, Dudley, Apr. 16, 1897; Permanente Canyon, Chamberlain, no date; Foothills west of Los Gatos, Heller 7241; Saratoga - Big Basin Rd., Abrams 5269; Near Big Basin, Dudley, June 7, 1895; Soquel Valley, Thomas 1412.

2. Cryptantha muricata (Hook. & Arn.) Nels. & Macbr. var. jonesii (Gray) Johnston, Plant World 22: 114. 1919.

Local distribution: Dry chaparral, usually above 1500 feet, Santa

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Clara and Santa Cruz counties. May through August.

General distribution: Coast Ranges and Sierra Nevada foothills from Glenn and Nevada counties south to northern Baja California.

Specimens examined: Permanente Creek, Dudley, Apr. 30, 1899; Alma Soda Spring, Heller 7491; Loma Prieta, Davis, May 8, 1920; Loma Prieta Ridge, Dudley, July 22, 1893; Big Basin, Rose 35225; Shockley, June 7-8, 1919; Glenwood, Dudley, June 19, 1909; Powder Mill Canyon, Thompson, July 6, 1902.

3. Cryptantha flaccida (Dougl.) Greene, Pittonia 1: 115. 1887.

Local distribution: Common on serpentine outcroppings, rarely in other rocky areas, mainly east of the crest of the Santa Cruz Mountains. April through June.

General distribution: Washington and western Idaho south through Oregon, the Sierra Nevada foothills and the Coast Ranges to San Diego County, rare in southern California.

Specimens examined: San Andreas Lake, Oberlander 885; Crystal Springs Lake, Dudley, Apr. 21, 1894; Redwood City, Davis, June 1, 1920; Woodside, Abrams 1567; Near Menlo Park, Dale, June 1, 1920; Jasper Ridge, McMurphy, May 1911; Alamitos Creek, Ferris 3716; Hills 4 miles south of San Jose, Rattan, May 1, 1887; 2½ miles east of Los Gatos, Thomas 3921; Loma Prieta, Dudley, May 29, 1894; Edenvale, Thomas 4784; Bear Creek Canyon, Hesse 1270.

4. Cryptantha microstachys (Gray) Greene, Pittonia 1: 116. 1887.

Local distribution: Chaparral, usually in poor or rocky soil, southern San Mateo, Santa Clara, and Santa Cruz counties. April through July.

General distribution: Coast Ranges from Glenn County to San Diego County and in the Sierra Nevada foothills in Kern County.

Specimens examined: Coal Mine Ridge, Barry 191a; Near Stanford, Randall 15; Black Mt., Dudley, Apr. 14, 1900; Stevens Creek, Thomas 5715; Eagle Rock, Thomas 3481; Near Felton, Vestal, May 20, 1947.

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5. Cryptantha torreyana (Gray) Greene var. pumila (Heller) Johnston, Contr. Gray Herb. 74: 80. 1925.

Local distribution: Occasional in grasslands. May through July.

General distribution: Central California from Marin and Contra Costa counties south to Santa Cruz and Santa Clara counties.

Specimens examined: San Andreas Lake, Oberlander 267; Coal Mine Ridge, Barry 191; Stanford, Dudley, June 14, 1895; Stevens Creek, Chamberlain, June 1922; Swanton, Rich, Spring 1912.

6. Cryptantha hispidissima Greene, Pittonia 1: 118. 1887.

(C. clevelandii Greene var. florosa Johnston, Contr. Gray Herb. 74: 95. 1925.)

Local distribution: Occasional, sandy soils and grassy borders of chaparral, San Francisco southward. May through July.

General distribution: Coast Ranges from Marin County south to San Diego County.

Specimens examined: Golden Gate Park, Ratten, 1878; La Honda Grade, Bacigalupi, May 27, 1923; Near Eagle Rock, Thomas 4083; Saratoga - Big Basin Road, Abrams 5268; Near Eagle Rock, Hesse 2119; 2 miles south of Glenwood, Ferris 11140; Near Mt. Hermon, Ferris 11145; Ben Lomond Hills, Rose 33238.

7. Cryptantha leiocarpa (Fisch. & Mey.) Greene, Pittonia 1: 117. 1887.

Local distribution: Stabilized coastal sand dunes and occasionally on inland sand dunes, San Francisco southward. April and May.

General distribution: In sandy soils along the coast from Coos County, Oregon, south to Los Angeles County.

Specimens examined: Presidio, San Francisco, Howell 11219; Near Bakers Beach, Bacigalupi 1822; Lake Merced, Abrams 1592; Sunset Beach, Thomas 3080; Mouth of Pajaro River, Thomas 1599.

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8. Allocarya Greene, Pittonia 1: 12. 1887.

Nutlet attachment basal or basolateral, the scar not broad, not linear; pedicels commonly shorter than the calyx, or the flowers sessile.
  Stems somewhat fistulose or succulent; nutlet attachment basal, often substipitate; calyx with well-developed costae; the lower ½ to 2/3 of the mature nutlets hidden by the calyx-tube. 1. A. glabra.
  Stems not fistulose or succulent; nutlet attachment basolateral, not substipitate; calyx lacking well-developed costae; mature nutlets not hidden by the calyx-tube.
    Adaxial keel of the nutlets not in a groove. Plants widespread. 2. A. bracteata.
    Adaxial keel of the nutlets in a distinct groove. Endemic in San Francisco.....3. A. diffusa.
Nutlet attachment lateral, the scar linear; pedicels equalling the calyx to several times as long, or the flowers sessile.
  Corollas 1.5-2.5 mm. across; keel on the adaxial surface of the nutlets not in a groove. Rare. 4. A. undulata.
  Corollas 4-10 mm. across; keel in a definite groove.
    Stems trailing, usually not branched below the 4th-6th internode; lower internodes elongate; pedicels 2-30 mm. long, usually longer than the calyx, often recurved; corolla 6-10 mm. broad.....5a. A. chorisiana var. chorisiana.
    Stems branched from the base; lower internodes short; pedicels commonly shorter than the calyx; corolla 4-6 mm. broad. 5b. A. chorisiana var. hickmanii.

1. Allocarya glabra (Gray) Macbr. Proc. Amer. Acad. 51: 543. 1916.

Local distribution: Low alkaline soils in the Santa Clara Valley, poorly collected, and rarely in the adjacent foothills. April and May.

General distribution: Low alkaline soils in western Alameda County, in the Santa Clara Valley, and near Hollister in San Benito County.

Specimens examined: 3 miles south of San Jose, Thomas 4799; Los Gatos, Cannon, June 1894 (CAS).

2. Allocarya bracteata Howell, Fl. N. W. Amer. 481. 1901.

Local distribution: Common in moist grassy areas, ditches, and

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low wet places, at low elevations on the eastern side of the Santa Cruz Mountains. March through May.

General distribution: Southwestern Oregon south through California to northern Baja California.

Specimens examined: Golden Gate Park, Walther, Apr. 1922 (CAS); Crystal Springs Lake, Abrams 7335; Dudley, Apr. 21, 1894; Woodside to Crystal Springs Lake, Dudley, May 1894; Coal Mine Ridge, Barry 69; Near Stanford, Dudley, Apr. 29, 1902; Permanente Canyon, Daniel, Apr. 24, 1915; Near Campbell, Heller 8512; Santa Clara, Knoche, Apr. 21, 1893; Above Wrights, Dudley, Apr. 19, 1895.

3. Allocarya diffusa Greene, Pittonia 1: 14. 1887.

Local distribution: Occasional in the vicinity of Mountain Lake near the Presidio in San Francisco, growing in clay soils. April through June.

General distribution: Endemic in San Francisco, closely related to A. californica (Fisch. & Mey.) Greene, a species which ranges from Marin County northward to Coos County, Oregon.

Specimens examined: San Francisco, Greene, May 27, 1887 (isotype); Mountain Lake, Howell 11223.

4. Allocarya undulata Piper, Contr. U. S. Nat. Herb. 22: 104. 1920.

Local distribution: Occasional in the Santa Cruz Mountains in marshy areas and in wet clay soils. April through July.

General distribution: Coastal regions from Marin County south to San Diego County.

Specimens examined: San Andreas Lake, Oberlander 1062; Madrone Station, Ferris 794.

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5a. Allocarya chorisiana (Cham.) Greene var. chorisiana, Pittonia 1: 13. 1887.

Local distribution: Low boggy ground, San Francisco southward to central Santa Cruz County, generally absent east of the crest of the Santa Cruz Mountains. Latter part of March through July.

General distribution: Endemic in the Santa Cruz Mountains.

Specimens examined: San Francisco, Brandegee, no date; Rattan, Apr. 3, 1896; Near Lake Merced, Heller 8439; San Bruno Mt., Ferris 2136; Sweeney Ridge, Oberlander 804; Crystal Springs Lake, Baker 429; Pebble Beach, Dudley, Apr. 17, 1896; Peters Creek, Ferris 1953; Between Kings Mt. and La Honda, Dudley, May 27, 1893; Belmont, Greene, May 10, 1906; New Years Pt., Ferris 1979; El Corte Madera, Dudley, Apr. 24, 1898; Santa Cruz Co., Thompson, Apr. 27, 1902; Hilton Airport, Thomas 1911; Camp Evers, Thomas 1675.

5b. Allocarya chorisiana (Cham.) Greene var. hickmanii Jepson, Man. Fl. Pl. Calif. 852. 1925.

Local distribution: Low moist ground, coastal bluffs and inland sand deposits, Pescadero southward. March through August.

General distribution: Central San Mateo County south to northern San Luis Obispo County.

Specimens examined: Pescadero, Keck 4728; Near Woodside, McMurphy, May 8, 1906; Near Stanford, Dudley, Apr. 12, 1895; Swanton, Rich, Spring 1912; Jamison Creek Road, Hesse 610; Big Basin, Dudley, Apr. 16, 1904; June 5, 1897; Near Olympia, Thomas 1664; Camp Evers, Thomas 3357.

9. Echidiocarya Gray in Benth. & Hook. Gen. Pl. 2: 854. 1876.

1. Echidiocarya californica Gray, Proc. Amer. Acad. 12: 164. 1877.

Local distribution: Known locally only from Eagle Rock in Santa Cruz County, but to be expected elsewhere in rocky soils along the margins of chaparral. April and May.

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General distribution: Coast Ranges from Santa Cruz and San Benito counties south to northern Baja California, also in Kern County.

Specimen examined: Eagle Rock, Hesse 1278.

10. Plagiobothrys Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 46. 1835.

Calyx circumscissile; corolla-limb 6-8 mm. broad; margins and midribs of the leaves staining purple; nutlets 2-2.5 mm. long.
1. P. nothofulvus.
Calyx not circumscissile; corolla-limb 1.5-4 mm. broad; leaves not staining purple; nutlets 1.5-3 mm. long.
Nutlets 2.5-3 mm. long, triangular-ovoid; stems usually 1-2 from the base; plants usually 3-6 dm. tall; calyx about 5 mm. long.
2. P. campestris.
Nutlets 1.5-2 mm. long, thick-cruciform; stems usually many from the base; plants usually 0.5-3 dm. tall; calyx about 3 mm. long.
3. P. tenellus.

1. Plagiobothrys nothofulvus (Gray) Gray, Proc. Amer. Acad. 20: 285. 1885.

Local distribution: A common annual on grassy fields and slopes. February through June.

General distribution: Klickitat County, Washington, thence south, mainly west of the Cascades, to San Diego County through the Coast Ranges and Sierra Nevada foothills, east to the Providence Mountains.

Specimens examined: San Francisco, Dudley, Apr. 1897; Emerald Lake, Wiggins 6651; Coal Mine Ridge, Barry 45; Stanford, Baker 403; Monte Bello Ridge, Thomas 5702; Ridge west of Los Gatos, Heller 7391; Near Morgan Hill, Ferris 796; Near Gilroy, Sheldon, Apr. 1, 1915; Near Big Basin, Dudley, June 7, 1895; Near Saratoga Summit, Thomas 2948.

Plagiobothrys nothofulvus is readily identified by its circumscissile calyx and purple-staining leaves. The superficial cells of the margins and the midribs of the leaves contain an anthocyanin pigment which stains the hands when the leaves are crushed or the newsprint when the plants are pressed.

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2. Plagiobothrys campestris Greene, Pittonia 2: 282. 1892.

Local distribution: Occasional in grasslands in the Santa Clara Valley. March through June.

General distribution: Southwestern Oregon south to Monterey County in the Coast Ranges, and to Fresno County in the Sierra Nevada.

Specimens examined: Stanford, Dudley, Mar. 26, 1895; Apr. 12, 1895; Near San Jose, Rattan, June 24, 1880.

3. Plagiobothrys tenellus (Nutt.) Gray, Proc. Amer. Acad. 20: 283. 1885.

Local distribution: Open grasslands, rocky soils, and sandy soil of inland marine sand deposits. March through May.

General distribution: British Columbia south to northern Baja California, east to Idaho, Utah, and southern Arizona.

Specimens examined: Menlo Park Reservoir, Dudley, Apr. 11, 1894; Jasper Ridge, Hichborn, Apr. 12, 1920; Stanford, Atkinson, Mar. 1900; Palo Alto, Dudley, Apr. 1893; Black Mt., Dudley, Mar. 19, 1898; Foothills west of Los Gatos, Heller 7338; Castle Rock, Dudley, Mar. 25, 1899; Jamison Creek, Hesse 717; Near Felton, Dudley, Apr. 17, 1904; Ben Lomond sand hills, Thomas 4893.

105. VERBENACEAE

Calyx 5-lobed; flowers in spikes; corollas blue to purplish..1. Verbena.
Calyx 2-lipped; flowers in dense heads; corollas white to pink or rose-colored.....2. Phyla.

1. Verbena L. Sp. Pl. 18. 1753.

Adaxial leaf surfaces not scabrous; spikes loosely flowered in fruit.
1. V. lasiostachys.
Adaxial leaf surfaces scabrous; spikes densely flowered in fruit.
2. V. robusta.

1. Verbena lasiostachys Link, Enum. Hort. Berol. 2: 122. 1822.

Local distribution: Dry ground of disturbed areas, creek bottoms,

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roadsides, and along edges of brushy vegetation. May through September.

General distribution: Southwestern Oregon south through the Coast Ranges and Sierra Nevada foothills to northern Baja California.

Specimens examined: Pilarcitos Canyon, Oberlander 197; Pescadero, Dudley, June 18, 1905; Coal Mine Ridge, Barry 215; Near Stanford, Randall 422; 1 mi. south of Gilroy, Thomas 4365; Glenwood, Davis, Sept. 1907; China Grade, Thomas 3532; Swanton, Rich, June 8, 1912; Watsonville, Thomas 3290.

2. Verbena robusta Greene, Pittonia 3: 309. 1898.

Local distribution: Margins of ponds, river beds, and low moist ground where water has stood during the winter, mainly on the eastern side of the Santa Cruz Mountains. June through October.

General distribution: Sonoma and Solano counties south to northern Baja California, also in Tuolumne County and on some of the Channel Islands.

Specimens examined: Crystal Springs Lake, Elmer 4950; Near Woodside, Dutton, Feb. 18, 1900; Stanford, Abrams 1032; 3 miles SE of Los Altos, Thomas 4309; Chittenden, Dudley, Oct. 10, 1908.

2. Phyla Lour. Fl. Cochinch. 66. 1790.

1. Phyla nodiflora (L.) Greene var. rosea (D. Don) Moldenke, Phytologia 2: 22. 1941.

Local distribution: Occasional in marshes, in lawns, and in disturbed areas, San Francisco southward. May through October.

General distribution: Native of South America, widely established in North America.

Specimens examined: San Francisco, Howell 31481 (CAS); Crystal Springs Lake, Oberlander 316; Stanford, Thomas 5209; Between Gilroy and Bells Station, Abrams 5284.

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106. MENTHACEÆ

Calyx 2-lipped.
- Fertile stamens 2.
  - Anther cells 2, close together; bracts with 7-9 radiating spines; herbs.....1. Acanthomintha.
  - Anther cells 1 or 2, if 2 the anther cells separated by an elongated connective; bracts lacking spines or with only a terminal spine; herbs or shrubs.....2. Salvia.
- Fertile stamens 4.
  - Calyx-lips entire, the adaxial hood-like.....3. Scutellaria.
  - Calyx-lips toothed, not hook-like.
    - Corollas white or slightly tinged with lavender; flowers in axial clusters; bracts lacking.....4. Melissa.
    - Corollas violet; flowers in dense terminal inflorescences; bracts present.....5. Prunella.

Calyx regular or nearly so.
- Stamens long-exserted, at least twice as long as the corolla, 4; nutlets united.....6. Trichostema.
- Stamens included or exserted, less than twice as long as the corolla, 2 or 4; nutlets distinct.
  - Calyx-teeth 10, with hooked spines at the tips..7. Marrubium.
  - Calyx-teeth 5, lacking hooked spines.
    - Corollas regular or nearly so.
      - Flowers in terminal heads; stamens 4. Plants of dry habitats.....8. Monardella.
      - Flowers in axillary clusters or in verticils; stamens 2 or 4. Plants of wet habitats.
        - Stamens 2.....9. Lycopus.
        - Stamens 4.....10. Mentha.
    - Corollas strongly 2-lipped.
      - Adaxial pair of stamens longer than the abaxial.
        - Leaves trifoliate.....11. Cedronella.
        - Leaves simple, variously toothed.
          - Stems erect; leaves ovate to oblong. 12. Nepeta.
          - Stems creeping with ascending branches; leaves suborbicular.....13. Glecoma.
      - Adaxial pair of stamens shorter than or equalling the abaxial.
        - Upper lip of the corolla concave.
          - Corollas lacking a ring of hairs within. 14. Lamium.
          - Corollas with a ring of hairs within. 15. Stachys.
        - Upper lip of the corollas plane.
          - Flowers solitary in the axils of the leaves or leaf-like bracts; plants perennial.
            - Corollas 25-30 mm. long; shrubby plants, 1-1.5 m. tall, not trailing.....16. Lepechinia.
            - Corollas 6-8 mm. long; stems trailing. 17. Satureja.

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Flowers in dense clusters; plants annual or perennial.
Plants annual; bracts not colored; corollas 3-5 mm. long; calyx glabrous within.
18. Pogogyne.
Plants perennial; bracts colored; corollas 5-6 mm. long; calyx pubescent within.
19. Origanum.

1. Acanthomintha Gray ex Benth. & Hook. Gen. Pl. 2: 1192. 1876.

1. Acanthomintha obovata Jepson ssp. duttonii Abrams, Ill. Fl. Pacif. St. 2: 635. 1951.

Local distribution: A local endemic of serpentine areas in southern San Mateo County between Redwood City and Woodside. April through July.

General distribution: Endemic in San Mateo County. The typical subspecies ranges from San Benito County south to Ventura County.

Specimens examined: Crystal Springs Lake, Elmer 4538; Near Menlo Golf Club, Dutton & Walker 3819; Emerald Lake, Wolf 3723; Keck 5034; Woodside serpentine, Dutton, Apr. 17, 1900 (type).

2. Salvia L. Sp. Pl. 23. 1753.

Annual herbs; stamens with 2 anther cells; leaves pinnatifid.
1. S. columbariae.
Perennial herbs or shrubs; stamens with 1 anther cell; leaves not pinnatifid.
Perennial herbs; leaves hastate to truncate at the base; corollas about 3 cm. long.....2. S. spathacea.
Shrubs; leaves gradually narrowed at the base, not hastate or truncate; corolla about 1.2 cm. long.....3. S. mellifera.

1. Salvia columbariae Benth. Lab. Gen. & Sp. 302. 1833.

Local distribution: Dry open grassy slopes, bare rocky slopes, and edges of chaparral, northern San Mateo County southward, mainly along the crest of the Santa Cruz Mountains. March through July.

General distribution: Tehama County south to the Vizcaíño Desert

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of Baja California, east to Nevada and Arizona.

Specimens examined: Crystal Springs Lake, Baker 546; Dudley, Apr. 21, 1894; Coal Mine Ridge, Barry, May 6, 1938; Black Mt., Applegate 437; Alma Soda Springs, Heller 7504; 4 miles S. of San Jose, Rattan, May 1, 1887; Loma Prieta, Dudley, May 30, 1893; Thomas 3965.

2. Salvia spathacea Greene, Pittonia 2: 236. 1892.

Local distribution: Known locally from the vicinity of Colma, Daly City, and San Bruno Mountain in northern San Mateo County where it occurs on open slopes. March through May.

General distribution: Coast Ranges from Solano County south to Orange County, in general in the Outer Coast Ranges.

Specimens examined: Colma, Edward, Mar. 1877; Elmer 4440; San Bruno Hills, Heller 8459; Rollins 3016.

3. Salvia mellifera Greene, Pittonia 2: 236. 1892.

Local distribution: Dry slopes and chaparral, northern Santa Clara County southward, also in Santa Cruz County. March through August.

General distribution: Coast Ranges from Contra Costa and Santa Clara counties south to northern Baja California.

Specimens examined: Los Gatos Hills, McMurphy, May 1, 1906; Foothills west of Los Gatos, Heller 7465; El Toro, Ferris 799; Near Gilroy, Dudley, Mar. 11, 1905; Glenwood, Bioletti, May 1892; Ben Lomond Mt., Dudley, Mar. 29, 1899; Santa Cruz, Thompson, June 7, 1903; Pajaro River, Thomas 1551.

3. Scutellaria L. Sp. Pl. 598. 1753.

Flowers blue; rootstocks terminating in tubers. Common.1. S. tuberosa.
Flowers white; rootstocks slender, lacking tubers. Rare.
2. S. bolanderi.

1. Scutellaria tuberosa Benth. Lab. Gen. & Sp. 441. 1834.

Local distribution: Oak-madrone woods, borders of shrubby vegeta-

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tion, and in central Santa Cruz County on the inland marine sand deposits. Latter part of March through June.

General distribution: Southern Oregon south through the Coast Ranges and Sierra Nevada foothills to northern Baja California.

Specimens examined: San Francisco, Cannon, no date (CAS); Cahil Ridge, Oberlander 909; Crystal Springs Lake, Baker 447; Coal Mine Ridge, Barry 109; Stanford, Abrams 2355; Black Mt., Dudley, June 5, 1895; Foothills west of Los Gatos, Heller 7288; Loma Prieta, Thompson, June 7, 1902; Swanton, Rich, Spring 1912; Near Glenwood, Thomas 2877; 4 miles N of Felton, Keck 4501.

2. Scutellaria bolanderi Gray, Proc. Amer. Acad. 7: 387. 1868.

Local distribution: Known only in the Santa Cruz Mountains from Uvas Creek in southern Santa Clara County. May.

General distribution: Sierra Nevada, from Amador County south to Kern County and in Santa Clara County in the Coast Range.

Specimen examined: Uvas Creek near Bradley's Store, Ferris, May 12, 1923.

4. Melissa L. Sp. Pl. 592. 1753.

1. Melissa officinalis L. Sp. Pl. 592. 1753.

Local distribution: Roadsides and shaded canyons, most common in the central portion of the Santa Cruz Mountains. July through October.

General distribution: Native of Europe, widely introduced into the United States.

Specimens examined: La Honda, Abrams 7348; Palo Alto, Dudley, Nov. 10, 1908; Wrights, Ferris 3621; Loma Prieta Ridge, Dudley, Oct. 12, 1902; Glenwood, Davis, Sept. 1907; Mt. Hermon, Cox, Aug. 3, 1908; Boulder Creek, Hesse 144 (JEPS).

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5. Prunella L. Sp. Pl. 600. 1753.

Leaves ovate to oblong-ovate, rounded at the base, ½ as broad as long.
Lawn weeds.....la. P. vulgaris ssp. vulgaris.
Leaves lanceolate, gradually narrowed at the base, about 1/3 as broad as long. Native plants.....lb. P. vulgaris ssp. lanceolata.

la. Prunella vulgaris L. ssp. vulgaris, Sp. Pl. 600. 1753.

Local distribution: Occasional in lawns as a weed. June through July.

General distribution: Native of Europe, widely introduced.

Specimens examined: Presidio, San Francisco, Eastwood 261 (CAS); Stanford, Abrams 14317.

lb. Prunella vulgaris L. ssp. lanceolata (Barton) Hultén, Fl. Aleut. Isl. 286. 1937.

Local distribution: Along the coast on bluffs and inland in shaded woods. April through December.

General distribution: Widely distributed in North America from Alaska to northern Mexico and east to the Atlantic coast.

Specimens examined: Cahill Ridge, Oberlander 331; Crystal Springs Lake, Elmer 4206; Pescadero, Dudley, July 5, 1901; Pigeon Pt., Ferris, Spring 1921; Kings Mt. Rd., Randall 172; Powder Mill Canyon, Thompson, July 6, 1902.

An indistinct coastal variety, P. vulgaris L. var. atropurpurea Fernald (Rhodora 15: 186. 1913) has larger flowers and bracts which are less ciliate on the margins.

6. Trichostema L. Sp. Pl. 589. 1753.

1. Trichostema lanceolatum Benth. Lab. Gen. & Sp. 659. 1835.

Local distribution: Dry open fields and slopes, southern San

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Mateo County, southward. June through October.

General distribution: Northwestern Oregon south through the Coast Ranges and Sierra Nevada foothills to northern Baja California.

Specimens examined: Frenchman's Lake, Stinchfield 249; Black Mt., Elmer 5016; Saratoga Summit, Rose 41456; Foothills west of Los Gatos, Heller 7213; Waddell Creek, Dudley, Sept. 1901; Hilton Airport, Thomas 3583; Felton, McCracken, Sept. 1919.

7. Marrubium L. Sp. Pl. 582. 1753.

1. Marrubium vulgare L. Sp. Pl. 583. 1753.

Local distribution: Widely distributed in disturbed areas, especially common along roadsides and in hard-packed soils. February through July.

General distribution: Native of Eurasia, widely established in temperate regions.

Specimens examined: San Francisco, Dudley, 1897; Bayview Hills, Howell 31620 (CAS); Stanford, Randall 173; About 3 miles SE of Los Altos, Thomas 4312; San Jose, Rattan, June 1880; Near Glenwood, Thomas 3198.

8. Monardella Benth. Lab. Gen. & Sp. 331. 1834.

Plants annual or sometimes perennial, not woody at the base; leaves oblong, oblanceolate, to linear, undulate-margined.
1. M. undulata.
Plants perennial, usually woody at the base; leaves ovate to lanceolate, or orbicular, not undulate-margined.
Leaves thin, ovate to lance-ovate, not orbicular, nearly glabrous to somewhat villous.....2a. M. villosa var. villosa.
Leaves thick, broadly ovate to orbicular, densely villous to tomentose.....2b. M. villosa var. franciscana.

1. Monardella undulata Benth. Lab. Gen. & Sp. 332. 1834.

Local distribution: Coastal sand dunes in San Francisco and on the inland marine sand deposits in Santa Cruz County. At the latter

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locality it grows in chaparral with Adenostoma fasciculatum, Arctostaphylos silvicola, A. crustacea, Salvia mellifera, and with occasional trees of Pinus ponderosa and P. attenuata. May through August.

General distribution: Coast Ranges, usually near the coast on sand dunes and inland sand deposits, from Marin County south to northern Santa Barbara County.

Specimens examined: Lake Merced, Howell 11431 (CAS); Eastwood, Aug. 6, 1913 (CAS); Near Zayante, Dudley, June 26, 1897; Between Ben Lomond and Zayante, Ferris 11138; Quail Hollow Road, Thomas 6016; Between Ben Lomond and Olympia, Hesse 981 (CAS).

2a. Monardella villosa Benth. var. villosa, Bot. Sulph. 42. pl. 21. 1844.

Local distribution: Fairly common in the Santa Cruz Mountains, often on rocky ridges and brushy canyon sides. May through September.

General distribution: Coast Ranges from Humboldt County south to San Luis Obispo County.

Specimens examined: Bayview Hills, Eastwood 351 (CAS); Cahill Ridge, Oberlander 219; Redwood City, Abrams 7496; Kings Mt., Randall 177; Coal Mine Ridge, Barry 210; Jasper Ridge, Abrams 1643; Soda Rock, Sevens Creek, Davis, May 25, 1920; Foothills west of Los Gatos, Heller 7497; Loma Prieta, Dudley, July 22, 1893; Llagas Post Office, Dudley, June 6, 1909; Big Basin, Dudley, Sept. 1901; Ben Lomond Mt., Thomas 3405; Boulder Creek, Hesse 769; Santa Cruz, Jones 2218.

2b. Monardella villosa Benth. var. franciscana (Elmer) Jepson, Man. Fl. Pl. Calif. 881. 1925.

Local distribution: Mainly along or near the coast, western San Francisco south to northern Santa Cruz County. May through July.

General distribution: Marin County south along the coast to northern San Luis Obispo County.

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Specimens examined: Potrero, San Francisco, Kellogg & Harford 755 (CAS); San Bruno Hills near Ocean View, Heller 8371; Edgemar, Bacigalupi 2793; Southwest side of Montara Mt., Hall 11958; San Pedro, Elmer 4766 (type).

Monardella villosa var. franciscana, the best marked local subspecific taxon of M. villosa, has thick, nearly orbicular, densely villous leaves and almost tomentose stems above. Intermediates between var. villosa and var. franciscana exist and are usually more inland than typical var. franciscana. Intermediates include the following collections: Ocean View, Dudley, Nov. 8, 1896; California Redwood Park, Shockley, June 7-8, 1919; Saratoga-Big Basin Road, Abrams 7273; Eagle Rock, Thomas 3482; Swanton, Rich, May 1912.

Epling (1928, pp. 47-52) cited specimens of subspecific taxa of M. villosa from the Santa Cruz Mountains. Hoover (1949) indicated that another subspecific taxon probably occurs in the Santa Cruz Mountains. There appears to be no consistent correlation of leaf shape, size, pubescence, character of the margin, and stem thickness. Rather than attempt to assign all of the minor variants to six subspecific categories, it seems more appropriate in a local flora to combine them. Those who are interested in the formally recognized subspecific taxa are referred to the papers mentioned above and to the treatment in Volume III of Jepson's Flora of California.

9. Lycopus L. Sp. Pl. 21. 1753.

1. Lycopus americanus Muhl. ex Bart. Fl. Phila. Prod. 15. 1815.

Local distribution: Known only from Mountain Lake in San Francisco, perhaps to be expected elsewhere. June through September.

General distribution: British Columbia south to southern

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California, eastward to the Atlantic Ocean.

This species was reported by Brandegee (1892, p. 368).

10. Mentha L. Sp. Pl. 576. 1753.

Verticils remote, subtended by ordinary foliage leaves.
  Leaves subtending the verticils about equalling the cauline leaves, leaves usually with 5-6 pairs of lateral veins.
    1. M. arvensis var. lanata.
  Leaves subtending the verticils conspicuously smaller than the cauline leaves, leaves usually with 2-3 pairs of lateral veins.
    2. M. pulegium.
Verticils usually close together, subtended by bracts; inflorescence spike-like.
  Calyx under 3 mm. long; verticils numerous; inflorescence spike-like.
    3. M. spicata.
  Calyx 3-4 mm. long; verticils few to many.
    Inflorescence of 1-3 verticils, these usually head-like; calyx lavender-purple, densely beset with yellowish sessile glands; petioles of main leaves usually at least 5 mm. long.
      4. M. citrata.
    Inflorescence of several to many verticils; calyx greenish-purple, glabrous to sparingly beset with yellowish sessile glands; petioles usually under 5 mm. long or none.
      5. M. piperita.

1. Mentha arvensis L. var. lanata Piper, Bull. Torr. Bot. Club 29: 223. 1902.

Local distribution: Occasional along coastal marshes and borders of ponds and lakes, rarely collected. August through October.

General distribution: Range of the species; circumpolar, in North America extending from Alaska and Canada south to northern Mexico.

Specimens examined: Lake Merced, Howell 718 (CAS); Granada, Rose 36730; Mountain View, Abrams 3084; Kellogg's Lake near Watsonville, Dudley, Oct. 11. 1908.

2. Mentha pulegium L. Sp. Pl. 577. 1753.

Local distribution: Weeds in disturbed areas, commonly of road-

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side ditches, low areas where water has stood, and in dry lake beds, occasionally abundant locally. June through October.

General distribution: Native of Europe, naturalized in the Pacific States.

Specimens examined: Pilarcitos Canyon, Oberlander 320; Near Crystal Springs Reservoir, Dudley, Sept. 21, 1902; Near woodside, Randall 174; Coal Mine Ridge, Ferris 2050; Palo Alto, Congdon, July 19, 1897.

3. Mentha spicata L. Sp. Pl. 576. 1753.

Local distribution: Occasionally to be found in disturbed areas. July through October.

General distribution: Native of Europe, established at various locations in temperate North America.

Specimens examined: Embarcadero, San Francisco, Howell 33008 (CAS); Stanford, Thomas 6847; Above Raymonds, Dudley, Sept. 1906; Loma Prieta, Ferris 3622.

4. Mentha citrata Ehrh. Beitr. 7: 150. 1792.

Local distribution: Occasionally found as an escape in moist areas along creeks and ponds. July through September.

General distribution: Native of Eurpoe, established in the United States.

Specimens examined: Lands End, Rubtzoff 3538 (CAS); Campbell Creek, Ferris 2067; Santa Cruz, Hesse 1216.

5. Mentha piperita L. Sp. Pl. 576. 1753.

Local distribution: Low moist places, known definitely from the vicinity of Alviso and Aptos. August through November.

General distribution: Native of Europe, established throughout the

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United States and southern Canada.

Specimens examined: Near Alviso, Dudley, Nov. 9, 1903; Between Alviso and Coyote Creek, Dudley, Oct. 24, 1909; Aptos, Abrams 3039; Aptos Creek, Dudley, Oct. 13, 1902.

Mentha piperita and M. citrata are sometimes difficult to tell apart. Mentha citrata tends to have fewer leaves, longer petioles, more dense inflorescences, slightly larger flowers, and more glandular calyces and corollas. Both are considered to be of hybrid origin (Clapham, Tutin, & Warburg, 1952, p. 936) and these authors consider M. citrata to be a variety of M. piperita.

11. Cedronella Moench, Meth. 411. 1794.

1. Cedronella canariensis (L.) Willd. ex Webb & Berth. Phyt. Canar. 3: 87. 1836-1850.

Local distribution: Occasionally escaped from cultivation in San Francisco. Summer months.

General distribution: Native of the Canary Islands, widely cultivated and adventive in San Francisco.

Specimens examined: Twin Peaks, King 3590; Mud Lake, King, 1914.

12. Nepeta L. Sp. Pl. 570. 1753.

1. Nepeta cataria L. Sp. Pl. 570. 1753.

Local distribution: Very rare in disturbed areas, sometimes grown in gardens. July through September.

General distribution: Native of Europe, established in temperate regions in North America.

Specimen examined: Near Raymonds, Dudley, Sept. 1906.

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13. Glecoma L. Sp. Pl. 578. 1753.

1. Glecoma hederacea L. Sp. Pl. 578. 1753.

Local distribution: Very rare in the Santa Cruz Mountains, growing in moist shaded areas. March through May.

General distribution: Native of Europe, naturalized in various parts of the United States.

Specimen examined: Little Arthur Creek, Jepson 9676 (JEPS).

14. Lamium L. Sp. Pl. 579. 1753.

1. Lamium amplexicaule L. Sp. Pl. 579. 1753.

Local distribution: Common as a garden weed and as a weed of cultivated fields. January through August.

General distribution: Native of Europe, widely introduced into the United States and southern Canada.

Specimens examined: Golden Gate Park, Howell 32870 (CAS); Menlo Park, Smith, Mar. 31, 1893; Stanford, Mason 43; Alma, Abrams 2286; Gilroy, Condit 15; Near Watsonville, Thomas 1567.

15. Stachys L. Sp. Pl. 580. 1753.

Ring of hairs in the corolla-tube not producing a constriction visible on the surface.
  Ring of hairs horizontal, near the base of the tube; corolla-tube 8-10 mm. long; calyx 6-7 mm. long.....1. S. bullata.
  Ring of hairs oblique or horizontal, near the middle of the tube; corolla-tube 15-25 mm. long; calyx 11-15 mm. long.
    2. S. chamissonis.
Ring of hairs producing a visible constriction.
  Leaves rounded to subcordate at base, usually ovate.
    Flower verticils forming an interrupted spike; corolla rose-colored or purple; herbage not conspicuously glandular-villous.
      3. S. rigida ssp. quercetorum.

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Flower verticils forming a short dense spike; corolla whitish; herbage glandular-villous.....4. S. pycnantha.
Leaves gradually narrowed at the base, not rounded or subcordate, oblong, silky-canescent.....5. S. ajugoides.

1. Stachys bullata Benth. Lab. Gen. & Sp. 547. 1834.

Local distribution: Common throughout the Santa Cruz Mountains, usually in moist areas in canyons, ravines, and moist woods. April through September.

General distribution: San Francisco south to Orange County in the Coast Ranges.

Specimens examined: Lobos Creek, Rubtzoff 3282 (CAS); Colma Canyon, Soares, May 13, 1925 (CAS); Pilarcitos Canyon, Oberlander 139; Near Edgemar, Bacigalupi 2791; San Mateo, Elmer 4417; Pescadero Creek, Mason, July 14, 1921; Portola Valley, Randall 187; Stanford, Abrams 2434; Alma, Rattan, May 3, 1885; Loma Prieta, Thompson, June 7, 1902; Swanton, Rich, May 20, 1912; Big Basin, Abrams 5251; Boulder Creek, Winblad, Aug. 14, 1937 (CAS); Santa Cruz, Jones 2222; Pajaro River, Thomas 1552; Pinto Lake, Hayward, July 10, 1929.

2. Stachys chamissonis Benth. Linnaea 6: 80. 1831.

Local distribution: Along or near the coast from San Francisco south to New Years Point in southern San Mateo County. May through October.

General distribution: Humboldt County south along or near the coast to New Years Point in southern San Mateo County, also collected in San Luis Obispo County where it may have been introduced.

Specimens examined: Lake Merced, Mason 1222; Pilarcitos Stone Dam, Elmer 4760; Arroyo de Los Frijoles, Swabey, June 3, 1923; New Years Pt., Ferris 2186.

3. Stachys rigida Nutt. ex Benth. ssp. quercetorum (Heller) Epling, Rep. Spec. Nov. Beihefte 80: 59. 1934.

Local distribution: Common from San Francisco southward, usually on

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bushy slopes and on grassy slopes, more common on the eastern slopes of the Santa Cruz Mountains. March through July.

General distribution: Coast Ranges from Douglas County, Oregon, south to northern Baja California and in Butte County.

Specimens examined: Presidio, Heller 5711; Colma, Abrams 1583; San Bruno Hills, Abrams 7058; Crystal Springs, Heller 8577; Ravine west of San Mateo, Dudley, Apr. 21, 1894; Woodside, Dutton, Mar. 25, 1900; Stanford, Kraus, Apr. 3, 1893; Isabel Creek, Bacigalupi, May 20, 1923; Foothills west of Los Gatos, Heller 7214; Saratoga Summit, Thomas 1837.

Stachys rigida ssp. quercetorum is commonly confused with S. bullata. In addition to the characters mentioned in the key, the following may be helpful in distinguishing between the two species:

Ring of hairs at about the middle of the corolla-tube; corolla-tube usually at least somewhat saccate abaxially; calyx-lobes widely divergent at maturity; leaves 3-7 cm. long, generally sparsely pubescent on the adaxial surface...3. S. rigida ssp. quercetorum.
Ring of hairs near the base of the corolla-tube; corolla-tube not saccate; calyx-lobes not widely divergent; leaves 3-15 cm. long, villous-tomentose on the adaxial surface.
1. S. bullata.

4. Stachys pycnantha Benth. Pl. Hartw. 331. 1849.

Local distribution: Moist ground near springs, ponds, and borders of marshes, often on serpentine. June through October.

General distribution: Eastern Tehama and Butte counties, in the Outer Coast Ranges from Marin County south to northern Santa Barbara County, and in the Inner Coast Ranges from Contra Costa County south to San Benito County.

Specimens examined: Crystal Springs Lake, Elmer 4261; Redwood City, Hichborn, June 5, 1920; Palo Alto, Congdon, July 19, 1897; Black Mt., Dudley, July 6, 1903; Wrights Station, Dudley, Sept. 29, 1894; Goertz Ravine, Abrams 3034.

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5. Stachys ajugoides Benth. Linnaea 6: 80. 1831.

Local distribution: Usually in low, often marshy areas, San Francisco southward to central Santa Cruz County. May through October.

General distribution: Coast Ranges from northern Humboldt County south to Los Angeles County with several disjunctions in distribution.

Specimens examined: San Francisco, Olsson-Seffer, 1904; Golden Gate Park, Rattan, 1878; Belmont, Rose 41469; Cahill Ridge, Oberlander 1050; Granada, Eastwood 206; Redwood City, Hichborn 309; Stanford, Randall 183; Between Gilroy and Morgan Hill, Abrams 5663; Camp Evers, Hesse 1019; Santa Cruz, Dudley, Oct. 4, 1896.

16. Lepechinia Willd. Hort. Berol. 1: 20. 1806.

1. Lepechinia calycina (Benth.) Epling ex Munz, Man. S. Calif. Bot. 447. 1935.

Local distribution: Chaparral slopes throughout the Santa Cruz Mountains, often growing with Adenostoma fasciculatum, Pickeringia montana, Eriodictyon californica, Diplacus aurantiacus, and Photinia arbutifolia. April through July.

General distribution: Coast Ranges from Lake County south to Ventura County, in the Sierra Nevada from Butte County south to Mariposa County, and on some of the Channel Islands.

Specimens examined: Near San Francisco, Dudley, 1897; Near Belmont, Dudley, 1893; Sweeney Ridge, Abrams 4244; San Mateo, Elmer 4416; Coal Mine Ridge, Barry 193; Stanford, Applegate 434; San Antonio Creek, Randall 182; Foothills west of Los Gatos, Heller 7454; Loma Prieta Ridge, Dudley, July 22, 1893; Near Saratoga Summit, Thomas 1948; Glenwood, Davis, Sept. 1907; Eagle Rock, Thomas 3491.

17. Satureja L. Sp. Pl. 567. 1753.

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1. Satureja douglasii (Benth.) Briq. in Engler & Prantl, Nat. Pflanzenf. 4^{3a}: 300. 1897.

Local distribution: Common in the Santa Cruz Mountains on open slopes, in brush and in the redwood - douglas fir forests. May through August.

General distribution: Southern British Columbia southwest to Idaho and south through the Coast Ranges to Los Angeles County.

Specimens examined: Lone Mt., Rattan, 1878; 3 miles west of San Bruno, Rose 33220; Sweeney Ridge, Oberlander 970; Near mouth of Pescadero Creek, Thomas 4272; Coal Mine Ridge, Barry 147; Stanford, Abrams 1037; Coyote Creek, Dudley 4148; Near New Almaden, Leitholt, July 22, 1893; Swanton, Rich, Spring 1912; Boulder Creek, Walker 729; Big Trees, Leitholt, May 15, 1893; Watsonville, Elmer 4308.

18. Pogogyne Benth. Lab. Gen. & Sp. 414. 1834.

1. Pogogyne serpylloides (Torr.) Gray, Proc. Amer. Acad. 7: 386. 1868.

Local distribution: Occasional in grasslands from southern San Mateo County southward. At Stanford it occurs as a weed in paths and walks which have puddles of water standing on them in the winter and early spring. April through June.

General distribution: Humboldt County south through the Coast Ranges to San Luis Obispo County, and in the foothills of the Sierra Nevada in Amador, Calaveras, and Tuolumne counties.

Specimens examined: San Francisco, Kellogg & Harford 729 (CAS); Woodside to Crystal Springs Reservoir, Dudley, May 1894; Foothills near Stanford, Baker 543; Stanford, Abrams 2354; Rose Hill, Dudley, May 21, 1898; Permanente Creek, Abrams 5100 (CAS); Los Gatos, Heller, Apr. 23, 1904 (CAS); Santa Cruz, Thompson, June 9, 1902.

19. Origanum L. Sp. Pl. 588. 1753.

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1. Origanum vulgare L. Sp. Pl. 590. 1753.

Local distribution: Known only from near Glenwood in Santa Cruz County where it is thoroughly naturalized. August and September.

General distribution: Native of Europe, sparingly introduced into the United States.

Specimen examined: Near Glenwood, Bacigalupi 2698.

108. SCROPHULARIACEAE

Stamens with anthers 5; corollas yellow.....1. Verbascum.
Stamens with anthers 2 or 4; a 5th sterile filament often present.
  Corollas spurred or saccate at the base.
    Corollas spurred at the base.
      Plants erect, glabrous; leaves linear.....2. Linaria.
      Plants prostrate, pubescent; leaves ovate to orbicular. 3. Kickxia.
    Corollas saccate at the base.
      Capsules symmetrical, not opening by pores....4. Asarina.
      Capsules asymmetrical, opening by pores.....5. Antirrhinum.
  Corollas not spurred or saccate at the base.
    Upper lip of the corollas not galeate.
      Stamens with anthers 4.
        Corollas essentially regular; prostrate aquatic plants. 6. Limosella.
        Corollas distinctly irregular; plants, if aquatic, not prostrate.
          Median lobe of the lower lip of the corolla keeled. 7. Collinsia.
          Median lobe of the lower lip of the corolla not keeled.
            Flowers small, the corollas less than 5 mm. long. 8. Tonella.
            Flowers larger, the corollas over 5 mm. long.
              Sterile filament present.
                Corollas 8-15 mm. long.....9. Scrophularia.
                Corollas 25-35 mm. long.....10. Penstemon.
              Sterile filament lacking.
                Corollas campanulate, the lobes erect; flowers pendant; stems usually over 1 m. tall, herbaceous.....11. Digitalis.
                Corollas not campanulate, the lobes not erect; flowers pendant to erect; stems usually under 1 m. tall, or if taller then the plants woody.
                  Plants woody.....12. Diplacus.
                  Plants herbaceous.....13. Mimulus.

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Stamens with anthers 2.
Corollas tubular.....14. Gratiola.
Corollas rotate.....15. Veronica.
Upper lip of the corollas galeate.
Anther cells equal in size and borne side by side; seed coat not conspicuously reticulate; leaves opposite or alternate.
Corollas reddish-purple; plants perennial; leaves pinnate, alternate.....16. Pedicularis.
Corollas pale purple to white; plants annual; leaves simple, opposite.....17. Bellardia.
Anther cells often unequal in size, not borne side by side, or 1-celled; seed coat obviously reticulate; leaves alternate.
Plants annual.
Plants over 4 dm. tall, very much branched; bracts not colored.....18. Cordylanthus.
Plants under 3 dm. tall, simple or with a few branches; bracts commonly colored.....19. Orthocarpus.
Plants perennial.
Bracts not colored; calyx spathe-like.18. Cordylanthus.
Bracts commonly colored; calyx tubular.
20. Castilleja.

1. Verbascum L. Sp. Pl. 177. 1753.

Inflorescence a dense spike, the axis completely obscured; calyx densely pubescent, not glandular; leaves densely tomentose.
1. V. thapsus.
Inflorescence lax, axis visible; leaves glabrous to thinly pubescent; calyx with at least some glandular hairs.
At least some nodes with more than one flower; pedicels 3-5 mm. long; capsule with some stellate hairs; leaves pubescent.
2. V. virgatum.
Only 1 flower per node; pedicels 10-15 mm. long; capsule lacking stellate hairs; leaves glabrous.....3. V. blattaria.

1. Verbascum thapsus L. Sp. Pl. 177. 1753.

Local distribution: Occasional in pastures, along roadsides, and in other disturbed areas; a very poorly collected species locally. June through November.

General distribution: Native of Eurasia, naturalized throughout temperate North America and in other temperate regions.

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Specimens examined: Saratoga, Pendleton 743 (UC); Highland Way, Thomas 2496.

2. Verbascum virgatum Stokes ex With. Bot. Arr. Brit. Pl. ed. 2. 1: 227. 1787-1793.

Local distribution: Occasional as a weed in fallow fields. May through October.

General distribution: Native of Eurasia, widely naturalized in temperate regions.

Specimens examined: China Grade, Thomas 4559; Santa Cruz, Waterhouse, June 16, 1932 (DAV).

3. Verbascum blattaria L. Sp. Pl. 178. 1753.

Local distribution: Occasional in dry creek beds and in disturbed areas. March through October.

General distribution: Native of Eurasia, naturalized throughout the United States and southern Canada.

Specimens examined: Golden Gate Park, Eastwood, May 20, 1915 (CAS); Near Stanford, Bacigalupi, Aug. 27, 1922; Near Gilroy, Thomas 4355.

2. Linaria Mill. Gard. Dict. ed. 4. 1754.

Corolla purple; spur filiform, curved. Native species.1. L. texana.
Corolla yellow; spur stout, straight. Introduced species.
2. L. vulgaris.

1. Linaria texana Scheele, Linnaea 21: 761. 1848.

Local distribution: Sandy or loose soil throughout the Santa Cruz Mountains. Latter part of February through May.

General distribution: Southern British Columbia south to northern

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Baja California, east to Virginia and Florida.

Specimens examined: Ocean View, Rattan, Mar. 2, 1877; Lake Merced, Michener & Bioletti, March 1892; Crystal Springs Lake, Mason 93; Tunitas Creek, Applegate 427; Stanford, McCracken, May 1910; Ben Lomond Mt., Dudley, Mar. 30, 1900; East of Ben Lomond, Thomas 4891; Sunset Beach State Park, Thomas 1607.

2. Linaria vulgaris Hill, Brit. Herb. 109. 1756.

Local distribution: Occasional as a garden escape. June through October.

General distribution: Native of Europe and Asia, widely naturalized in North America.

Specimen examined: Stanford, Rust, Oct. 22, 1907.

3. Kickxia Dumort. Fl. Belg. 35. 1827.

1. Kickxia spuria (L.) Dumort. Fl. Belg. 35. 1827.

Local distribution: Occasional as a weed of hard-packed soil in the vicinity of Stanford. June through November.

General distribution: Native of Europe, Asia, and Africa, widely established in eastern United States, less so in the Pacific States.

Specimens examined: Menlo Park, Bacigalupi 2795; Stanford, Benson 4046; Thomas 4668; Palo Alto, Eastwood & Howell, July 4, 1941 (CAS).

Cymbalaria muralis Gartn., Mey & Scherb. (Fl. Wett. 2: 397. 1800) has occasionally been collected as a garden weed in San Francisco, Rose 57035 (CAS). It may be distinguished from Kickxia spuria by its glabrous herbage and twining habit. Kickxia spuria is glandular and prostrate.

4. Asarina Mill. Gard. Dict. ed. 7. 1759.

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1. Asarina stricta (Hook. & Arn.) Pennell, Proc. Acad. Phila. 99: 175. 1947.

Local distribution: Very rare in chaparral clearings. April and May.

General distribution: Marin County south through the Coast Ranges to northern Baja California.

Specimens examined: La Honda Road, Dudley, May 19, 1900; West of Los Gatos, Heller 7376.

5. Antirrhinum L. Sp. Pl. 1753.

Sepals all equal; corollas 3-5 cm. long. Introduced species. 1. A. majus.
Adaxial sepal longer than the others; corollas under 2 cm. long. Native species.
Inflorescence usually congested; corollas 1.5-2 cm. long; lower leaf blades 4-7 cm. long.....2. A. multiflorum.
Inflorescence usually lax; corollas under 1.5 cm. long; lower leaf blades 1.5-2.5 cm. long.....3. A. vexillo-calyculatum.

1. Antirrhinum majus L. Sp. Pl. 617. 1753.

Local distribution: Rare as a garden escape, possibly not persisting. March through June.

General distribution: Native of Europe, naturalized sparingly in most temperate regions.

Specimens examined: Bayview Hills, Howell 31543 (CAS); Stevens Creek, Thomas 4304.

Antirrhinum orontium L. (Sp. Pl. 617. 1753) was collected about 10 miles north of Santa Cruz by C. A. Reed in April of 1939 and was reported by Howell (1940). It may be distinguished from the other species of Antirrhinum by its linear sepals which are 8-20 mm. long.

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2. Antirrhinum multiflorum Pennell in Abrams, Ill. Fl. Pacif. St. 3: 789. 1951.

Local distribution: Chaparral in Santa Cruz and Santa Clara counties from Los Gatos southward, often in sandy soil. June through September.

General distribution: Santa Clara County south to Los Angeles and San Bernardino counties, also in the Sierra Nevada foothills in Calaveras and Tuolumne counties.

Specimens examined: Los Gatos Canyon, Cannon, June 19, 1894 (CAS); Mt. Umunhum, Mason, June 21, 1921; Loma Prieta, Elmer 4348; Big Basin, Pendleton, 1908; Glenwood, Davis, Sept. 1907; Ben Lomond Sand Hills, Thomas 6014; Eastwood & Howell 7457 (CAS); Santa Cruz, Thompson, July 6, 1902.

3. Antirrhinum vexillo-calyculatum Kell. Proc. Calif. Acad. 1: 27. 1855.

Local distribution: Chaparral, serpentine, and open rocky areas mainly on the eastern slopes of the Santa Cruz Mountains. April through October.

General distribution: Coast Ranges, Mendocino County south to San Benito County.

Specimens examined: Woodside, Dutton, April 19, 1900; Coal Mine Ridge, Barry 213; Los Gatos, McMurphy, Oct. 14, 1906; Oakhill Cemetery, Rattan, May 1886; Loma Prieta, Elmer 4983; Big Basin Road, Vickery, Sept. 1915; Below Saratoga Summit, Thomas 3527.

Rothmaler has recently described a new species, A. elmeri Rothm. (Leafl. West. Bot. 7: 117. 1954), from Mount Diablo and Loma Prieta. It differs from A. vexillo-calyculatum in having linear, glabrous leaves. The leaves of specimens of A. vexillo-calyculatum which lack linear

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leaves are glabrous to pubescent and vary in shape from ovate to lanceolate. The specimen in the Dudley Herbarium from Loma Prieta (Elmer 4983) has ovate leaves. Rothmaler has designed the specimens of this collection at Berlin-Dahlem and New York Botanical Garden as paratypes. Antirrhinum elmeri properly belongs in the synonymy of A. vexillo-calyculatum.

6. Limosella L. Sp. Pl. 631. 1753.

1. Limosella aquatica L. Sp. Pl. 631. 1753.

Local distribution: Mud on margins of lakes and ponds. May through October.

General distribution: British Columbia east to Newfoundland, south to southern California, New Mexico, and Minnesota; in Alaska and Eurasia.

Specimens examined: Lone Mt., Kellogg & Harford 690 (CAS); West Twin Pond, Dudley, Oct. 4, 1909; Crystal Springs, Dudley, Oct. 10, 1909; Ano Nuevo Pt., Wiggins & Ferris 9294; Felt Lake, Keck 5048.

7. Collinsia Nutt. Journ. Acad. Phila. 1: 190. 1817.

Pedicels all shorter than the calyx.
- Inflorescence very congested, usually of only 1 terminal verticil; upper corolla-lobe less than $\frac{1}{2}$ as long as the lower. 1. C. corymbosa.
- Inflorescence less congested, usually of several verticils; upper corolla-lobe more than $\frac{1}{2}$ as long as the lower.
  - Upper pair of stamens each with an upward projecting awn-like process; corolla usually purplish; capsule about 5 mm. long. 2. C. heterophylla.
  - Upper pair of stamens lacking awn-like processes; corolla white or tinged with lavender; capsules about 3.5 mm. long. 3. C. bartsiaefolia var. hirsuta.

At least some of the lower pedicels longer than the calyx.
- Only the lower pedicels longer than the calyx; corolla over 18 mm. long; inflorescence with gland-tipped hairs. 4. C. multicolor.
- All pedicels longer than the calyx; corolla under 15 mm. long; inflorescence lacking gland-tipped hairs. 5. C. solitaria.

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1. Collinsia corymbosa Herder, Ind. Sem. Hort. Petrop. 32. 1857.

Local distribution: Sand dunes along the coast of San Francisco and found at Mountain Lake and Lake Merced. May and June.

General distribution: Coastal sand dunes, Mendocino County south to San Francisco County.

Specimens examined: Lake Merced, Abrams 1601; San Francisco, Dudley, 1897.

The southern limit of distribution of this species is in San Francisco County. Today it is to be expected only very occasionally in San Francisco because of the destruction of most of the sand dune habitat.

2. Collinsia heterophylla Buist ex R. Graham, Bot. Mag. 65: pl. 3695. 1838.

Local distribution: Shaded grassy slopes and fields, commonly associated with Quercus agrifolia, Q. kelloggii, and Arbutus menziesii. April through July.

General distribution: Humboldt and Butte counties south through the Coast Ranges and Sierra foothills to northern Baja California.

Specimens examined: Lake Merced, Elmer 5046; La Honda Road, Mason, July 14, 1921; Stanford, Baker 481; Near Los Gatos, Heller 7403; Guadalupe Hills, Patterson, Apr. 15, 1907; Bear Creek Road, Thomas 1857; Mt. Charley Road, Thomas 3319; Swanton, Rich, May 1912; Santa Cruz, Thompson, June 1, 1902.

Collinsia heterophylla is by far the most common species of this genus in the Santa Cruz Mountains.

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3. Collinsia bartsiaefolia Benth. var. hirsuta (Kell.) Pennell in Abrams, Ill. Fl. Pacif. St. 3: 776. 1951.

Local distribution: Occasional in inland sand deposits around Lake Merced and in Santa Cruz County. April and May.

General distribution: San Francisco to Monterey County and from Madera County south to Kern County in the Sierra Nevada foothills.

Specimens examined: Lake Merced, Dudley, May 11, 1901; Tuxedo, Dudley, Apr. 17, 1904; Quail Hollow Road, Thomas 1863.

4. Collinsia multicolor Lindl. & Paxt. Flow. Gard. 2: 89. pl. 55. 1851.

Local distribution: Open or shaded slopes throughout the Santa Cruz Mountains, sometimes on serpentine. March through May.

General distribution: San Francisco County south to northern Monterey County.

Specimens examined: San Francisco, Michener & Bioletti, May 3, 1893; San Bruno Hills, Rollins 2953; San Mateo Creek, Hoover 4901; Stanford, Elmer 5050; Edenvale, Ferris 806; Waddell Creek, Thomas 1745.

5. Collinsia solitaria Kell. Proc. Calif. Acad. 2: 10. 1863.

Local distribution: Open grassy fields from San Francisco southward, on the eastern margin of the Santa Cruz Mountains. March through May.

General distribution: Humboldt County south through the Coast Ranges to San Luis Obispo County and in the Sierra Nevada foothills from Butte County to Fresno County.

Specimens examined: Mission Hills, Rattan, Apr. 1881; San Andreas Lake, Abrams 2322; Crystal Springs Lake, Baker 444; Stanford, Abrams 13845.

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8. Tonella Nutt. ex Gray, Proc. Amer. Acad. 7: 378. 1868.

1. Tonella tenella (Benth.) Heller, Muhlenbergia 1: 5. 1900.

Local distribution: Occasional in the oak belt on the eastern side of the Santa Cruz Mountains as far south as Los Gatos. March through May.

General distribution: Southern Washington south through Oregon, mainly west of the Cascades, to Santa Clara County.

Specimens examined: Stanford, Abrams, Apr. 1898; Coal Mine Ridge, Barry 108; Saratoga Springs, Dudley, Mar. 17, 1893; Los Gatos Creek, Dudley, Apr. 19, 1895; Wooley-Dod, Apr. 19, 1921 (CAS).

9. Scrophularia L. Sp. Pl. 619. 1753.

1. Scrophularia californica Cham. & Schlecht. Linnaea 2: 585. 1827.

Local distribution: Woods, borders of thickets, occasionally in chaparral, and in coastal scrub. February through July with mature empty capsules persisting through the winter.

General distribution: Southern British Columbia south through the Coast Ranges to northern Baja California.

Specimens examined: Cliff House, Heller 5669; San Bruno Hills, Heller 8457A; Half Moon Bay Road, Heller 8585; Coal Mine Ridge, Barry 189; Foothills west of Los Gatos, Heller 7336; South of San Jose, Rattan, May 1887; Edenvale, Thomas 4766; Swanton, Rich, May 12, 1912; 5 miles east of Aptos, Keck & Hiesey 5161.

Pennell has recently described S. multiflora (Proc. Acad. Phila. 99: 173. 1947) from the interior of California and Nevada. Some specimens from the Santa Cruz Mountains vary in the direction of S. multiflora, but are referable to S. californica.

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10. Penstemon Mitch. Nov. Gen. Pl. Virg. 36. 1769.

Plants perennial herbs; leaves over 5 cm. long.
1. P. rattanii ssp. kleei.
Plants low woody shrubs; leaves under 5 cm. long.
Corolla red, buds red; leaves elliptic, usually serrate; inflorescence puberulent.....2. P. corymbosus.
Corolla rose-violet, buds yellowish; leaves linear, entire; inflorescence usually glabrous.....3. P. heterophyllus.

1. Penstemon rattanii Gray ssp. kleei (Greene) Keck, Carnegie Inst. Wash. Pub. 520: 295. 1940.

Local distribution: Endemic in the Santa Cruz Mountains, usually in areas of somewhat sandy soil in chaparral or burned chaparral, Ben Lomond Mountain and from Loma Prieta to Mount Madona. April through July.

General distribution: Endemic in the Santa Cruz Mountains.

Specimens examined: 1.7 miles south of Eagle Rock, Thomas 4081; Northern end of Ben Lomond Ridge, Ferris 2025; Loma Prieta, Elmer 5068; Aptos Creek, Dudley, no date; Mt. Madona, Keck 4569.

2. Penstemon corymbosus Benth. in A. DC. Prod. 10: 593. 1846.

Local distribution: Occasional in crevices of dry rocky outcroppings and ledges, sometimes on serpentine, in Santa Clara and Santa Cruz counties. July through August.

General distribution: Coast Ranges from Del Norte County south to Monterey County, also in Sutter County.

Specimens examined: Stevens Creek Canyon, Atkinson, July 11, 1901; Mt. Umunhum, Ferris 3631; Loma Prieta, Elmer 4980; Eagle Rock, Thomas 3486.

3. Penstemon heterophyllus Lindl. Bot. Reg. 22: pl. 1899. 1836.

Local distribution: Known from only a few specimens from Mount Umunhum, Los Gatos, and Madrone. June and July.

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General distribution: Coast Ranges from Humboldt County south to San Diego County.

Specimens examined: Los Gatos, Cannon, 1894 (CAS); Mt. Umunhum, Ferris, July 15, 1922; Madrone, Clemens, June 6, 1921 (CAS).

11. Digitalis L. Sp. Pl. 621. 1753.

1. Digitalis purpurea L. Sp. Pl. 621. 1753.

Local distribution: Occasional as an escape from gardens. Probably more common than the local collections indicate. May through September.

General distribution: Native of Europe, widely established as a garden escape in the Pacific States and other temperate regions.

Specimens examined: Golden Gate Park, Raven 6854 (CAS); San Francisco Watershed Reserve, Oberlander 351; China Grade, Thomas 4345; San Vicente Creek, Thomas 3389.

Flower color usually varies within a local colony from nearly pure white to pink or to purple. The lower portion of the corolla is variously marked.

12. Diplacus Nutt. Ann. Nat. Hist. 1: 137. 1838.

1. Diplacus aurantiacus (Curtis) Jepson, Man. Fl. Pl. Calif. 991. 1925.

Local distribution: One of the commonest shrubs of dry hillsides, chaparral, rock outcroppings, and coastal scrub; commonly associated with Eriodictyon californicum, Adenostoma fasciculatum, Quercus agrifolia, Q. chrysolepis, and various species of Arctostaphylos. March through July.

General distribution: Coos County, Oregon, south through the Coast

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Ranges to Santa Barbara County and in the Sierra Nevada foothills from Placer County to Tuolumne County.

Specimens examined: San Francisco, Parish, Nov. 1881; Belmont, Nichols 1006; Kings Mt., McMurphy 25, Page Mill Road, Wiggins 9215; Foothills west of Los Gatos, Heller 7449; Glenwood, Davis, Sept. 1907; Rancho del Oso, Thomas 1730; Soda Lake, Thomas 3313.

Diplacus aurantiacus commonly invades road embankments especially in areas of chaparral. It would appear to be of value in a highway beautification program.

13. Mimulus L. Sp. Pl. 634. 1753.

Flowers yellow.
- Plants densely shaggy-villous.....1. M. pilosus.
- Plants not shaggy-villous.
  - Calyx-teeth conspicuously unequal, the upper much larger than the others; calyx much inflated; corolla throat partly closed. 2. M. guttatus.
  - Calyx-teeth all nearly equal, the upper not conspicuously larger; calyx not conspicuously inflated; throat of the corolla open.
    - Calyx-teeth broadly deltoid, rounded at the apex; plants annual, not rhizomatous.....3. M. floribundus.
    - Calyx-teeth narrowly deltoid, acute at the apex; plants perennial, rhizomatous.....4. M. moschatus.

Flowers red, purple, or violet.
- Plants perennial, over 2.5 dm. tall; anthers ciliate; calyx 25-30 mm. long. Plants of wet areas.....5. M. cardinalis.
- Plants annual, under 1.5 dm. tall; anthers glabrous; calyx 9-12 mm. long. Plants of dry areas.
  - Pedicels at least 3 times as long as the calyx. 6. M. androsaceus.
  - Pedicels shorter than the calyx.
    - Corolla 15-40 mm. long; lobes of the lower lip of the corolla smaller than those of the upper lip or nearly lacking; capsule asymmetrical.
      - Corolla 30-40 mm. long; lower lip of the corolla almost lacking.....7. M. douglasii.
      - Corolla 15-25 mm. long; lower lip of the corolla well developed.....8. M. congdonii.
    - Corolla 8-10 mm. long; lobes of the corolla all nearly equal; capsule symmetrical.....9. M. rattanii.

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1. Mimulus pilosus (Benth.) Wats. Bot. King Expl. 225. 1871.

Local distribution: Known definitely only from near Eagle Rock in northern Santa Cruz County, growing in nearly bare soil of disturbed areas, but to be expected also in moist sandy soil along streams. June and July.

General distribution: Washington south to northern Baja California, east to Idaho, Utah, and Arizona.

Specimens examined: 0.7 miles southwest of Eagle Rock, Thomas 6005, 6043.

2. Mimulus guttatus DC. Cat. Hort. Monsp. 127. 1813.

Local distribution: A common species found at almost any location where there are springs, seeps, ponds, or swales, San Francisco southward. January through October.

General distribution: Alaska, southern Yukon, south to British Columbia, Alberta, and Saskatchewan, thence south to northern Mexico.

Specimens examined: Presidio, Dudley, 1893; Lake Merced, Bioletti, Apr. 1892; San Francisco, Wolf 584; Colma, Abrams 1610; Near Ocean View, Heller 8375; Pilarcitos Canyon, Oberlander 613; Pescadero, Grant 942; Near San Mateo, Dudley, Jan. 1, 1896; Belmont, Greene, 1887; Woodside serpentine, Dutton, Apr. 17, 1900; Coal Mine Ridge, Barry 249; Stanford, Abrams 2370; Black Mt. Rd., Randall 391; Permanente Creek, Abrams, Apr. 1915; San Jose, Knoche, July 6, 1896; Near Los Gatos, Heller 7393; Hills west of Los Gatos, Heller 7410 (isotype of M. micranthus); Alma Soda Springs, Heller 7508; Swanton, Rich, Spring 1912; Davenport Landing, Thomas 1724; Big Basin, Dudley, June 5, 1893; Hilton Airport, Thomas 1918; Camp Evers, Thomas 1667; Pajaro River, Thomas 2313.

Mimulus guttatus is a common and variable species in which many subspecies and varieties have been described and which has been divided into a number of segregate species. I agree with Mason (1957, p. 725) that "there is little that can be definitely said about them until the

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problem is approached from an ecogenetic point of view and some idea is formed concerning the relative stability of characters and the ecological and geographical patterns of variation."

The most recent attempt to bring order into the Mimulus guttatus complex is that of Campbell (1950). Campbell recognized six varieties in the species, five of which occur in the Santa Cruz Mountains. None of the five shows any definite geographical or ecological patterns except perhaps M. guttatus var. grandis, which tends to be more coastal. Extremes of any of the varieties are distinct, but intermediates are very common.

The following key, together with the more important synonyms, is adapted from Campbell's paper and will indicate some of the modes of variation in M. guttatus.

Corolla less than 1.5 times the length of the calyx, under 1 cm. long. 2a. M. guttatus var. micranthus.
Corolla at least twice as long as the calyx, over 1.5 cm. long.
  Calyx more or less truncate at both the top and bottom, sinuses glabrous.....2b. M. guttatus var. arvensis.
  Calyx not truncate, sinuses pubescent.
    Calyx 6-22 mm. long, glabrous to sparsely pubescent; capsule 7-8 mm. long. Inland plants.
      Stems 2-13 mm. in diameter, not geniculate; inflorescence never scorpioid; upper calyx-tooth usually 2 times as long as the others.....2c. M. guttatus var. guttatus.
      Stems 5-7 mm. in diameter, often geniculate; inflorescence often scorpioid when young; upper calyx-tooth usually 3 times as long as the others. 2d. M. guttatus var. gracilis.
    Calyx 17-30 mm. long, pubescent to tomentose; capsule 8-12 mm. long. Coastal plants.....2e. M. guttatus var. grandis.

2a. Mimulus guttatus var. micranthus (Heller) Campbell, El Aliso 2: 332. 1950.

(M. micranthus Heller, Muhlenbergia 8: 132. 1912.)

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2b. Mimulus guttatus var. arvensis (Greene) Grant, Ann. Mo. Bot. Gard. 11: 174. 1924.

(M. arvensis Greene, Pittonia 1: 37. 1887.)

2c. Mimulus guttatus var. guttatus

(M. langsdorfii Donn in Sims, Bot. Mag. 36: pl. 1501. 1812; M. scouleri Hook. Fl. Bor. Amer. 2: 100. 1840; M. guttatus var. depauperatus (Gray) Grant, Ann. Mo. Bot. Gard. 11: 170. 1924.)

2d. Mimulus guttatus var. gracilis (Gray) Campbell, El Aliso 2: 328. 1950.

(M. nasutus Greene, Bull. Cal. Acad. Sci. 1: 112. 1885; M. glareosus Greene, Pittonia 1: 282. 1889; M. guttatus var. nasutus (Greene) Jepson, Man. Fl. Pl. Calif. 928. 1925.)

2e. Mimulus guttatus var. grandis Greene, Man. Bay Region 277. 1894.

(M. grandis (Greene) Heller, Muhlenbergia 1: 110. 1904; M. guttatus ssp. littoralis Pennell, Proc. Acad. Phila. 99: 165. 1947; M. guttatus ssp. arenicola Pennell, loc. cit. 166.)

3. Mimulus floribundus Dougl. ex Lindl. Bot. Reg. 13: pl. 1125. 1828.

Local distribution: Rare in the Santa Cruz Mountains, known only from Santa Cruz County, from Swanton, near Boulder Creek, and from near Santa Cruz, probably to be expected elsewhere. April through September.

General distribution: British Columbia south to southern Baja California, east to Wyoming, Colorado, and Arizona, and in the Mexican states of Sinaloa and Chihuahua.

Specimens examined: Swanton, Rich, Spring 1912; Near Jamison Creek, Thomas 3499; Hesse 627 (CAS); Near Felton, Dudley, Oct. 1896.

4. Mimulus moschatus Dougl. ex Lindl. Bot. Reg. 13: pl. 1118. 1828.

(M. moschatus var. longiflorus Gray, Syn. Fl. N. Amer. 2: 278. 1878.)

Local distribution: Occasional in stream beds in Santa Cruz County.

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May through September.

General distribution: A widely ranging North American species, British Columbia south to southern California east to Montana and Colorado, also in the northeastern United States and eastern Canada.

Specimens examined: Swanton, Rich, Spring 1912; Blooms Grade, Thomas 2372.

A variety with sessile leaves, M. moschatus var. sessifolius Gray (Syn. Fl. N. Amer. 2: 447. 1886), is to be found occasionally in Santa Cruz County. It ranges northward into western Washington from its southern limit of distribution, Santa Cruz County. An example of this variety is Jepson 50m (JEPS), from between Gilroy and Santa Cruz.

5. Mimulus cardinalis Dougl. ex Benth. Scroph. Indicae 28. 1835.

Local distribution: Occasional, from northern San Mateo County southward, along springs and streams. June and July.

General distribution: Southern Oregon south to northern Baja California, on some of the Channel Islands and on Cedros Island, and in Nevada, Arizona, and Utah.

Specimens examined: Sawyer Ridge, Oberlander 227; Lake San Andreas, Elmer 4941; Near Stanford, Dudley, July 1893; Near Black Mt., Dudley, June 3, 1900; Wrights, Rattan, July 1885; Loma Prieta - Wrights, Ferris 3633; Loma Prieta, Dudley, July 22, 1893; Swanton, Rich, June 6, 1912.

6. Mimulus androsaceus Curran ex Greene, Bull. Calif. Acad. 1: 121. 1885.

Local distribution: Known locally only from the Ben Lomond sand hills. April.

General distribution: Occasional in the Coast Ranges from Lake

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County south to Los Angeles County, also in the Tehachapi Mountains in Kern County.

Specimen examined: Ben Lomond sand hills, Thomas 1645.

This species was first reported from Santa Cruz County by Brandegee (1890[a], p. 83).

7. Mimulus douglasii (Benth.) Gray, Bot. Calif. 1: 563. 1876.

Local distribution: Occasional in the Santa Cruz Mountains on bare sand, serpentine, grassy slopes, or in clearings in brush-covered slopes. February through April.

General distribution: Coast Ranges from Douglas County, Oregon, south to Monterey and San Benito counties and to Tulare County in the Sierra Nevada.

Specimens examined: Between Woodside and Crystal Springs Lake, Abrams 5566; Near Woodside, Dutton, Feb. 4, 1900; Coal Mine Ridge, Ferris 758; Stevens Creek, Abrams, Apr. 2, 1904; Black Mt., Richardson, Apr. 15, 1906; Ridge west of Los Gatos, Heller 7273; Near Boulder Creek, Hesse 918 (JEPS).

Mimulus douglasii often produces cleistogamous flowers. At least in the vicinity of Boulder Creek, the formation of cleistogamous flowers is correlated with a shortage of water (Hesse, 1957).

8. Mimulus congdonii Robinson, Proc. Amer. Acad. 26: 175. 1891.

Local distribution: Vicinity of Boulder Creek. March through May.

General distribution: Coast Ranges from Mendocino County south to northern Monterey county and in the Sierra Nevada from Mariposa County south to Tulare County.

This species has been reported from the vicinity of Boulder Creek (Hesse, 1957).

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9. Mimulus rattanii Gray, Proc. Amer. Acad. 20: 307. 1885.

Local distribution: Known locally from the vicinity of Mount Umunhum and Loma Prieta, and from the Ben Lomond sand hills, growing in sandy or rocky soils. April through June.

General distribution: Coast Ranges from Lake and Colusa counties south to central Santa Cruz County and to the vicinity of Mount Umunhum in Santa Clara County.

Specimens examined: Near top of Mt. Umunhum, Smith, June 17, 1956 (CAS); Loma Prieta Ridge, Dudley, May 30, 1893; Ben Lomond sand hills, Thomas 1875; Elmer 4519 (isotype of M. decurtatus); Near Felton, Dudley, Apr. 17, 1904; Near Mt. Hermon, Bacigalupi 1493; Stony Creek, near Santa Cruz, Reed, May 1922 (CAS).

Plants from the inland marine sand deposits at Ben Lomond, Felton, and Mount Hermon have been called M. decurtatus Grant (Ann. Mo. Bot. Gard. 11: 288. 1924) or M. rattanii var. decurtatus (Grant) Pennell (Not. Nat. No. 236: 1. 1951). The difference between M. rattanii and M. decurtatus is slight. Mimulus decurtatus has truncately rounded to obtuse calyx-lobes; M. rattanii has acute to obtuse lobes. I do not feel that M. decurtatus is worthy even of varietal status.

14. Gratiola L. Sp. Pl. 17. 1753.

1. Gratiola ebracteata Benth. in DC. Prod. 10: 595. 1846.

Local distribution: Known locally only from the muddy shores of ponds near the southern end of Crystal Springs Lake. May and April.

General distribution: Vancouver south to San Mateo and San Joaquin counties, east to western Montana.

Specimens examined: Near Crystal Springs Lake, McMurphy, May 8, 1906; Between Woodside and Crystal Springs Reservoir, Dudley, Apr. 27, 1909.

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15. Veronica L. Sp. Pl. 9. 1753.

Herbs.
All leaves opposite; main stem not terminating in an inflorescence.
Leaves sessile and clasping.....1. V. connata ssp. glaberrima.
Leaves short-petiolate, not clasping.
2. V. americana.
Upper bract-like leaves alternate; main stem terminating in an inflorescence.
Pedicels longer than the subtending leaf-like bracts; corollas over 5 mm. in diameter.....3. V. persica.
Pedicels shorter than the subtending leaf-like bracts; corollas less than 5 mm. in diameter.
Plants perennial; stems creeping, rooting at the nodes; style about as long as the mature capsule.
4. V. serpyllifolia.
Plants annual, not creeping, the lower nodes occasionally with adventitious roots; style less than $\frac{1}{2}$ the length of the mature capsule.
Leaves ovate to suborbicular, crenate; capsule deeply obcordate.....5. V. arvensis.
Leaves oblong to lanceolate, obscurely crenate; capsule shallowly notched.....6. V. peregrina ssp. xalapensis.
Shrubs.
Leaves obovate to obovate-oblong, 5-10 cm. long; corollas reddish-purple.....7. V. ×franciscana.
Leaves elliptic, about 3 cm. long; corolla lilac-purple.
8. V. speciosa.

1. Veronica connata Raf. ssp. glaberrima Pennell, Monog. Acad. Nat. Sci. Phila. 1: 368. 1935.

Local distribution: Known locally only from the Pajaro River where it occurs in moist sand of the river bed, to be expected elsewhere. May and June.

General distribution: Widely distributed in western North America from Washington and Manitoba south to southern California, New Mexico, and Missouri.

Specimens examined: Pajaro River, Thomas 3215; Watsonville, Thomas 1968.

The collections cited above and others from adjacent Monterey

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County all have minutely glandular inflorescences. Otherwise the specimens are glabrous.

2. Veronica americana (Raf.) Schwein. ex Benth. in A. DC. Prod. 10: 468. 1846.

Local distribution: Along the margins of ponds, streams, and ditches. May through October.

General distribution: A widely ranging species, occurring from Alaska to Newfoundland, south to Mexico, and in eastern Asia.

Specimens examined: Lake Merced, Howell 2079 (CAS); Pilarcitos Canyon, Oberlander 960; Crystal Springs Lake, Dudley, Sept. 21, 1902; "Pond 15," San Mateo Co., Dudley, Oct. 12, 1903; Felt Lake, Hichborn, May 25, 1920; Mt. View - Alviso Road, Ferris 2066; Watsonville Slough, Hayward, Aug. 9, 1928.

3. Veronica persica Poir. Encycl. 8: 542. 1808.

Local distribution: Fairly common in the Santa Cruz Mountains and adjacent lowlands, commonly in lawns, as a weed in gardens, and along stream beds. March through September.

General distribution: Widely introduced into North America from Eurasia.

Specimens examined: Golden Gate Park, Eastwood, May 15, 1917 (CAS); Hillsborough, Kelson 133; Palo Alto, Dudley, Mar. 13, 1909; Permanente Creek, Abrams 6625; Wrights, Hichborn, May 7, 1920; Gilroy, Dudley, Mar. 11, 1901; Swanton, Rich, May 1912; Scott Creek, Bacigalupi, Mar. 29, 1922; Glenwood, Thomas 2883; Santa Cruz, Thompson, Mar. 15, 1902; Watsonville, Thomas 1963.

4. Veronica serpyllifolia L. Sp. Pl. 12. 1753.

Local distribution: Occasional as a lawn and garden weed. April through August.

General distribution: Native of Europe, introduced into the United

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States and other temperate regions.

Specimens examined: Golden Gate Park, Pollard, Aug. 21, 1948 (CAS); Russian Hill, Rose 57034 (CAS); Palo Alto, Thomas 5218; Montalvo, Howell, May 12, 1955.

5. Veronica arvensis L. Sp. Pl. 13. 1753.

Local distribution: Occasional as a weed in gardens and disturbed areas. April through June.

General distribution: Widely introduced and established into North America from Europe.

Specimens examined: San Francisco, Sutliffe, June 1917 (CAS); Montalvo, Howell, May 12, 1955; Swanton, Rich, Spring 1912.

6. Veronica peregrina L. ssp. xalapensis (H. B. K.) Pennell, Torreya 19: 167. 1919.

Local distribution: Fairly common in marshy ground and in soils where puddles of water have stood during the spring. April through June.

General distribution: Widely distributed from Alaska and Quebec south to Mexico, and in South America.

Specimens examined: San Andreas Lake, Oberlander 762; Crystal Springs Lake, Elmer 4268; Stanford, Dudley, June 7, 1905; Bacigalupi, Spring 1922; Uvas Creek, Bacigalupi, no date; Swanton, Rich, Spring 1912.

7. Veronica X franciscana Eastw. Leafl. West. Bot. 3: 221. 1943.

(Hebe X franciscana (Eastw.) Souster, Journ. Roy. Hort. Soc. 81: 498. 1956.)

Local distribution: Common as a cultivated hedge species in San Francisco and naturalized on the ocean bluffs at Bakers Beach.

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Flowering in the summer and fall.

General distribution: Widely grown as a garden ornamental in temperate regions.

Specimens examined: San Francisco, Eastwood, Oct. 1913 (CAS - type); Raven 2705 (CAS).

Souster (1956) has recently investigated the origin of this hybrid. The hybrid is the result of a cross between Veronica speciosa from New Zealand and V. decussata from the Falkland Islands, first made about 1862 by Isaac Anderson-Henry of Edinburgh. Veronica decussata is conspecific with V. elliptica from New Zealand. The hybrids were grown under the common name of "Blue Gem" in England, by 1868 they were being grown in Melbourne, and by 1889 they were grown in Golden Gate Park in San Francisco. In addition to the common name of Blue Gem, they passed botanically as V. decussata. Miss Eastwood recognized that the plants growing in Golden Gate Park were not typical V. decussata and applied the name V. franciscana.

8. Veronica speciosa R. Cunn. ex Hook. Bot. Mag. 63: under pl. 3461. 1836.

Local distribution: Occasionally escaped in San Francisco where it is commonly grown as a hedge. Probably flowering all year.

General distribution: Native of New Zealand, occasionally escaped from cultivation in San Francisco.

Specimen examined: San Francisco, Raven 2727 (CAS).

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16. Pedicularis L. Sp. Pl. 607. 1753.

Pinnae oblong-lanceolate; corolla usually at least 2.5 cm. long, the lower lip about 2 mm. long, erect and usually appressed.
1. P. densiflora.

Pinnae elliptic-oblong to ovate; corollas usually under 2 cm. long, the lower lip 4-6 mm. long, divergent from the galea.
2. P. dudleyi.

1. Pedicularis densiflora Benth. ex Hook. Fl. Bor. Amer. 2: 110. 1838.

Local distribution: Oak-woodland and chaparral from northern San Mateo County southward, much more common on the eastern side of the Santa Cruz Mountains. Latter part of January through July.

General distribution: Southern Oregon south through the Coast Ranges to San Diego County and in the Sierra Nevada foothills to Amador County.

Specimens examined: Sawyer Ridge, Oberlander 86; Near Belmont, Dudley, no date; Woodside, Abrams 2278; Searsville, Davis, Feb. 22, 1903; Black Mt., Dudley, Apr. 23, 1904; Foothills west of Los Gatos, Heller 7281; Mt. Umunhum, Thomas 3963; El Toro, Ferris 803; Swanton, Rich, Spring 1912; Near Eagle Rock, Thomas 1346.

2. Pedicularis dudleyi Elmer, Bot. Gaz. 41: 316. 1906.

Local distribution: Known only from a few localities in the redwoods in the central portion of the Santa Cruz Mountains where it is endemic. April through June.

General distribution: Endemic in the Santa Cruz Mountains.

Specimens examined: Pescadero Creek, Elmer 4289 (type); San Lorenzo River, Dudley, May 7, 1893; Aptos, Rattan, Apr. 1884; Old Page Mill, Dudley, May 2, 1903.

17. Bellardia All. Fl. Ped. 1: 61. 1785.

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1. Bellardia trixago (L.) All. Fl. Ped. 1: 61. 1785.

Local distribution: Weeds of disturbed roadsides and overgrazed pastures. April and May.

General distribution: Native of the Mediterranean Region, introduced into central California and parts of South America.

Specimens examined: San Francisco, Braun, May 1921 (CAS); San Bruno Mountain, Thomas 4235; San Andreas Valley, Oberlander 899; Stanford, Wiggins 11162.

This species has probably spread considerably in the past fifteen years or so. The oldest specimen in the Dudley Herbarium was collected in Sonoma County in 1902. The majority of the specimens were collected after about 1940 and the first from this area, Wiggins 11162, was collected in 1945. The label bears the note, "apparently introduced in 1944."

18. Cordylanthus Nutt. ex Benth. in A. DC. Prod. 10: 597. 1846.

Leaves oblong-lanceolate or wider; inflorescence spicate. Plants of salt marshes.....1. C. maritimus.
Leaves or their divisions linear; inflorescence of capitate clusters of 2 or more flowers. Plants of dry inland areas.
Capitate clusters each with 3-15 flowers, dense; bracts several; leaves entire or with a pair of lobes; calyx 12-15 mm. long. 2. C. rigidus.
Capitate clusters each of 2-3 flowers, not dense; bracts few; leaves entire; calyx 17-19 mm. long.....3. C. pilosus.

1. Cordylanthus maritimus Nutt. ex Benth. in A. DC. Prod. 10: 598. 1846.

Local distribution: Salt marshes along the borders of San Francisco Bay.

General distribution: Salt marshes from Coos County, Oregon, south to San Quintin, Baja California.

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Specimens examined: San Francisco, Congdon, May 24, 1881; Dudley, July 31, 1893; Redwood City, Halsey, Oct. 1908; Salt marshes, Palo Alto, Baker 3357; Stinchfield & Philips 269; Near Alviso, Dudley, July 18, 18--.

Behr redescribed this species as Chloropyron palustre from San Francisco (1855, p. 61).

There is one sheet of Cordylanthus mollis Gray (Proc. Amer. Acad. 7: 384. 1868) collected by C. C. Parry in San Francisco in 1881 in the Dudley Herbarium. This species is otherwise known only from the northern end of San Francisco Bay. The data on the label may be incorrect. Cordylanthus mollis has two stamens; C. maritimus has four.

2. Cordylanthus rigidus (Benth.) Jepson, Fl. W. Mid. Calif. 387. 1911.

Local distribution: Central San Mateo County southward on both slopes of the Santa Cruz Mountains, often on serpentine, road embankments, and in openings in chaparral. August through October.

General distribution: Central San Mateo County south to northern San Luis Obispo County.

Specimens examined: San Andreas Valley, Oberlander 381; Near Crystal Springs Lake, Dudley, Sept. 21, 1902; Corte de Madera Creek, McMurphy, Oct. 15, 1905; Page Mill Road, Keck 1750; Permanente Creek, Dudley, July 23, 1903; Near Saratoga, Stinchfield, Sept. 5, 1915; Los Gatos Creek, Dudley, Sept. 29, 1894; Near Loma Prieta, Dudley, July 2, 1893; Big Basin, Stinchfield 253; Abrams 6384; Blooms Grade, Thomas 2378; Aptos Creek, Abrams 3028.

3. Cordylanthus pilosus Gray, Proc. Amer. Acad. 7: 382. 1868.

Local distribution: Eastern slopes of the Santa Cruz Mountains from northern San Mateo County southward to the vicinity of Los Gatos in Santa Clara County, usually on dry open hill slopes. July through October.

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General distribution: Coast Ranges from Sonoma and Napa counties south to Los Gatos Creek in Santa Clara County.

Specimens examined: Crystal Springs Lake, Oberlander 355; Woodside, Rose 41362; Near Portola, McMurphy, Aug. 1906; Coal Mine Ridge, Barry 218; Near Stanford, Stinchfield 255; Palo Alto, Dudley, Sept. 14, 1901; Black Mt., Leitholt, Aug. 13, 1894; Los Gatos Canyon, Parks 721; Raymonds Ranch, Blasdale, Aug. 14, 1911.

19. Orthocarpus Nutt. Gen. 2: 56. 1818.

Anthers 2-celled.
- Bracts green throughout; galea about equalling the lower lip; teeth of the lower lip inconspicuous; corollas yellow to white.
  - Bracts entire; anthers glabrous.
    - 1. O. campestris.
  - Bracts cleft; anthers pubescent.
    - 2. O. lithospermoides.
- Bracts tipped with yellow or purple; galea exceeding the lower lip; teeth conspicuous; corollas yellow, white, to purple.
  - Spikes conspicuous, wider than the leaves; corollas not linear, broader above; lower lip more than 2 mm. deep.
    - Galea hooked at the tip, bearded.
      - Divisions of the floral bracts 1 mm. or less wide.
        - 3a. O. purpurascens var. purpurascens.
      - Divisions of the floral bracts 1-2 mm. wide.
        - 3b. O. purpurascens var. latifolius.
    - Galea straight, pubescent.
      - Leaves oblong, not attenuate, 3 or more mm. wide, entire or with rounded teeth. Coastal.
        - 4. O. castillejoides.
      - Leaves lanceolate, attenuate, usually under 3 mm. wide, entire or more usually with lanceolate divisions. Usually inland plants.
        - 5. O. densiflorus.
  - Spikes inconspicuous, not usually wider than the leaves; corollas linear; lower lip less than 2 mm. deep.
    - 6. O. attenuatus.

Anthers 1-celled.
- Stamens not exceeding the galea.
  - Flowers conspicuous; main axis distinct; galea straight or slightly curved.
    - Herbage pubescent; galea purple.
      - Corollas yellow; the lower lip 3-4 mm. deep.
        - 7a. O. erianthus var. erianthus.
      - Corollas white, aging pink; lower lip 4-5 mm. deep.
        - 7b. O. erianthus var. roseus.

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Herbage glabrous, the inflorescence often puberulent; galea yellowish.....8. O. faucibarbatus var. albidus.
Flowers inconspicuous; many branches from near the base, obscuring the main axis; galea sharply curved.
9. O. pusillus.
Stamens exceeding the galea..10. O. floribundus.

1. Orthocarpus campestris Benth. Pl. Hartw. 329. 1839.

Local distribution: Known locally from only one specimen collected near Stanford University, probably introduced. April.

General distribution: Lake and Harney counties, Oregon, south to Fresno County, sparingly introduced into the Santa Clara Valley.

Specimen examined: Near Frenchmans Dam, Stinchfield 482.

2. Orthocarpus lithospermoides Benth. Scroph. Indicae 13. 1835.

Local distribution: Grasslands and serpentine from northern San Mateo County southward, commonly on the eastern slopes of the Santa Cruz Mountains, to southern Santa Clara County. April through the first part of June.

General distribution: Coast Ranges from Douglas County, Oregon, south to southern Santa Clara County.

Specimens examined: San Andreas Lake, Oberlander 128; Half Moon Bay Road, Heller 8579; Between Woodside and Crystal Springs Lake, Applegate 392; Searsville Ridge, Davis, Apr. 1903; 4 miles west of Morgan Hill, Keck & Hiesey 5051; Gilroy - Almaden Road, Ferris, May 6, 1922.

3a. Orthocarpus purpurascens Benth. var. purpurascens, Scroph. Indicae 13. 1835.

Local distribution: A common spring annual growing in grasslands, in cultivated fields, and in oak savannas. March through May.

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General distribution: Mendocino and Butte counties south through cismontane California to Baja California, east to southern Arizona and adjacent Sonora.

Specimens examined: Golden Gate Park, Rattan, May 1884; Cahill Ridge, Oberlander 127; Woodside serpentine, Dutton, Apr. 17, 1900; Near Felt Lake, Stinchfield 485; Coal Mine Ridge, Barry 19; Stanford, Abrams 2382; Stevens Creek, Dudley, June 1, 1902; Black Mt., Dudley, Apr. 14, 1900; Near Campbell, Heller 8515; 3 miles southeast of San Jose, Thomas 4956; 7 miles north of New Almaden, Constance 2075; Guadalupe Reservoir, Thomas 3926; Near Saratoga Summit, Thomas 2976; Tuxedo, Dudley, Apr. 17, 1904; Near Eccles, Dudley, June 26, 1897.

3b. Orthocarpus purpurascens Benth. var. latifolius Wats. Bot. King Exp. 458. 1871.

Local distribution: Occasional along or near the coast on dry bluffs, commonly with Fragaria chiloensis, Castilleja foliolosa, and Hemizonia corymbosa, and grasses. May and June.

General distribution: Along or near the coast from Humboldt County south to northern San Luis Obispo County.

Specimens examined: Lake Merced, Heller, June 13, 1902; Dudley, May 11, 1901; Near Ocean View, Heller 8381; Montara Pt., Keck 395; Sunset Beach State Park, Thomas 1603, 3095.

4. Orthocarpus castillejoides Benth. Scroph. Indicae 13. 1835.

Local distribution: Along or near the coast from San Francisco southward, growing in moist areas with grasses and sedges, often subject to ocean spray. April through June, occasionally through September.

General distribution: Along the coast from Vancouver Island, British Columbia, south to northern Monterey County.

Specimens examined: San Bruno Hills, Vestal, May 31, 1955; San Pedro, Elmer 4800; Montara Pt., Keck 394; Pescadero Creek, Dudley, June 1901.

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5. Orthocarpus densiflorus Benth. Scroph. Indicae 13. 1835.

Local distribution: A common annual of grasslands, open fields, and on serpentine soils, San Francisco southward. Latter part of March through May.

General distribution: Coast Ranges, Mendocino County south to Los Angeles County and in the Sierra Nevada foothills from Amador County south to Tuolumne County.

Specimens examined: Presidio, Dudley, Apr. 29, 1902; Heller 6596; San Bruno Mt., Ferris 2142; Near Baden, Dudley, May 14, 1899; Crystal Springs Lake, Abrams 2455; Menlo Heights, Abrams 5074; Coal Mine Ridge, Barry 75; Stanford, Abrams 2348; Black Mt., Elmer 4919; Foothills west of Los Gatos, Heller 7325; Edenvale, Ferris 805; Swanton, Rich, Spring 1912; Santa Cruz, Stinchfield 175; Near Glenwood, Thomas 3191; Boulder Creek, Hesse 428; Hilton Airport, Thomas 3123; Camp Evers, Thomas 3354.

6. Orthocarpus attenuatus Gray, Pacif. R. Rep. 4: 121. 1857.

Local distribution: Grassy slopes, meadows, and sandy flats, southern San Mateo County southward. April and May.

General distribution: Vancouver Island, British Columbia, south to northern Baja California, west of the Cascades, in the Coast Ranges, the Central Valley, and in the Sierra Nevada foothills from Butte County south to Kern County.

Specimens examined: Menlo Heights, Abrams 5078; Stanford, Baker 545; Abrams 2356; Permanente Canyon, Daniel, Apr. 24, 1915; Boulder Creek, Hesse 302.

7a. Orthocarpus erianthus Benth. var. erianthus, Scroph. Indicae 12. 1835.

Local distribution: Open fields and grassy slopes, southern San Mateo County southward, more common on the eastern slopes of the Santa Cruz Mountains than on the western. March and April.

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General distribution: Coast Ranges, Central Valley, and Sierra Nevada foothills from Del Norte and Shasta counties south to San Diego County, but rare south of San Luis Obispo County.

Specimens examined: Near Palo Alto, Dudley, Apr. 1893; Near San Martin, Abrams 5178; Near Gilroy, Sheldon, Apr. 1, 1925; Between Scott and Waddell creeks, Ferris 1987; Santa Cruz, Elmer 4491.

7b. Orthocarpus erianthus Benth. var. roseus Gray, Bot. Calif. 1: 578. 1876.

Local distribution: Along or near the coast in San Francisco and northern San Mateo County, usually on open grassy or sandy slopes and fields, often with Plantago erecta, Layia platyglossa, and Linanthus parviflorus. April and May.

General distribution: Coastal, Del Norte County south to San Luis Obispo County.

Specimens examined: Lake Merced, Rose 42016; Near Ocean View, Powell, Apr. 18, 1894; Daly City, Howell 1922 (CAS); Colma, Abrams 1580; San Bruno Hills, Rollins 3020; Eastwood 3760 (CAS); South San Francisco, Elmer 4670.

8. Orthocarpus faucibarbatus Gray var. albidus (Keck) Howell, Leafl. West. Bot. 5: 107. 1948.

Local distribution: Along the coast in sandy soils, coastal bluffs, or wet grassy flats, also inland at Camp Evers in Santa Cruz County. April through the first half of June.

General distribution: Along or near the coast from Lane County, Oregon, south to northern Monterey County, and introduced on Vancouver Island, British Columbia.

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Specimens examined: San Francisco, Jones 3267; Pasture near Pebble Beach, Dudley, Apr. 17, 1896; Arroyo de los Frijoles, Ferris 1975, 2200; Pigeon Pt., Thomas 4279; Ano Nuevo Pt., Abrams & Wiggins 430; Davenport Landing, Thomas 1766; Camp Evers, Thomas 1671, 3340; Santa Cruz, Knoche 86; West of Watsonville, Baker 1955 (CAS).

9. Orthocarpus pusillus Benth. Scroph. Indicae 12. 1835.

Local distribution: A common annual of shaded or open grassy slopes and meadows, San Francisco southward. March through May.

General distribution: British Columbia southward, west of the Cascades, to San Luis Obispo County and in the Sierra Nevada foothills from Butte County south to Calaveras County.

Specimens examined: Near Lake Merced, Heller 8440; San Bruno Hills, Eastwood, May 7, 1919; San Andreas Valley, Oberlander 684; Near Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Stanford, Abrams 1539; Permanente Canyon, Daniel, Apr. 24, 1915; Near Eagle Rock, Thomas 4023; Santa Cruz, Thomas 1485.

10. Orthocarpus floribundus Benth. Scroph. Indicae 12. 1835.

Local distribution: Moist grasslands, fields, and marshy areas, San Francisco southward to the vicinity of Lower Crystal Springs Lake and Belmont in San Mateo County. March through May.

General distribution: A narrowly distributed central California endemic, ranging from Marin County south to northern San Mateo County.

Specimens examined: Presidio, Heller 6595; Mission, San Francisco, Rattan, 1886; San Bruno Mt., Ferris 2134; Colma, Curran, May 1886; Burlingame, Eastwood, May 6, 1919 (CAS); San Mateo, Rose, May 1, 1927 (CAS); Seal Cove, Dudley, Mar. 17, 1900; San Andreas Lake, Abrams 2321; Belmont, Dudley, May 8, 1897.

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20. Castilleja Mutis ex L. f. Suppl. Syst. Veg. 47. 1781.

Plants annual; leaves and bracts entire; bracts green at anthesis.
1. C. stenantha.
Plants perennial; leaves and bracts entire to lobed; bracts usually colored at anthesis.
Stems and leaves densely white-tomentose.
2. C. foliolosa.
Stems and leaves variously pubescent, but not densely white-tomentose.
Lower lip of the corolla exserted, evident; leaves linear-lanceolate to linear, usually entire.
Corollas 3.5-4.5 cm. long; leaves occasionally with a small pair of lobes. Common..3. C. franciscana.
Corollas 2-3.5 cm. long; leaves usually entire. Rare.
4. C. miniata.
Lower lip of the corolla rarely exserted; leaves various.
Leaves oblong-lanceolate to orbicular, entire or occasionally lobed, thick; stems diffuse to erect.
Leaves oblong to orbicular, rounded, usually not more than twice as long as broad; bracts entire; plants hirsute to villous-hirsute, the trichomes glandless.
5a. C. latifolia var. latifolia.
Leaves oblong-lanceolate, usually at least 3 times as long as broad; bracts trifid; plants more or less hirsute, usually with glandular trichomes.
5b. C. latifolia var. wightii.
Leaves lanceolate to linear, thin, usually lobed; stems erect.
Pubescence of the bracts and calyces pilose.
6. C. douglasii.
Pubescence of the bracts and calyces hirsute-villous.
7. C. affinis.

1. Castilleja stenantha Gray, Syn. Fl. N. Amer. 2: 295. 1878.

Local distribution: Known locally only from Harkins Slough at Watsonville. June and July.

General distribution: Coast Ranges from Lake County south to Monterey County, in Fresno and Tulare counties, and in southern California from Ventura County southward to northern Baja California.

Specimen examined: Near Watsonville, Hayward, July 1, 1929.

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2. Castilleja foliolosa Hook. & Arn. Bot. Beechey 154. 1833.

Local distribution: A common species along the edges of chaparral, dry rocky slopes, or in sandy soils of inland marine sand deposits. Latter half of March through August.

General distribution: Coast Ranges from Humboldt County south to northern Baja California and in the Sierra Nevada foothills from Amador County south to Mariposa County.

Specimens examined: San Francisco, Raven 9245 (CAS); Sawyer Ridge, Oberlander 74; Near Crystal Springs Lakes, Abrams 10; Near Stanford, Baker 478; Black Mt., Dudley, Feb. 16, 1896; Guadalupe Hills, Patterson, Apr. 15, 1907; Foothills west of Los Gatos, Heller 7308; Swanton, Rich, Spring 1912; Eagle Rock, Thomas 1343; Glenwood, Davis, 1914 (CAS); Glenwood Highway, Thomas 2891; Near Tuxedo, Dudley, Apr. 17, 1904.

3. Castilleja franciscana Pennell, Proc. Acad. Phila. 99: 188. 1947.

Local distribution: Brush-covered hills and along the margins of chaparral, San Francisco and San Mateo counties, but to be expected occasionally in Santa Cruz County. March through September.

General distribution: Near the coast from Mendocino County south to Ventura County.

Specimens examined: Golden Gate Park, San Francisco, Cannon, Mar. 23, 1895 (CAS); San Francisco, Michener & Bioletti, May 1893; San Bruno Mt., Ferris 2146; San Mateo Creek, Dudley, May 14, 1899; Crystal Springs Lake, Pennell & Keck 25420 (isotype); Butano Creek, Ferris 1966.

4. Castilleja miniata Dougl. ex Hook. Fl. Bor. Amer. 2: 106. 1838.

Local distribution: Known only from one old specimen from a now extinct marsh in San Francisco.

General distribution: British Columbia south to southern California, east to Alberta, Montana, and Colorado.

Specimen examined: San Francisco, Bolander, no date (JEPS).

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5a. Castilleja latifolia Hook. & Arn. var. latifolia, Bot. Beechey 154. 1833.

Local distribution: Stabilized coastal sand dunes. Latter part of March through September, occasional plants with flowers to be expected during the remainder of the year.

General distribution: Marin County south to the Monterey Peninsula.

Specimens examined: Lands End, San Francisco, Robbins 3733 (JEPS); Near mouth of Pajaro River, Thomas 1588, 2415; Yates 5569 (JEPS).

5b. Castilleja latifolia Hook. & Arn. var. wightii (Elmer) Zeile in Jepson, Man. Fl. Pl. Calif. 937. 1925.

Local distribution: A common variety, occurring on coastal bluffs and sand dunes, moist fields and pastures, and in coniferous forests, San Francisco southward to northern Santa Cruz County. March through October.

General distribution: Coast Ranges from Mendocino County south to northern Santa Cruz County.

Specimens examined: Bakers Beach, Dudley, Apr. 5, 1902; Near Lake Merced, Heller 8442; Cahill Ridge, Oberlander 953; San Pedro, Elmer 4761 (type); Mussel Rock, Brandegee, July 22, 1917; Pescadero, Wolf 3730; San Mateo - Santa Cruz Co. line, Thomas 1707; Near Swanton, Thomas 1297; Davenport, Hesse 937 (JEPS); Near Santa Cruz, Dudley, July 1893.

Plants with less crowded inflorescences, usually rounded calyx-lobes, and bracts and calyces which are bright red distally have been called C. wightii Elmer var. rubra Pennell (Proc. Acad. Phila. 99: 183. 1947). Castilleja wightii, sensu Pennell, has relatively crowded inflorescences, acute to rounded calyx-lobes, and yellowish to red bracts and calyces, and tends to be more coastal than var. rubra.

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6. Castilleja douglasii Benth. in A. DC. Prod. 10: 530. 1846.

Local distribution: Grassy slopes and woods, San Francisco southward. March through August.

General distribution: San Francisco and Alameda counties south to Monterey and San Benito counties.

Specimens examined: Mt. Davidson, San Francisco, Raven 9016 (JEPS); Kings Mt., Bacigalupi 4741 (JEPS); Near Alpine Road, Randall, Mar. 22, 1908; Bear Gulch, Dudley, July 7, 1894; Near Stanford, Randall 380; Los Gatos Canyon, Bacigalupi 4749 (JEPS); Loma Azule, Dudley, May 7, 1898; Bear Creek Rd., Thomas 1851.

7. Castilleja affinis Hook. & Arn. Bot. Beechey 154. 1833.

Local distribution: Open slopes, borders of chaparral, and wooded areas, northern San Mateo County southward, usually away from the immediate coast. March through June.

General distribution: Coast Ranges and Sierra Nevada foothills from Del Norte and Shasta counties south to northern Baja California.

Specimens examined: San Bruno Hills, Rollins 3002; Crystal Springs Lake, Baker 464; Near Portola State Park, Bacigalupi 4552 (JEPS); Coal Mine Ridge, Barry 214; Stanford, Atkinson, Feb. 1900; Foothills west of Saratoga, Pendleton 710 (JEPS); Foothills west of Los Gatos, Heller 7286; New Almaden, Heckard 448 (JEPS); San Jose, Rattan, Apr. 1888; Near Swanton, Thomas 1305; Empire Grade, Dreis 1 (JEPS); Near Boulder Creek, Hesse 493 (JEPS).

109. LENTIBULARIACEAE

1. Utricularia L. Sp. Pl. 18. 1753.

1. Utricularia vulgaris L. ssp. macrorhiza (Le Conte) R. T. Clausen, Cornell Univ. Agric. Expt. St. Mem. 291: 9. 1949.

Local distribution: Known locally only from the Mud Lakes on Coal Mine Ridge in southern San Mateo County.

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General distribution: Widely distributed throughout the temperate and arctic portions of North America; also in Eurasia.

Specimen examined: Coal Mine Ridge, Ferris 2103.

110. OROBANCHACEAE

Stamens not pubescent at base; capsule 2-valved.....1. Orobanche.
Stamens pubescent at base; capsule 4-valved.....2. Boschniakia.

1. Orobanche L. Sp. Pl. 632. 1753.

Plants lacking floral bracts; pedicels slender, elongate.
Stems stout, 3-10 mm. thick; pedicels 3-12, equalling or shorter than the stem.
Calyx-lobes broadly triangular, equalling or shorter than the tube.
1a. O. fasciculata var. fasciculata.
Calyx-lobes lanceolate, longer than the tube.
1b. O. fasciculata var. franciscana.
Stems slender, 2-4 mm. thick, short; pedicels 1-3, exceeding the stem in length.....2. O. uniflora.
Plants with 2 subulate floral bracts; flowers pedicellate or not; inflorescence spicate, corymbose, or paniculate.
Palatal folds of the corolla lacking or poorly developed; inflorescence compact; flowers sessile; base of the stem thickened.
3. O. bulbosa.
Palatal folds well developed; inflorescences less compact; flowers sessile or pedicellate; base of the stem not conspicuously thickened.
Calyx 10-16 mm. long, the lobes longer than the tube. Common.
Inflorescence corymbose; anthers densely wooly.
Corollas over 4 cm. long, purple; calyx 2-2.5 cm. long. Coastal bluffs and sand dunes.
4a. O. grayana var. violacea.
Corollas under 3.5 cm. long, pinkish; calyx 1.5-2 cm. long. Inland plants....4b. O. grayana var. jepsonii.
Inflorescence subracemose to paniculate; anthers glabrous or sparsely hairy.....5. O. californica.
Calyx under 10 mm. long, the lobes about equalling the tube. Rare.
6. O. pinorum.

1a. Orobanche fasciculata Nutt. var. fasciculata, Gen. 2: 59. 1818.

Local distribution: Occasional in the Santa Cruz Mountains on serpentine, in chaparral, or in forested areas. April through August.

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General distribution: British Columbia east to Michigan and Illinois, south to northern Baja California, Arizona, and New Mexico.

Specimens examined: Stanford, Atkinson, Apr. 1900; San Jose, Dutton, Apr. 9, 1900; Loma Prieta, Elmer 5069; Between Ben Lomond and Zayante, Ferris 11139.

1b. Orobanche fasciculata Nutt. var. franciscana Achey, Bull. Torr. Bot. Club 60: 450. 1933.

Local distribution: Occasionally encountered in chaparral or on wooded slopes. May through July.

General distribution: Southern Oregon south through the Coast Ranges and Sierra Nevada foothills to San Diego County.

Specimens examined: Laurel Hill Cemetery, Eastwood, June 7, 1912 (CAS); Near Colma, Dudley, May 11, 1901; Black Mt., Applegate 431b; Los Gatos Hills, McMurphy, May 1, 1906; Loma Prieta, Hichborn, May 9, 1920; Near Bielawski Lookout, Thomas 3450; Redwood Park, Vandervoort, July 1912.

Both varieties are parasitic on a number of genera; among these are: Eriodictyon, Eriogonum, Artemisia, and Phacelia.

2. Orobanche uniflora L. Sp. Pl. 633. 1753.

Local distribution: Occasional in the Santa Cruz Mountains. March and April.

General distribution: Widespread in North America; British Columbia south to northern Mexico, east to the Atlantic Ocean.

Specimens examined: San Mateo Creek, Dudley, Apr. 21, 1894; San Mateo Canyon, Abrams, Apr. 10, 1904; Big Basin, Thomas 7005.

Orobanche uniflora is parasitic on various members of the sunflower, stone-crop, and saxifrage families.

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3. Orobanche bulbosa Beck, Bibl. Bot. 4: 83. 1890.

Local distribution: Chaparral slopes on the eastern slope of the Santa Cruz Mountains from southern San Mateo County southward. May through October.

General distribution: Marin and Solano counties south through the Coast Ranges to the vicinity of Rosarito, Baja California, on the Channel Islands, and in the central Sierra Nevada.

Specimens examined: Coal Mine Ridge, Ferris, Apr. 14, 1917; Searsville Lake, McMurphy, Aug. 6, 1906; Loma Prieta, Elmer 4885.

Orobanche bulbosa is commonly parasitic on Adenostoma fasciculata and probably also on other chaparral shrubs.

4a. Orobanche grayana Beck var. violacea (Eastw.) Munz, Bull. Torr. Bot. Club 57: 616. 1930.

Local distribution: Along the coast on bluffs and sand dunes. June through October.

General distribution: Coastal California from Humboldt County south to San Luis Obispo County.

Specimens examined: Montara Pt., Baker 3330 (POM); Farallone, Setchell 173; Halfmoon Bay, Geis, Oct. 26, 1901; Pescadero, Abrams 4275.

This variety is commonly parasitic on Grindelia.

4b. Orobanche grayana Beck var. jepsonii Munz, Bull. Torr. Bot. Club 57: 617. 1930.

Local distribution: Occasional in the foothills of the Santa Cruz Mountains. July through September.

General distribution: Sacramento Valley from Colusa to Tulare counties and in the Coast Ranges from Sonoma to Santa Clara counties.

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Specimens examined: Palo Alto, Dudley, Sept. 14, 1901; Palo Alto willows, McMurphy, Aug. 23, 1906; Santa Cruz, Jones 242 (POM).

Parasitic on Baccharis, Grindelia, and perhaps other members of the sunflower family.

5. Orobanche californica Cham. & Schlecht. Linnaea 3: 134. 1828.

Local distribution: Known currently only from a few localities, San Francisco, Coyote, and between Saratoga and Cupertino. July through September.

General distribution: Shasta County south to Monterey County in the Coast Ranges.

Specimens examined: Lands End, San Francisco, Howell 5460 (CAS); Between Cupertino and Saratoga, Lannis, July 23, 1937; Coyote, Jepson 6196 (JEPS).

The type of this species was collected in San Francisco. Parasitic on Eriophyllum staechadifolium and probably on other members of the sunflower family.

6. Orobanche pinorum Geyer ex Hook. Kew Journ. Bot. 3: 297. 1851.

Local distribution: Known locally only from the redwoods north of Boulder Creek near the San Lorenzo River. July and August.

General distribution: British Columbia south to northern Oregon, in the Siskiyou Mountains, the Blue Mountains, Idaho, and the Santa Cruz Mountains.

Specimens examined: 3.4 miles north of Boulder Creek, Bacigalupi 6025 (JEPS); Hesse 1353 (JEPS).

2. Boschniakia C. A. Mey. ex Bong. Mem. Acad. St. Petersb. 2: 159. 1832.

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1. Boschniakia strobilacea Gray, Pacif. R. Rep. 4: 118. 1857.

Local distribution: Occasional in chaparral and on wooded slopes, parasitic on Arctostaphylos and Arbutus. April and May.

General distribution: British Columbia south through the Coast Ranges to Monterey County and in the Sierra Nevada to Nevada County, also in the mountains of southern California.

Specimens examined: 4 miles northeast of Ano Nuevo Pt., Hanks 224 (UC); Wrights, Wiesendanger 1473 (DAV); Boulder Creek, Thomas 1769; Brookdale, Logan, Apr. 30, 1903; Felton, Harrison 121; Sierra Azule Ridge, Davis & Hichborn, May 9, 1920.

There is a considerable amount of variation in the specimens of this species. The plants are usually dark red, but Thomas 1769 is pink. Calyx teeth are either present or absent. Bractlets beneath the flowers are present or absent. Shape of the bracts and scales varies, but all are truncate to obtuse and broadest above the middle. There is some variation in the height of the plant.

111. PLANTAGINACEAE

1. Plantago L. Sp. Pl. 112. 1753.

Plants with a well-developed stem.....1. P. indica.
Plants acaulescent.
  Leaves laciniately divided; inflorescence nodding prior to anthesis.
    2. P. coronopus.
  Leaves entire or occasionally irregularly dentate; inflorescence erect prior to anthesis.
    Plants biennial or perennial; leaves ovate to lanceolate, if linear then also fleshy.
      Leaves conspicuously fleshy. Plants of maritime or saltmarsh habitats.
        Leaves about equalling the scapes, both erect or nearly so; seeds usually 2 mm. or more long; leaves thin on drying.
          3a. P. juncoides var. juncoides.
        Leaves shorter than the scapes, both spreading; seeds usually under 2 mm. long; leaves thick on drying.
          3b. P. juncoides var. californica.

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Leaves not fleshy. Plants of various habitats.
Leaves ovate; inflorescence usually glabrous; seeds 4 or more per capsule.....4. P. major.
Leaves oblong to lanceolate; inflorescence pubescent; seeds 2 or 3 per capsule.
Mature spikes 9-30 cm. long; flowers polygamous; seeds 3, not excavated on the face.
5. P. hirtella var. galeottiana.
Mature spikes usually under 9 cm. long; flowers perfect; seeds 2, deeply excavated on the face.
6. P. lanceolata.
Plants annual; leaves linear, not fleshy.
Corolla-lobes over 2 mm. long; stamens 4. Plants of open grassy hillsides.....7. P. erecta.
Corolla-lobes under 1 mm. long; stamens 2. Plants of maritime habitats or of low-lying flats.
8. P. bigelovii.

1. Plantago indica L. Syst. Nat. ed. 10. 896. 1759.

Local distribution: Reported only from San Francisco. July and August.

General distribution: Native of Europe, sparingly introduced into the Pacific states.

Specimens examined: San Francisco, Tilden, Aug. 1833 (CAS); Lake Merced, Raven 11305 (CAS).

2. Plantago coronopus L. Sp. Pl. 115. 1753.

Local distribution: Sandy soil in disturbed habitats, mainly along the coast but occasionally inland along railroad tracks. March through August.

General distribution: Sporadically established along the coast in the Pacific states, native of Europe and Asia.

Specimens examined: Pescadero, Thomas 587; Santa Cruz, Keck 2971; 4 miles north of Santa Cruz, Thomas 4570; Laurel, Abrams 13817; Robroy, Thomas 3061.

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3a. Plantago juncoides Lamk. var. juncoides, Encycl. 1: 342. 1783.

Local distribution: Occasional in salt marshes and on coastal bluffs as far south as San Mateo County. June through November.

General distribution: Along the Pacific Coast of North America from Alaska (Aleutian Islands and Kotzebue) south to San Mateo County; also in Patagonia.

Specimens examined: Redwood City, Halsey, Oct. 1908; Mayfield, McMurphy, May 5, 1906.

3b. Plantago juncoides Lamk. var. californica Fern. Rhodora 27: 100. 1925.

Local distribution: Common on exposed coastal bluffs along the coast. May through November.

General distribution: Along the coast from Callam County, Washington, to northern Monterey County.

Specimens examined: Cliff House, Parish, Nov. 1881; San Francisco-San Mateo Co. line, Bacigalupi 2748; Pescadero, Mason, June 1, 1921; Santa Cruz, Heller, Aug. 27, 1924.

This variety is more common than the typical one in the area covered by this flora.

4. Plantago major L. Sp. Pl. 112. 1753.

Local distribution: Occasional in disturbed habitats throughout the Santa Cruz Mountains. May through November.

General distribution: Native of Europe, widely established in temperate and subtemperate regions.

Specimens examined: San Francisco, Eastwood, Sept. 1917 (CAS); Crystal Springs, Dudley, Sept. 21, 1902; Palo Alto, Abrams 1034; Alviso, McMurphy, Oct. 20, 1906; Santa Cruz, Dudley, Nov. 29, 1908.

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5. Plantago hirtella H. B. K. var. galeottiana (Decne.) Pilger, Pflanzenreich 4^{260}: 234. 1937.

Local distribution: Mainly along or near the coast and margins of San Francisco Bay, occasionally inland in swampy habitats. May through November.

General distribution: Along or near the coast from Washington to San Diego County east and south to Arizona and Oaxaca, Mexico.

Specimens examined: Lands End, San Francisco, Thomas 4261; Cliff House, Parish, Nov. 1881; Near Pescadero, Cox, July 20, 1946; Portola Rd., Randall, June 29, 1907; Top of Black Mt., Dudley, Oct. 12, 1894; Swanton, Rich, Spring 1912; Camp Evers, Thomas 3342; Watsonville, Hayward, July 31, 1928.

6. Plantago lanceolata L. Sp. Pl. 113. 1753.

Local distribution: Very common along roadsides, disturbed areas, and as a troublesome lawn weed. April through October.

General distribution: Native of Europe, widely naturalized in North America and other temperate regions.

Specimens examined: Presidio, San Francisco, Pettibone, July 9, 1894 (CAS); Daly City, Thomas 237; San Carlos, Dudley, May 30, 1894; Pebble Beach, Abrams 12193; Coal Mine Ridge, Barry 268; Carnadero Creek, Thomas 4363; Camp Evers, Thomas 3359.

7. Plantago erecta Morris, Bull. Torr. Bot. Club 27: 118. 1900.

Local distribution: Common throughout the Santa Cruz Mountains, especially on eastern slopes of open grassy areas. Latter part of February through June.

General distribution: Southwestern Oregon south to northern Baja California, through the Coast Ranges and Sierra Nevada foothills.

Specimens examined: Lake Merced, Heller 6623; Twin Peaks, Thomas 4851; San Bruno Hills, Elmer 4795; Pebble Beach, Mason, June 1, 1921;

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Woodside, Dutton, Feb. 25, 1900; Foothills near Stanford, Baker 523; Permanente Creek, Daniel, Apr. 24, 1915; 2.5 miles east of Los Gatos, Thomas 3917; 3 miles southeast of San Jose, Thomas 4954; Swanton, Rich, Spring 1912; Glenwood, Rossbach 711; Santa Cruz, Pendleton, May 1908.

Plantago erecta is extremely variable with respect to size, number of leaves, and size of inflorescence. The variation is due largely to environmental factors.

8. Plantago bigelovii Gray, Pacif. R. Rep. 4: 117. 1857.

Local distribution: Ocean cliffs, edges of salt marshes, and low pastures. March through June.

General distribution: Salt marshes along the coast from British Columbia south to Monterey County, in the Santa Clara Valley, and in the Central Valley from Colusa County south to Kern County; also in South Africa as an introduced plant.

Specimens examined: Lands End, San Francisco, Rubtzoff 992 (CAS); Pebble Beach, Mason, June 1, 1921; Ano Nuevo Pt., Abrams & Wiggins 422; Mayfield, Dudley, Mar. 16, 1902; Alviso, Bioletti, 1892; 3 miles south of San Jose, Thomas 4794A.

112. RUBIACEAE

Plants shrubs; leaves opposite, shiny above.....1. Coprosma.
Plants herbaceous; leaves whorled, dull.
  Corolla funnelform; flowers subtended by an involucre.2. Sherardia.
  Corolla rotate; flowers not subtended by an involucre.3. Galium.

1. Coprosma Forst. Char. Gen. 137. 1776.

1. Coprosma repens Hook. f. Fl. Antarct. 1: 22. 1847.

Local distribution: Known only from San Francisco where it has been found as an occasional escape from cultivation and where it forms extensive stands at Bakers Beach. Flowering in late summer and fall.

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General distribution: Native of New Zealand, widely planted as an ornamental.

Specimen examined: San Francisco, Raven 2724 (CAS).

2. Sherardia L. Sp. Pl. 102. 1753.

1. Sherardia arvensis L. Sp. Pl. 102. 1753.

Local distribution: Common as a lawn weed, occasional along roadsides, and on grassy slopes. March through September.

General distribution: Native of Europe, introduced into much of the United States and southern Canada; also in South America.

Specimens examined: San Francisco, Sutliffe, June 1917 (CAS); Cahill Ridge, Oberlander 572; 3.5 miles northeast of Halfmoon Bay, Thomas 3833; Hillsborough, Kelson 134; Stanford, Wiggins 3671; Jasper Ridge, Thomas 4996; San Jose, Dudley, June 13, 1897; Glenwood, Thomas 2868.

3. Galium L. Sp. Pl. 105. 1753.

Leaves 4 or occasionally 5 per node.
- Plants annual, stems very slender, often rooting at the nodes; fruit longer than broad, with hooked hairs terminally and sometimes on the lateral surfaces.....1. G. murale.
- Plants perennial, usually with stout stems, often woody, not rooting at the nodes; fruit broader than long, glabrous, or if pubescent the hairs more or less evenly distributed.
  - Leaves distinctly linear-subulate, acute; plants usually matted, under 10 cm. tall.....2. G. andrewsii.
  - Leaves ovate to lanceolate, obtuse; plants not matted, usually over 10 cm. tall (some specimens of G. californicum under 5 cm. tall).
    - Stems weak; herbaceous throughout; leaves 4 or 5 per node; plants of marshy or very moist habitats. 3. G. trifidum var. pacificum.
    - Stems somewhat woody at least below; leaves 4 per node; plants of dry habitats.
      - Stems and leaves scabrous, the trichomes usually retrorse; plants climbing, often 1.5 m. tall; fruit glabrous. 4. G. nuttallii.
      - Stems and leaves pilose-hispidulous, the trichomes usually spreading; plants usually under 2-3 dm. tall, more or less tufted; fruit pubescent or glabrous (see discus-

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sion under this species for low tufted plants which have the pubescence of G. nuttallii).

5. G. californicum.

Leaves 6 or 8 per node, occasionally some plants with 2 or 4 per node.

Fruit smooth or tuberculate, never with bristles.

Stems glabrous or with spreading hairs, not scabrous; plants perennials; fruit smooth, on slender erect pedicels.

6. G. mollugo.

Stems scabrous; plants annual; fruit tuberculate or rough, on stout recurved pedicels.....7. G. tricornutum.

Fruit with hooked bristles.

Plants perennial; leaves elliptic to ovate, 6 per node.

8. G. triflorum.

Plants annual; leaves oblong-linear to linear, 6 or 8 per node, occasionally 2 or 4.

Fruit under 1 mm. long; plants slender, diffusely branched.

9. G. parisiense.

Fruit over 1.5 mm. long; plants coarser, usually branched only below.....10. G. aparine.

1. Galium murale (L.) All. Fl. Ped. 1: 8. 1785.

Local distribution: Known from only two specimens collected in Redwood City and near Stanford, but to be expected elsewhere in lawns and on open grassy slopes. March through May.

General distribution: Native of Europe, sparingly introduced into central California.

Specimens examined: Redwood City, sent to the Dudley Herbarium by the County Horticultural Commissioner, no date; Stanford, Stacey, Apr. 1930 (CAS).

2. Galium andrewsii Gray, Proc. Amer. Acad. 6: 537. 1865.

Local distribution: Known only from near the summit of Loma Prieta. March through August.

General distribution: Lake County south through the Coast Ranges to northern Baja California, also in the Sierra Nevada foothills.

Specimens examined: Loma Prieta Peak, Dudley, May 30, 1893; Loma Prieta, Mexia, June 13, 1926 (CAS).

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3. Galium trifidum L. var. pacificum Wiegand, Bull. Torr. Bot. Club 24: 400. 1897.

Local distribution: Occasional in very moist or marshy areas. June through November.

General distribution: Very moist habitats, from the westernmost Aleutian Islands eastward along the southern coast of Alaska to British Columbia, thence south to southern California.

Specimens examined: San Andreas Lake, Oberlander 1056; Santa Cruz, Dudley, Nov. 28, 1908; Near Pajaro River, Dudley, Sept. 27, 1903.

4. Galium nuttallii Gray, Smiths. Contr. 3: 80. 1852.

Local distribution: Common on shrubby slopes throughout our area. March through August.

General distribution: Humboldt County south through the Coast Ranges to northern Baja California.

Specimens examined: Twin Peaks, Thomas 4861; Montara Mts., Dudley, Mar. 17, 1900; San Mateo, Elmer 4629; Stanford, Abrams, Mar. 1898; Near Swanton, Thomas 1301; Near Felton, Thomas 2799; Soquel Valley, Thomas 1397.

5. Galium californicum Hook. & Arn. Bot. Beechey 349. 1838.

Local distribution: Partially shaded areas throughout the Santa Cruz Mountains, less frequently in open exposed habitats. May through July.

General distribution: Humboldt County south through the Coast Ranges to Los Angeles County, on some of the Channel Islands, and in the foothills of Amador County.

The majority of the specimens of G. californicum from the Santa Cruz Mountains area have leaves and stems which are pilose. The leaves

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vary from 5-15 mm. in length and the plants are usually tufted and less than 2 dm. tall. The following are representative specimens of the typical mode of variation: La Honda, Dudley, July 30, 1894; Kings Mountain, Dudley, Feb. 10, 1900; Big Basin, Ferris 4155; Empire Grade, Thomas 3386; Santa Cruz, Jones 2214.

In addition to the above there appear to be three other modes of variation. The first consists of taller plants with larger leaves, 1.5-3 cm. long, and longer internodes. Representative specimens are: Stevens Creek, Dudley, June 1, 1902; Santa Cruz, Smith, June 10, 1907; Boulder Creek, Hesse 757.

The second consists of plants which are similar to the typical with respect to general habit and leaf size. The leaves and stems, however, are more scabrous, approaching the condition existing in G. nuttallii. The abaxial surface is glabrous except for the midrib and margins. The adaxial surface is glabrous or somewhat scabrous. Specimens representing this variation are: Pescadero Creek, Dudley, Oct. 3, 1906; Boulder Creek, Hesse 747.

The third consists of usually small, depressed plants with short internodes and leaves usually under 5 mm. long. The leaves are similar to those of G. nuttallii with respect to the pubescence in that they are glabrous on the abaxial surface except for retrorse scabrous hairs on the midrib and margin. The adaxial surface is glabrous, scabrous, or somewhat pilose. Specimens representing this mode of variation are: San Bruno Hills, Walker 3555; Cahill Ridge, Oberlander 708. Hilend and Howell (1935, p. 167) have suggested that specimens showing these morphological characters are intermediate between G. californicum and G.

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nuttallii and are probably referable to G. californicum Hook. & Arn. var. miguelense (Greene) Jepson (Man. Fl. Pl. Calif. 961. 1925).

The variation in G. californicum may in part be due to the environment. Galiums grow in a variety of light intensities and moisture conditions and as yet no one has attempted to grow them in a uniform environment. The scabrosity and exceedingly small leaves of some specimens may be due to hybridization between G. californicum and G. nuttallii. In general, however, most local specimens of G. californicum and G. nuttallii can readily be separated on the basis of the characters listed in the key to the species.

6. Galium mollugo L. Sp. Pl. 107. 1753.

Local distribution: Known only as orchard weeds in Menlo Park and Los Altos. May through September.

General distribution: Native of Europe, sparingly introduced into California, Oregon, and eastern United States.

Specimens examined: Menlo Park, Donahoe, July 1922 (CAS); Los Altos, Adams, July 1929 (CAS).

7. Galium tricornutum Dandy, Watsonia 4: 47. 1957.

(G. tricorne Stokes in With. Bot. Arr. Brit. Pl. 1: 153. 1787.)

Local distribution: Occasional as a weed of fallow fields and gardens. April through July.

General distribution: Native of Europe, introduced sparingly into the Pacific States and in eastern North America.

Specimens examined: East Palo Alto, Wiggins 3385; Llagas Post Office, Dudley, June 7, 1909.

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8. Galium triflorum Michx. Fl. Bor. Amer. 1: 80. 1803.

Local distribution: Throughout the wooded and forested parts of the Santa Cruz Mountains. April through August.

General distribution: Widely distributed throughout North America north of Mexico; also in Eurasia.

Specimens examined: Cahill Ridge, Oberlander 113; San Gregorio, Brannon & Kellogg, May 31, 1870; Stevens Creek, Randall 356; Swanton, Rich, May 12, 1912; Glencarry Road, Thomas 1682.

9. Galium parisiense L. Sp. Pl. 108. 1753.

Local distribution: Known locally only from one specimen which was collected at Boulder Creek, but to be expected elsewhere in shaded canyons and on shaded slopes. May through September.

General distribution: Native of Europe, sparingly introduced into California.

Specimen examined: Boulder Creek, Hesse 330.

10. Galium aparine L. Sp. Pl. 108. 1753.

Local distribution: Very widely distributed, especially in thickets and open woodland; the most common species of Galium in the area covered by this flora. March through August.

General distribution: Widely distributed on all continents. The extent to which this species has spread as a weed is uncertain.

Specimens examined: San Francisco, Dudley, May 3, 1897; Cahill Ridge, Oberlander 700; Crystal Springs, Dudley, Apr. 21, 1894; San Mateo, Elmer 4424; Stanford, Abrams 2296; Edenvale, Thomas 4778; Near Waddell Creek, Thomas 1753; Near Glenwood, Thomas 3190; 6 miles east of Watsonville, Thomas 1560.

In considering G. aparine, I have not attempted to segregate G. spurium L. var. echinospermum (Wallr.) Hayak (Fl. Steinbrm. 2: 293. 1913)

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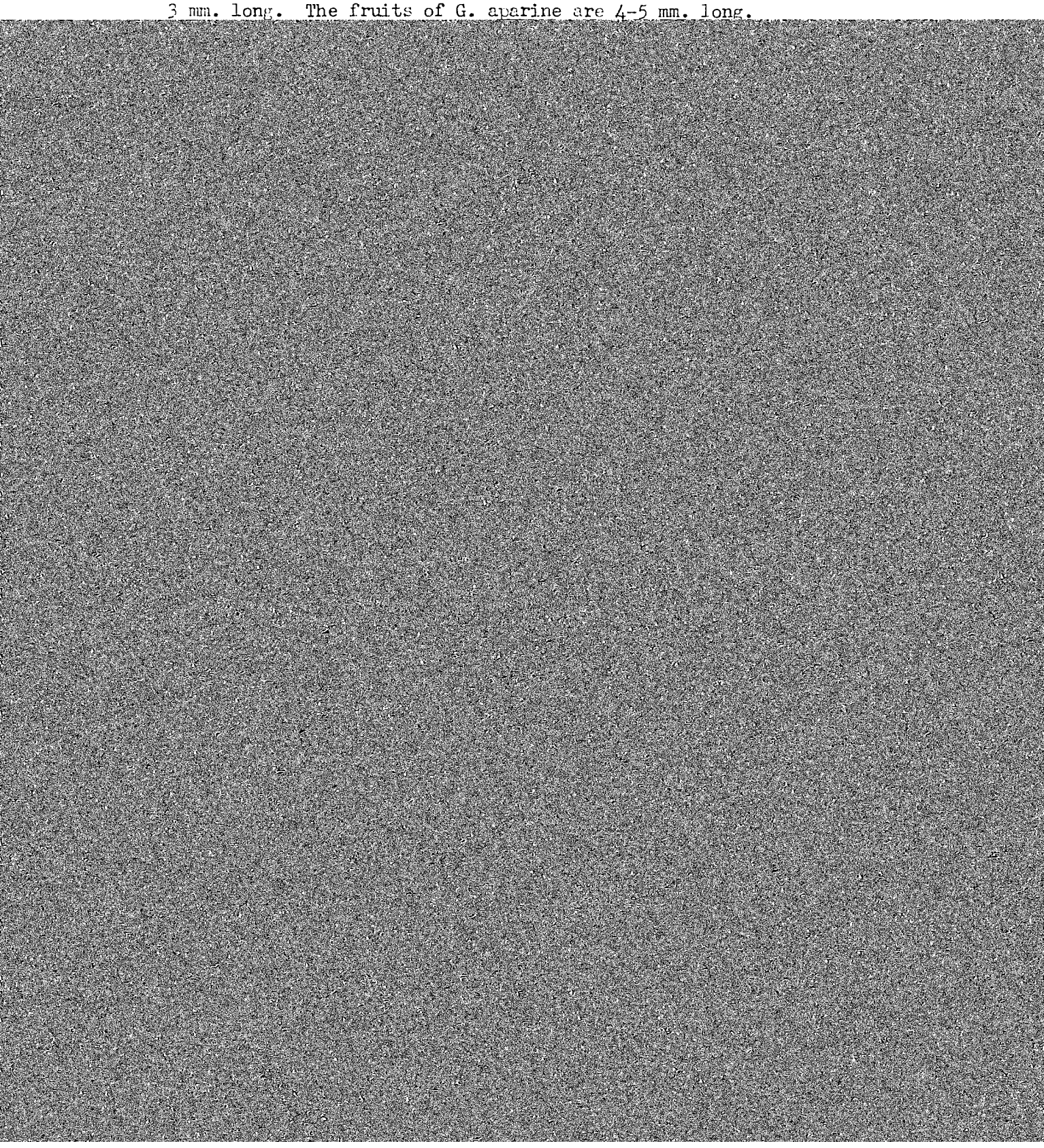
from it. This latter taxon has smaller leaves and fruits which are under 3 mm. long. The fruits of G. aparine are 4-5 mm. long.



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Specimens examined: Near Redwood City, Dudley, May 24, 1899; Kings Mt., Dudley, May 27, 1893; Black Mt., Irloister, Apr. 26, 1902; Permanente Creek, Dudley, Apr. 23, 1899; Foothills west of Los Gatos

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1. Dipsacus L. Sp. Pl. 97. 1753.

Receptacular bracts flexible, straight.....1. D. sylvestris.
Receptacular bracts stout, the tips recurved.....2. D. fullonum.

1. Dipsacus sylvestris Huds. Fl. Angelica 49. 1762.

Local distribution: San Francisco, occasional in disturbed areas. July through September.

General distribution: Native of Europe and widely introduced into North America.

Specimens examined: Presidio, San Francisco, Eastwood, Mar. 14, 1896 (UC); Bracelin 555 (UC).

2. Dipsacus fullonum L. Sp. Pl. 97. 1753.

Local distribution: Common along roads, in fields, pastures, and disturbed areas. March through October.

General distribution: Native of Europe and widely naturalized throughout the temperate regions of the world.

Specimens examined: Stanford University, Randall 135; Alviso, Elmer 4948 (UC); Los Gatos, Cannon, June 1894 (CAS); Near San Jose, Eastwood, Sept. 1913 (CAS); 12 miles northwest of Gilroy, Thomas 4380; Waddell Creek, Thomas 3642.

2. Scabiosa L. Sp. Pl. 98. 1753.

1. Scabiosa atropurpurea L. Sp. Pl. 100. 1753.

Local distribution: Becoming increasingly common along roads and highways and in disturbed areas throughout the Santa Cruz Mountains and the adjacent coastal areas. February through November, and probably flowering the year around.

General distribution: Native of Europe, widely introduced into

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temperate regions.

Specimens examined: San Francisco, Raven 1329 (CAS); Spanish Town, Dudley, Nov. 15, 1896; Stanford, Randall 150; Sea Bright, Dudley, Nov. 27, 1908; Camp Evers, Thomas 3623.

The corolla color of individual populations on the Santa Cruz Peninsula varies from pure white through various shades of pink, lavender, and purple to deep purple-black. Usually the total range of color variation is present within each population, but occasionally the extremes are lacking. Some plants become distinctly woody below, especially if they have been mutilated or cut during the growing season.

Vaslit (1890) recorded the presence of this species north of Pescadero and noted that "It promises to be nearly as great a nuisance as its relative, the "Fuller's Teasel....." Vaslit's prediction has not come true. Nowhere is S. atropurpurea a pest as is Dipsacus.

115. VALERIANACEAE

Introduced plants, perennial, 0.5 m. or more tall; corolla over 1 cm. long.....1. Kentranthus.
Native plants, annual, less than 0.5 m. tall; corolla less than 1 cm. long.....2. Plectritis.

1. Kentranthus Neck. Elem. 1: 122. 1790.

1. Kentranthus ruber DC. Flor. Fr. 4: 239. 1805.

Local distribution: Escaped from cultivation near cities and towns throughout the Santa Cruz Mountains. To be found flowering at all times of year.

General distribution: Native of the Mediterranean region and widely used as a garden ornamental, becoming established.

Specimens examined: San Francisco, Thomas 4246; San Carlos, Thomas 4262.

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Flower color of local colonies varies from white through various shades of pink to purple. In San Francisco at the intersection of Bayshore and Alemany boulevards, K. ruber is very common on the nearly vertical rock road bank. Individual plants occur in small crevices often many feet from the next plant, thus showing that establishment has been by seed.

2. Plectritis DC. Prod. 4: 631. 1830.

The following treatment of Plectritis is based upon that of Dempster (1958). Mrs. Dempster's paper should be consulted for a discussion of variability of the fruits of Plectritis and the disposition of previously recognized species.

Cotyledons and the first few pairs of leaves bright green, usually only the midvein conspicuous; fruit-body triangular in cross section, keel rounded or grooved, wings present or absent, if present the wings thin, their margins not revolute; spur of the corollas usually less than 1/3 of the length of the corolla.

Fruit with an acute keel, keel sometimes with a longitudinal groove. 1a. P. congesta var. congesta.

Fruit rounded on the back, not with a groove. 1b. P. congesta var. magna.

Cotyledons and the first few pairs of leaves silvery, the lateral veins as well as the midveins conspicuous; fruit-body obcompressed, the keel usually with a groove, wings present or absent, if present the wings thick, the margins revolute; spur of the corolla very short to over $\frac{1}{2}$ of the length of the corolla.

Corollas slender, the spur usually longer than the ovary, with purple spots in the sinuses between the upper and lower lips; fruits winged or not, usually with a dense band of hairs on either side of the keel.

Corollas usually over 5 mm. long; trichomes of the fruits cylindric. 2a. P. ciliosa var. ciliosa.

Corollas under 4 mm. long; trichomes of the fruits distinctly clavate.....2b. P. ciliosa var. insignis.

Corollas stout, the spur usually shorter than the ovary, lacking purple spots; fruits winged or not, lacking dense bands of hairs on either side of the keel.....3. P. macrocera.

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1a. Plectritis congesta (Lindl.) DC. var. congesta, Prod. 4: 631. 1830.

Local distribution: Wooded slopes, serpentine, and grasslands, northern San Mateo County southward. Latter half of February through May.

General distribution: British Columbia south through the Coast Ranges to Santa Barbara County, also in El Dorado County.

Specimens examined: San Bruno Hills, Rollins 3008; New Years Pt., Ferris 2137; Coal Mine Ridge, Barry 150; Stanford, Dudley, Apr. 29, 1902; Thomas 5648; Near Eagle Rock, Thomas 5029; Hilton Airport, Thomas 1914, 2957, 3129.

1b. Plectritis congesta (Lindl.) DC. var. magna (Greene) Dempster, Brittonia 10: 22. 1958.

Local distribution: Borders of oak woods, wooded slopes, edges of chaparral, and in grasslands, northern San Mateo County southward, but more common on the eastern slopes of the Santa Cruz Mountains. March through May.

General distribution: Coast Ranges from Mendocino County south to northern Monterey County.

Specimens examined: San Bruno Hills, Abrams 7057; Heller 8466; Crystal Springs, Abrams 2457; Stevens Creek, Heller 8544; Near Madrone Springs, Dudley 4096; Swanton, Rich, May 1912.

2a. Plectritis ciliosa (Greene) Jepson var. ciliosa, Fl. W. Mid. Calif. 475. 1901.

Local distribution: Rare in the Santa Cruz Mountains, growing on grassy slopes interspersed among wooded areas of Quercus dumosa, Q. agrifolia, Rhamnus californica, Umbellularia californica, and Rhus diversiloba. March and April.

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General distribution: Washington south to San Luis Obispo County in the Coast Ranges and to Kern County in the Sierra Nevada.

Specimen examined: Near Guadalupe Creek, Thomas 5562.

2b. Plectritis ciliosa (Greene) Jepson var. insignis (Suksd.) Dempster, Brittonia 10: 25. 1958.

Local distribution: Occasional on exposed grassy slopes, known definitely from the vicinity of Stanford. April and May.

General distribution: Occasional from the Columbia River south to central California; more common from there south, mainly through the Coast Ranges, to northern Baja California; also in Arizona.

Specimens examined: Coal Mine Ridge, Barry 61; Near Page Mill Road, Dudley, Apr. 1, 1893.

3. Plectritis macrocera Torr. & Gray, Fl. N. Amer. 2: 50. 1841.

Local distribution: Wooded slopes, occasionally on serpentine, central San Mateo County southward along the eastern slopes of the Santa Cruz Mountains. April through May.

General distribution: British Columbia south to Santa Barbara and Mariposa counties, eastward to Montana and Utah.

Specimens examined: Crystal Springs, Abrams, Apr. 10, 1904; Near San Mateo, Heller 8558; Abrams, Apr. 10, 1904; Woodside, Dutton, Apr. 17, 1900; Stanford, Applegate 235; Black Mt., Dudley, Apr. 14, 1900.

116. CUCURBITACEAE

1. Marah Kell. Proc. Calif. Acad. 1: 38. 1855.

To insure accurate identification, both inflorescences and mature fruits should be collected.

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Corollas of mature flowers campanulate; carpels 2-3, 1-2-(rarely 3-4-) seeded; fruit attenuate at the ends, spines weak, few, to 6 mm. long.....1. M. oreganus.
Corollas of mature flowers rotate; carpels 4, commonly 1-seeded; fruit globose, spines many, rigid, 12 mm. long.....2. M. fabaceus.

1. Marah oreganus (Torr. & Gray) Howell, Fl. N. W. Amer. 1: 239. 1898.

Local distribution: Fairly common in the Santa Cruz Mountains along the borders of grassland and in brushy areas. March through May.

General distribution: Vancouver Island, British Columbia, south, mainly in the Coast Ranges, to San Mateo and Santa Clara counties.

Specimens examined: Cahill Ridge, Oberlander 565; Crystal Springs Reservoir, Dudley, Apr. 21, 1894; Baker 450; Kings Mt. Rd., Randall 127; Black Mt., Elmer 4733; Near Saratoga Summit, Thomas 3946; Blooms Grade, Thomas 1809.

2. Marah fabaceus (Naud.) Greene, Leafl. Bot. Obs. 2: 36. 1910.

Local distribution: Common in the Santa Cruz Mountains, usually scrambling over other vegetation, coastal sand dunes, brushy slopes, and roadsides. March and April.

General distribution: Marin County south to Monterey County, other subspecific taxa occur in other parts of California.

Specimens examined: Near Fort Funston, Ferris 12362; Sweeney Ridge, Oberlander 66; Spanishtown, Dudley, Mar. 28, 1896; San Mateo, Davis, Mar. 22, 1903; Pigeon Pt., Howell 10970; Coal Mine Ridge, Barry 115; Stanford, Baker 512; Foothills west of Los Gatos, Heller 7262; Swanton, Rich, Apr. 1912; Saratoga Summit, Thomas 2834; Ben Lomond Mt., Thomas 3470; Santa Cruz, Jones 2267; Sunset Beach State Park, Thomas 1287, 3070; 6 miles east of Watsonville, Thomas 1563.

117. CAMPANULACEAE

Plants perennial.....1. Asyneuma.
Plants annual.
  Flowers pedicellate.....2. Campanula.
  Flowers sessile.

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Calyx-lobes 1 cm. or more long in fruit; capsule dehiscent at the apex; leaves narrow.....3. Githopsis.
Calyx-lobes less than 0.5 cm. long in fruit; capsule not dehiscent at the apex; leaves usually broad.
Capsule longer than broad; calyx-lobes narrowly deltoid, entire. 4. Triodanus.
Capsule about as long as broad; calyx-lobes ovate, toothed. 5. Heterocodon.

1. Asyneuma Griseb. & Schenk, Archiv fur Naturgesch. 18: 335. 1852.

1. Asyneuma prenanthoides (Durand) McVaugh, Bartonia 23: 36. 1945.

(Campanula prenanthoides Durand, Journ. Acad. Phila. 3: 93. 1855.)

Local distribution: Usually in partial shade in wooded areas, southern San Mateo County southward, common along roadsides in partially disturbed habitats. Latter part of June through September.

General distribution: Southern British Columbia south, mainly west of the Cascades, to Monterey County in the Coast Ranges and to Tulare County in the Sierra Nevada foothills.

Specimens examined: 4 miles west of La Honda, Wiggins 3779; Kings Mt. Road, Randall 17; Stevens Creek, Randall 18; Wrights, Dudley, June 1885; Los Gatos, Newell, June 20, 1914 (CAS); Bielawski Lookout, Thomas 3451; Empire Grade, Thomas 3475; Glenwood, Davis, Sept. 1907; Big Basin, Dudley, Sept. 23, 1905; Santa Cruz, Jones 2275.

2. Campanula L. Sp. Pl. 163. 1753.

1. Campanula angustifolia Eastw. Proc. Calif. Acad. 1: 132. 1898.

Local distribution: Known in the Santa Cruz Mountains only from Boulder Creek where it grows in rocky soil among chaparral. May and June.

General distribution: Coast Ranges from Marin County south to Santa Cruz County, also in San Benito County.

Specimens examined: Boulder Creek, Hesse 309, 316.

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3. Githopsis Nutt. Trans. Amer. Phil. Soc. II. 8: 258. 1843.

1. Githopsis specularioides Nutt. Trans. Amer. Phil. Soc. II. 8: 258. 1843.

Local distribution: Occasional on shaded slopes in woods and brushy areas, southern San Mateo County southward. April through June.

General distribution: Southern Washington south, mainly west of the Cascades, to San Diego County, through the Coast Ranges, the Central Valley, and the Sierra Nevada foothills.

Specimens examined: Coal Mine Ridge, Barry, May 15, 1937; Foothills west of Los Gatos, Heller 7339; Near Big Basin, Thomas 1813.

4. Triodanus Raf. New Fl. 4: 67. 1838.

1. Triodanus biflora (Ruiz & Pav.) Greene, Man. Bay Reg. 230. 1894. (Specularia biflora (Ruiz & Pav.) Fisch. & Mey. Ind. Sem. Hort. Petrop. 1: 17. 1835.)

Local distribution: Occasional in brushy areas, chaparral, or grassy flats, often overlooked by collectors. April through June.

General distribution: Widely distributed in North America from Oregon south to Mexico, east to the Atlantic Ocean, also on Guadalupe Island and in South America.

Specimens examined: Jasper Ridge, Mason, June 4, 1921; Stanford, Dudley, May 15, 1897; Elmer 3055; Los Gatos, Newell, June 20, 1914 (CAS); Swanton, Rich, Spring, 1912; California Redwood Park, Ferris 4156; Santa Cruz, Reed, July 3, 1920 (CAS).

5. Heterocodon Nutt. Trans. Amer. Phil. Soc. II. 8: 255. 1843.

1. Heterocodon rariflorum Nutt. Trans. Amer. Phil. Soc. II. 8: 255. 1843.

Local distribution: Occasional in moist grassy areas, usually in

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partial shade. Poorly collected locally. April through July.

General distribution: Widely distributed from British Columbia south to southern California, east to Idaho, Wyoming, and Nevada.

Specimens examined: Presidio, San Francisco, Cannon, May 29, 1896 (CAS); Jamison Creek Road, Thomas 2983, 3497.

118. LOBELIACEAE

Corolla 2-lipped.....1. Downingia.
Corolla-lobes nearly equal.....2. Legenere.

1. Downingia Torr. Pacif. R. Rep. 4: 116. 1857.

Corolla-tube 3-4 mm. long; upper corolla-lobes 3.5-5 mm. long, shorter than the lower 3 lobes; lower lobes with 1 red-purple spot near the base.....1. D. concolor var. tricolor.
Corolla-tube 2-3 mm. long; upper corolla-lobes 6-8 mm. long, about as long as the lower 3 lobes; lower lobes with 3 dark purple spots near the base.....2. D. pulchella.

1. Downingia concolor Greene var. tricolor (Greene) Jepson, Fl. W. Mid. Calif. 402. 1911.

Local distribution: Spring pools and mud flats in the Santa Clara Valley, originally from Palo Alto southward. May and June.

General distribution: Lake County south to Monterey County, also reported from Tulare County.

Specimens examined: Near Mayfield, Dudley, May 2, 1893; Abrams, May 1901; Between Morgan Hill and San Martin, Bacigalupi, May 12, 1923; Between Gilroy and Morgan Hill, Abrams 5664.

This variety is without doubt extinct in the vicinity of Mayfield (Palo Alto). The Dudley collection cited above indicates that D. concolor var. tricolor was once common in Mayfield.

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2. Downingia pulchella (Lindl.) Torr. Pacif. R. Rep. 4: 116. 1857.

Local distribution: Santa Clara Valley from San Jose southward in alkaline areas, low-lying fields, and vernal pools. April through June.

General distribution: Coast Ranges and Central Valley from Colusa County south to Monterey and Merced counties, in Lassen County, and in Marion County, Oregon.

Specimens examined: East of San Jose, Rattan, June 1880; Southwest of Gilroy, Mason 6956.

2. Legenere McVaugh, N. Amer. Fl. 32A: 13. 1943.

1. Legenere limosa (Greene) McVaugh, N. Amer. Fl. 32A: 13. 1943.

(Howellia limosa Greene, Pittonia 2: 81. 1890.)

Local distribution: Known locally only from ponds on Coal Mine Ridge in southern San Mateo County. May.

General distribution: Lake County south to Stanislaus County, mainly in the Central Valley.

Specimen examined: Coal Mine Ridge, Dudley, May 22, 1906.

119. COMPOSITAE

Key to the Tribes

Corollas within one head all ligulate; plants with milky juice. ..... 1. **Cichorieae.**

Corollas within one head never all ligulate; plants without milky juice.

Ray flowers none; anthers caudate at the base.

Plants never spiny or prickly; herbage usually at least somewhat white-tomentose when young; involucral bracts when present white to tawny, scarious and often hyaline..4. **Inuleae.**

Plants usually with spiny herbage, involucral bracts, or both; herbage variously pubescent, rarely white-tomentose; involucral bracts always present, the margins occasionally scarious.....11. **Cynareae.**

Ray flowers present or none; anthers not caudate at the base.

Receptacle without bristles or chaffy bracts.

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Flowers never yellow; heads discoid; branches of the styles thickened above, the stigmatic surface confined to the lower half of the style branch.....2. **Eupatorieae.**
Flowers commonly yellow; heads discoid or radiate; branches of the styles not thickened above, the style branch with a stigmatic line from the base to the top.
Involucral bracts usually conspicuously imbricate (poorly so in Bellis, Erigeron, and Conyza).
Pappus of bristles or awns, rarely lacking; involucral bracts usually herbaceous at least in part.
3. **Astereae.**
Pappus none or represented by a low ring or a crown at the top of the achene; involucral bracts dry, scarious.....9. **Anthemideae.**
Involucral bracts usually not conspicuously imbricate.
Pappus of paleae, awns, stout bristles, or none; involucral bracts in 1-3 series.....8. **Helenieae.**
Pappus of soft capillary bristles; involucral bracts mainly in 1 series (sometimes with very short outer bracts in addition to the main series).
10. **Senecioneae.**
Receptacle with chaffy bracts or bristles, but not every disk flower necessarily subtended by a receptacular bract.
Ray flowers absent; pappus none; heads often unisexual; fruit usually a bur.....7. **Ambrosieae.**
Ray flowers present, the ligules sometimes inconspicuous; pappus of paleae or awns or none.
Involucral bracts enclosing or closely enveloping the achenes of the ray flowers; plants often with conspicuous tack-shaped glands.....6. **Madieae.**
Involucral bracts not enclosing or closely enveloping the achenes of the ray flowers; plants rarely conspicuously glandular.
Ray flowers yellow; involucral bracts herbaceous.
5. **Heliantheae.**
Ray flowers white to rose-colored; involucral bracts dry, scarious.....9. **Anthemideae.**

1. Cichorieae

Achenes lacking pappus.....1. Lapsana.
Achenes with pappus.
Pappus of paleae or at least paleaceous at the base.
Margins of leaves spinose; involucral bracts spine-tipped.
2. Scolymus.
Margins of leaves not spinose; involucral bracts not spine-tipped.
Heads sessile; corollas white, pink, or blue; paleae lacking awns.....3. Cichorium.
Heads scapose; corollas yellow; some paleae in each head with awns.

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Involucral bracts in 1 series, enfolding the outer achenes, becoming corky.....4. Hedypnois.
Involucral bracts in more than 1 series, not enfolding the outer achenes, not becoming corky.
All achenes with awns, these at most subplumose. 5. Microseris.
Only the inner achenes with awns, these conspicuously plumose.....6. Leontodon.
Pappus of awns or bristles, not paleaceous.
Pappus conspicuously plumose.
Achenes beakless.....7. Stephanomeria.
Achenes, at least the inner ones, beaked.
Receptacle chaffy; leaves basal.....8. Hypochaeris.
Receptacle lacking chaff; stems at least somewhat leafy.
Herbage prickly; corollas yellow.....9. Picris.
Herbage not prickly; corollas not yellow.
Achenes including the beak over 3 cm. long; plants perennial; corollas lavender. 10. Tragopogon.
Achenes including the beak under 1.5 cm. long; plants annual; corollas white.....11. Rafinesquia.
Pappus not plumose, merely barbed or barbellate.
Stems scapose; leaves all basal.
Achenes spinose or at least tuberculate above, 4-5-ribbed. 12. Taraxacum.
Achenes not spinose or tuberculate above, 10-ribbed. 13. Agoseris.
Stems leafy.
Achenes flattened.
Achenes beaked; involucre cylindrical in flower. 14. Lactuca.
Achenes not beaked; involucre campanulate in flower. 15. Sonchus.
Achenes terete.
Heads nodding in bud; leaves especially when young with conspicuous tufts of wool along the margins. 16. Malacothrix.
Heads erect in bud; leaves lacking tufts of wool.
Leaves and stem with long, yellowish, bristly hairs; pappus usually stiff.....17. Hieracium.
Leaves and stem lacking such hairs; pappus soft. 18. Crepis.

2. Eupatorieae

Leaves alternate.....19. Brickellia.
Leaves opposite.....20. Eupatorium.

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3. Astereae

Plants dioecious; heads discoid.....21. Baccharis.
Plants monoecious; heads radiate or discoid.
Heads radiate, the ray flowers sometimes rather inconspicuous.
Ray flowers yellow.
Heads 1 cm. or more in diameter, usually few per stem.
Heads gummy; pappus of 2-8 awns.
22. Grindelia.
Heads not gummy; pappus of numerous bristles.
Leaves glabrous.....23. Haplopappus (racemosus).
Leaves variously pubescent.
Leaves toothed or coarsely serrate.
24. Heterotheca.
Leaves entire.....25. Chrysopsis.
Heads less than 1 cm. in diameter, usually numerous.
Leaves linear or broader, over 3 cm. long, not fascicled.
26. Solidago.
Leaves linear-terete, under 1 cm. long, fascicled.
23. Haplopappus (ericoides).
Ray flowers white, pink, lavender, or blue.
Leaves basal; heads solitary, pedunculate; pappus none; ray flowers white to pink.....27. Bellis.
Some cauline leaves present; heads rarely solitary or long pedunculate; pappus usually present; ray flowers usually not pure white.
Pappus bristles usually 3-5, occasionally none; heads solitary or several.....28. Chaetopappa.
Pappus bristles more than 5; heads usually several, rarely only one.
Plants densely white-tomentose, sometimes becoming glabrate in age.....29. Corethrogyne.
Plants variously pubescent but not white-tomentose.
Ligules of the ray flowers inconspicuous, scarcely exceeding the involucre.
Heads usually about 10 mm. in diameter.
30. Aster (exilis).
Heads usually about 6 mm. or less in diameter.
31. Conyza.
Ligules of the ray flowers conspicuous, much exceeding the involucre.
Involucral bracts in 1 series, under 0.8 mm. wide, gradually narrowed toward the tip, the tips not herbaceous..32. Erigeron.
Involucral bracts in 3 series, over 1.5 mm. wide (rarely only 1.2 mm. wide), abruptly narrowed toward the tip, the tips herbaceous.
30. Aster.
Heads discoid (in Lessingia the marginal flowers enlarged, the lobes spreading).
Plants annual.

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Pappus bristles 3-5, rarely none..28. Chaetopappa.
Pappus bristles numerous.
Plants usually white-tomentose, at least when young; marginal flowers with expanded corollas, pink to purplish (yellow in Lessingia germanorum var. germanorum).
33. Lessingia.
Plants not white-tomentose; marginal flowers with a very inconspicuous ligule, yellowish.
31. Conyza.
Plants perennial.
Involucres 2-3 times as long as broad.
34. Chrysothamnus.
Involucres about as long as broad.
Leaves punctate-glandular, narrowly linear.
23. Haplopappus (arboreus).
Leaves not punctate-glandular, linear or broader.
Involucres 5-6 mm. high; lateral heads on widely divergent branches.....32. Erigeron.
Involucres 8-10 mm. high; lateral heads on ascending to erect branches.
Involucral bracts gradually narrowed to the tip.
25. Chrysopsis (oregona).
Involucral bracts abruptly narrowed at the tip.
23. Haplopappus (venetus).

4. Inuleae

Leaves deltoid, the blades 8-12 cm. long, cordate at the base, green adaxially, densely white-tomentose abaxially; plants perennial; achenes with stalked glands.....35. Adenocaulon.
Leaves various, not deltoid; plants annual or perennial; achenes lacking stalked glands.
Pistillate marginal flowers not enclosed or closely subtended by receptacular bracts; involucral bracts numerous; pappus of capillary bristles; plants annual or perennial.
Involucral bracts pearly white; plants polygamodioecious, perennial.
36. Anaphalis.
Involucral bracts shiny, not pearly white; plants monoecious, annual or perennial.....37. Gnaphalium.
Pistillate flowers enclosed or closely subtended by receptacular bracts; involucral bracts lacking or few; pappus usually absent (present in Filago and some species of Stylocline); plants annual.
Leaves opposite; heads globose; plants usually diffusely branched and forming mats.....38. Psilocarphus.
Leaves alternate; heads globose to cylindrical; plants erect or variously branched.
Pappus present, conspicuous, the tips of the bristles usually exserted.....39. Filago.

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Pappus present or lacking, never conspicuous, the tips never exserted.
Receptacular bracts closely subtending, but not enclosing, the pistillate flowers, the bracts persistent, not falling away with the achenes; leaves spatulate, the ones toward the top of the stem much exceeding the stem apex and the terminal flowers..40. Evax.
Receptacular bracts enclosing the pistillate flowers, the bracts deciduous, falling away with the achenes; leaves linear, oblanceolate, to oblong, the ones toward the top of the stem not usually exceeding the stem apex or terminal flowers.
Receptacle broader than long; central (staminate) flowers lacking pappus; margins of the marginal receptacular bracts lacking hyaline margins; involucral bracts present.....41. Micropus.
Receptacle longer than broad; central flowers with an inconspicuous pappus; margins of the marginal receptacular bracts with hyaline margins; involucral bracts present or absent.....42. Stylocline.

5. Heliantheae

Heads solitary on long peduncles.
Involucral bracts in 2 or more series, similar.
Lower cauline leaves alternate; achenes not flattened.
43. Wyethia.
Lower cauline leaves opposite; achenes conspicuously flattened.
44. Helianthella.
Involucral bracts in 2 series, dissimilar.....45. Coreopsis.
Heads not solitary, usually several, clustered at the ends of the stems and branches.
Leaves opposite, sessile. Plants of wet areas.....46. Bidens.
Leaves alternate, petiolate. Plants of dry areas..47. Helianthus.

6. Madieae

Achenes of the ray flowers obcompressed, each hidden within the involucral bracts, the margins of which more or less overlap.
Disk flowers 6 or more.
Achenes 10-ribbed and tuberculate-scabrous; pappus of paleae, oblong, obtuse. 48. Achyrachaena.
Achenes not ribbed or scabrous; pappus present or absent, not obtuse.
Achenes of the disk flowers sterile, poorly developed; heads closing during midday; herbage villous at least when young.
49. Lagophylla.
Achenes of the disk flowers fertile; heads open all day; plants variously pubescent.....50. Layia.
Disk flowers 1.....51. Madia (exigua).

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Achenes of the ray flowers not obcompressed, each not hidden by the enveloping lateral margins of the involucral bracts.
Ligules of the ray flowers 3-toothed or 3-lobed, the lobes more or less parallel; herbage lacking tack-shaped glands.
Achenes of the ray flowers laterally compressed and longitudinally striate, completely enfolded (but not hidden) by the involucral bracts; basal leaves subentire....51. Madia.
Achenes of the ray flowers not laterally compressed or striate, only partially enfolded by the involucral bracts; basal leaves pinnatifid or toothed, rarely subentire.
Upper leaves and involucral bracts without terminal pit-like glands; pappus present or lacking....52. Hemizonia.
Upper leaves and involucral bracts with terminal pit-like glands; pappus none.....53. Holocarpha.
Ligules of the ray flowers 3-cleft or parted into lobes which are palmately spreading; tack-shaped glands present.
54. Calycadenia.

7. Ambrosieae

Leaves entire; within one head, the marginal flowers pistillate, the disk flowers perfect; mature achenes not enclosed within the involucre.....55. Iva.
Leaves serrate, lobed or dissected; heads unisexual; mature achenes enclosed within the involucre; fruiting involucre often spiny.
Fruiting involucre not spiny.....56. Ambrosia.
Fruiting involucre spiny.
Fruiting involucre 1-2.5 cm. long; spines of the involucre hooked; plants annual; stems usually erect.....57. Xanthium.
Fruiting involucre under 1 cm. long; spines of the involucre not hooked; plants perennial; stems usually spreading or prostrate.....58. Franseria.

8. Heleniеae

Leaves alternate at least above.
Leaves lobed or variously divided.
Plants perennial, woody at least at the base, usually over 3 dm. tall.....59. Eriophyllum.
Plants annual, usually under 1.5 dm. tall.
Herbage somewhat tomentose; pappus present.60. Chaenactis.
Herbage glabrous; pappus none.....61. Blennosperma.
Leaves entire or toothed.
Ligules of the ray flowers reflexed at maturity; receptacle globose to hemispherical; leaves decurrent; plants perennial.
62. Helenium.
Ligules of the ray flowers not reflexed at maturity; receptacle flat or conical; leaves not decurrent; plants annual.

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Plants white-tomentose; pappus none; rays conspicuous; receptacle conical.....63. Monolopia.
Plants commonly glabrous, if somewhat pubescent, never tomentose; pappus of 3-5 subulate awns; rays inconspicuous; receptacle flat.....64. Rigiopappus.

Leaves opposite.
Involucral bracts in several series; herbage fleshy; pappus none. 65. Jaumea.
Involucral bracts in 1 series; herbage usually not fleshy; pappus usually present.
Involucral bracts not united into a cup.....66. Baeria.
Involucral bracts united into a shallow cup....67. Lasthenia.

9. Anthemideae

Heads radiate.
Inflorescence corymbose; heads numerous, small; ray flowers usually 5, the ligules about as long as broad.....68. Achillea.
Inflorescence not corymbose; heads few, larger; ray flowers 15 or more, the ligules 2-4 times as long as broad.
Receptacle conical, bracts present toward the top; ray flowers white.....69. Anthemis.
Receptacle more or less flat, naked; ray flowers yellow or white. 70. Chrysanthemum.

Heads discoid.
Heads sessile, solitary, inconspicuous in the axils; plants annual. 71. Soliva.
Heads not sessile, rarely solitary, conspicuous; plants annual, biennial, or perennial.
Receptacle conical.....72. Matricaria.
Receptacle flat to convex.
Plants herbaceous, rarely over 1.5 dm. tall; marginal flowers pedicellate.....73. Cotula.
Plants herbaceous to woody, usually at least 3 dm. tall, often to 1.5 m. tall; marginal flowers sessile.
Inflorescence elongate; heads small, less than 8 mm. in diameter.....74. Artemisia.
Inflorescence more or less flat-topped, not elongate; heads large, about 12 mm. in diameter....75. Tanacetum.

10. Senecioneae

Leaves opposite.....76. Arnica.
Leaves alternate or basal.
Basal leaves palmately lobed, plants not climbing.77. Petasites.
Leaves not palmately lobed, or if so the plants climbing. 78. Senecio.

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11. Cynareae

Leaves not spiny, or if slightly so the mature heads 8-15 cm. in diameter.
Basal leaves usually at least 1 m. long; mature heads 8-15 cm. in diameter; pappus plumose.....79. Cynara.
Basal leaves under 0.5 m. long; mature heads under 3 cm. in diameter; pappus not plumose.
Involucral bracts hooked at the tip.....80. Arctium.
Involucral bracts not hooked at the tip.....81. Centaurea.
Leaves spiny.
Leaves marked with white along the veins.....82. Silybum.
Leaves not marked with white along the veins.
Attachment of the achenes lateral; involucral bracts with lateral spines.
Uppermost leaves nearly obscuring and surpassing the involucre; achenes terete.....83. Cnicus.
Uppermost leaves not obscuring the involucre; achenes quadrangular.....84. Carthamus.
Attachment of the achenes basal; involucral bracts usually entire, the outer sometimes with lateral spines.
Pappus plumose.....85. Cirsium.
Pappus not plumose.....86. Carduus.

1. Lapsana L. Sp. Pl. 811. 1753.

1. Lapsana communis L. Sp. Pl. 811. 1753.

Local distribution: To be expected occasionally in shaded, somewhat disturbed areas throughout the Santa Cruz Mountains. June through August.

General distribution: Native of Europe, North Africa, and western and central Asia, widely introduced into North America.

Specimen examined: Near La Honda, Abrams 12179.

2. Scolymus L. Sp. Pl. 813. 1753.

1. Scolymus hispanicus L. Sp. Pl. 813. 1753.

Local distribution: Known only from Los Gatos. Summer months.

General distribution: Native of the Mediterranean region, Madeira,

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and the Canary Islands, now established in parts of North and South America and northern Europe.

Specimens examined: Los Gatos, Heller 8416; Cannon, July 1894 (CAS).

Scolymus hispanicus was first noted in California by Miss Evelina Cannon in 1893 at Los Gatos (Eastwood, 1896[b]). Davy (1896) indicated that S. hispanicus was purposely planted from seeds sold under the name of "Spanish Oyster Plant" by local residents. Heller's specimen was collected in 1906. No local specimens have been reported since then; however, S. hispanicus is now to be found in Napa, Knights, and Ukiah valleys. Thus since S. hispanicus was established at Los Gatos for at least thirteen years and since it now grows spontaneously elsewhere in California, it is a species to be expected in the local flora. For that reason it is included.

3. Cichorium L. Sp. Pl. 813. 1753.

1. Cichorium intybus L. Sp. Pl. 813. 1753.

Local distribution: Very common along roadsides and in disturbed areas in the Santa Clara Valley, less frequent in the other parts of the Santa Cruz Mountains region. Flowering all year.

General distribution: Native of Eurasia, widely distributed as a weed on all continents.

Specimens examined: Redwood City, Thomas 4229; Alviso, Elmer 4957; Stanford, Randall 60; 1 mile SE of Saratoga Summit, Thomas 3421.

The flowers are usually blue, but white-flowered and intermediate pink forms occur frequently.

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4. Hedypnois Mill. Gard. Dict. abr. ed. 4. 1754.

1. Hedypnois cretica (L.) Willd. Sp. Pl. 3: 1617. 1804.

Local distribution: Known only from San Francisco and from Guadalupe Canyon in northern Santa Clara County, but to be expected elsewhere as it occurs occasionally in California from at least Sonoma and Butte counties south to the Mexican border. March through May.

General distribution: Native of the Mediterranean Region, locally established throughout California.

Specimens examined: Golden Gate Park, Raven 6224 (CAS); Guadalupe Canyon, Mason & Borthwick, Mar. 20, 1921.

5. Microseris D. Don, Phil. Mag. 11: 388. 1882.

Plants perennial; taproot fleshy.....1. M. paludosa.
Plants annual; taproot slender.
  Paleae lanceolate or linear-lanceolate, bifid at the apex; awn usually equal to or shorter than the palea.
    Paleae silvery-scarious, deciduous; awns filiform; heads nodding at least in bud.....2. M. linearifolia.
    Paleae silvery to dull, persistent; awns stouter; heads always erect.
      Paleae usually dull, shorter than to longer than the achenes; tips of the ribs thick, flaring.
        3. M. heterocarpa.
      Paleae usually silvery, much shorter than the achenes; tips of the ribs not thickened nor flaring.
        4. M. decipiens.
  Paleae ovate to ovate-lanceolate, irregularly margined but not bifid; awns usually at least 1.5 times as long as the paleae.
    Paleae thin, smooth to minutely scabrous, flat at maturity at least in the upper half; awns minutely spiculate; achenes smooth to minutely scabrous on the ribs.
      Achenes never dark-spotted, the apex of greater diameter than the body; paleae under 2 mm. long. Plants of the eastern side of the Santa Cruz Mountains.
        5. M. elegans.
      Achenes often dark-spotted, the apex of lesser diameter than the body; paleae 1-4 mm. long. Coastal plants.
        6. M. bigelovii.

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Paleae usually thick, smooth to more commonly scabrous or villous, curved at maturity or almost lacking; awns barbellulate; achenes scabrous.
Paleae 1-6 mm. long; ribs of the achenes flaring at the apex. 7a. M. douglasii ssp. douglasii.
Paleae usually under 1 mm. long; ribs of the achenes not flaring at the apex.....7b. M. douglasii ssp. tenella.

1. Microseris paludosa (Greene) Howell, Leafl. West. Bot. 5: 108. 1948.

Local distribution: Known only from the Presidio in San Francisco, Pebble Beach, and Santa Cruz. April through June.

General distribution: Southern Sonoma County south to Santa Cruz; also on the Monterey Peninsula.

Specimens examined: Presidio, Raven 9330 (JEPS); Pebble Beach, Chambers 1049; Santa Cruz, Hesse 2195 (JEPS).

2. Microseris linearifolia (Nutt.) Sch.-Bip. Pollichia 22-24: 308. 1866.

Local distribution: Mainly on the eastern slopes of the Santa Cruz Mountains, often in rocky soils and serpentine, in chaparral, on open grassy slopes and along roadsides as a weed. April and May.

General distribution: Southern Washington and western Idaho south to Baja California and Sonora, east to the westernmost part of Texas, on most of the Channel Islands, Cedros Island, and Guadalupe Island.

Specimens examined: Mission Hills, Rattan, 1877; Marine Hospital, Heller 6622; San Francisco Watershed Reserve, Oberlander 714; Redwood City, Rose 33127; Coal Mine Ridge, Barry 132A; Tuff Hill, Cannon, Apr. 14, 1900; 2.5 miles east of Los Gatos, Thomas 3919; Loma Prieta Ridge, Thomas 3952; Edenvale, Thomas 4758; Near mouth of Waddell Creek, Thomas 1738A.

3. Microseris heterocarpa (Nutt.) Chambers, Contr. Dudley Herb. 5: 286. 1955.

Local distribution: Grassy slopes and fields on the eastern slopes

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of the Santa Cruz Mountains from northern San Mateo County southward. March through May.

General distribution: Coast Ranges and Sierra Nevada foothills from Butte County south to northern Baja California, on most of the Channel Islands, and on Guadalupe Island.

Specimens examined: Woodside - La Honda Road, Chambers 418; Stanford, Atkinson, Mar. 1900; Clarita Vineyard, Elmer 4701; Foothills west of Los Gatos, Heller 7398.

4. Microseris decipiens Chambers, Contr. Dud. Herb. 4: 290. 1955.

Local distribution: Known so far only from two localities in northwestern Santa Cruz County, near Eagle Rock and near the mouth of Waddell Creek. April and May.

General distribution: Near the coast, Marin County, south to the Monterey Peninsula.

Specimens examined: 2.2 miles from Eagle Rock, Thomas 4094A (type); 0.2 miles south of mouth of Waddell Creek, Thomas 1738.

Microseris decipiens is an allotetraploid species, its parents presumably being M. linearifolia and M. bigelovii. Additional specimens of M. decipiens are to be expected in areas where the two parent species are sympatric.

5. Microseris elegans Gray, Syn. Fl. N. Amer. 1: 419. 1884.

Local distribution: Known in the Santa Cruz Mountains only from one collection from Stevens Creek. Typically at this latitude this is a species of the Inner Coast Ranges and the Sierra Nevada foothills. April and May.

General distribution: Coast Ranges and Sierra Nevada foothills

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from Shasta County south to northern Baja California.

Specimen examined: Stevens Creek, Dudley

6. Microseris bigelovii (Gray) Sch.-Bip. Pollichia 22-24: 308. 1866.

Local distribution: Along or near the coast on coastal bluffs and areas of sandy soil. May and June.

General distribution: Puget Sound area and from Lincoln County, Oregon, south to Santa Barbara County.

Specimens examined: San Francisco, Brandegee, no date; Pt. Lobos, Howell 11337 (CAS); Pebble Beach, Chambers 1048; Swanton, Rich, Spring 1912; 2.2 miles from Eagle Rock, Thomas 4094; Sunset Beach, Thomas 3272.

7a. Microseris douglasii (DC.) Sch.-Bip. ssp. douglasii, Pollichia 22-24: 308. 1866.

Local distribution: Grassy slopes and flats on the eastern side of the Santa Cruz Mountains, often on serpentine soils. Latter part of March through May.

General distribution: Southern Oregon south through the Coast Ranges and Sierra Nevada foothills to San Diego County.

Specimens examined: Presidio, Howell 13088 (CAS); Crystal Springs Lake, Elmer 4721; Woodside, Abrams 2421; Strawberry Bend, Dudley, May 8, 1906; Mayfield, Ferris 769; Jasper Ridge, Thomas 4993; 2.5 miles east of Los Gatos, Thomas 3916; Uvas and Llagas Roads, Ferris 3718; Near Coyote, Ferris 792; Almaden Canyon, Bacigalupi 1339; Edenvale, Thomas 4775.

7b. Microseris douglasii (DC.) Sch.-Bip. ssp. tenella (Gray) Chambers, Contr. Dud. Herb. 4: 294. 1955.

Local distribution: Eastern slope of the Santa Cruz Mountains, from San Francisco to the southern part of Santa Cruz County, usually

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on grassy slopes. April and May.

General distribution: Coast Ranges and Sierra Nevada foothills from Tehama County south to northern Baja California.

Specimens examined: San Francisco, Curran, no date; San Bruno Hills, Abrams 7212; Redwood City, Rose 33129; Woodside, Abrams 2423; Stanford, Dudley, Apr. 23, 1895; Uvas and Llagas Roads, Ferris 3718 (with M. d. ssp. douglasii); 8 miles east of Watsonville, Thomas 3256.

6. Leontodon L. Sp. Pl. 798. 1753.

1. Leontodon leysseri (Wallr.) G. Beck, Fl. Nied. Osterr. 1312. 1893.

Local distribution: Occasional in lawns and disturbed habitats. May through September.

General distribution: Native of northern Europe and Russia, now occasionally found in the eastern and western parts of the United States.

Specimens examined: San Francisco, Howell 31726 (CAS); Stanford, Ferris 9023; Boulder Creek, Hesse 323; Graham Hill Road, Thomas 6040; Rincon, Thomas 4564.

7. Stephanomeria Nutt. Trans. Amer. Phil. Soc. II. 7: 427. 1841.

1. Stephanomeria virgata Benth. Bot. Sulph. 32. 1844.

Local distribution: Open slopes, commonly with Artemisia californica, Zauschneria californica, Rhus diversiloba, and Baccharis pilularis, often becoming a weed along roads. June through October.

General distribution: Southwestern Oregon south through the Coast Ranges and Sierra Nevada foothills to northern Baja California.

Specimens examined: Cahill Ridge, Oberlander 1070; Near Portola, Abrams 3002; Coal Mine Ridge, Barry 200; Stevens Creek, Randall, Sept. 1906; Loma Prieta, Elmer 4975; Near Eccles, Dudley, Oct. 3, 1896; Summit of Los Gatos - Santa Cruz Highway, Thomas 4572; Santa Cruz, Jones 2346; Aptos Creek, Abrams 3061.

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Greene (1890) recognized several segregates of this species. At most they are minor varients without separate geographical ranges involving pubescence characters, internode lengths, and minor achene differences.

8. Hypochaeris L. Sp. Pl. 810. 1753.

Plants perennial; leaves usually hispid on both surfaces; marginal achenes beaked; flowering heads about 2 cm. in diameter. 1. H. radicata.
Plants annual; leaves glabrous to sparingly hispid; marginal achenes usually not beaked; flowering heads about 1 cm. in diameter. 2. H. glabra.

1. Hypochaeris radicata L. Sp. Pl. 811. 1753.

Local distribution: Grasslands and disturbed areas throughout the Santa Cruz Mountains and adjacent lowlands. February through August.

General distribution: Native of Europe, western Russia, North Africa, and Asia Minor, now a nearly cosmopolitan weed.

Specimens examined: Lake Merced, Abrams 1609; Baden, Dudley, June 19, 1908; Sawyer Ridge, Oberlander 55; Stanford, Randall 84; Waddell Valley, Thomas 2464; Swanton, Rich, May 1912; Summit of Los Gatos - Santa Cruz Highway, Thomas 3172; Robroy, Thomas 3067.

2. Hypochaeris glabra L. Sp. Pl. 811. 1753.

Local distribution: Grassland, pastures, and disturbed areas throughout the Santa Cruz Mountains and low adjacent areas, common. March through September.

General distribution: Native of Europe, North Africa, and Asia Minor, now widely introduced into temperate regions throughout the world.

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Specimens examined: Ocean View, Dudley, Nov. 8, 1896; San Bruno Mt., Thomas 4843; Sawyer Ridge, Oberlander 910; Mayfield, Ferris 761; Big Basin, Dudley, June 5, 1897; Summit of Santa Cruz - Los Gatos Highway, Thomas 3166; Near Ben Lomond, Ferris 11132A; Sunset Beach State Park, Thomas 3271.

Hypochaeris radicata and H. glabra often occur sympatricly. Most of the specimens of these two species can be distinguished readily. However, some specimens of H. glabra lack unbeaked marginal achenes and are hispid on the leaf margins, midribs, and to some extent on the leaf surfaces. The leaves of H. glabra are thinner than those of H. radicata.

9. Picris L. Sp. Pl. 792. 1753.

1. Picris echioides L. Sp. Pl. 792. 1753.

Local distribution: Edges of salt marshes, in ditches, fallow fields, and in other moist disturbed habitats. April through November.

General distribution: Native of the Mediterranean region, the Canary Islands, and southwestern Asia, widely established in northern Europe and in the Western Hemisphere.

Specimens examined: San Pedro Valley, Thomas 5505; Palo Alto, Abrams 1040; Alviso, Thomas 5320; Santa Clara, Leeds, Jan. 1891; Santa Cruz, Thomas 1190; Seabright, Hichborn 323; Watsonville, Hayward, June 27, 1929.

10. Tragopogon L. Sp. Pl. 789. 1753.

1. Tragopogon porrifolius L. Sp. Pl. 789. 1753.

Local distribution: Weedy areas and roadsides throughout the Santa Cruz Mountains and especially in the adjacent lowlands. March through July.

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General distribution: Native of the Mediterranean region, now widely introduced into temperate areas.

Specimens examined: Menlo Park, Dudley, May 12, 1897; Alviso, Elmer 4953; Pajaro River, Thomas 3234.

11. Rafinesquia Nutt. Trans. Amer. Phil. Soc. II. 7: 429. 1841.

1. Rafinesquia californica Nutt. Trans. Amer. Phil. Soc. II. 7: 429. 1841.

Local distribution: Occasionally found on moist brushy canyon slopes in southern San Mateo County and in Santa Clara and Santa Cruz counties. May and June.

General distribution: Coast Ranges from Humboldt County south to northern Baja California, in the Sierra Nevada foothills of Kern County, and at higher elevations in the Mojave and Colorado deserts.

Specimens examined: Stanford, Hichborn, June 2, 1920; Black Mt., Elmer 4288; Swanton, Rich, Spring 1912.

12. Taraxacum Hall. ex Zinn, Cat. Pl. Hort. Acad. Agri. Gottingensis 425. 1757.

Both of the species of Taraxacum listed below have been poorly collected locally. The paucity of citations does not reflect the distribution and abundance of the dandelions.

Achenes gray, brown, or black; involucral bracts usually lacking appendages; leaves coarsely lobed.....1. T. officinale.
Achenes reddish or rose-colored; at least a few of the involucral bracts with appendages; leaves finely lobed, usually to the midrib. 2. T. laevigatum.

1. Taraxacum officinale Weber in Wiggers, Prim. Pl. Holst. 56. 1780.

Local distribution: Common as lawn weeds, in disturbed habitats,

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and less frequently on open or shaded slopes. To be found in flower throughout the year.

General distribution: Native of Europe and western Asia, now nearly cosmopolitan in temperate regions.

Specimens examined: Stanford, Randall 100; Glenwood, Thomas 1438; Hilton Airport, Thomas 3127; Watsonville, Thomas 1573.

2. Taraxacum laevigatum (Willd.) DC. Cat. Hort. Monspel. 149. 1813.

Local distribution: Occasional in lawns and open areas. March through July.

General distribution: Native of Eurasia, widely established in temperate regions.

Specimens examined: San Francisco, Kennedy 4665 (DAV); Stanford, Dudley, Apr. 15, 1902.

13. Agoseris Raf. Fl. Ludov. 58. 1817.

Plants annual; beak of the achene 2-3 times the length of the body, body of the achene strongly ribbed, usually conspicuously winged, the wing often crisped.....1. A. heterophylla.
Plants perennial; body of the achene ribbed, but not winged.
Beak of the achene less than 2 times the length of the body; leaves usually under 15 cm. long.
Leaves lanceolate, usually conspicuously lobed, usually at least halfway to the midrib; root slender. Inland subspecies. 2a. A. apargioides ssp. apargioides.
Leaves oblanceolate to spatulate, usually entire to remotely toothed; root stout. Coastal sand dune subspecies. 2b. A. apargioides ssp. maritima.
Beak of the achene 2-4 times as long as the body. 3. A. grandiflora.

1. Agoseris heterophylla (Nutt.) Greene, Pittonia 2: 178. 1891.

Local distribution: More common on the eastern slopes of the Santa Cruz Mountains than on the western, grassy slopes, often on serpentine. Latter part of January through July.

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General distribution: British Columbia south to northern Baja California, Arizona, and New Mexico, but absent from the Great Basin and the Colorado and Mojave deserts.

Specimens examined: San Mateo, Dudley, May 13, 1906; Coal Mine Ridge, Barry 132b; Black Mt., Dudley, Jan. 1, 1902; Alma, Heller 7493; Coyote, Ferris 793.

2a. Agoseris apargioides (Less.) Greene ssp. apargioides, Pittonia 2: 177. 1891.

Local distribution: Grasslands throughout the Santa Cruz Mountains, but most common on the open slopes in northern San Mateo and San Francisco counties. April through November.

General distribution: Coast Ranges, Mendocino County south to northern Monterey County.

Specimens examined: Ocean View, Dudley, Mar. 24, 1895; San Francisco, Parish, Nov. 1881; Greene, Apr. 1886; Lake Merced, Hall 1771; San Bruno Mt., Vestal, May 19, 1926; San Andreas Lake, Oberlander 1023A; Pescadero, Dudley, Apr. 17, 1896; Near Portola, Abrams, Oct. 25, 1897; Wrights, Dudley, May 28, 1894; Hilton Airport, Thomas 2451; Santa Cruz, Jones 2350; Capitola, Abrams 3245.

2b. Agoseris apargioides (Less.) Greene ssp. maritima (Sheld.) Jones ex Cronq. Univ. Wash. Pub. Biol. 17: 24. 1955.

Local distribution: Sand dunes along the coast. March through November.

General distribution: Along the coast from Bodega Bay, Sonoma County, south to Point Sur, Monterey County.

Specimens examined: Land's End, Walker 1805; Cliff House, Baker 314; Spanishtown, Dudley, Nov. 15, 1896; Watsonville, Elmer 4391.

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3. Agoseris grandiflora (Nutt.) Greene, Pittonia 2: 178. 1891.

Local distribution: Common in grassland throughout the Santa Cruz Mountains and adjacent lowlands and in disturbed habitats along roadsides. April through September.

General distribution: British Columbia south to northern Idaho and southern California.

Specimens examined: Baden, Dudley, May 14, 1899; San Andreas Lake, Oberlander 333; San Mateo Ravine, Dudley, Apr. 21, 1894; Frenchmans Tower, Randall 44; Campbell Creek, Thomas 4192; Foothills west of Los Gatos, Heller 7476; Bielawski Lookout, Thomas 3441; Near Glenwood, Thomas 3182; Near Pajaro River, Thomas 3265; Watsonville, Dudley, Oct. 11, 1908.

14. Lactuca L. Sp. Pl. 795. 1753.

Upper cauline leaves linear, if divided the divisions also linear; margins entire; inflorescence spike-like.....1. L. saligna.
Upper cauline leaves oblong or broader, entire or divided; margins dentate or somewhat spinose; inflorescence paniculate.
Achenes black, not setulose; cauline leaves not held vertically. 2. L. virosa.
Achenes usually brown, setulose at least above on the lateral margins; cauline leaves usually held vertically. 3. L. serriola.

1. Lactuca saligna L. Sp. Pl. 796. 1753.

Local distribution: Occasional in disturbed ground along roadsides. August through November.

General distribution: Native of Europe, the Mediterranean region, and southern Russia, now introduced into North America, Australia, and South America.

Specimens examined: Stanford, Wiggins 3329; Palo Alto, Bacigalupi 2712; Near Saratoga Summit, Kesse 240.

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2. Lactuca virosa L. Sp. Pl. 795. 1753.

Local distribution: Known locally so far only from central San Mateo County. August and September.

General distribution: Europe and North Africa eastward to central Asia, sparingly introduced into the San Francisco Bay region.

Specimen examined: Near San Andreas Lake, Howell 30108 (CAS).

Stebbins (1939, p. 125) stated that: "Usually Lactuca virosa does not become a field or roadside weed as does L. scariola, but prefers half-wild places, often growing in rock crevices."

3. Lactuca serriola L. Cent. Pl. 2: 29. 1756.

Local distribution: Common in fields and along roadsides throughout the Santa Cruz Mountains and adjacent lowlands. July through November.

General distribution: Europe, Asia, and North Africa, now a cosmopolitan weed.

Specimens examined: Stanford, Wiggins 3311; San Antonio Creek, Randall 86; Alviso, Thomas 5303; Summit of Los Gatos - Santa Cruz Highway, Thomas 4576; Hilton Airport, Thomas 3566.

A minor varient, Lactuca serriola L. forma integrifolia Bogenh. (Taschenb. Fl. Jen. 269. 1850), which differs in having entire leaves, is occasionally found. Specimens of this form are: Corte Madera Creek, McMurphy, Oct. 1, 1905; Stanford, Dudley, Nov. 11, 1908.

15. Sonchus L. Sp. Pl. 793. 1753.

Auricles of cauline leaves pointed, terminal portion of leaves often deltoid, leaf margins rarely spinose; achenes rugose. 1. S. oleraceus.

Auricles of cauline leaves rounded, terminal portion of leaves seldom deltoid, leaf margins usually spinose; achenes usually smooth. 2. S. asper.

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1. Sonchus oleraceus L. Sp. Pl. 794. 1753.

Local distribution: A very common weed along roadsides, coastal bluffs, edges of salt marshes, and in disturbed habitats generally. Flowering all year, although more commonly so from March to September.

General distribution: Native of Europe, western Asia, and North Africa, now a cosmopolitan weed.

Specimens examined: San Francisco, Rattan, Apr. 29, 1877; San Bruno Mt., Thomas 7054; Coal Mine Ridge, Barry 240; Stanford, Randall 98; Wrights, Dudley, Apr. 19, 1895; Davenport, Thomas 1360; Santa Cruz, Thomas 1275.

2. Sonchus asper (L.) Hill, Herb. Brit. 1: 47. 1769.

Local distribution: Disturbed areas especially along moist roadside drainages and cultivated fields. March through July.

General distribution: Native of Europe, western Asia, and North Africa, widely introduced into other continents.

Specimens examined: Mission Hills, Rattan, 1877; Menlo Park, Abrams 1144; Stanford, Randall 97; Swanton, Rich, May 1912; Pajaro River, Thomas 3246.

16. Malacothrix DC. Prod. 7: 192. 1838.

1. Malacothrix floccifera (DC.) Blake, Contr. U. S. Nat. Herb. 22: 656. 1924.

Local distribution: Dry hillside slopes in loose rocky or sandy soils, Santa Clara and Santa Cruz counties. April through August.

General distribution: Humboldt and Siskiyou counties, south through the Coast Ranges to Ventura County, in the Sierra Nevada and adjacent Nevada from Lassen County to Mariposa County; introduced into Chile.

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Specimens examined: Los Gatos Canyon, Heller 7481; Loma Prieta Ridge, Dudley, June 22, 1893; Loma Prieta Peak, Elmer 4779; Sand hills east of Ben Lomond, Thomas 4899B; Quail Hollow Road, Thomas 1658.

17. Hieracium L. Sp. Pl. 799. 1753.

1. Hieracium albiflorum Hook. Fl. Bor. Amer. 1: 298. 1833.

Local distribution: Fairly common on shaded slopes covered with oak - madrone woods, less frequently associated with douglas fir. June and August.

General distribution: Southern Alaska and southern Yukon south to Colorado, Utah, and northern Baja California.

Specimens examined: Sawyer Ridge, Oberlander 997; Pescadero Creek, Mason, July 14, 1921; Portola Valley, Randall 82; Stevens Creek, Randall 80; Loma Prieta, Elmer 4406; Swanton, Rich, Spring 1912; Castle Rock, Thomas 3435; San Vicente Creek, Thomas 3402; Santa Cruz, Jones 2284.

18. Crepis L. Sp. Pl. 805. 1753.

Involucre about 10 mm. long; achenes short-beaked.
1. C. vesicaria ssp. taraxacifolia.
Involucre 5-7 mm. long; achenes beakless.
2. C. capillaris.

1. Crepis vesicaria L. ssp. taraxacifolia (Thuill.) Thell. Krit. Fl. Schweiz 361. 1914.

Local distribution: Occasional in disturbed habitats. April through July.

General distribution: Native in Europe and North Africa, now adventive on both coasts of North America, New Zealand, and Australia.

Specimens examined: Stanford, Bartholemew, Apr. 13, 1932; Thomas 4264.

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2. Crepis capillaris (L.) Wallr. Linnaea 14: 657. 1840.

Local distribution: Occasional in disturbed habitats. June through September.

General distribution: Native of central Europe and western Asia, now widely established in other temperate regions.

Specimens examined: San Francisco, Bacigalupi 2848; Portola, Randall 66; Glenwood, Davis, Sept. 1907; Ben Lomond sand hills, Thomas 6013.

Crepis bursifolia L. (Sp. Pl. 805. 1753) has been collected on the Stanford University campus (Howell, June 5, 1951). This species is probably an escape from the experimental gardens of the Carnegie Institution of Washington where several species of Crepis were grown in connection with the studies undertaken by Professor Ernest B. Babcock. It is to be expected that other species of Crepis may also be found in the vicinity as casual escapes. Crepis bursifolia differs from the other two species listed above in having an achene whose beak is twice as long as the body.

19. Brickellia Ell. Sketch 2: 290. 1824.

1. Brickellia californica (T. & G.) Gray, Pl. Fendl. 64. 1849.

Local distribution: Known only from one specimen from San Jose, but to be expected along dry creek beds in the Santa Clara Valley in August and September.

General distribution: Jackson and Josephine counties, Oregon, south to northern Baja California, east to western Colorado, New Mexico, and Texas.

Specimen examined: San Jose, Rattan, Sept. 1881.

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20. Eupatorium L. Sp. Pl. 836. 1753.

1. Eupatorium adenophorum Spreng. Syst. Veg. 3: 420. 1826.

Local distribution: Occasional in disturbed areas, known from San Francisco and Santa Cruz. April through August.

General distribution: Native of Mexico, sparingly established as an escape from cultivation in California.

Specimens examined: San Francisco, Eastwood, Aug. 1915 (CAS); Santa Cruz, Reed, Apr. 16, 1934 (CAS).

21. Baccharis L. Sp. Pl. 860. 1753.

Mature leaves cuneate to oblong, usually 1-nerved, rarely over 3 times as long as broad.
  Plants prostrate to decumbent, under 3 dm. tall. Coastal.
    1a. B. pilularis var. pilularis.
  Plants erect, 1-4 m. tall. Inland.
    1b. B. pilularis var. consanguinea.
Mature leaves ovate, lanceolate, to linear-lanceolate, 3-nerved from near the base, usually 5 or more times as long as broad.
  Stems woody; leaves ovate to lanceolate; achenes glabrous.
    2. B. viminea.
  Stems herbaceous, woody only near the base; leaves linear-lanceolate to linear; achenes minutely pubescent.
    3. B. douglasii.

1a. Baccharis pilularis DC. var. pilularis, Prod. 5: 407. 1836.

Local distribution: Coastal bluffs, hills, and sand dunes, San Francisco southward. March through August.

General distribution: Along the coast from the Russian River, Sonoma County, south to Point Sur, Monterey County, and along the margins of San Francisco Bay.

Specimens examined: Presidio, San Francisco, Michener & Bioletti, 1892; San Francisco, Jones 2382; Wolf 2339; Pillar Pt., Baker 1740; Arroyo de los Frijoles, Mason, Mar. 27, 1922; San Gregorio Creek, Thomas 1144; Pigeon Pt., Wolf 6240; 4.5 miles northwest of Davenport, Thomas 3642; Santa Cruz, Dudley, Oct. 4, 1896.

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1b. Baccharis pilularis DC. var. consanguinea (DC.) Kuntze, Rev. Gen. Pl. 1: 319. 1891.

Local distribution: A common shrub of hills, edges of chaparral, woods, and disturbed areas. August through October.

General distribution: Coast Ranges from Tillamook County, Oregon, south to San Diego County, in the Sierra Nevada from Nevada County south to Tuolumne County, and on most of the Channel Islands.

Specimens examined: San Andreas Valley, Oberlander 1211; Near La Honda, Dudley, Dec. 13, 1894; Portola, Elmer 4576; Stanford, Abrams 2240; Black Mt., Baker 60; Near Mt. View, Randall, Oct. 19, 1907; Hills back of Los Gatos, Heller 7210; Below Saratoga Summit, Thomas 1130, 1139; Near Waddell Creek, Thomas 2477; Between Big Basin and Boulder Creek, McMinn 46.

2. Baccharis viminea DC. Prod. 5: 400. 1836.

Local distribution: Occasional along dry stream beds in the Santa Clara Valley. April through June.

General distribution: Tehama and Butte counties south to Baja California, east to southern Nevada, southwestern Utah, and western Arizona.

Specimens examined: Near Campbell, Heller 8510; Near Alma, Davis, May 9, 1920; 6.5 miles south of San Jose, Thomas 4971; Near Coyote, Ferris 830.

3. Baccharis douglasii DC. Prod. 5: 400. 1836.

Local distribution: Moist areas along streams and in lowlands, occasionally along the edges of salt marshes. April through December.

General distribution: Curry County, Oregon, south to San Diego County, occasionally in the Central Valley, and in the Sierra Nevada foothills from Amador County southward.

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Specimens examined: San Andreas Lake, Oberlander 363; Crystal Springs Lake, Randall 57; Menlo Park, Abrams 2225; San Francisquito Creek, Stinchfield 262; Cooleys Landing, Randall, Sept. 28, 1907; Alviso, Rust 37; Near Wrights, Dudley, Sept. 29, 1894; Waddell Creek, Thomas 3631; 4 miles north of Santa Cruz, Thomas 4569.

22. Grindelia Willd. Ges. Nat. Fr. Ber. 1: 260. 1807.

Involucral bracts pubescent.....1. G. hirsutula.
Involucral bracts glabrous.
Tips of the involucral bracts not sharply reflexed. Plants of salt marshes or slopes near the sea.
Plants woody. Salt marshes along San Francisco Bay. 2. G. humilis.
Plants herbaceous. San Francisco....3. G. maritima.
Tips of the involucral bracts (at least the outer) sharply reflexed. Plants of various habitats.
Plants not succulent; stems erect. Inland plants. 4. G. camporum.
Plants succulent; stems prostrate or decumbent, rarely erect. Coastal plants.
Leaves pointed at the tips.....5. G. latifolia.
Leaves rounded at the tips.....6. G. stricta ssp. venulosa.

1. Grindelia hirsutula Hook. & Arn. Bot. Beechey 147. 1833.

Local distribution: Dry open slopes, away from the coast, northern San Mateo County southward, east of the crests of the Santa Cruz Mountains. April through June.

General distribution: Napa County south to Monterey County, also in Ventura County.

Specimens examined: San Bruno Hills, Abrams 7064; Cahill Ridge, Dudley, June 10, 1906; Crystal Springs, Heller 7585; Near San Mateo, Dudley, May 1894; Pescadero - La Honda Rd., Mason, July 3, 1921; Coal Mine Ridge, Barry 161; Stanford, Randall 73; Black Mt., Elmer 4584; Foothills west of Los Gatos, Heller 7461.

Plants with very densely villous stems and peduncles and very long, linear bracts beneath the heads have been called G. hirsutula Hook. & Arn. ssp. rubicaulis Keck (Aliso 4: 102. 1958).

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2. Grindelia humilis Hook. & Arn. Bot. Beechey 147. 1833.

Local distribution: Salt marshes along the shores of San Francisco Bay. To be found in flower at all times of the year.

General distribution: Salt marshes bordering San Francisco Bay from Solano County south to Santa Clara County.

Specimens examined: Redwood City, Eastwood, Dec. 16, 1914 (CAS); Redwood Creek, Dudley, Jan. 28, 1894; Dumbarton Bridge, Keck 1273 (CAS); Cooleys Landing, Randall, Sept. 28, 1907; Palo Alto, Stinchfield 252; Alviso, Thomas 5307.

3. Grindelia maritima (Greene) Steyermark, Ann. Mo. Bot. Gard. 21: 576. 1934.

Local distribution: San Francisco, sandy or serpentine slopes near the ocean. May through September.

General distribution: Endemic.

Specimens examined: Presidio, Howell 11489; Lone Mt., Kellogg & Brandon, May 1870; Laguna Honda, Howell 11656; Rose 38245.

Plants with pubescent stems have been called G. maritima (Greene) Steyermark f. anomala Steyermark (Ann. Mo. Bot. Gard. 21: 578. 1934). Howell 11660 (CAS) from Twin Peaks is an example of this form.

4. Grindelia camporum Greene, Man. Bay Reg. 171. 1894.

Local distribution: Dry slopes, road embankments, fields, and low alkaline areas, but not in salt marshes. June through December.

General distribution: Humboldt and Butte counties south to northern Los Angeles County, mainly through the Central Valley.

Specimens examined: Near San Francisco Airport, Thomas 4233; Jasper Ridge, Mallory, July 15, 1919; Stanford, Dudley, June 29, 1894; Mountain View, Abrams 3080; Near Alviso, Dudley, Nov. 9, 1903.

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5. Grindelia latifolia Kell. Proc. Calif. Acad. 5: 36. 1873.

(G. latifolia Kell. ssp. platyphylla (Greene) Keck, Aliso 4: 102. 1958.)

Local distribution: Coastal sand dunes and salt marshes, central San Mateo County southward. June through November.

General distribution: Along the coast from Marin County south to Point Conception, Santa Barbara County, and on the northern Channel Islands.

Specimens examined: Pebble Beach, Abrams 4249; Waddell Creek, Thomas 2480; Swanton, Rich, Spring 1912; Santa Cruz, Dudley, Oct. 3, 1896; Seabright, Hichborn, July 6, 1920; Aptos, Abrams 3072; Watsonville Slough, Hayward, June 27, 1929.

6. Grindelia stricta DC. ssp. venulosa (Jepson) Keck, Aliso 4: 102. 1958.

Local distribution: Occasional on bluffs along the coast and in coastal salt marshes. March through October.

General distribution: Along the coast from Coos County, Oregon, south to Monterey County.

Specimens examined: Montara Mt., Dudley, Mar. 17, 1900; Pillar Point, Dudley, Oct. 10, 1897; Half Moon Pt., McMinn 252; Waddell Creek, Dudley, Sept. 23, 1901.

23. Haplopappus Cass. Dict. Sci. Nat. 56: 168. 1828.

Perennial herbs; basal leaves 10-30 cm. long; heads radiate. ..... 1. H. racemosus.

Shrubs or subshrubs; leaves never over 6 cm. long; heads radiate or discoid.

Leaves oblanceolate to spatulate, dentate at least at the apex; heads discoid..... 2. H. venetus ssp. vernonioides.

Leaves linear to filiform, entire; heads radiate or discoid.

Leaves 4-12 mm. long, fascicled; shrubs, usually less than 1 m. tall; heads radiate.

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Achenes glabrous or with a few scattered hairs; young twigs and leaves puberulent, obscurely glutinous. Coastal.
3a. H. ericoides ssp. ericoides.
Achenes sericeous; young twigs and leaves rarely puberulent, conspicuously glutinous. Inland.
3b. H. ericoides ssp. blakei.
Leaves 3-6 cm. long, usually not fascicled; shrubs 0.5-3 m. tall; heads discoid.....4. H. arborescens.

1. Haplopappus racemosus (Nutt.) Torr. in Sitgr. Rep. 162. 1854.

(H. racemosus (Nutt.) Torr. ssp. longifolius Hall, Carnegie Inst. Wash. Pub. 389: 130. 1928; Pyrrocoma elata Greene, Man. Bay Reg. 173. 1894.)

Local distribution: Edges of marshes, saline soils and occasionally in disturbed areas, southern end of San Francisco Bay. August through November.

General distribution: Willamette Valley, Oregon, south to northern San Benito County.

Specimens examined: Cooleys Landing, Dudley, Sept. 14, 1901; Near Alviso, Richardson, Oct. 20, 1906; Agnews, Abrams 3087; Cooper, Oct. 1914; San Jose, Duncan, Sept. 1922.

2. Haplopappus venetus (H. B. K.) Blake ssp. vernonioides (Nutt.) Hall, Carnegie Inst. Wash. Pub. 389: 224. 1928.

(Isocoma veneta (H. B. K.) Greene var. vernonioides (Nutt.) Jepson, Fl. W. Mid. Calif. 560. 1901.)

Local distribution: Known locally only from San Francisco and from near Burlingame. September through November.

General distribution: Coast Ranges from San Francisco south to San Diego County.

Specimens examined: San Francisco, Brandegee, Oct. 1891; Near Burlingame, Walker 3833 (UC).

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3a. Haplopappus ericoides (Less.) Hook. & Arn. ssp. ericoides, Bot. Beechey 146. 1833.

(Ericameria ericoides (Less.) Jepson, Fl. W. Mid. Calif. 559. 1901.)

Local distribution: Coastal sand dunes, southward along the coast from San Francisco. September through November.

General distribution: Sand dunes along the coast from Marin County south to Los Angeles County.

Specimens examined: San Francisco, Greene, Sept. 25, 1891; Lone Mt., San Francisco, Parish, Nov. 1881; Lake Merced, Rose 41433; San Mateo - San Francisco Co. line, Bacigalupi 2739; Near Waddell Creek, Dudley, Sept. 23, 1901; Mouth of Waddell Creek, Thomas 2479; Near mouth of Pajaro River, Thomas 2402.

3b. Haplopappus ericoides (Less.) Hook. & Arn. ssp. blakei Wolf, Occ. Pap. Rancho Santa Ana Bot. Gard. 1: 87. 1938.

Local distribution: Inland marine sand deposits. September through November.

General distribution: Outer Coast Ranges from central Santa Cruz County south to Santa Barbara County.

Specimens examined: Glenwood, Davis, Sept. 1907; Eccles, Dudley, Oct. 3, 1896; Near Bonnie Doon, Wolf 9788; Abrams 13740; Thomas 1220.

4. Haplopappus arborescens (Gray) Hall, Univ. Calif. Pub. Bot. 7: 273. 1919.

(Ericameria arborescens (Gray) Greene, Man. Bay Reg. 175. 1894.)

Local distribution: Chaparral, southern San Mateo County southward. July through October.

General distribution: Coast Ranges from Del Norte County south to Ventura County, in the Sierra Nevada from Yuba and Nevada counties south

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to Tulare County.

Specimens examined: Stevens Creek, Abrams 3010; Near Raymonds, Dudley, Sept. 1906; Loma Prieta Peak, Elmer 4995; Gilroy, Miller, July 30, 1918 (CAS); Near Bielawski Lookout, Thomas 3444; China Grade, Cox, Aug. 5, 1908; Opal Creek, Thomas 2436; Near Big Basin, McMinn 821b.

24. Heterotheca Cass. Bull. Soc. Philom. 137. 1817.

1. Heterotheca grandiflora Nutt. Trans. Amer. Phil. Soc. II. 7: 315. 1841.

Local distribution: Occasional in sandy disturbed areas, roadsides, and coastal sand dunes, perhaps introduced locally from southern California or the Central Valley. March through October.

General distribution: Sonoma and Butte counties south to northern Baja California, in Arizona, and naturalized in the Hawaiian Islands.

Specimens examined: Stanford, Dudley, Sept. 10, 1895; Sept. 1897; Santa Cruz - Los Gatos Highway, Thomas 4573; Near Glenwood, Thomas 3603; Larkin Valley, Thomas 2725.

25. Chrysopsis (Nutt.) Ell. Sketch 2: 333. 1824.

Heads radiate.
  Heads solitary or few, closely subtended by leaf-like bracts; plants 1-2 dm. tall.....1a. C. villosa var. bolanderi.
  Heads several, not subtended by leafy bracts; plants 3-8 dm. tall.
    Leaves and stems densely canescent, somewhat glandular. 1b. C. villosa var. echioides.
    Leaves and stems hispid, not canescent, conspicuously glandular. 1c. C. villosa var. camphorata.
Heads discoid.....2. C. oregona var. rudis.

1a. Chrysopsis villosa (Pursh) Nutt. var. bolanderi (Gray) Gray ex Jepson, Man. Fl. Pl. Calif. 1036. 1925.

Local distribution: Occasional on open slopes, usually along or near the coast. April through November.

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General distribution: Coastal, Mendocino County south to northern San Mateo County.

Specimens examined: Ocean View, Dudley, Nov. 8, 1896; Jersey Farm, Dudley, Oct. 12, 1906; San Bruno Hills, Abrams 7075; San Bruno Mt., Thomas 4236; Near Portola, Leitholt, July 28, 1894.

1b. Chrysopsis villosa (Pursh) Nutt. var. echioides (Benth.) Gray, Syn. Fl. N. Amer. 1: 123. 1884.

Local distribution: Open grassy slopes, often among rock outcroppings, usually away from the immediate coast. September through November.

General distribution: Coast Ranges from Sonoma and Solano counties south to northern Baja California, east to the edge of the Mojave Desert.

Specimens examined: Menlo Park, Abrams 2228; Coal Mine Ridge, Barry 217; Campbell Creek, Dudley, Sept. 15, 1901; Saratoga, Abrams, Oct. 6, 1906; Saratoga Summit, Thomas 3590; Rose 41459; Castle Rock Ridge, Abrams, Oct. 7, 1906; Aptos Creek, Abrams 3073.

Some specimens of C. villosa are intermediate between var. echioides and var. bolanderi, as for example Thomas 3590.

1c. Chrysopsis villosa (Pursh) Nutt. var. camphorata (Eastw.) Jepson, Man. Fl. Pl. Calif. 1036. 1925.

Local distribution: Most common on the inland marine sand deposits in Santa Cruz County, occasionally elsewhere. June through September.

General distribution: Santa Cruz and Santa Clara counties south to Monterey and San Benito counties.

Specimens examined: Stevens Creek Rd., Randall, Sept. 1907; Near Lexington, Dudley, Sept. 11, 1906; Near Eccles, Dudley, June 26, 1897; Glenwood, Davis, Aug. 1900 (isotype); July, 1900; Bacigalupi & Ferris 2703; Mt. Hermon, Cox, Aug. 3, 1908.

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2. Chrysopsis oregona (Nutt.) Gray var. rudis (Greene) Jepson, Fl. W. Mid. Calif. 558. 1901.

Local distribution: Sandy and gravelly areas, commonly along creeks and dry washes on the eastern slopes of the Santa Cruz Mountains and in the Santa Clara Valley from Menlo Park south to Gilroy. June through November.

General distribution: Coast Ranges from Humboldt County south to Santa Clara County, also in Shasta and Tehama counties.

Specimens examined: Between Menlo Park and Palo Alto, Dudley, Oct. 11, 1896; Mountain View, Abrams 3079; Santa Clara, Dudley, Oct. 10, 1902; San Jose, Rattan, June 1885; Los Gatos Creek, Ferris 2075; Abrams 6382; Between Gilroy and Morgan Hill, Abrams 6386; 1 mile south of Gilroy, Thomas 4362.

26. Solidago L. Sp. Pl. 878. 1753.

Leaves linear to linear-lanceolate, entire.
1. S. occidentalis.
Leaves variously lanceolate to obovate, usually not entire.
Leaf surfaces essentially glabrous.
Involucres 3-4 mm. high; leaf margins scabrous-ciliate.
2. S. canadensis ssp. elongata.
Involucres 6-7 mm. high; leaf margins usually not ciliate.
3. S. spathulata.
Leaf surfaces densely pubescent.....4. S. californica.

1. Solidago occidentalis (Nutt.) Torr. & Gray, Fl. N. Amer. 2: 226. 1842.

Local distribution: Edges of marshes, wet roadside ditches, and moist places along streams, southern San Mateo County southward. August through November.

General distribution: British Columbia south to northern Baja California, east to Alberta, Nebraska, and Texas.

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Specimens examined: Portola, McMurphy, Oct. 29, 1905; Palo Alto, Abrams, Oct. 25, 1897; Randall, Sept. 1907; Alviso, Parks 410; Page Mill Road, Dudley, Sept. 15, 1895; Black Mt., Dudley, Oct. 12, 1894; Waddell Creek, Thomas 3632; Near Felton, Dudley, Oct. 3, 1896; Watsonville, Hayward, Aug. 4, 1928.

2. Solidago canadensis L. ssp. elongata (Nutt.) Keck, Aliso 4: 103. 1958.

Local distribution: Occasional on ridges and brush-covered slopes, southern San Mateo County southward. August through November.

General distribution: British Columbia south to Monterey and Tulare counties, eastward to the Rocky Mountains, also in Baja California.

Specimens examined: Kings Mt., Rose, Sept. 1931; Los Gatos Canyon, Abrams 4328; Foothills west of Los Gatos, Heller 7531; Near Loma Prieta, Dudley, Nov. 1, 1903; Near Felton, Dudley, Oct. 3, 1896; Aptos, Abrams 30751.

3. Solidago spathulata DC. Prod. 5: 339. 1836.

Local distribution: Coastal sand hills and coastal bluffs, known locally from San Francisco and Pescadero. August through October.

General distribution: Along the coast from Coos County, Oregon, south to San Luis Obispo County.

Specimens examined: Ocean View, San Francisco, Congdon, Sept. 20, 1877; Near San Francisco, Pringle, Oct. 9, 1882; Pebble Beach, Abrams 4251.

4. Solidago californica Nutt. Trans. Amer. Phil. Soc. II. 7: 328. 1841.

Local distribution: Dry, open or shrubby slopes, becoming a weed along roadsides. July through November.

General distribution: Southern Oregon south through the California

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Coast Ranges and the western slopes of the Sierra Nevada to northern Baja California.

Specimens examined: Sawyer Ridge, Oberlander 357; Mills Lake, Randall 96; Near Woodside, Bacigalupi 2730; Searsville, Dudley, July 1893; Coal Mine Ridge, Ferris 2051; Stevens Creek, Randall, Sept. 1907; Between Saratoga Summit and Big Basin, Thomas 3592; Big Basin, Dudley, Sept. 23, 1905; Glenwood, Davis, Sept. 1907; Santa Cruz, Hichborn 316; Alba Grade, Thomas 2455; Aptos, Rattan, 1883.

27. Bellis L. Sp. Pl. 886. 1753.

1. Bellis perennis L. Sp. Pl. 886. 1753.

Local distribution: A common weed of lawns and occasionally along roads or in disturbed habitats, rarely collected. Plants flowering throughout the year.

General distribution: Native of Europe, widely introduced in temperate regions.

Specimens examined: Kings Mt., Yarris, May 20, 1951; Stanford, Preissig 105; Between Scott Valley and Santa Cruz, Thomas 3611.

28. Chaetopappa DC. Prod. 5: 301. 1836.

Until recently the following three species have been included in the genus Pentachaeta (Keck, 1958, pp. 102-103).

Ray flowers present, conspicuous, white to pinkish; pappus bristles usually 5 or wanting.....1. C. bellidiflora.
Ray flowers absent or the corollas reduced to a filiform tube; pappus bristles 3-5 or wanting.
  Disk corollas dilated at the throat.....2. C. exilis.
  Disk corollas linear.....3. C. elsinoides.

1. Chaetopappa bellidiflora (Greene) Keck, Aliso 4: 102. 1958.

Local distribution: Known from only a few localities in the Santa Cruz Mountains, usually growing in bare areas in grasslands. April and May.

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General distribution: Marin County south to Monterey County.

Specimens examined: Above San Andreas Lake, Rose 46026 (CAS); Between Scott and Waddell Creeks, Ferris 1985; Between Scott and Mill Creek drainages, Thomas 4031, 5034; Near San Lorenzo River, 2 miles north of Boulder Creek, Dudley, May 7, 1893; Santa Cruz, Reed, Apr. 3, 1922 (CAS).

The pappus of C. bellidiflora usually consists of 5 scabrous bristles, but it is often lacking. Within one population, there may be some plants with pappus and some without.

2. Chaetopappa exilis (Gray) Keck, Aliso 4: 103. 1958.

Local distribution: Forming dense, but local stands on bare areas in grasslands, San Mateo and Santa Clara counties. April.

General distribution: Coast Ranges from Mendocino County south to Monterey County and in the Sierra Nevada foothills from Placer County south to Mariposa County.

Specimens examined: Lake San Andreas, Abrams 2326; Crystal Springs Lake, Baker 446; Black Mt., Dudley, April 20, 1901; Abrams 1533.

3. Chaetopappa alsinoides (Greene) Keck, Aliso 4: 103. 1958.

Local distribution: Occasional in grasslands on the eastern slopes of the Santa Cruz Mountains. April and May.

General distribution: Humboldt County, from Marin and Napa counties south to Santa Barbara County, and in El Dorado and Tulare counties.

Specimens examined: Potrero Hills, San Francisco, Cannon, May 2, 1896 (CAS); Black Mt., Dudley, Apr. 20, 1901; Grants Fork, Permanente Creek, Dudley, Apr. 23, 1899; Foothills west of Los Gatos, Heller 7356; 4 miles south of San Jose, Rattan, 1887; Near San Jose, Lemmon, no date; Jasper Ridge, Thomas 7155.

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29. Corethrogyne DC. Prod. 5: 215. 1836.

Heads usually solitary; at least the outer involucral bracts somewhat to densely white-tomentose abaxially.
  Heads 2-3.5 cm. across; plants decumbent, the stems rarely over 1.5 dm. tall.....1. C. californica.
  Heads under 2 cm. across; plants decumbent to erect, the stems usually over 2 dm. tall.....2. C. leucophylla.
Heads several to many per stem; involucral bracts usually glandular, occasionally somewhat white-tomentose.
  Involucral bracts usually not conspicuously glandular, the outer somewhat white-tomentose abaxially. Rare.
    3a. C. filaginifolia var. filaginifolia.
  Involucral bracts usually conspicuously glandular, the outer not white-tomentose abaxially. Common.
    3b. C. filaginifolia var. rigida.

1. Corethrogyne californica DC. Prod. 5: 215. 1836.

Local distribution: San Francisco southward, mainly west of the crest of the Santa Cruz Mountains, usually in bare soil on open hills. April through June.

General distribution: San Francisco south to the Monterey Peninsula.

Specimens examined: Hunters Pt., San Francisco, Mason 4365; Near Crystal Springs, Dudley, Apr. 6, 1896; Crystal Springs, Abrams 2459; Half Moon Bay Rd., Heller 8576; Swanton, Rich, Spring 1912.

2. Corethrogyne leucophylla (Lindl. in DC.) Jepson, Fl. W. Mid. Calif. 564. 1901.

Local distribution: Occasional along the coast from Ano Nuevo Point southward. April through December.

General distribution: Ano Nuevo Point, San Mateo County, south to the Monterey Peninsula and Point Sur, Monterey County.

Specimen examined: Between Scott Creek and Waddell Creek, Ferris 1986.

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3a. Corethrogyne filaginifolia (Hook. & Arn.) Nutt. var. filaginifolia, Trans. Amer. Phil. Soc. II. 7: 290. 1841.

Local distribution: Known locally only from southern Santa Cruz County, but to be expected elsewhere on open slopes near the coast. May through September.

General distribution: Santa Clara and Santa Cruz counties south to Santa Barbara County.

Specimen examined: Near Soda Lake, Thomas 3307.

3b. Corethrogyne filaginifolia (Hook. & Arn.) Nutt. var. rigida Gray, Syn. Fl. N. Amer. 1: 170. 1884.

Local distribution: Santa Cruz and southern Santa Clara counties, growing on inland marine sand deposits, on coastal bluffs and sand dunes, and occasionally on grassy slopes. May through October.

General distribution: Alameda County south to central Monterey County.

Specimens examined: Near Llagas Post Office, Dudley, June 7, 1909; Near Glenwood, Class Collection, Summer 1940; Quail Hollow Road, Thomas 6015; Ben Lomond sand hills, Eastwood & Howell 7448 (CAS); Mt. Hermon, Cox, Aug. 8, 1908; Santa Cruz, Thomas 1980; Rose 35219; Jones 2320; Capitola, Abrams 3076; Dudley, Oct. 13, 1902; 4.5 miles south of Aptos, Howell 11611 (CAS).

30. Aster L. Sp. Pl. 872. 1753.

Rays relatively inconspicuous; heads less than 1 cm. in diameter; plants annual.....1. A. exilis.
Rays conspicuous; heads usually about 1.5 cm. in diameter; plants perennial.
  Leaves linear to narrowly oblanceolate; involucral bracts glabrous abaxially.....2. A. chilensis.
  Leaves obovate; involucral bracts pubescent abaxially.
3. A. radulinus.

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1. Aster exilis Ell. Sketch 2: 344. 1824.

Local distribution: Salt marshes around the southern end of San Francisco Bay, occasionally elsewhere in marshy areas. October and November.

General distribution: Northern California south to Baja California, east to Texas and Florida, thence northward to South Carolina and southward to central America.

Specimens examined: Palo Alto, Halsey, Nov. 23, 1908; Alviso, Abrams, Oct. 20, 1906; Chittenden, Dudley, Oct. 10, 1908.

2. Aster chilensis Nees, Aster 123. 1832.

Local distribution: A common species, growing along the edges of salt marshes, along streams, and on wooded and brush-covered slopes, San Francisco southward. July through December, rarely flowering as early as May.

General distribution: A wide ranging species, Washington south to southern California, east to Saskatchewan and New Mexico.

Specimens examined: San Francisco, Dudley, Nov. 8, 1896; Near Crystal Springs Lake, Randall 54; Pillar Pt., Dudley, Oct. 10, 1897; Between Pebble Beach & Whitehouse Creek, Dudley, Dec. 2, 1899; Menlo Park, Dudley, Sept. 21, 1895; Portola, Abrams 1042; Black Mt., Dudley, Sept. 24, 1905; Agnew, Abrams 2234; Near Santa Clara, Dudley, Oct. 21, 1893; Los Gatos Canyon, Abrams 4325; Foothills west of Los Gatos, Heller 7538; Loma Prieta Rd., Dudley, Nov. 1, 1903; Swanton, Rich, Spring 1912; Big Basin, Dudley, Sept. 1901; Near Felton, Dudley, Oct. 3, 1896; Aptos Creek, Abrams 3064; Near Watsonville, Dudley, Oct. 11, 1908.

3. Aster radulinus Gray, Proc. Amer. Acad. 8: 388. 1872.

Local distribution: Northern San Mateo County southward, wooded or brush-covered slopes, nowhere very common. July through December.

General distribution: Washington south to San Luis Obispo County

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in the Coast Ranges and to Tuolumne County in the Sierra Nevada.

Specimens examined: Sawyer Ridge, Oberlander 364; La Honda Road, Dudley, Dec. 13, 1894; Portola, Abrams 3004; Coal Mine Ridge, Barry 203; Searsville Ridge, Abrams 6350 (CAS); Black Mt., Leitholt, Aug. 13, 1894; Foothills west of Los Gatos, Heller 7540; Near Loma Prieta, Knoche, Aug. 1896; Glenwood, Davis, Sept. 1907; Mt. Hermon, Howell 11618 (CAS); Big Basin, Dudley, Sept. 23, 1901; Blooms Grade, Thomas 3564.

31. Conyza L. Sp. Pl. 861. 1753.

Leaves coarsely toothed, narrowly obovate.....1. C. coulteri.
Leaves usually entire, linear to linear-lanceolate.
  Involucral bracts essentially glabrous.....2. C. canadensis.
  Involucral bracts hirsutulous.....3. C. bonariensis.

1. Conyza coulteri Gray, Proc. Amer. Acad. 7: 355. 1868.

Local distribution: Known locally only from near Loma Prieta, Felton, and Santa Cruz, but to be expected elsewhere in rocky soil in chaparral. October through November.

General distribution: Santa Clara and Amador counties south to southern Baja California, east to Colorado and Texas, thence south through much of Mexico.

Specimens examined: Loma Prieta Road, Dudley, Nov. 1, 1903; Near Felton, Dudley, Oct. 1896; Santa Cruz, Reed, Sept. 1919 (CAS).

2. Conyza canadensis (L.) Cronq. Bull. Torr. Bot. Club 70: 632. 1943.
(C. canadensis (L.) Cronq. var. glabrata (Gray) Cronq. Bull. Torr. Bot. Club 74: 150. 1947; C. bilbaoana Remy in Gay, Fl. Chil. 4: 76. 1849.)

Local distribution: A widespread and common weed. July through October, occasionally to be found in flower during the other months of the year.

General distribution: Native of North and South America,

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introduced into the Old World.

Specimens examined: San Francisco, Howell 31897; Sawyer Ridge, Oberlander 360; Stanford, Dudley, August 28, 1897; Alviso, Randall, Oct. 9, 1907; Alba Grade, Thomas 2453; Near Big Basin, Thomas 6840; Hilton Airport, Thomas 3575; About 4 miles north of Santa Cruz, Thomas 4565; Near mouth of Pajaro River, Thomas 2400.

3. Conyza bonariensis (L.) Cronq. Bull. Torr. Bot. Club 70: 632. 1943.

(Erigeron crispus Pourret, Mem. Acad. Toul. 3: 318. 1788.)

Local distribution: A weed of disturbed areas, especially along streets and about habitations. September.

General distribution: Native of South America, widely introduced into North America.

Specimens examined: Stanford, Thomas 7204; Santa Cruz, Abrams 7241.

32. Erigeron L. Sp. Pl. 863. 1753.

Plants fleshy. Coastal.....1. E. glaucus.
Plants not fleshy. Inland.
  Leaves cordate-clasping, oblanceolate, the lower usually toothed or lobed; ray flowers over 150...2. E. philadelphicus.
  Leaves not cordate-clasping, variously shaped; ray flowers present or lacking, if present under 65.
    Ray flowers present.
      At least the lower leaves with a few sharp-pointed teeth; plants spreading by slender rhizomes.
        3. E. karwinskianus.
      Leaves entire; plants with a short taproot.
        4. E. foliosus var. hartwegii.
    Ray flowers lacking.
      Leaves and stems villous.....5. E. petrophilus.
      Leaves and stems essentially glabrous.
        6. E. inornatus var. angustatus.

1. Erigeron glaucus Ker-Gawl. Bot. Reg. 1: pl. 10. 1815.

Local distribution: Coastal bluffs, occasionally inland on wind swept summits of hills. March through August.

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General distribution: Clatsop County, Oregon, south along the coast to San Luis Obispo County and on the northern Channel Islands.

Specimens examined: Lands End, Thomas 4256; Cliff House, Congdon, May 1880; Near Lake Merced, Heller 8455; Montara Pt., Dudley, May 17, 1900; Farralone City, Stinchfield 481; Near Pescadero, Grant 935; Swanton, Rich, June 12, 1912; Near Davenport, Thomas 3522; Santa Cruz, Thompson, July 1, 1903.

2. Erigeron philadelphicus L. Sp. Pl. 863. 1753.

Local distribution: Occasional in wet ground, from the vicinity of Stanford southward. April through June.

General distribution: Southern Canada south to southern California, Texas, and Florida.

Specimens examined: Stanford, Dudley, Apr. 30, 1906; Almaden Ridge, Howell 1883 (CAS); Between Madrone Station and Llagas Creek, Dudley, June 10, 1909; Near Gilroy, Sheldon, Apr. 3, 1915; Santa Cruz, Reed, Apr. 20, 1919 (CAS).

3. Erigeron karwinskianus DC. Prod. 5: 285. 1836.

Local distribution: Occasional as an escape from cultivation. April and May.

General distribution: Native of Mexico and central America, widely grown as an ornamental, occasionally escaped and becoming established in California.

Specimen examined: Near Jamison Creek Road, Thomas 1807.

4. Erigeron foliosus Nutt. var. hartwegii (Greene) Jepson, Man. Fl. Pl. Calif. 1056. 1925.

Local distribution: Occasional in the Santa Cruz Mountains in grasslands. June and July.

General distribution: Linn County, Oregon, south to the Santa Cruz

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Mountains in the Coast Ranges and to Madera County in the Sierra Nevada.

Specimens examined: Cahill Ridge, Oberlander 303; Searsville, Dudley, June 14, 1895; Black Mt., Elmer 4589; Ben Lomond Mt., Thomas 3473.

5. Erigeron petrophilus Greene, Pittonia 1: 218. 1888.

Local distribution: Rocky outcroppings, known only from Mount Umunhum and Eagle Rock, but to be expected elsewhere in similar dry habitats. June through August.

General distribution: Coast Ranges, southwestern Oregon south to Monterey County.

Specimens examined: Mt. Umunhum, Ferris 3612; Eagle Rock, Thomas 3485.

6. Erigeron inornatus Gray var. angustatus Gray, Syn. Fl. N. Amer. 1: 215. 1884.

Local distribution: Known only from a serpentine outcropping at Crystal Springs Lake. July through November.

General distribution: Coast Ranges from Trinity County south to San Mateo County.

Specimen examined: Crystal Springs Lake, Howell, Nov. 9, 1930 (CAS).

33. Lessingia Cham. Linnaea 4: 203. 1829.

Leaves with numerous conspicuous, spheroidal, short-stipitate glands. 1b. L. germanorum var. tenuipes.

Leaves rarely with such glands.

At least the outer involucral bracts tomentose or arachnoid-tomentose abaxially; heads 8-40-flowered; involucres narrowly campanulate to turbinate.

Heads 25-40-flowered; at least the outer involucral bracts somewhat tomentose abaxially, glabrate in age, glands present; corollas lemon yellow. Sand dunes, San Francisco and adjacent San Mateo County....1a. L. germanorum var. germanorum.

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Heads 8-18-flowered; involucral bracts arachnoid-tomentose abaxially, lacking glands; corollas pink to purplish. Central San Mateo Co. southward.
Herbage persistently white-tomentose, glabrate in age; involucres 9-12 mm. long.....2a. L. hololeuca var. hololeuca.
Herbage glabrate; involucres 6-9 mm. long.
2b. L. hololeuca var. arachnoidea.
Involucral bracts not tomentose; heads 3-5-flowered; involucres narrowly cylindro-turbinate....3. L. ramulosa var. glabrata.

1a. Lessingia germanorum Cham. var. germanorum, Linnaea 4: 203. 1829.

Local distribution: Sand dunes in San Francisco and northern San Mateo County, often growing with Croton californicus and Baccharis pilularis. May through November.

General distribution: Endemic.

Specimens examined: Presidio, San Francisco, Rose 41435; Howell 8126; San Francisco, Abrams 2195; Parry, 1881; Bloomer, June 1868.

1b. Lessingia germanorum Cham. var. tenuipes Howell, Univ. Calif. Pub. Bot. 16: 20. 1929.

Local distribution: Growing on dry slopes in the foothills on the eastern side of the Santa Cruz Mountains in southern San Mateo and Santa Clara counties. July through November.

General distribution: Coast Ranges from southern San Mateo County south to Santa Barbara County.

Specimens examined: Near Searsville, Leitholt, July 1893; Jasper Ridge, Mallory, July 15, 1919; Abrams, Aug. 14, 1910; Saratoga, Dudley, Sept. 15, 1901.

Occasional specimens, as for example Randall 89 from Stevens Creek Road, approach L. germanorum var. parvula (Greene) Howell (Univ. Calif. Pub. Bot. 16: 18. 1929).

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2a. Lessingia hololeuca Greene var. hololeuca, Fl. Franciscana 377. 1897.

Local distribution: San Mateo and Santa Clara counties, usually in open grasslands. July through November.

General distribution: Sonoma and Yolo counties south to the vicinity of Los Gatos in Santa Clara County.

Specimens examined: Near Crystal Springs, Abrams 2987; Randall 63; Dudley, Sept. 21, 1902; Near Woodside, Randall, July 15, 1907; Portola, Abrams, Oct. 12, 1907; Los Trancos Road, Dudley, Nov. 15, 1897; Stevens Creek, Atkinson, July 1901; Foothills west of Los Gatos, Heller 7537.

2b. Lessingia hololeuca Greene var. arachnoidea (Greene) Howell, Univ. Calif. Pub. Bot. 16: 42. 1929.

Local distribution: Crystal Springs Lakes area, San Mateo County, usually on open grassy slopes. August through November.

General distribution: Endemic.

Specimens examined: Near Crystal Springs Lake, Rose 54111; Howell 2220A (CAS); Abrams 2996; Dudley, Nov. 15, 1896; San Mateo Canyon, Rose 41434.

3. Lessingia ramulosa Gray var. glabrata Keck, Aliso 4: 105. 1958.

Local distribution: Eastern slopes of the Santa Cruz Mountains in Santa Clara County, growing in open dry areas in oak woods. July through September.

General distribution: Endemic.

Specimens examined: Hills west of Los Gatos, Heller 13529 (isotype); New Almaden, Rose 41438 (CAS); West of Madrone, Belshaw 2270 (CAS).

34. Chrysothamnus Nutt. Trans. Amer. Phil. Soc. II. 7: 323. 1841.

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1. Chrysothamnus nauseosus (Pall.) Britt. ssp. occidentalis (Greene) Hall & Clements, Carnegie Inst. Wash. Pub. 326: 213. 1923.

Local distribution: Known locally only from the serpentine slopes of Mount Umunhum. October and November.

General distribution: Coast Ranges and Sierra Nevada from Humboldt and Siskiyou counties south to Riverside County.

Specimen examined: Mt. Umunhum, Ferris 2086.

35. Adenocaulon Hook. Bot. Misc. 1: 19. 1830.

1. Adenocaulon bicolor Hook. Bot. Misc. 1: 19. 1830.

Local distribution: Moist places in forests, commonly growing near Pseudotsuga menziesii, Sequoia sempervirens, Lithocarpus densiflorus, and Umbellularia californica, northern San Mateo County south to southern Santa Cruz County. May through September.

General distribution: British Columbia south to Santa Cruz County in the Coast Ranges and to Tulare County in the Sierra Nevada, east to Idaho and western Montana, in the Black Hills of South Dakota, and in the upper Great Lakes region.

Specimens examined: Cahill Ridge, Oberlander 275; Pescadero Creek, Elmer 4300; Butano Creek, Mason, July 1921; Kings Mt., Randall 41; Searsville, Rattan, May 1867; Black Mt., Dudley, June 3, 1895; Stevens Creek, Randall 42; Loma Prieta, Dudley, July 22, 1893; Glenwood, Davis, Sept. 1907; Between Boulder Creek and Big Basin, Thomas 6823.

36. Anaphalis DC. Prod. 6: 271. 1837.

1. Anaphalis margaritacea (L.) Gray, Proc. Amer. Acad. 8: 653. 1873.

Local distribution: Coastal bluffs, stabilized sand dunes, and

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wind swept summits, San Francisco southward. May through September.

General distribution: Widely distributed in North America and eastern Asia, introduced into Europe.

Specimens examined: Presidio, Heller 5709; Lake Merced, Abrams 1614; Crystal Springs Lake, Randall 47; Pescadero Creek, Randall 46; Between Pescadero and La Honda, Dudley, July 28, 1894; Swanton, Rich, Spring 1912; Whitehouse Creek, Thomas 3517; Boulder Creek, Smith, June 10, 1907.

37. Gnaphalium L. Sp. Pl. 850. 1753.

Heads leafy-bracted, the leaves exceeding the mature heads.
  Heads about 3 mm. high, glomerate at the tips of the stem and branches; plants annual, usually diffusely branched, usually under 3 dm. tall; pappus bristles falling separately. Plants of moist or wet areas.....1. G. palustre.
  Heads 4-5 mm. high, arranged in a spike-like inflorescence; plants annual or biennial, usually with a few stems, not diffusely branched, 1.5-4 dm. tall; pappus deciduous as a unit. Plants of dry areas.....2. G. purpureum.
Heads not leafy-bracted.
  Leaves remaining white-wooly on both surfaces.
    Plants annual or rarely biennial; heads subglobose.
      Heads 3-3.5 mm. high, tips of the involucral bracts hyaline. 3. G. luteo-album.
      Heads 4-6 mm. high; tips of the involucral bracts scarious. 4. G. chilense.
    Plants perennial; heads longer than broad.....5. G. beneolens.
  Leaves green or becoming so adaxially, glandular.
    Involucral bracts pink; heads longer than broad. 6. G. ramosissimum.
    Involucral bracts white; heads subglobose.
      Leaves about equally green on both surfaces, not decurrent. Common.....7. G. californicum.
      Leaves green adaxially, white-wooly abaxially, decurrent. Rare. 3. G. bicolor.

1. Gnaphalium palustre Nutt. Trans. Amer. Phil. Soc. II. 7: 403. 1841.

Local distribution: San Francisco southward, along the edges of ponds and lakes, along streams, and in areas in which water has stood during the early part of the year. May through October.

General distribution: Widely distributed in western North America

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from British Columbia south to Baja California, east to Alberta, Montana, Colorado, and New Mexico.

Specimens examined: San Francisco, Brandegee, no date; San Andreas Lake, Oberlander 322; Crystal Springs, Ferris 726; Centerville Lake, Abrams 1066; Ben Lomond Mt., Hesse 1943 (JEPS); Between Felton and Santa Cruz, Hesse 777 (JEPS); Santa Cruz, Jones 2286; Near Pajaro River, Thomas 3329; Near Pajaro, Dudley, Sept. 27, 1903.

2. Gnaphalium purpureum L. Sp. Pl. 854. 1753.

Local distribution: A common plant of disturbed areas, often in sandy soil, San Francisco southward. April through June.

General distribution: British Columbia south to Baja California, in the central and eastern portions of the United States, southward to South America, and in Australia and New Zealand as an introduced weed.

Specimens examined: San Francisco, Harford & Kellogg, June 20, 1878; Mt. Davidson, San Francisco, Raven 9013 (JEPS); San Andreas Lake, Oberlander 156; Salada Valley, Dudley, Mar. 18, 1900; Coal Mine Ridge, Barry 141; Stanford, Dudley, Apr. 29, 1902; Swanton, Rich, Spring 1912; 1.5 miles south of Felton, Thomas 1894; San Lorenzo River, Dudley, May 7, 1893; Sweets Gulch, Thompson, Apr. 12, 1903; Near Robroy, Thomas 3064.

3. Gnaphalium luteo-album L. Sp. Pl. 851. 1753.

Local distribution: A weed of gardens, roadsides, and other disturbed areas, especially common in gravelly, sandy, or hard-packed soils. To be found in flower at all times of the year.

General distribution: Native of Europe, introduced into the Pacific States.

Specimens examined: Lobos Creek, San Francisco, Raven 6451 (JEPS); Golden Gate Park, Howell 18243; San Andreas Lake, Howell 12578; Burlingame, Rose 36005; Ano Nuevo Pt., Abrams & Wiggins 431; Stanford, Vestal, July 30, 1930; Hilton Airport, Thomas 3378; Near Boulder Creek, Hesse 301.

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4. Gnaphalium chilense Spreng. Syst. Veg. 3: 480. 1826.

Local distribution: Most common near the coast on wooded slopes and on coastal bluffs and sand dunes, less frequent inland, San Francisco southward. Plants in flower at all seasons.

General distribution: Washington south to Baja California, east to Montana, Colorado, and western Texas.

Specimens examined: Embarcadero, San Francisco, Raven 6630 (JEPS); Cliff House, Congdon, May 11, 1895; Lands End, Bacigalupi, Sept. 16, 1921; Lake Merced, Heller 5703; Sawyer Ridge, Oberlander 327; Arroyo de los Frijoles, Dudley, Feb. 9, 1895; Ano Nuevo Pt., Abrams & Wiggins 428; Stanford, Dudley, July 1893; Swanton, Rich, May 22, 1912; Santa Cruz, Dudley, Jan. 5, 1898; Del Mar, Thompson, May 30, 1902; Boulder Creek, Hesse 320; Watsonville Slough, Thomas 2399, 1581.

5. Gnaphalium beneolens Davidson, Bull. S. Calif. Acad. 17: 17. 1918.

Local distribution: Chaparral, dry brush-covered slopes, and among Baccharis pilularis, northern San Mateo County southward, most common on the eastern slopes of the Santa Cruz Mountains. July through September.

General distribution: Southwestern Oregon south through the Coast Ranges and Sierra Nevada foothills to northern Baja California.

Specimens examined: Sweeney Ridge, Oberlander 336; Spanishtown, Geis, Sept. 26, 1901; Black Mt., Randall 76; Coal Mine Ridge, Ferris 2052; Stanford, Atkinson, Feb. 1900; Wrights, Dudley, Sept. 29, 1894; Loma Prieta, Elmer 4985; Boulder Creek, Smith, July 10, 1907.

6. Gnaphalium ramosissimum Nutt. Journ. Acad. Phila. 1: 173. 1848.

Local distribution: Wooded slopes and in chaparral, San Francisco southward. June through October.

General distribution: Coast Ranges from Humboldt County south to Orange County.

Specimens examined: Golden Gate Park, Rattan, Oct. 1880; Lake Merced, Rose 41360; Sweeney Ridge, Oberlander 1082; Near Pescadero, Cox,

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Aug. 7, 1946; El Corte Madera, Dudley, Sept. 15, 1895; San Francisquito Creek, Abrams, Oct. 9, 1897; 1 mile north of Felton, Thomas 1162.

7. Gnaphalium californicum DC. Prod. 6: 224. 1837.

Local distribution: Fairly common in poor soils, in chaparral and on dry ridges, San Francisco southward. May through August.

General distribution: Lincoln County, Oregon, south through the Coast Ranges to northern Baja California, in the Sierra Nevada from Tuolumne County southward, and on some of the Channel Islands.

Specimens examined: Presidio, Heller 5708; Crystal Springs, Elmer 429; Searsville, Dudley, June 14, 1895; Stanford, Abrams 2377; Black Mt. Road, Randall 75; Stevens Creek Reservoir, Thomas 5708; Foothills west of Los Gatos, Heller 7511; Swanton, Rich, Spring 1912; Bielawski Lookout, Thomas 3446; Santa Cruz, Thompson, May 15, 1902.

8. Gnaphalium bicolor Bioletti, Erythea 1: 16. 1893.

Local distribution: Known locally only from the stabilized coastal sand dunes in southern Santa Cruz County. April through October.

General distribution: Southern Santa Cruz County south to central Baja California, in the Sierra Nevada foothills from Madera County to Tulare County, and on most of the Channel Islands.

Specimen examined: Sunset Beach State Park, Thomas 3088.

38. Psilocarphus Nutt. Trans. Amer. Phil. Soc. II. 7: 340. 1841.

Receptacular bracts about 2 mm. long. Common.
1. P. tenellus.
Receptacular bracts about 3 mm. long. Rare.
Pistillate flowers usually less than 80 per head; leaves broadest near the base.....2a. P. brevissimus var. brevissimus.
Pistillate flowers usually over 100 per head; leaves broadest toward the middle.....2b. P. brevissimus var. multiflorus.

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1. Psilocarphus tenellus Nutt. Trans. Amer. Phil. Soc. II. 7: 341. 1841.

Local distribution: A common plant of dry bare ground, open grassland, and often becoming a weed in gardens and disturbed areas, often growing with Soliva sessilis, Alchemilla occidentalis, Trifolium sp., Poa annua, Evax sparsiflora, and Micropus californicus. Latter part of March through May.

General distribution: Vancouver Island south to northern Baja California, generally west of the Cascades and Sierra Nevada, but also in northern Idaho.

Specimens examined: San Francisco, Rattan, no date; Montara, Rose 33140; Sawyer Ridge, Oberlander 909; Woodside serpentine, Dutton, Mar. 25, 1900; Coal Mine Ridge, Barry 70; Permanente Creek, Abrams 6335; Morgan Hill, Ferris 8330; Near Saratoga Summit, Thomas 2880; Near Big Basin, Thomas 3145; San Lorenzo River, Hesse 1257 (JEPS); Santa Cruz Big Trees, Thomas 1892; Soquel, Thompson, May 8, 1902.

2a. Psilocarphus brevissimus Nutt. var. brevissimus, Trans. Amer. Phil. Soc. II. 7: 340. 1841.

Local distribution: Known locally only from southwestern Santa Clara County. April through June.

General distribution: Washington south to northern Baja California and east to Montana and Utah; also in Chile and Argentina.

Cronquist (1950, p. 79) indicated that this variety occurred in Santa Clara County but did not cite specimens.

2b. Psilocarphus brevissimus Nutt. var. multiflorus Cronq. Res. Stud. State Coll. Wash. 18: 80. 1950.

Local distribution: Known locally only from vernal pools between

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Morgan Hill and Gilroy. April through June.

General distribution: Solano County south to southern Santa Clara County.

Specimens examined: 1 mile south of Morgan Hill, Howell 5193 (CAS); Between Gilroy and Morgan Hill, Abrams 5665.

39. Filago L. Sp. Pl. 927. 1753.

Upper leaves conspicuously exceeding the heads, linear-lanceolate. 1. F. gallica.
Upper leaves about equalling the heads, oblong.....2. F. californica.

1. Filago gallica (L.) L. Sp. Pl. 1312. 1763.

Local distribution: A widespread but poorly collected weed of grasslands, gardens, and disturbed areas. April and May.

General distribution: Native of Europe, introduced into northern and central California.

Specimens examined: San Francisco, Raven 9264 (JEPS); San Bruno Mt., Thomas 4234; San Andreas Lake, Oberlander 705; Saratoga, Smith 42010; Morgan Hill, Ferris 8329; Near Soquel, Thompson, May 8, 1902.

2. Filago californica Nutt. Trans. Amer. Phil. Soc. II. 7: 405. 1841.

Local distribution: Occasional in grasslands, probably often overlooked in collecting. April through May.

General distribution: Mendocino and Butte counties south to northern Baja California, east to Utah and New Mexico, also in Sonora and on Guadalupe Island.

Specimen examined: Cahill Ridge, Oberlander 767.

40. Evax Gaertn. Fruct. 2: 393. 1791.

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1. Evax sparsiflora (Gray) Jepson, Fl. Mid. W. Calif. 549. 1901.

Local distribution: Grassy areas and rocky soils, mainly on the eastern slopes of the Santa Cruz Mountains. April and May.

General distribution: Coast Ranges from Humboldt County south to San Luis Obispo County and in the Sierra Nevada from Amador County south to Mariposa County.

Specimens examined: Sweeney Ridge, Oberlander 322; Woodside, Abrams 2417; Coal Mine Ridge, Barry 126; Jasper Ridge, Borthwick, Apr. 12, 1920; Stanford, Abrams 1642; 4 miles south of San Jose, Rattan, May 1, 1887; Uvas and Llagas Roads, Ferris 3717; Boulder Creek, Hesse 1273 (JEPS); Jamison Creek, Thomas 2964.

41. Micropus L. Sp. Pl. 927. 1753.

1. Micropus californicus Fisch. & Mey. Ind. Sem. Hort. Petrop. 1835: 42. 1835.

Local distribution: Grassy slopes, rocky areas, and edges of chaparral, common throughout the Santa Cruz Mountains. April through June.

General distribution: Southwestern Oregon south through cismontane California to northern Baja California.

Specimens examined: Cahill Ridge, Oberlander 286; Southwest of San Mateo, Dudley, May 13, 1900; Kings Mt., Dudley, June 11, 1906; Coal Mine Ridge, Barry 9; Stanford, Abrams 2384; Loma Azule, Dudley, May 8, 1898; Foothills west of Los Gatos, Heller 7388; Near New Almaden, Mason 6936; San Jose, Rattan, May 1, 1887; Saratoga Summit, Thomas 2979; Near Glenwood, Thomas 3204; 1.2 miles southwest of Eagle Rock, Thomas 4075; Hesse 1531 (JEPS).

42. Stylocline Nutt. Trans. Amer. Phil. Soc. II. 7: 338. 1841.

Involucral bracts lacking; receptacular bracts subtending the central staminate flowers conspicuous, hooked, stellate-spreading in age; staminate flowers lacking pappus.....1. S. filaginea.

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Involucral bracts present; receptacular bracts subtending the staminate flowers not conspicuous, not hooked, not stellate-spreading in age; staminate flowers with a few pappus bristles.
Receptacular bracts, enclosing the pistillate flowers, with a wide hyaline margin, the margin wider than the rest of the bract. 2. S. gnaphalioides.
Receptacular bracts, enclosing the pistillate flowers, with a narrow hyaline margin, the margin narrower than the rest of the bract. 3. S. amphibola.

1. Stylocline filaginea Gray, Proc. Amer. Acad. 7: 356. 1868.

Local distribution: Known locally from one specimen collected on serpentine between Crystal Springs and Woodside. April and May.

General distribution: Western Oregon, adjacent Idaho, northeastern Nevada, and from southwestern Oregon south to southern California.

Specimen examined: Woodside to Crystal Springs, Abrams, Apr. 10, 1904.

2. Stylocline gnaphalioides Nutt. Trans. Amer. Phil. Soc. II. 7: 338. 1841.

Local distribution: Known locally only from near Stanford and from central Santa Cruz County, usually growing in sandy or rocky soils on hill tops, ridges, or in chaparral. April through May.

General distribution: Marin and Lake counties south to northern Baja California, east to Arizona.

Specimens examined: Stanford, Atkinson, Mar. 1900; Ben Lomond, sand hills, Hesse 1516 (JEPS); Between Ben Lomond and Zayante, Ferris 11137; Near Felton, Dudley, Apr. 17, 1904.

3. Stylocline amphibola (Gray) Howell, Leafl. West. Bot. 5: 91. 1948.

Local distribution: Known locally only from Page Mill Road near Stanford and from Santa Cruz County, but to be expected elsewhere on hillsides with occasional oaks and rock outcroppings. April and May.

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General distribution: Coast Ranges from Lake County south to Santa Cruz County.

Specimens examined: Page Mill Road, Ferris 764; Mission Springs area, Hesse 1569 (JEPS).

43. Wyethia Nutt. Journ. Acad. Phila. 7: 39. 1834.

Outer involucral bracts ovate to ovate-lanceolate, over 4 cm. long; leaves tending to be ovate or elliptic.
Herbage shiny, not tomentose, glandular; mature disk achenes 10-12 mm. long.....1. W. glabra.
Herbage not shiny, tomentose, glabrate in age, not glandular; mature achenes 12-15 mm. long.....2. W. helenioides.
Outer involucral bracts lanceolate, under 2.5 cm. long; leaves tending to be lanceolate.....3. W. angustifolia.

1. Wyethia glabra Gray, Proc. Amer. Acad. 6: 543. 1865.

Local distribution: Grassy slopes, usually in at least partial shade of evergreen trees or Pinus attenuata and P. sabiniana, from southern San Mateo County southward. Latter part of March through June.

General distribution: Coast Ranges from Mendocino County south to San Luis Obispo County.

Specimens examined: Stanford, Abrams 2357; Foothills west of Los Gatos, Heller 7404; Vicinity of Mt. Umunhum, Thomas 3972; Empire Grade, Thomas 3385.

2. Wyethia helenioides (DC.) Nutt. Trans. Amer. Phil. Soc. II. 7: 353. 1841.

Local distribution: Open grassy slopes from northern San Mateo County southward. Latter part of February through May.

General distribution: Coast Ranges from Mendocino and Colusa counties south to San Luis Obispo County and in the foothills of the Sierra Nevada from El Dorado County south to Mariposa County.

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Specimens examined: Near La Honda, Dudley, Mar. 24, 1894; Coal Mine Ridge, Barry 143; Stanford, Dudley, May 29, 1895; Near Campbell, Heller 8509; El Toro, Roush & Kimber, Apr. 23, 1913; Near Glenwood, Thomas 3200; Zayante Valley, Dudley, Apr. 19, 1904; San Lorenzo Valley, Dudley, May 7, 1893.

3. Wyethia angustifolia (DC.) Nutt. Trans. Amer. Phil. Soc. II. 7: 352. 1841.

Local distribution: Open grasslands from San Francisco south to the vicinity of Pescadero on the western side of the Santa Cruz Mountains and to the southern part of Santa Clara County on the eastern side of the Mountains. April and May.

General distribution: Columbia River south to San Luis Obispo and Tulare counties, mainly west of the Cascade Mountains in Oregon and through the California Coast Ranges and the Sierra Nevada foothills.

Specimens examined: Twin Peaks, Rose 33114; Near Montara Mt., Dudley, Mar. 18, 1900; Pebble Beach, Dudley, Apr. 18, 1896; Near San Andreas Lake, Oberlander 180; Searsville Ridge, Davis, Apr. 1, 1903; Stanford, Randall 103.

Occasional specimens of Wyethia angustifolia approach W. helenioides in having involucral bracts which are 1.5-2 times as long as normal, slightly wider leaves, and a more tomentose pubescence, as for example, Abrams 2335 from San Andreas Lake.

44. Helianthella Torr. & Gray, Fl. N. Amer. 2: 333. 1842.

Involucre 1.5-2 cm. long.....1. H. californica.
Involucre 2.5-4 cm. long.....2. H. castanea.

1. Helianthella californica Gray in Torr. Pacif. R. Rep. 4: 103. 1857.

Local distribution: Rocky or somewhat grassy slopes, known definitely only from the vicinity of Jasper Ridge and Black Mountain. May and June.

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General distribution: Mendocino and Glenn counties south to San Mateo and Santa Clara counties.

Specimens examined: Jasper Ridge, McMurphy, May 9, 1911; Near Searsville, Applegate 264; Black Mt., Dudley, Apr. 14, 1900.

2. Helianthella castanea Greene, Erythea 1: 127. 1893.

Local distribution: Grassy slopes, known only from San Francisco and northern San Mateo counties. April and May.

General distribution: Contra Costa, Alameda, San Francisco, and northern San Mateo counties.

Specimens examined: Bay view Hills, Congdon, Apr. 13, 1901; Brisbane Hills, Ward, Apr. 12, 1941 (CAS).

45. Coreopsis L. Sp. Pl. 907. 1753.

1. Coreopsis lanceolata L. Sp. Pl. 908. 1753.

Local distribution: Occasional as a garden escape. May through July.

General distribution: Michigan south to New Mexico, Texas, and Florida, widely cultivated and occasionally established as an escape.

Specimen examined: 1.3 miles south of Scott Valley, Thomas 3335.

46. Bidens L. Sp. Pl. 831. 1753.

Ray flowers usually over 1.5 cm. long; plants 3-15 dm. tall. 1. B. laevis.
Ray flowers usually under 1.5 cm. long; plants 2-5 dm. tall. 2. B. cernua.

1. Bidens laevis (L.) B. S. P. Prelim. Cat. N. Y. 29. 1888.

Local distribution: Occasional in marshes, roadside ditches, sloughs, and along margins of ponds and slow-moving streams. August

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through October.

General distribution: Widespread from New Hampshire to Florida and westward to Indiana, West Virginia, and Mexico, thence to California, south to South America, also in the Hawaiian Islands.

Specimens examined: Alviso, Abrams 3095; Baker 1698 (CAS); Campbell Creek, Ferris 2061; Santa Cruz, Reed, 1920 (JEPS); Watsonville, Dudley, Oct. 10, 1901; Hesse 1413 (JEPS).

Bidens laevis was reported as B. chrysanthemoides Michx. by Brandegee (1891, p. 358) from "a deep swamp at Seventh and Mission Streets" in San Francisco.

2. Bidens cernua L. Sp. Pl. 832. 1753.

Local distribution: Occasional in moist areas along standing or slowly moving water. July through October.

General distribution: Widespread in suitable habitats in the temperate zones of North America and Europe.

Jepson (1925, p. 1086) indicated that this species occurred in San Francisco.

Guizotia abyssinica (L. f.) Cass. (Dict. Sci. Nat. 59: 248. 1829), a native of Africa, has recently been reported from San Francisco and Santa Barbara as a weed (Howell, 1957). It was first collected in San Francisco by Miss Eastwood in 1932 as a garden weed. It may be expected occasionally, but probably will not become naturalized. Guizotia abyssinica may be distinguished from Bidens by broad herbaceous involucral bracts, fertile ray flowers, and achenes which lack a pappus.

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47. Helianthus L. Sp. Pl. 904. 1753.

Plants perennial; involucral bracts narrowly lanceolate.
1. H. californicus.
Plants annual; involucral bracts ovate to ovate-lanceolate.
Involucral bracts ovate, abruptly narrowed into a long attenuate tip.
2. H. annuus.
Involucral bracts ovate-lanceolate, not abruptly or only slightly narrowed into a long attenuate tip.....3. H. bolanderi.

1. Helianthus californicus DC. Prod. 5: 589. 1836.

Local distribution: Along flood plains and rocky banks of streams, mainly on the eastern side of the crest of the Santa Cruz Mountains. August through September.

General distribution: Coast Ranges and Sierra foothills south to northern Baja California.

Specimens examined: Crystal Springs, Oberlander 880; Woodside - Crystal Springs road, Abrams 2989; Menlo Park, Dudley, Aug. 2, 1893; Page Mill Road, Dudley, Sept. 1895; Near Santa Clara, Dudley, Sept. 21, 1893; Wrights Station, Dudley, Sept. 29, 1894; Loma Prieta, Elmer 5017.

2. Helianthus annuus L. Sp. Pl. 904. 1753.

Local distribution: To be expected occasionally in disturbed habitats throughout the Santa Cruz Mountains. July through October.

General distribution: Apparently originally native in Eastern North America, now widely cultivated and escaped on most continents.

Specimen examined: Stanford, Dudley, Oct. 1, 1895.

For a discussion of the subspecific taxa in H. annuus see Heiser (1954).

3. Helianthus bolanderi Gray, Proc. Amer. Acad. 6: 544. 1865.

Local distribution: Occasional in fields and along roadsides around the southern tip of San Francisco Bay, and to be expected farther

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south in the Santa Clara Valley. July through October.

General distribution: Josephine and Jackson counties, Oregon, south through the Coast Ranges, the Sacramento and San Joaquin valleys, and the Sierra Nevada foothills to San Luis Obispo and Tulare counties.

Specimens examined: Mt. View to Mayfield, Randall, Sept. 1907; Mt. View, Abrams 3090; Moffett Field, Abrams 13823; Alviso, Elmer 4949.

For a discussion of the evolution of the races of H. bolanderi see Heiser (1949).

48. Achyrachaena Schauer, Del. Sem. Hort. Vratisl. 3. 1837.

1. Achyrachaena mollis Schauer, Del. Sem. Hort. Vratisl. 3. 1837.

Local distribution: Adobe or other heavy clay soils, growing in open fields and on hillsides. April and May.

General distribution: Douglas County, Oregon, south through the Coast Ranges, Central Valley, and Sierra Nevada foothills to northern Baja California.

Specimens examined: San Francisco, Rattan, May 7, 1877; Baden, Dudley, May 14, 1899; Stanford, Keck 1440; Clarita Vineyard, Elmer 4708; Foothills west of Los Gatos, Heller 7386; Guadalupe Reservoir, Thomas 3928; Near Pajaro River, Thomas 3255.

49. Lagophylla Nutt. Trans. Amer. Phil. Soc. II. 7: 390. 1841.

Heads scattered along the stems, not glomerate.....1. L. ramosissima.
Heads densely glomerate.....2. L. congesta.

1. Lagophylla ramosissima Nutt. Trans. Amer. Phil. Soc. II. 7: 391. 1841.

Local distribution: Serpentine, open rocky soils, and grasslands, most common in southern San Mateo County and in Santa Clara County. May through October.

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General distribution: Eastern Washington and adjacent Idaho south through Oregon, northern Nevada, and cismontane California to San Diego County.

Specimens examined: San Bruno Hills, McMurphy, June 13, 1909; San Andreas Lake, Howell 2215 (CAS); Near Redwood City, Abrams 7493; Old La Honda Road, McMurphy, Sept. 15, 1905; Portola, Abrams 3003; Searsville, Abrams 5111; Coal Mine Ridge, McMurphy, Sept. 24, 1906; Black Mt., Dudley, Oct. 4, 1906; Saratoga Summit, Rose 41458; Foothills west of Los Gatos, Heller 7512; Los Gatos, Campbell, Sept. 1918 (CAS); Loma Prieta, Elmer 5000; Uvas Creek, Keck & Hiesey 5057; Santa Cruz, Jones 2349.

2. Lagophylla congesta Greene, Bull. Torr. Bot. Club 10: 87. 1883.

Local distribution: Occasional on dry chaparral slopes on the eastern slopes of the Santa Cruz Mountains. May through October.

General distribution: Coast Ranges from Humboldt County south to Santa Cruz and Santa Clara counties and in the Sierra Nevada from El Dorado County south to Stanislaus and Tuolumne counties.

Specimen examined: Black Mt., Dudley, Sept. 23, 1905.

50. Layia Hook. & Arn. Bot. Beechey 148. 1833.

Involucral bracts pectinate or with short, thick, hispid-ciliate hairs; each disk flower subtended by a receptacular bract.
1. L. chrysanthemoides.

Involucral bracts not pectinate, variously pubescent or often with tack-shaped glands but not with short, thick, hispid-ciliate hairs; only the outer disk flowers subtended by receptacular bracts.

Ligules of the ray flowers 2-4 mm. long, relatively inconspicuous.

Stems with dark dots, erect, branched above, 2-10 dm. tall; ligules of the ray flowers yellow; pappus bristles under 15. Inland plants.....2. L. hieracioides.

Stems without dark dots, freely branched from near the base, to 1.5 dm. tall; ligules of the ray flowers white; pappus bristles over 25. Coastal sand dune plants.
3. L. carnosa.

Ligules of the ray flowers 6-15 cm. long, conspicuous.

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Stems with dark dots; pappus bristles reddish brown to purplish, rarely white, plumose; ligules of the ray flowers rarely white-tipped.....4. L. gaillardioides.
Stems without dark dots; pappus bristles white or tawny, scabrous; ligules of the ray flowers usually white-tipped.
Plants semiprostrate to decumbent, succulent; the stems 1-3 dm. long; tips of the involucral bracts dilated. Along the immediate coast....5a. L. platyglossa ssp. platyglossa.
Plants erect, not particularly succulent; the stems to 5 dm. tall; tips of the involucral bracts not dilated. Usually growing away from the immediate coast.
5b. L. platyglossa ssp. campestris.

1. Layia chrysanthemoides (DC.) Gray, Proc. Amer. Acad. 7: 360. 1868.

Local distribution: Open grassy summits of wind swept hills and occasionally in low alkaline soils along the San Francisco Bay, San Francisco southward on the eastern slopes of the Santa Cruz Mountains. April through June.

General distribution: Coast Ranges, Mendocino and Glenn counties south to Monterey County.

Specimens examined: Potrero, San Francisco, Kellogg & Brandon, May 18, 1868; San Bruno Hills, McMurphy, June 13, 1909; Burlingame, Keck 1488; Millbrae, Keck 1487; Redwood City, Keck 1450; San Jose, Elmer 4630.

2. Layia hieracioides (DC.) Hook. & Arn. Bot. Beechey Suppl. 358. 1838.

Local distribution: Chaparral, inland and coastal sand dunes, and open woods, San Francisco southward. April through August.

General distribution: Coast Ranges from San Francisco and Contra Costa counties south to Santa Cruz and Santa Clara counties in the Outer and Inner Coast Ranges.

Specimens examined: Lake Merced, Abrams 1591; Salada, Keck 2306; San Andreas Lake, Keck, June 1, 1940; Kings Mt., Abrams, Aug. 26, 1901; Stanford, Randall 58; Jasper Ridge, Thomas 7158; Ben Lomond sand hills, Thomas 1646, 1871; Aptos, Pringle, July 11, 1882; Sunset Beach, Thomas 3085.

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3. Layia carnosa Nutt. Trans. Amer. Phil. Soc. II. 7: 393. 1841.

Local distribution: Occasional on coastal sand dunes, known locally only from San Francisco. April through June.

General distribution: Along the coast from Humboldt County south to Point Conception, Santa Barbara County.

Specimen examined: San Francisco, Olsson-Seffer, 1904.

4. Layia gaillardioides (Hook. & Arn.) DC. Prod. 7: 294. 1838.

Local distribution: Growing on grassy slopes, open fields, and brush-covered areas, San Francisco southward. April through July.

General distribution: Coast Ranges, Humboldt and Colusa counties south to northern Monterey County.

Specimens examined: San Francisco, Harford & Kellogg 475; Baden, Dudley, May 14, 1899; Half Moon Bay Road, Heller 8556; San Mateo Canyon, McMurphy, May 25, 1909; Above La Honda, McMurphy, May 26, 1909; Near Pescadero Creek, Mason, July 14, 1921; Alpine School House, Elmer 4261; Black Mt., Randall 89; Swanton, Rich, Spring 1912; Near Saratoga Summit, Keck 1983.

5a. Layia platyglossa (Fisch. & Mey.) Gray ssp. platyglossa, Mem. Amer. Acad. 4: 103. 1849.

Local distribution: Coastal bluffs and sand dunes, San Francisco south to the mouth of the Pajaro River. March through September.

General distribution: Coastal, Mendocino County south to Point Conception, Santa Barbara County, also on Santa Cruz Island.

Specimens examined: Bakers Beach, Dudley, Mar. 1, 1905; Pigeon Pt., Hesse 938; Sunset Beach State Park, Thomas 1605.

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5b. Layia platyglossa (Fisch. & Mey.) Gray ssp. campestris Keck, Aliso 4: 106. 1958.

Local distribution: A common subspecies of open grasslands, serpentine, sand dunes, and occasionally on coastal bluffs. March through June.

General distribution: Mendocino and Butte counties south, mainly in the Coast Ranges, to northern Baja California.

Specimens examined: Marine Hospital, San Francisco, Heller 6626; Lake Merced, Congdon, May 21, 1892; San Bruno Mt., Ferris 2130; Crystal Springs Lake, Elmer 5022; Sawyer Ridge, Oberlander 157; Near La Honda, McMurphy, May 26, 1909; Woodside serpentine, Dutton, Apr. 19, 1900; Near Stanford, Baker 526; Black Mt., Dudley, Apr. 14, 1900; San Jose, Elmer 5025; Swanton, Rich, Spring 1912; Between Scott and Mill Creek drainages, Thomas 4096; Hilton Airport, Thomas 4103; Near Felton, Dudley, Apr. 17, 1904; Near Mt. Hermon, Ferris 2010.

51. Madia Molina, Sagg. Chile 136. 1782.

Pappus present, of fimbriate paleae, about 1 mm. long; plants perennial. 1. M. madioides.

Pappus lacking; plants annual.

Disk flowers more than 1 per head.

Disk achenes sterile; receptacle densely hairy; ligules of the ray flowers conspicuous.

Plants with a well-developed basal rosette; strongly glandular-pubescent above; flowering from August through November. 2a. M. elegans ssp. densifolia.

Plants lacking a well-developed basal rosette; sparingly glandular above; flowering from May through July. 2b. M. elegans ssp. vernalis.

Disk achenes fertile; receptacle glabrous; ligules of the ray flowers relatively inconspicuous.

Plants glandular in the upper half; stems slender; involucral bracts 6-9 mm. long.....3. M. gracilis.

Plants glandular to the base; stems stout; involucral bracts 8-15 mm. long.

Heads in congested glomerules, usually exceeded by the subtending leaf-like bracts; involucral bracts 8-15 mm. long.....4. M. capitata.

Heads scattered, rarely glomerate, not exceeded by the subtending bracts; involucral bracts 7-12 mm. long. 5. M. sativa.

Disk flower 1, rarely 2 per head.....6. M. exigua.

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1. Madia madioides (Nutt.) Greene, Man. Bay Reg. 193. 1894.

Local distribution: Shade in redwood - douglas fir forests, central San Mateo County southward. April through September.

General distribution: Coast Ranges from Vancouver Island, British Columbia, south to Monterey County.

Specimens examined: San Mateo Canyon, McMurphy, May 25, 1909; Pescadero Creek, Dudley 4209; Kings Mt., Rose 41387; Near Woodside, Keck 1497; Los Gatos Creek, Hall 13068; Foothills west of Los Gatos, Heller 7477; Swanton, Rich, May 12, 1912; Mill Creek drainage, Thomas 4018; Big Basin, Dudley, May 29, 1897; Empire Grade, Gould 703; Santa Cruz, Jones 2248; Loma Prieta, Thompson, June 7, 1902.

2a. Madia elegans D. Don ex Lindl. ssp. densifolia (Greene) Keck, Madrono 3: 4. 1935.

Local distribution: Grasslands, woodlands, and disturbed areas, northern San Mateo County southward. August through November.

General distribution: Willamette Valley, Oregon, south to San Diego County.

Specimens examined: San Andreas Lake, Oberlander 369; Crystal Springs Lake, Abrams & Wiggins 173A; Spring Valley Lakes, Demaree 10519; Stanford, Abrams 3013; Black Mt., Dudley, Oct. 4, 1906; Near Santa Clara, Dudley, Sept. 13, 1897; Loma Prieta Road, Dudley, Sept. 29, 1894; Waddell Creek, Dudley, Sept. 1901; Hilton Airport, Thomas 2449; Felton, Dudley, Oct. 3, 1896; Alba Road, Thomas 4563; Aptos Creek, Abrams 3074.

2b. Madia elegans D. Don ex Lindl. ssp. vernalis Keck, Aliso 4: 108. 1958.

Local distribution: Wooded slopes and grasslands, San Mateo County southward. May through July.

General distribution: Northwestern Oregon south to San Luis Obispo County and Kern County.

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Specimens examined: Alpine Road, Wolf 3713; Skyline Blvd., Keck 1979; Near Castle Rock, Thomas 3431; Uvas Creek, Keck & Hiesey 5056; Felton, Elmer 5026; Alba Grade, Thomas 3469.

3. Madia gracilis (Smith) Keck, Madroño 3: 4. 1935.

Local distribution: Mainly east of the crests of the Santa Cruz Mountains, in San Mateo and Santa Clara counties, growing in grasslands and oak - woodlands. May through July.

General distribution: British Columbia south to Baja California, east to Montana and Utah; also in Chile and Argentina.

Specimens examined: Pilarcitos Lake, Oberlander 270; San Mateo Canyon, McMurphy, May 25, 1909; Redwood City, Abrams 7502; Woodside, Keck 1787; Stanford, Abrams 1544; Jasper Ridge, Thomas 7142; Stevens Creek, Dudley, June 1, 1902; Foothills west of Los Gatos, Heller 7453; 4 miles west of Morgan Hill, Keck & Hiesey 5050; Mt. Charlie Road, Thomas 3325.

4. Madia capitata Nutt. Trans. Amer. Phil. Soc. II. 7: 386. 1841.

Local distribution: A widespread species of grasslands, coastal bluffs, and disturbed areas. May through September.

General distribution: Coastal, southern British Columbia south to Santa Barbara County.

Specimens examined: San Francisco, Brandegee, no date; Near Colma, Dudley, May 11, 1901; Pescadero Beach, Wiggins 3796; Alpine Creek Road, Keck 1745; Coal Mine Ridge, McMurphy, Sept. 24, 1906; Stanford, Dudley, June 15, 1897; Near Santa Cruz, Dudley, Nov. 27, 1908.

5. Madia sativa Molina, Sagg. Chile 136. 1782.

Local distribution: Grasslands, roadsides, and disturbed areas, becoming a weed. June through November.

General distribution: Coastal, southern Alaska south to Los Angeles County.

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Specimens examined: Lake Merced, Abrams 1620; Ingleside, San Francisco, Hall 9751; Sawyer Ridge, Oberlander 1045; Menlo Park, Abrams 2227; Stanford, Abrams 1005; Los Gatos Creek, Dudley, Oct. 11, 1902; 4 miles north of Santa Cruz, Thomas 4566; Hilton Airport, Thomas 4339; Aptos Creek, Abrams 3062; 2 miles northeast of Watsonville, Keck 2634.

6. Madia exigua (Smith) Gray, Proc. Amer. Acad. 8: 391. 1872.

Local distribution: Grasslands, chaparral, and open woods, northern San Mateo County southward. May through June.

General distribution: Southern British Columbia south to northern Baja California, east to western Montana and western Nevada.

Specimens examined: Crystal Springs Lake, Oberlander 320; Woodside serpentine, Dutton, May 6, 1900; Jasper Ridge, Thomas 7141; Kings Mt., Dudley, June 11, 1906; Coal Mine Ridge, McMurphy, May 19, 1907; Ridge west of Los Gatos, Heller 7467; Big Basin, Dudley, June 5, 1897; Blooms Grade, Thomas 1992; Ben Lomond, Thompson, May 27, 1902; Mt. Hermon, Bacigalupi 1489.

52. Hemizonia DC. Prod. 5: 692. 1836.

Ligules of the ray flowers yellow; achenes of the ray flowers beaked; inner receptacular bracts not adnate or deliquescent.
Leaves not spine-tipped.
Involucral bracts not keeled; anthers yellow or black.
Ray flowers 5; disk flowers 6; anthers yellow.
1. H. kelloggii.
Ray flowers over 12; disk flowers over 12; anthers black.
2. H. corymbosa.
Involucral bracts keeled; anthers black.
Ray flowers 3; disk flowers 3.
3. H. lobbii.
Ray flowers 5; disk flowers 6.
4. H. pentactis.
Leaves spine-tipped.
Pappus absent; anthers yellow.
5. H. pungens ssp. maritima.
Pappus of paleae; anthers yellow or black.
Anthers yellow; receptacular bracts fleshy at the tips, not long-villous; paleae 3 (rarely 5); herbage with yellow glands.
Herbage minutely glandular; receptacular bracts weakly spine-tipped...6a. H. parryi ssp. parryi.
Herbage not glandular; receptacular bracts not at all spine-tipped...6b. H. parryi ssp. congdonii.

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Anthers black; receptacular bracts not fleshy at the tips, long-villous; paleae 8-12; herbage with black, stipitate glands.....7. H. fitchii.

Ligules of the ray achenes white, purple-veined; achenes of the ray flowers not beaked; inner receptacular bracts adnate, deliquescent.

Herbage conspicuously glandular at least above, villous; involucral bracts 3.5-6 mm. long; inflorescence paniculate, the heads usually scattered.

Basal rosettes poorly developed if present; involucral bracts 5-6 mm. long.....8a. H. luzulaefolia ssp. luzulaefolia.

Basal rosettes well developed; involucral bracts 3.5-5 mm. long. 8b. H. luzulaefolia ssp. rudis.

Herbage slightly glandular, shaggy-villous; involucral bracts 6-9 mm. long; inflorescence corymbosely paniculate, the heads usually clustered.....9. H. congesta.

1. Hemizonia kelloggii Greene, Bull. Torr. Bot. Club 10: 41. 1883.

Local distribution: Rare in fields in the southern part of the Santa Clara Valley, usually growing with Hemizonia fitchii, H. congesta, and Trichostema lanceolatum. April through September.

General distribution: Coast Ranges and San Joaquin Valley from Contra Costa County south to San Diego County, introduced into Mendocino, Colusa, and Imperial counties, and around Tucson, Arizona.

Specimen examined: 1 mile south of Morgan Hill, Keck 1801.

2. Hemizonia corymbosa (DC.) Torr. & Gray, Fl. N. Amer. 2: 398. 1843.

Local distribution: The most common species of Hemizonia in the local flora, occurring on coastal bluffs and fields, open grasslands, and in cultivated fields, San Francisco southward. May through November.

General distribution: Coastal, Mendocino County south to northern Monterey County.

Specimens examined: San Francisco, Kellogg, 1870; Presidio, Bacigalupi 2716; San Bruno Hills, McMurphy, June 13, 1909; Crystal Lake, Abrams 3000; Montara Pt., Keck 396; Moss Beach, Rose 41361; Pescadero Beach, Wiggins 12199; Belmont, Keck 1784; Millbrae, Dudley, May 17, 1893; Searsville, Dudley, July 1893; Portola, McMurphy 2; Black Mt.,

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McMurphy, Aug. 31, 1907; Swanton, Rich, Spring 1912; Big Basin, Dudley, Sept. 23, 1901; Hilton Airport, Thomas 4322, 3586; 4 miles south of Glenwood, Rose 35573; Santa Cruz, Jones 2210; Capitola, McMurphy, Oct. 8, 1909; Aptos, Abrams 3078; Hecker Pass, Keck & Hiesey 5063.

3. Hemizonia lobbii Greene, Bull. Torr. Bot. Club 9: 109. 1882.

Local distribution: Known locally from fields around Stanford University, commonly growing in grain fields. September through November.

General distribution: Solano County south to Monterey and San Benito counties.

Specimens examined: San Francisquito Creek, McMurphy, Oct. 28, 1906; Stanford, McMurphy, Sept. 1906; Palo Alto, Clark, Oct. 9, 1909.

4. Hemizonia pentactis (Keck) Keck, Aliso 4: 109. 1958.

Local distribution: Grain fields near Stanford, perhaps no longer extant locally, as no specimens have been collected since 1909. June through October.

General distribution: Introduced around Stanford, native in Monterey and San Luis Obispo counties.

Specimens examined: Palo Alto, McMurphy, Oct. 17, 1909; Stanford, Abrams, Sept. 19, 1906; Smith 1366; Randall 79.

5. Hemizonia pungens (Hook. & Arn.) Torr. & Gray ssp. maritima (Greene) Keck, Aliso 4: 110. 1958.

Local distribution: Low lands bordering the San Francisco Bay and in the Santa Clara Valley, rarely elsewhere. May through October.

General distribution: Sonoma and Yolo counties south to Monterey County.

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Specimens examined: Presidio, San Francisco, Bacigalupi 2718; San Mateo, Rose 41463; Redwood City, Thomas 4231; Menlo Park, Abrams 4017; Palo Alto, Congdon, Aug. 20, 1897; Alviso, Rust, Oct. 20, 1906; Santa Clara, Dudley, Aug. 28, 1903; San Jose, Leitholt, July 14, 1893.

6a. Hemizonia parryi Greene ssp. parryi, Bull. Torr. Bot. Club 9: 16. 1882.

Local distribution: Hard-packed soil of roadsides and low alkaline areas, northern San Mateo County. August through November.

General distribution: Colusa and Sonoma counties south through the Coast Ranges to Monterey County.

Specimens examined: Salada Beach, Keck 1291; Rose, Aug. 28, 1931 (CAS).

6b. Hemizonia parryi Greene ssp. congdonii (Robins. & Greenm.) Keck, Madroño 3: 15. 1935.

Local distribution: Alkaline and heavy soils in the Santa Clara and Pajaro valleys. July through October.

General distribution: Valleys, Contra Costa County south to the Salinas Valley, Monterey County.

Specimens examined: Between Sunnyvale and Alviso, Keck 2472; East of San Jose, McMurphy, Sept. 19, 1908; Watsonville, McMurphy, Oct. 10, 1909.

7. Hemizonia fitchii Gray, Pacif. R. Rep. 4: 109. 1857.

Local distribution: Rare in the Santa Cruz Mountains, known locally only from between New Almaden and Campbell and from near Morgan Hill. June through November.

General distribution: Southwestern Oregon south through the Coast Ranges to San Luis Obispo County and to the San Bernardino Mountains

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through the Sierra Nevada foothills.

Specimens examined: Between New Almaden and Campbell, Ferris 2096.

8a. Hemizonia luzulaefolia DC. ssp. luzulaefolia, Prod. 5: 692. 1836.

Local distribution: Grassy slopes, San Francisco, Crystal Springs Lakes area, and southern Santa Cruz County. May through August.

General distribution: Coast Ranges from Lake County south to San Luis Obispo County.

Specimens examined: San Francisco, Parry, 1881; Crystal Springs, Abrams 5140; Millbrae Hills, McMurphy, June 13, 1909; Corralitos Creek, Keck 5159; Near Pajaro River, Thomas 3258.

8b. Hemizonia luzulaefolia DC. ssp. rudis (Benth.) Keck, Aliso 4: 111. 1958.

Local distribution: Grain fields, pastures, and grassy slopes, Crystal Springs Lakes, Santa Clara Valley, and Pajaro River Valley. July through November.

General distribution: Sacramento Valley from Tehama County south to the northern part of the San Joaquin Valley and in the Coast Ranges from Mendocino and Lake counties south to San Luis Obispo County.

Specimens examined: Near Crystal Springs Lake, Randall 78; Crystal Springs - Belmont Rd., McMurphy, Aug. 1908; Stanford, Abrams 2209; Dudley, July 1, 1893; Santa Clara, McMurphy, Sept. 19, 1908; Los Gatos, McMurphy, Aug. 29, 1909; 1 mile south of Morgan Hill, Keck 1803; 2 miles northeast of Watsonville, Keck 2635; Watsonville, Hayward, July 1, 1929.

9. Hemizonia congesta DC. Prod. 5: 692. 1836.

Local distribution: Rare in northern San Mateo County. June through July.

General distribution: Near the coast, Del Norte County south to San Mateo County.

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Specimen examined: Between Colma and San Bruno, McMurphy, June 13, 1909.

53. Holocarpha Greene, Fl. Franciscana 426. 1897.

1. Holocarpha macradenia (DC.) Greene, Fl. Franciscana 426. 1897.

Local distribution: Grassy slopes, San Francisco and adjacent San Mateo County and the coastal plain from Santa Cruz south to Watsonville. July through November.

General distribution: Marin and Alameda counties south to northern Monterey County.

Specimens examined: Santa Cruz, Jones 2285; Near Seabright, Dudley, June 30, 1909; Soquel, Keck & Clausen 2631; College Lake, Keck 2633; Watsonville, McMurphy, Oct. 10, 1909.

This species is probably extinct in the Santa Cruz Mountains (Clausen, 1951, p. 103).

54. Calycadenia DC. Prod. 5: 695. 1836.

Heads usually in a terminal cluster; upper leaves exceeding the terminal cluster; involucral bracts more or less purplish, the glands black. San Mateo Co.....1a. C. multiglandulosa ssp. cephalotes.
Heads in a terminal cluster and in clusters in the axils of the upper leaves; upper leaves more or less recurved; involucral bracts greenish yellow, the glands light brown. Mainly in Santa Clara Co. 1b. C. multiglandulosa ssp. robusta.

1a. Calycadenia multiglandulosa DC. ssp. cephalotes (DC.) Keck, Aliso 4: 113. 1958.

Local distribution: San Mateo County, usually on dry open hills. May through October.

General distribution: Coast Ranges from southern Mendocino County south to San Mateo County.

Specimen examined: Emerald Lake, Rose 34278.

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1b. Calycadenia multiglandulosa DC. ssp. robusta Keck, Aliso 4: 113. 1958.

Local distribution: Southern San Mateo County and in Santa Clara County, in clearings in chaparral and in open woods. June through November.

General distribution: Santa Cruz Mountains and the Mount Hamilton Range.

Specimens examined: Emerald Lake, Rose 37658 (CAS); Jasper Ridge, McMurphy, June 7, 1909; Black Mt., Dudley, Oct. 4, 1906; Page Mill Rd., Keck 1742; Castle Rock Ridge, Abrams 4996; Loma Prieta, Elmer 4978.

55. Iva L. Sp. Pl. 988. 1753.

1. Iva axillaris Pursh, Fl. Amer. Sept. 743. 1841.

Local distribution: Known definitely only from San Francisco and from the southeastern portion of Santa Cruz County, but to be expected elsewhere in low disturbed areas in the Santa Clara Valley, especially along railroad tracks. May through July.

General distribution: British Columbia east to Manitoba, south to southern California, northern Arizona, northern New Mexico, and Oklahoma.

Specimens examined: San Francisco, Clark, July 22, 1930 (CAS); Southeastern Santa Cruz Co., Thomas 3260.

56. Ambrosia L. Sp. Pl. 987. 1753.

1. Ambrosia pilostachya DC. Prod. 5: 526. 1836.

Local distribution: Occasional in low moist or disturbed areas. June through November.

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General distribution: Washington eastward to Saskatchewan, south to southern Baja California, northern non-peninsular Mexico, southern Texas, and Illinois.

Specimens examined: Crystal Springs Lake, Abrams 2992; Aptos, Abrams 3077; Watsonville, Dudley, Oct. 10, 1908.

57. Xanthium L. Sp. Pl. 987. 1753.

Stems with 1 or 2 trifid spines at each node; leaves ovate-lanceolate, toothed to pinnately lobed, distinctly paler beneath. 1. X. spinosum.

Stems lacking spines; leaves ovate, often broadly so and sometimes cordate at the base, toothed, often coarsely so, not distinctly paler beneath.....2. X. strumarium.

1. Xanthium spinosum L. Sp. Pl. 987. 1753.

Local distribution: Fallow fields, dry lake bottoms, margins of swamps, creek bottoms, and disturbed areas. April through November.

General distribution: Native of Europe, widely naturalized in North America.

Specimens examined: Upper Crystal Springs Lake, Oberlander 342; Palo Alto, Clark, Oct. 9, 1909; San Antonio Creek, Randall 102; Swanton, Rich, Apr. 1912; Near Corralitos, Thomas 2498.

2. Xanthium strumarium L. Sp. Pl. 987. 1753.

Local distribution: Low areas where water has stood or accumulated during the winter and early spring, not as common as the preceding species. June through October.

General distribution: Native of Europe and possibly of North America, now widely established in North America.

Specimens examined: Presidio, Cannon, Sept. 10, 1894 (CAS); Lake Lagunita, Randall 101; Pajaro River, Thomas 1547.

Xanthium strumarium is a weedy and variable species and numerous

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names have been applied to it. One of the latest and one from the vicinity of Stanford University is Xanthium calvum Mills. & Sherff (Field Mus. Pub. Bot. 4: 35. 1919). In view of the wide distribution, weedy habit, ease of dispersal, and variability, it seems best not to attempt to recognize the segregates.

58. Franseria Cav. Ic. 2: 78. 1793.

Plants perennial.
  Burs 6-8 mm. long. Plants of coastal sand dunes.
    Leaves serrate.....1a. F. chamissonis ssp. chamissonis.
    Leaves 1-3 times pinnatifid.
      1b. F. chamissonis ssp. bipinnatisecta.
  Burs 2-3 mm. long. Plants of disturbed inland areas.
    2. F. confertiflora.
Plants annual.....3. F. acanthicarpa.

1a. Franseria chamissonis Less. ssp. chamissonis, Linnaea 6: 507. 1831.

Local distribution: Sea beaches and sand dunes, most common in San Francisco and northern San Mateo counties. July through November.

General distribution: Along the coast, southern British Columbia south to Santa Cruz County.

Specimens examined: Golden Gate Park, Rattan, Sept. 1880; Laguna Pueria, Dudley, Oct. 9, 1909.

Plants with leaves intermediate between F. chamissonis ssp. chamissonis and ssp. bipinnatisecta are often found, as for example the following from near the mouth of the Pajaro River, Thomas 2397; and Golden Gate Park, Parish, Nov. 1881.

1b. Franseria chamissonis Less. ssp. bipinnatisecta (Less.) Wiggins & Stockwell, Madroño 4: 120. 1937.

Local distribution: Sand dunes and beaches along the coast. June

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through October.

General distribution: Southern British Columbia and Vancouver Island south along the coast to at least central Baja California, also around the margins of the Puget Sound and San Francisco Bay.

Specimens examined: San Francisco, Curran, Aug. 1886; Cliff House, Heller 5706; Laguna Salada, Dudley, Oct. 4, 1908; Mouth of Redwood Creek, Rattan, 1897; Swanton, Rich, May 1912; Santa Cruz, Jones 2277; Palm Beach, McMinn 266.

2. Franseria confertiflora (DC.) Rydb. N. Amer. Fl. 33: 28. 1922.

Local distribution: Occasionally found in disturbed areas. September through December.

General distribution: Southern California eastward to Colorado and Mexico, introduced into central California.

Specimens examined: San Francisco, Bacigalupi 2727; San Jose, Swezey, Oct. 11, 1957 (CAS), Jan. 20, 1958 (CAS).

Leeds (1891, pp. 124-25) noted the occurrence of this species along the railway tracks in Santa Clara in about 1888 and suggested that it had been introduced by means of railway freight cars.

3. Franseria acanthicarpa (Hook.) Coville, Contr. U. S. Nat. Herb. 4: 129. 1893.

Local distribution: River bottoms and disturbed areas, Santa Clara Valley, poorly collected. June through August.

General distribution: Southern Canada south to southern California, Arizona, and western Texas, perhaps introduced locally.

Specimen examined: 1 mile south of Gilroy, Thomas 4358A.

Leeds (1891, p. 125) reported this species as F. hookeriana from Berryessa, a small community northeast of San Jose.

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59. Eriophyllum Lagasca, Gen. et Sp. 28. 1816.

Involucres usually less than 8 mm. in diameter; heads in dense terminal clusters.
Involucral bracts 8-12; rays 6-9. Plants of coastal sand dunes and bluffs.....1. E. staechadifolium.
Involucral bracts 4-7; rays 4-6 or none. Inland plants. 2. E. confertiflorum.
Involucres usually over 10 mm. in diameter; heads solitary or loosely corymbose.....3. E. lanatum var. arachnoideum.

1. Eriophyllum staechadifolium Lagasca, Gen. et Sp. 28, 1816.

Local distribution: Coastal bluffs and sand dunes, occasionally inland. May through November, but individual plants are to be found in flower during the remaining months of the year.

General distribution: Coos County, Oregon, south to Santa Barbara County and on some of the Channel Islands.

Specimens examined: Lone Mt. Cemetery, Rattan, Feb. 22, 1877; San Francisco, Grant, May 12, 1900; Sweeney Ridge, Oberlander 332; Between Pescadero and Half Moon Bay, Abrams, Aug. 1907; Swanton, Rich, Spring 1912; Near Seabright, Dudley, June 28, 1909; Watsonville, Elmer 4833.

2. Eriophyllum confertiflorum (DC.) Gray, Proc. Amer. Acad. 19: 25. 1883.

Local distribution: Chaparral, brushy slopes, and serpentine, throughout the Santa Cruz Mountains. March through October, occasionally in flower to November.

General distribution: Coast Ranges from Mendocino County south to northern Baja California, in the foothills of the Sierra Nevada from Calaveras County south, and on the Channel Islands, Los Coronados Islands, and Cedros Island.

Specimens examined: San Francisco, Jepson 10583 (UC); Near Belmont, Leitholt, May 30, 1894; Redwood City, Rose 33176; Coal Mine Ridge, Barry 172; Black Mt., Elmer 4564; Foothills west of Los Gatos, Heller 7463; Loma Prieta, Dudley, Oct. 11, 1902; Glenwood, Davis, Sept. 1907; Ben Lomond sand Hills, Thomas 1870; Near Soquel, Thompson, May 8, 1902; Soda Lake, Thomas 3304.

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3. Eriophyllum lanatum (Pursh) Forbes var. arachnoideum (Fisch. & Avé-Lall.) Jepson, Man. Fl. Pl. Calif. 1119. 1925.

Local distribution: Wooded slopes and open hills near the coast. May through July.

General distribution: Coastal mountains from Del Norte County south to Monterey County.

Specimens examined: Dry hills near the coast, San Mateo Co., McMinn 258; Near La Honda, Dudley, May 27, 1893; Woodside to Crystal Springs Reservoir, Dudley, May 1894; Kings Mt., Abrams 2472.

The following specimens are probably hybrids between the above variety and E. confertiflorum: San Francisco Watershed Reserve, Oberlander 1019; Back of San Mateo, Heller 8485; San Mateo, Elmer 4397; Black Mt., Dudley, June 8, 1895. The hybrids have very broad leaves which are more or less lobed like those of E. confertiflorum and heads which are intermediate in size and in lax corymbs. For a further discussion of such hybrids see Constance (1937, pp. 111-112).

60. Chaenactis DC. Prod. 5: 659. 1836.

1. Chaenactis tanacetifolia Gray, Proc. Amer. Acad. 6: 545. 1865.

Local distribution: Known only from near Mount Umunhum at about 3400 feet elevation. April.

General distribution: Inner Coast Ranges, Lake and Colusa counties south to southern San Benito County.

Specimen examined: Vicinity of Mt. Umunhum, Thomas 3958.

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61. Blennosperma Less. Syn. Comp. 267. 1832.

1. Blennosperma nanum (Hook.) Blake, Proc. Biol. Soc. Wash. 39: 144. 1926.

Local distribution: Known within the Santa Cruz Mountains only from the vicinity of San Francisco, growing on moist open hillsides. March and April.

General distribution: Mendocino and Butte counties south to San Diego County.

Specimens examined: Bayview Hills, Raven 1447 (JEPS); South San Francisco, presumably collected by Brandegee, Apr. 9, 1892; San Bruno Hills, Elmer 4521.

62. Helenium L. Sp. Pl. 886. 1753.

1. Helenium puberulum DC. Prod. 5: 667. 1836.

Local distribution: Creek beds and marshy meadows along streams and lakes, apparently more abundant in disturbed localities. April through November.

General distribution: Del Norte and Siskiyou counties south to northern Baja California, in the Sierra Nevada foothills from Butte County to Tuolumne County, and in the Central Valley from Glenn County to San Joaquin County, established as a weed in the Willamette Valley in Oregon.

Specimens examined: Lands End, Thomas 4255; 3 miles north of Pescadero, Harvey & Tucker 1701 (DAV); Pilarcitos Canyon, Oberlander 318; San Francisquito Creek, Dudley, June 14, 1895; Stevens Creek, Thomas 4308; Loma Prieta, Dudley, May 29, 1894; Carnadero Creek, Thomas 4364; Swanton, Rich, Spring 1912; Powder Mill Gulch, Thompson, July 6, 1902.

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63. Monolopia DC. Prod. 6: 74. 1837.

Involucral bracts not united, the margins more or less imbricate.
1. M. gracilens.
Involucral bracts united in the lower half, the margins not imbricate.
2. M. major.

1. Monolopia gracilens Gray, Proc. Amer. Acad. 19: 20. 1883.

Local distribution: Shaded slopes, road cuts, serpentine, and burned chaparral throughout the Santa Cruz Mountains from northern San Mateo county southward. April through June.

General distribution: Coast Ranges from San Mateo and Contra Costa counties south to San Luis Obispo County.

Specimens examined: Sawyer Ridge, Oberlander 155; Black Mt., Dudley, May 5, 1894; Loma Prieta Peak, Elmer 5012; 1.5 miles south of New Almaden, Constance 2078; Gilroy, Elmer 4729; San Lorenzo Canon, Crum 2090; Saratoga - Big Basin Road, Abrams 5625; Santa Cruz, Jones 2333; Hecker Pass, Keck 4568.

2. Monolopia major DC. Prod. 6: 74. 1837.

Local distribution: Slopes, road cuts, and serpentine outcroppings on the eastern slopes of the Santa Cruz Mountains from San Francisco southward. March through May.

General distribution: Tehama County south to Monterey County in the Central Valley, adjacent Coast Ranges, and in the Sierra Nevada foothills.

Specimens examined: Ravine of San Mateo Creek, Dudley, Apr. 21, 1894; Stanford, Dudley, Mar. 30, 1893; Black Mt., Applegate 235; Hills 4 miles south of San Jose, Rattan, May 1, 1887; Near Coyote, Ferris 819.

64. Rigiopappus Gray, Proc. Amer. Acad. 6: 548. 1865.

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1. Rigiopappus leptocladus Gray, Proc. Amer. Acad. 6: 548. 1865.

Local distribution: Serpentine or open grassy slopes on the eastern face of the Santa Cruz Mountains from central San Mateo County southward. Latter part of April through May.

General distribution: Mainly east of the Cascades in Washington and Oregon, western Idaho, south to Los Angeles County through the Coast Ranges and the western slopes of the Sierra Nevada; also in Nevada in the vicinity of Reno.

Specimens examined: Between Woodside and Crystal Springs Lake, Abrams, May 7, 1910; Woodside, Abrams 2401; Page Mill Road, Hichborn, May 1, 1920; Near Coyote, Ferris 785; Uvas Creek, Wiesendanger 1501 (DAV).

Achenes with either three or five paleae are found in the Santa Cruz Mountains.

65. Jaumea Pers. Synops. 2: 397. 1807.

1. Jaumea carnosa (Less.) Gray in Torr. Bot. Wilkes Exp. 17: 360. 1874.

Local distribution: Along the Pacific Ocean and the margins of San Francisco Bay in salt marshes, tidal flats, and on sea cliffs which are subjected to salt spray. Commonly found with Frankenia grandiflora, various species of Salicornia, Spartina foliosa, and Distichlis spicata.

General distribution: Vancouver Island and the Puget Sound south along the coast to northern Baja California.

Specimens examined: San Francisco, Brandegee, no date; Cooleys Landing, Abrams 2224; Mt. View Landing, Dudley, July 18, 1903; Alviso, Dudley, Nov. 9, 1903; Laguna Salada, Dudley, Oct. 4, 1908; Swanton, Rich, Spring 1912; Santa Cruz, Keck 2972; Near mouth of Pajaro River, Thomas 2397.

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66. Baeria Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 29. 1836.

Some members of the genus Baeria in the Santa Cruz Mountains vary considerably and individual specimens are hard to place in one species or another. For example, robust specimens of B. minor approach B. macrantha var. thalassophila; intermediates between B. minor and B. chrysostoma are occasionally encountered; and it is often difficult to assign specimens to the varieties of B. chrysostoma or to B. hirsutula. The characters in the following key will serve to separate most specimens found locally.

Plants perennial; involucral bracts over 9 mm. long; leaves entire. Coastal.....1. B. macrantha var. thalassophila.
Plants annual; involucral bracts under 9 mm. long and usually under 5 mm. long; leaves entire or pinnately lobed. Coastal or inland.
Stems and leaves villous, villous-tomentose, or nearly glabrous. 2. B. minor.
Stems and leaves hirsute and/or strigose.
Lower leaf margins usually hirsute or strigose toward the base; achenes subclavate; paleae 2-7 or none, subulate from the base, white to brownish.
Leaves linear-oblong, entire or sometimes pinnately lobed, usually rounded at the apex; plants stout, usually branched, the branches spreading widely. 3. B. hirsutula.
Leaves linear, entire, acute; plants slender, when branched the branches usually ascending or erect. 4a. B. chrysostoma var. chrysostoma.
Lower leaf margins usually lacking hirsute or strigose hairs; achenes tending to be linear; paleae 2-5, or none, usually ovate at the base, then with a subulate awn, white. 4b. B. chrysostoma var. gracilis.

1. Baeria macrantha (Gray) Gray var. thalassophila Howell, Leafl. West. Bot. 5: 108. 1948.

Local distribution: Known in the Santa Cruz Mountains area only from the vicinity of Pescadero in San Mateo County, but to be expected along the coast north of there. April through June.

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General distribution: Along the coast from central Mendocino County to the vicinity of Pescadero in San Mateo County.

Specimens examined: Pebble Beach, Vestal, June 15, 1937; Mason, June 1, 1921; Dudley, Apr. 10, 1896; Chambers 1045; Mirimar, Briggs, May 27, 1922.

2. Baeria minor (DC.) Ferris, Contr. Dud. Herb. 4: 332. 1955.

(B. uliginosa (Nutt.) Gray, Proc. Amer. Acad. 9: 197. 1874.)

Local distribution: Mainly along the coast in moist areas near streams or in low areas in fields, occasionally found inland. April and May.

General distribution: Sonoma County south to Santa Barbara County, in the southern portion of the Sacramento Valley and in the San Joaquin Valley, and in the foothills of the Sierra Nevada from Amador County to Kern County.

Specimens examined: San Francisco, Harford, Apr. 16, 1878; Jones 3266; Pescadero Beach, Sokol 52; Chambers 1044; Alma, Rattan, May 3, 1883; Near San Jose Airport, Thomas 4797; Sunset Beach, Thomas 3078.

Some specimens from along the coast, Chambers 1044 and Thomas 3078 have ligules which range in length from 2-4 mm. and approach B. minor ssp. maritima (Gray) Ferris (Contr. Dud. Herb. 4: 334. 1955). Typical specimens of B. minor ssp. minor have ligules which are 4-8 mm. long.

3. Baeria hirsutula (Greene) Greene, Fl. Franciscana 438. 1897.

Local distribution: Usually along or near the coast in moist flats, also in northern San Mateo County in the vicinity of San Bruno Mountain. Latter part of March through June.

General distribution: Mendocino County south along the coast to San Luis Obispo County and on some of the Channel Islands.

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Specimens examined: San Bruno Mt., Ferris 2128; Baden, Dudley, May 14, 1899; Seal Cove, Dudley, Mar. 17, 1900; Pescadero, Chambers 1046; Santa Cruz, Thomas 1487.

4a. Baeria chrysostoma Fisch. & Mey. var. chrysostoma, Ind. Sem. Hort. Petrop. 2: 29. 1836.

Local distribution: Open grassy slopes, often on rocky and wind swept hills, and sometimes in serpentine soil or on sand dunes. Latter part of March through May.

General distribution: Coast Ranges from Curry County, Oregon, south to Santa Barbara County, also on Santa Cruz Island.

Specimens examined: San Francisco, Kellogg, May 1878; Bayshore Hills, Hoover 4052; Twin Peaks, Thomas 4866; San Bruno Hills, Howell 11204; Sawyer Ridge, Oberlander 78; Coal Mine Ridge, Barry 37; Stanford, Dudley, Apr. 12, 1893; Near San Jose, Rattan, May 16, 1866; Edenvale, Abrams 5187; Hills west of Gilroy, Baker 1941; Between Scott Valley & Waddell Creek, Ferris 1984.

4b. Baeria chrysostoma Fisch. & Mey. var. gracilis (DC.) Hall, Univ. Calif. Pub. Bot. 3: 170. 1907.

Local distribution: Open grassy slopes, sandy soil, or shallow soil of rocky or serpentine outcroppings, usually in the open, but sometimes partially shaded as at Mount Hermon. Latter part of January through May.

General distribution: Jackson County, Oregon, south through the Coast Ranges, Great Valley, and Sierra Nevada foothills to northern Baja California, on some of the Channel Islands, and eastward through the Mojave and Colorado deserts to Graham and Cochise counties, Arizona.

Specimens examined: Near Millbrae, Dudley, May 17, 1893; Redwood City, Rose 33128; Stanford, Abrams 2380; Edenvale, Thomas 4782; Near Jamison Creek, Thomas 2918; Scotts Valley, Abrams 10931; Near Mt. Hermon, Ferris 2011; Big Trees, Leitholt, May 15, 1893.

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67. Lasthenia Cass. Opusc. 3: 88. 1834.

Rays inconspicuous; pappus present.....1. L. glaberrima.
Rays conspicuous; pappus lacking.....2. L. glabrata.

1. Lasthenia glaberrima DC. Prod. 5: 664. 1836.

Local distribution: Semiaquatic of small ponds or on muddy ground, southern San Mateo County southward to the vicinity of San Jose. May and June.

General distribution: Southwestern Washington southward to Santa Clara County, also in the Central Valley from Yuba to San Joaquin counties.

Specimens examined: San Francisquito Creek, Bacigalupi, Apr. 16, 1923; Coal Mine Ridge, Dudley, May 22, 1906; San Jose, Rattan, 1880.

2. Lasthenia glabrata Lindl. Bot. Reg. 21: pl. 1780. 1836.

Local distribution: Edges of the salt marshes along San Francisco Bay and low moist areas of heavy clay soils in the northern part of the Santa Clara Valley. Latter part of March through May.

General distribution: Low saline lands, Humboldt and Butte counties south to southern Kern County.

Specimens examined: San Francisco, Rattan, no date; Millbrae, Elmer 4426; Crystal Springs, Abrams 2456; Belmont, Greene, May 1883; Redwood City, Ferris 6866; Mayfield, Dudley, Apr. 4, 1905; San Jose, Elmer 4715; 3 miles s. of San Jose, Thomas 4789.

68. Achillea L. Sp. Pl. 896. 1753.

Plants glabrate to arachnoid; leaves thin; involucres usually about 4 mm. high. Coastal bluffs and inland.
1a. A. borealis ssp. californica.
Plants tomentose; leaves thick; involucres usually about 5 mm. high. Coastal dunes.....1b. A. borealis ssp. arenicola.

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1a. Achillea borealis Bong. ssp. californica (Pollard) Keck, Carnegie Inst. Wash. Pub. 520: 299. 1940.

Local distribution: Coastal bluffs, open slopes, wooded areas, and often as weeds in disturbed areas and in lawns, throughout the Santa Cruz Mountains and adjacent lowlands. April through July.

General distribution: Vancouver Island south through Washington and Oregon on the western side of the Cascades, in the California Coast Ranges and Sierra Nevada foothills, and in northern Baja California.

Specimens examined: Twin Peaks, Thomas 4864; San Bruno Mt., Thomas 4835; Coal Mine Ridge, Barry 21; Foothills west of Los Gatos, Heller 7397; Saratoga - Big Basin Road, Abrams 5281; Blooms Grade, Thomas 1819; Ben Lomond sand hills, Thomas 1869.

1b. Achillea borealis Bong. ssp. arenicola (Heller) Keck, Carnegie Inst. Wash. Pub. 520: 299. 1940.

Local distribution: Coastal sand dunes from San Francisco southward. May through July.

General distribution: Del Norte County south to northern Monterey County.

Specimens examined: San Francisco, Olsson-Seffer, 1904; Heller 5664; Sunset Beach State Park, Thomas 3278.

Achillea borealis ssp. arenicola and ssp. californica are very difficult to distinguish. The best and most easily discernible creterion for distinguishing between the two subspecies is to be found in their habitats.

69. Anthemis L. Sp. Pl. 894. 1753.

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1. Anthemis cotula L. Sp. Pl. 894. 1753.

Local distribution: Very common throughout the Santa Cruz Mountains and adjacent lowlands in fallow and overgrazed fields, along highways and roads, and in other disturbed areas. Plants can be found in flower at all times of the year.

General distribution: Native of Europe, now almost cosmopolitan in distribution.

Specimens examined: San Francisco, Rattan, 1878; Upper San Mateo Creek, Oberlander 154; Stanford, Dudley, June 8, 1893; Cooleys Landing, Halsey, Nov. 7, 1908; Swanton, Rich, Spring 1912; Hilton Airport, Thomas 1985; Near Pajaro River, Thomas 3257.

70. Chrysanthemum L. Sp. Pl. 887. 1753.

Leaves bipinnatifid.
  Heads under 1.5 cm. across; rays white; ultimate divisions of the leaves rounded to obtuse.....1. C. parthenium.
  Heads over 2 cm. across; rays yellow; ultimate divisions of the leaves acute.....2. C. coronarium.
Leaves toothed.....3. C. leucanthemum.

1. Chrysanthemum parthenium (L.) Bernh. Syst. Verz. 145. 1800.

Local distribution: Occasional as an escape from cultivation in ditches, stream beds, marshes, and moist disturbed areas. June through October.

General distribution: Native of Europe, widely established.

Specimens examined: Palo Alto, Dudley, Oct. 18, 1897; Stevens Creek, Thomas 4305; Laurel, Abrams 13821; Boulder Creek, Hesse 328.

2. Chrysanthemum coronarium L. Sp. Pl. 890. 1753.

Local distribution: Occasionally as an escape from gardens. April through August.

General distribution: Native of Europe, North Africa, and Asia,

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widely established as an escape from cultivation.

Specimens examined: Golden Gate Park, Eastwood, Oct. 1914 (CAS); Half Moon Bay, Cox, Aug. 10, 1946.

3. Chrysanthemum leucanthemum L. Sp. Pl. 888. 1753.

Local distribution: Usually in disturbed areas along roads, northern San Mateo County. May through August.

General distribution: Native of Europe and Asia, widely naturalized in North America.

Specimens examined: West of Baden, Dudley, June 19, 1908; Millbrae, Howell 25356 (CAS); Cahil Ridge, Cox, Aug. 10, 1946.

71. Soliva Ruiz & Pavon, Fl. Peruv. Prod. 113. 1794.

1. Soliva sessilis Ruiz & Pavon, Fl. Peruv. Prod. 113. 1794.

Local distribution: Grassy slopes, old roads, and in gardens and lawns, throughout the Santa Cruz Mountains and adjacent lowlands. January through June.

General distribution: Native of Chile, adventive in Oregon and California.

Specimens examined: San Francisco, Congdon, Apr. 1881; Golden Gate Park, Thomas 6482; Near Pescadero Creek, Dudley, June 6, 1895; Pescadero Beach, Wiggins 12352; Pigeon Pt., Thomas 4283; Woodside, Abrams 2428; Palo Alto, Thomas 4913; Page Mill Road, Thomas 4822; Permanente Creek, Dudley, Apr. 23, 1899; Big Basin, Dudley, June 5, 1897; 1.2 miles southwest of Eagle Rock, Thomas 4073.

Cabrera in a recent synopsis of the genus Soliva (1949) recognized the occurrence of two introduced species of this genus in California, S. sessilis and S. pterosperma (Less.) Less. Crampton (1954) has recognized three species as occurring in California, namely the two above plus S. daucifolia Nutt. Cabrera considered S. daucifolia to be a

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synonym of S. sessilis. Unfortunately his synopsis does not contain descriptions. It is therefore impossible to determine the range of variation of S. sessilis in Chile from this source. Crampton has maintained S. daucifolia as a species because it lacks wings or has them poorly developed and lacks apical teeth or has these poorly developed. Soliva sessilis has broad wings and well-developed apical teeth. Several local collections, among them Abrams 2428, and several from other parts of the state, contain mixed collections, i.e., plants with S. sessilis achenes and plants with S. daucifolia achenes. In view of the mixed populations and occasional intermediates, I am following Cabrera rather than Crampton.

72. Matricaria L. Sp. Pl. 891. 1753.

Mature heads 9-11 mm. in diameter; plants 1.5-3.5 dm. tall, branched from the base or not; pappus crown with 2 conspicuous teeth. 1. M. occidentalis.

Mature heads 5-7 mm. in diameter; plants usually under 2 dm. tall, usually branched from the base; pappus crown lacking 2 conspicuous teeth.....2. M. matricarioides.

1. Matricaria occidentalis Greene, Bull. Calif. Acad. 2: 150. 1887.

Local distribution: Known only from San Francisco. April through June.

General distribution: Probably native in the Sacramento and San Joaquin valleys and introduced into southern California, San Francisco, and perhaps Oregon; also introduced into the British Isles.

Specimens examined: Streets of San Francisco, Brandegee, June 1888; San Francisco, Brandegee, no date; Islais Creek, Howell 32655 (CAS).

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2. Matricaria matricarioides (Less.) Porter, Mem. Torr. Bot. Club 5: 341. 1894.

Local distribution: Very common throughout the Santa Cruz Mountains and adjacent lowlands, especially in dry hard-packed soils of disturbed areas. March through June.

General distribution: Probably native from Alaska south to Montana, Idaho, California, and northern Mexico, widely introduced as a weed in the rest of the United States and southern Canada, Eurasia, Chile, and New Zealand.

Specimens examined: San Francisco, Brandegee, no date; San Andreas Valley, Oberlander 26; Stanford, Abrams 1576; Swanton, Rich, Spring 1912; Near Saratoga Summit, Thomas 2939; Santa Cruz, Thomas 1377.

73. Cotula L. Sp. Pl. 892. 1753.

Leaves pinnate, pubescent, not succulent.....1. C. australis.
Leaves pinnatifid, glabrous, somewhat succulent.....2. C. coronopifolia.

1. Cotula australis (Sieb.) Hook. f. Fl. Nov. Zel. 128. 1853-1855.

Local distribution: Common as a weed in disturbed areas, especially about habitations and along sidewalks and streets. March through October.

General distribution: Native of Australia, widely introduced in California and has been collected in the eastern states.

Specimens examined: San Francisco, Greene, 1886; Kellogg, Apr. 1888; Mussel Rock, Dudley, Oct. 4, 1909; Sawyer Ridge, Oberlander 1161; Stanford, Abrams, Mar. 20, 1912; Waddell Creek, Thomas 2926.

2. Cotula coronopifolia L. Sp. Pl. 892. 1753.

Local distribution: Very common along the coast and San Francisco Bay in marshes and in moist places in sand dunes; inland it occurs in low, usually disturbed marshy areas and areas of heavy soils below about

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500 feet elevation. March through October.

General distribution: Native of South Africa, widely distributed in the southern hemisphere and along both coasts of temperate North America.

Specimens examined: San Francisco, Curran, 1886; San Francisco - San Mateo Co. line, Bacigalupi 2747; Near Crystal Springs Lake, Randall 64; Coal Mine Ridge, Barry 254; Alviso, Rust 39; Swanton, Rich, Spring 1912; Santa Cruz, Jones 2344; Seabright, Hichborn 326; Near Pajaro River, Thomas 2393.

74. Artemisia L. Sp. Pl. 845. 1753.

Plants shrubby; leaf divisions filiform; plants distinctly with the odor of sage.....1. A. californica.
Plants herbaceous or somewhat woody at base; odorless or with a slightly pungent odor.
  At least the abaxial leaf surfaces tomentose.
    Leaves pinnate, the divisions lanceolate to ovate. Mainly inland plants.....2. A. douglasiana.
    Leaves once to thrice pinnate, the divisions linear. Plants of the sea coast and inland marine sand deposits. 3. A. pycnocephala.
  Leaves glabrous to pubescent, not tomentose.
    Leaves usually entire, or if lobed the segments entire. 4. A. dracunculoides.
    Leaves pinnate, the margins distinctly serrate. 5. A. biennis.

1. Artemisia californica Less. Linnaea 6: 523. 1831.

Local distribution: Coastal bluffs and open exposed slopes from San Francisco southward on both sides of the Santa Cruz Mountains, commonly growing with Baccharis pilularis, Rhus diversiloba, Diplacus aurantiacus, Rubus vitifolius, and Anaphalis margaritacea. July through November.

General distribution: Coast Ranges, Marin and Contra Costa counties, south to northern Baja California and the borders of the Colorado Desert, also on the Channel Islands.

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Specimens examined: San Francisco, Brandegee, no date; Sweeney Ridge, Oberlander 392; Stanford, Abrams 1007; Black Mt., Abrams 8; Near Big Basin, Thomas 2368; Eureka Canyon, Thomas 2495; Santa Cruz, Jones 2354.

2. Artemisia douglasiana Bess. in Hook. Fl. Bor. Amer. 1: 323. 1833.

Local distribution: Common throughout the Santa Cruz Mountains, especially along streams, in dry stream bottoms, occasionally on shaded slopes, and often appearing as a weed in disturbed areas. Latter part of June through November.

General distribution: Western Washington and northern Idaho south to Baja California, mainly west of the Cascade - Sierra axis, probably introduced into the area covered by this flora.

Specimens examined: San Andreas Lake, Oberlander 380; Portola Road, Randall 53; Black Mt., Leitholt, Aug. 15, 1894; Near Mountain View, Rust 43; Hills back of Los Gatos, Heller 7209; Carnadero Creek, Thomas 4368; Big Basin, Thomas 2432; Eccles, Dudley, June 26, 1897; Rincon, Thomas 4567; Watsonville Slough, Thomas 2418.

3. Artemisia pycnocephala (Less.) DC. Prod. 6: 99. 1837.

Local distribution: Coastal sand dunes and beaches, also occasionally inland as on the sand hills at Camp Evers. May through November.

General distribution: Coastal strand from Coos County, Oregon, south to Point Sur, Monterey County.

Specimens examined: San Francisco, Grant 15988; Lake Merced, Bioletti, Aug. 27, 1892; Mussel Rock, Dudley, Oct. 4, 1909; Pescadero Beach, Wiggins 3800; Waddell Creek, Thomas 2485; Camp Evers, Hesse 623; Sunset Beach, Thomas 3280; Palm Beach, McMinn 267.

4. Artemisia dracunculoides Pursh, Fl. Amer. Sept. 742. 1814.

Local distribution: Occasional, usually in disturbed areas. October and November.

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General distribution: British Columbia east to Manitoba, south to Baja California and Texas.

Specimens examined: San Francisquito Creek, Dudley, Nov. 12, 1897; Alviso, Randall, Oct. 19, 1907; Palo Alto, Dudley, Oct. 3, 1896; Mt. View, Rust 42; Big Trees, Dudley, Oct. 3, 1896.

5. Artemisia biennis Willd. Phytogr. 11. pl. 10. 1794.

Local distribution: Occasional throughout our range, commonly in swampy or marshy areas, along streams, and where water has been standing. September through December.

General distribution: Presumably native in the Rocky Mountains northward to British Columbia, widely established in the United States, Europe, and Asia.

Specimens examined: Upper Crystal Springs Lake, Oberlander 392; Searsville Lake, Ferris 4096; Mt. View, Rust 40; Near San Antonio Creek, Randall, Sept. 1907; Near Santa Cruz, Dudley, Nov. 29, 1908; Pajaro River, Hayward, Oct. 19, 1927.

75. Tanacetum L. Sp. Pl. 843. 1753.

1. Tanacetum camphoratum Less. Linnaea 6: 521. 1831.

Local distribution: Sand dunes in the western part of San Francisco, now probably restricted to the coastal dunes and the few small areas of sand left inland. June through October.

General distribution: Known only from southernmost Marin and San Francisco counties.

Specimens examined: Cliff House, Rose 32650; Pt. Lobos, Walker 1840; Golden Gate Park, Rattan, Sept. 1880.

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76. Arnica L. Sp. Pl. 884. 1753.

1. Arnica discoidea Benth. Pl. Hartw. 318. 1849.

Local distribution: Open slopes commonly adjacent to chaparral in soil often rocky, growing with Thermopsis macrophylla, Helianthemum scoparium, Polygala californica, Pteridium aquilinum, and various species of Lupinus, southern San Mateo County southward. May through July.

General distribution: Southern Washington southward in the Cascades, and the California Coast Ranges to Santa Barbara County, and the Sierra Nevada to Mariposa County.

Specimens examined: Pescadero Creek, Randall 49; Woodside to Crystal Springs Reservoir, Dudley, May 1894; Jasper Ridge, Mason, May 18, 1921; Alma, Heller 7490; Sierra Azule Ridge, Ferris 3632; Eagle Rock, Ferris 11114; Ridge between Scott and Mill Creek drainages, Thomas 4089; Big Basin, Lang, May 26, 1923.

77. Petasites Mill. Gard. Dict. abr. ed. 4. 1754.

1. Petasites frigidus (L.) Fries var. palmatus (Ait.) Cronq. Rhodora 48: 124. 1946.

Local distribution: Along creeks and streams in the redwood - douglas fir forests from central San Mateo County southward. March through May.

General distribution: Southern Yukon east to Labrador, south to Monterey County, California, Minnesota, New York, and Nova Scotia.

Specimens examined: Headwaters of Pescadero Creek, Herre & Wiggins 19A; Peters Creek, Ferris 750; Stevens Creek, Elmer 4873; Alma, Abrams 2288; Swanton, Rich, Mar. 1, 1912; Glenwood, Thomas 1441; Hester Creek, Thomas 2144.

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78. Senecio L. Sp. Pl. 866. 1753.

Pistillate flowers if present ligulate, marginal, heads usually radiate.
Ray flowers purple-lavender. Introduced plants...1. S. elegans.
Ray flowers yellow or none. Introduced or native plants.
Leaves palmately veined; plants climbing.....2. S. mikanioides.
Leaves pinnately veined; plants not climbing.
Plants annual.
Involucral bracteoles black-tipped, involucral bracts usually about 20; rays absent.....3. S. vulgaris.
Involucral bracteoles present or absent, but not black-tipped, involucral bracts about 12; rays present, but small.....4. S. sylvaticus.
Plants perennial.
Leaves and involucral bracts densely white-tomentose, leaf segments not linear. Introduced plants.
5. S. cineraria.
Leaves and involucral bracts not densely tomentose, or if the leaves tomentose then their segments linear. Native plants.
Leaves entire or toothed, not lobed or pinnatifid.
Leaves entire. Plants coastal or of salt marshes.
6. S. hydrophilus.
Leaves dentate. Inland plants.....7. S. aronicoides.
Leaves lobed or pinnatifid, the lobes various.
Segments of the leaves linear, usually tomentose.
8. S. douglasii.
Segments of the leaves not linear, glabrous.
9. S. breweri.
Pistillate flowers present, marginal, lacking ligules. Introduced plants.
Leaves sharply but irregularly dentate.....10. S. minimus.
Leaves pinnatifid.....11. S. glomeratus.

1. Senecio elegans L. Sp. Pl. 869. 1753.

Local distribution: Ocean bluffs and sandy beach soils in northwestern San Francisco. May and June.

General distribution: Native of South Africa, introduced in San Francisco.

Specimens examined: Bakers Beach, Bacigalupi 1920; Eastwood 2683A (CAS); Near Cliff House, Bartholemew, May 7, 1932; Lands End, Thomas 4259.

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2. Senecio mikanioides Otto, Allg. Gartenz. 10: 168. 1842.

Local distribution: Occasional in moist areas along streams or on shaded slopes, commonly climbing over other vegetation. January through March.

General distribution: Native of South Africa, introduced into central and southern California.

Specimens examined: Frenchmans Creek near the Ocean, Ferris 1761; Searsville, Abrams 2263.

3. Senecio vulgaris L. Sp. Pl. 867. 1753.

Local distribution: Very widespread as a weed in disturbed areas, especially in orchards where it may color the ground with yellow, and in grasslands. Flowering all year.

General distribution: Native of Europe, north Africa, and western Asia, now a cosmopolitan weed.

Specimens examined: San Francisco, Rattan, Feb. 22, 1877; East Palo Alto, Wiggins 3398; Coal Mine Ridge, Barry 110; Hilton Airport, Thomas 2526; Santa Cruz, Thomas 1379.

4. Senecio sylvaticus L. Sp. Pl. 868. 1753.

Local distribution: To be expected occasionally in the Santa Cruz Mountains. April through June.

General distribution: Native of Europe, widely introduced into temperate North America.

Specimens examined: Ben Lomond sand hills, Hesse 1534 (JEPS); Mt. Hermon, Hesse 1265 (JEPS).

5. Senecio cineraria DC. Prod. 6: 374. 1837.

Local distribution: Occasionally escaped from gardens. June

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through August.

General distribution: Native of the western Mediterranean region, widely used as a garden ornamental, occasionally escaping.

Specimens examined: San Francisco, Dudley, June 3, 1894; Coastal bluffs at Santa Cruz, Thomas 4570A; Howell 10858 (CAS).

6. Senecio hydrophilus Nutt. Trans. Amer. Phil. Soc. II. 7: 411. 1841.

Local distribution: Occasionally along the margins of the salt marshes of the San Francisco Bay and in low wet areas along the coast. May through October.

General distribution: British Columbia east to South Dakota, south to central California, Nevada, Utah, and Colorado.

Specimens examined: Menlo Park, Abrams 2220; Cooleys Landing, Dudley, Oct. 1902; Swanton, Rich, May 22, 1912.

7. Senecio aronicoides DC. Prod. 6: 426. 1837.

Local distribution: Occasional in open flats, in the evergreen forests, and in openings in chaparral, from San Francisco south to Loma Prieta and the Ben Lomond Sand Hills. Latter part of April through June.

General distribution: Southern Oregon south through the Coast Ranges to Santa Clara County and San Benito County, and in the Sierra Nevada to Fresno County.

Specimens examined: Mt. Davidson, San Francisco, Raven 9002 (JEPS); Ocean View, Dudley, Mar. 24, 1895; Colma, Abrams 1612; San Bruno Hills, Elmer 4508; Crystal Springs, Kellogg, no date; Redwood City, Abrams 2398; Kings Mt., Dudley, May 27, 1893; Searsville, Dudley, May 13, 1894; Black Mt., Dudley, June 6, 1903; Castle Rock, Thomas 5200; Loma Prieta, Dudley, May 30, 1893; Ben Lomond Sand Hills, Thomas 6029.

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8. Senecio douglasii DC. Prod. 6: 429. 1837.

Local distribution: Along dry stream beds, in chaparral, and on open exposed slopes from southern San Mateo County southward on the eastern side of the Santa Cruz Mountains. August through November.

General distribution: Coast Ranges and Sierra Nevada foothills from Sonoma and Amador counties south to northern Baja California.

Specimens examined: Mt. View, Abrams 3096; Stevens Creek, Dudley, Sept. 1904; Wrights Station, Dudley, Sept. 29, 1894; Soda Springs, Ferris 2077; Near Almaden, Ferris 2036.

9. Senecio breweri Davy, Erythea 3: 116. 1895.

Local distribution: Occasional at the edges of woodland, apparently restricted to the eastern slopes of the Santa Cruz Mountains. May and June.

General distribution: San Mateo and Contra Costa counties south in the Coast Ranges to Los Angeles County, also in eastern Kern County.

Specimens examined: Back of San Mateo, Heller 8565; Kings Mt., Dudley, May 27, 1893; Stanford, Elmer 4418; Black Mt., Hichborn, May 4, 1920.

10. Senecio minimus Poir. in Lam. Encycl. Suppl. 5: 130. 1817.

(Erechtites prenanthoides (Rich.) DC. Prod. 6: 296. 1837.)

Local distribution: Moist soil along creeks, at the edges of chaparral, and in disturbed ground at the edges of redwood - douglas fir forests. July through January.

General distribution: Native of Australia and New Zealand, established in the Coast Ranges from Lincoln County, Oregon, south to central California.

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Specimens examined: Pilarcitos Dam, Thomas 5515; Bielawski Look-out, Thomas 3452; Jamison Road, Thomas 3495; Waddell Creek, Thomas 2472.

11. Senecio glomeratus Desf. ex Poir. in Lam. Encycl. Suppl. 5: 130. 1817.

(Erechtites arguta DC. Prod. 6: 296. 1837.)

Local distribution: Open disturbed areas throughout the area covered by this flora. Latter part of May through December.

General distribution: Native of Australia and New Zealand, established in the Coast Ranges from Clatsop County, Oregon, south to central California.

Specimens examined: San Francisco, Rose, 1930 (CAS); Sharp Park, Rose 13980 (CAS); Near Daly City, Abrams 11218; Belmont, Demaree 10505; Redwood City, Wiggins 6970A; Near San Mateo - Santa Cruz Co. line, Thomas 1705; Soda Lake, Thomas 3305.

79. Cynara L. Sp. Pl. 827. 1753.

1. Cynara scolymus L. Sp. Pl. 827. 1753.

Local distribution: Occasional as an escape from cultivation. June through November.

General distribution: Native of Europe and widely grown in temperate regions, occasionally becoming established as an escape.

Specimens examined: Redwood City, Howell 31961; Stanford, Thomas 5212; Near Santa Clara, Dudley, Nov. 1893.

80. Arctium L. Sp. Pl. 816. 1753.

Heads 2.5-4 cm. broad, long-pedunculate.....1. A. lappa.
Heads 1.5-2.5 cm. broad, subsessile.....2. A. minus.

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1. Arctium lappa L. Sp. Pl. 816. 1753.

Local distribution: Known definitely only from San Francisco and Stanford, but to be expected elsewhere in disturbed areas. July through October.

General distribution: Native of Europe and widely naturalized in temperate North America, Japan, South America, and in other temperate regions.

Specimens examined: Golden Gate Park, Eastwood, Aug. 1916 (CAS); Stanford, Abrams 12178.

2. Arctium minus (Hill) Bernh. Syst. Verz. Erf. 154. 1800.

Local distribution: Known definitely only from near the Cowell Redwoods State Park in Santa Cruz County. July through October.

General distribution: Native of Europe and North Africa, eastward to the Caucasus, introduced into most temperate regions.

Specimen examined: Cowell Redwoods State Park, Rubtzoff 2163 (CAS).

81. Centaurea L. Sp. Pl. 909. 1753.

Terminal spine of the involucral bracts under 2 mm. long.
  Terminal spine 1-2 mm. long.....1. C. diluta.
  Terminal spine lacking or shorter than the lateral divisions of the involucral bracts.
    Leaves pinnately to bipinnately divided; herbage densely white-tomentose.....2. C. cineraria.
    Leaves entire or sometimes laciniate; herbage not densely white-tomentose.
      Pappus bristles about 4 mm. long; plants annual. 3. C. cyanus.
      Pappus paleae under 0.5 mm. long; plants perennial. 4. C. pratensis.
Terminal spine of the involucral bracts over 5 mm. long.
  Leaf bases not decurrent; pappus lacking; flowers blue. 5. C. calcitrapa.
  Leaf bases decurrent; pappus present; flowers yellow.
    Terminal spine 11-22 mm. long; pappus bristles 3-5 mm. long, that of the marginal flowers lacking.....6. C. solstitialis.
    Terminal spine 5-9 mm. long; pappus bristles 1.5-3 mm. long, that of the marginal flowers present.....7. C. melitensis.

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1. Centaurea diluta Ait. Hort. Kew. 3: 261. 1789.

Local distribution: Occasional as a weed. July and August.

General distribution: Native of North Africa, occasional as a weed in central and southern California.

Specimen examined: San Francisco, Rubtzoff 1302 (CAS).

2. Centaurea cineraria L. Sp. Pl. 912. 1753.

Local distribution: Occasional as an escape from cultivation. May through July.

General distribution: Native of southern Europe and North Africa, occasional as an escape from cultivation in central and southern California.

Specimen examined: Neary Lagoon, Santa Cruz, Hesse 1294 (JEPS).

3. Centaurea cyanus L. Sp. Pl. 911. 1753.

Local distribution: Occasional as an escape throughout the Santa Cruz Mountains in disturbed areas. May through August.

General distribution: Native of the Mediterranean region, widely cultivated as an ornamental, occasionally escaped.

Specimens examined: Stanford, Dudley, June 23, 1894; Alma, Thomas 3989; Near Saratoga Summit, Thomas 3453.

Corolla color in most populations of this species varies from deep purple through various shades of violet, blue, and pink to white. Blue is the most common color.

4. Centaurea pratensis Thuill. Fl. Paris 444. 1799.

Local distribution: Occasional in disturbed areas. July through August.

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General distribution: Native of Europe, introduced into British Columbia, the Pacific States, and in the eastern part of the United States.

Specimen examined: Empire Grade, Hesse 1668 (JEPS).

5. Centaurea calcitrapa L. Sp. Pl. 917. 1753.

Local distribution: Disturbed areas, mainly on the eastern side of the Santa Cruz Mountains. May through November.

General distribution: Native of Eurasia, widely introduced into temperate regions.

Specimens examined: San Bruno Mt., Thomas 4831; San Mateo, Mallory, July 21, 1919; Crystal Springs, Abrams & Wiggins 174; Belmont, Mason, Oct. 1921; Palo Alto, Duncan, Aug. 21, 1922; Stanford, Wiggins 3812; Near San Jose, Cody, May 22, 1922.

6. Centaurea solstitialis L. Sp. Pl. 917. 1753.

Local distribution: Roadsides, fallow fields, and other disturbed habitats. June through November.

General distribution: Native of the Mediterranean region, introduced into other temperate regions.

Specimens examined: South San Francisco, Thomas 7044; San Andreas Lake, Oberlander 268; Stanford, Thomas 5203; Lone Hill, Thomas 5326; Near Gilroy, Thomas 4357; Corralitos, Thomas 2497.

7. Centaurea melitensis L. Sp. Pl. 917. 1753.

Local distribution: Common in disturbed areas throughout the Santa Cruz Mountains. May through September.

General distribution: Native of Europe and widely naturalized in other temperate regions.

Specimens examined: Crystal Springs Lake, Elmer 4281; Coal Mine

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Ridge, Barry 167; Stanford, Dudley, June 17, 1897; Baker 177 (CAS); Foothills west of Los Gatos, Heller 7495; Swanton, Rich, Spring 1912; Saratoga Summit, Thomas 3455; Santa Cruz, Jones 2205; Sunset Beach State Park, Thomas 3082.

82. Silybum Adans. Fam. Pl. 2: 116. 1763.

1. Silybum marianum (L.) Gaertn. Fruct. 2: 378. 1791.

Local distribution: Very common throughout the Santa Cruz Mountains, in disturbed habitats, roadsides and overgrazed pastures and fields. March through August.

General distribution: Native of the Mediterranean region, widely established in North America, South Africa, and South America.

Specimens examined: Sawyer Ridge, Oberlander 257; Stanford, Randall 95; Loma Prieta, Elmer 5003; Swanton, Rich, Mar. 1912; Davenport Landing, Thomas 1363.

83. Cnicus L. Sp. Pl. 826. 1753.

1. Cnicus benedictus L. Sp. Pl. 826. 1753.

Local distribution: Occasional in disturbed areas. April through November.

General distribution: Native of Europe and Asia Minor, widely established in the United States and Canada.

Specimens examined: San Francisco, Clark, May 1935 (CAS); Stanford, Dudley, Nov. 18, 1897; Geis, June 1901; Saratoga, Smith, July 15, 1938.

84. Carthamus L. Sp. Pl. 830. 1753.

1. Carthamus lanatus L. Sp. Pl. 830. 1753.

Local distribution: Occasional as a weed, especially in overgrazed and disturbed areas. April through October.

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General distribution: Native of Europe, introduced into central and southern California, South Africa, South America, and probably into other temperate regions.

Specimens examined: San Francisco, Brandegee, July 1891; Larkin and Francisco Streets, Eastwood, Aug. 1, 1920 (CAS); South San Francisco, Cannon, Oct. 6, 1894 (CAS); Stanford, Keck 5540.

85. Cirsium Mill. Gard. Dict. ed. 4. 1754.

Plants dioecious; heads 2-2.5 cm. high.....1. C. arvense.
Plants monoecious; heads usually over 2.5 cm. high.
  Stems winged with spiny decurrent leaf bases.....2. C. vulgare.
  Stems not so winged.
    Involucral bracts with a conspicuous oblong, glutinous gland on the abaxial surface.....3. C. breweri.
    Involucral bracts lacking a gland.
      Adaxial leaf surfaces scabrous; involucral bracts 5-8 mm. wide at the widest point.....4. C. fontinale.
      Adaxial leaf surfaces variously pubescent, but not scabrous; involucral bracts usually under 5 mm. wide.
        Involucral bracts tomentose or arachnoid; corollas usually red or purple; stems usually over 3 dm. tall.
          Heads closely subtended by leaves.
            Corolla-lobes exceeding the anthers, linear; flowers about equalling the involucre.
              5. C. brevistylum.
            Anthers exserted beyond the corolla, its lobes oblong; flowers exceeding the involucre.
              6. C. andrewsii.
          Heads long-pedunculate.
            Outer involucral bracts reflexed; bases of the involucral bracts glabrate or naked, not obscured by the tomentum. Mainly inland plants.
              7. C. coulteri.
            Outer involucral bracts spreading but not reflexed; bases of the involucral bracts obscured by the tomentum. Most common on coastal sand dunes.
              8. C. occidentale.
        Involucral bracts usually glabrous; corollas white or cream-colored; stems usually less than 3 dm. tall.
          9. C. quercetorum.

1. Cirsium arvense (L.) Scop. Fl. Carn. 2: 126. 1772.

Local distribution: Occasional in disturbed areas. June through September.

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General distribution: Native of Eurasia, introduced into the United States and southern Canada.

Specimen examined: Golden Gate Park, Mulford, Sept. 28, 1945 (CAS).

2. Cirsium vulgare (Savi) Airy-Shaw, Fedde Rep. Sp. Nov. 43: 303. 1938.

Local distribution: A weed of disturbed areas, San Francisco southward. August through October.

General distribution: Native of Eurasia, widely introduced into North America.

Specimens examined: Sawyer Ridge, Oberlander 335; Cooleys Landing, Rose, Sept. 28, 1907; Near San Jose, Kinney, Oct. 4, 1903; Wrights, Elmer 5013; Near Hilton Airport, Thomas 3562; Swanton, Rich, Spring 1912; Near mouth of Pajaro River, Thomas 2410.

3. Cirsium breweri (Gray) Jepson, Fl. W. Mid. Calif. 507. 1901.

Local distribution: Hansens Slough near Watsonville, to be expected elsewhere in similar habitats. July through August.

General distribution: Southwestern Oregon south to northern Monterey County in the Coast Ranges, from Modoc County south to Butte County, and in Washoe County, Nevada.

Specimen examined: Near Watsonville, Hayward, July 1, 1929.

4. Cirsium fontinale (Greene) Jepson, Fl. W. Mid. Calif. 505. 1901.

Local distribution: Known from the Crystal Springs Lake region and from Alamitos Creek in Santa Clara County, growing in seeps or along springs, often on serpentine. May through October.

General distribution: Endemic in the Santa Cruz Mountains. Cirsium fontinale var. obispoensis Howell occurs in San Luis Obispo County.

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Specimens examined: Crystal Springs Lake, Sharsmith 3951; Elmer 4292; Howell 10852 (CAS); Spring Valley, Congdon, July 27, 1901; Alamitos Creek, Lorraine, May 12, 1923.

5. Cirsium brevistylum Cronq. Leafl. West. Bot. 7: 26. 1953.

(C. edule of California authors.)

Local distribution: Wooded areas and brush-covered slopes, San Francisco southward. April through July.

General distribution: British Columbia south to Los Angeles County, east to northern Idaho and western Montana.

Specimens examined: Lake Merced, Howell 1952 (CAS); 3 miles west of San Bruno, Rose 33216 (CAS); Crystal Springs, Elmer 4277; San Andreas Lake, Oberlander 283; Lobitos Creek, Sutliffe, July 26, 1933 (CAS); Ano Nuevo Pt., Abrams & Wiggins 427; Coal Mine Ridge, Barry 270; Near Stanford, Randall 61; Near Swanton, Shockley, Sept. 1919; Watsonville, Hayward, July 5, 1929.

6. Cirsium andrewsii (Gray) Jepson, Fl. W. Mid. Calif. 506. 1901.

Local distribution: Known locally only from Lake Merced. June through July.

General distribution: Sonoma County south to San Mateo County.

Specimens examined: Lake Merced, Howell 11424 (CAS).

7. Cirsium coulteri Harv. & Gray, Mem. Amer. Acad. 4: 110. 1849.

Local distribution: Open areas in woods and on dry slopes, northern San Mateo County southward. May through September.

General distribution: Coast Ranges and Sierra Nevada foothills from Mendocino and Sutter counties south to Los Angeles County.

Specimens examined: Near Portola, Leitholt, July 28, 1894; Coal Mine Ridge, Barry 201; Stanford, Dudley, July 1890; Foothills west of Los Gatos, Heller 7500; Los Gatos Canyon, Abrams 4331; Near Eagle Rock, Thomas 4099; Blooms Grade, Thomas 3554; Santa Cruz, Jones, June 1881.

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8. Cirsium occidentale (Nutt.) Jepson, Fl. W. Mid. Calif. 509. 1901.

Local distribution: Coastal sand dunes, less frequent inland, San Francisco southward. April through June.

General distribution: Coast Ranges from Douglas County, Oregon, south to northern Baja California and in the southern Sierra Nevada.

Specimens examined: Lake Merced, Abrams 1613; Ocean View, Heller 8379; Sawyer Ridge, Oberlander 251; Crystal Springs Lake, Elmer 4259; Near Stanford, Randall 62; Loma Prieta Ridge, Thomas 3947; Swanton, Rich, Spring 1912; Sunset Beach State Park, Thomas 3092.

9. Cirsium quercetorum (Gray) Jepson, Fl. W. Mid. Calif. 507. 1901.

Local distribution: Coastal bluffs and grassy slopes near the ocean and San Francisco Bay. April through July.

General distribution: Coast Ranges from Humboldt County south to San Benito County.

Specimens examined: Presidio, Pettibone, June 3, 1894 (CAS); San Francisco, Brandegee, no date; Granada, Eastwood, May 23, 1922 (CAS); Sawyer Ridge, Oberlander 252; Crystal Springs Lake, Elmer 4290; San Bruno Hills, Abrams 7665; Ferris 2144; Hills near Millbrae, Dudley, May 17, 1893; Pigeon Pt., Thomas 4287; Near Burlingame, Howell 14739 (CAS); Near Seabright, Dudley, June 29, 1909.

36. Carduus L. Sp. Pl. 820. 1753.

Involucral bracts scarious-margined, the tips not scabrous abaxially. 1. C. tenuiflorus.
Involucral bracts not scarious-margined, the tips scabrous abaxially. 2. C. pycnocephalus.

1. Carduus tenuiflorus Curtis, Fl. Lond. 6: pl. 55. 1790-1798.

Local distribution: Occasional in disturbed areas, San Francisco southward. May through July.

General distribution: Native of Europe, introduced into Oregon, California, and Texas.

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Specimens examined: Golden Gate Park, Abrams 13404; San Andreas Valley, Oberlander 395; San Mateo - Santa Cruz Co. line, Thomas 1700; Jasper Ridge, Biossat 75; Guadalupe Creek, Thomas 4972; Near Davenport, Hesse 932 (JEPS).

2. Carduus pycnocephalus L. Sp. Pl. 1151. 1763.

Local distribution: Occasional in disturbed areas. May through June.

General distribution: Native of the Mediterranean region, introduced into Oregon and California.

Specimen examined: San Francisco, Raven 9277 (JEPS).

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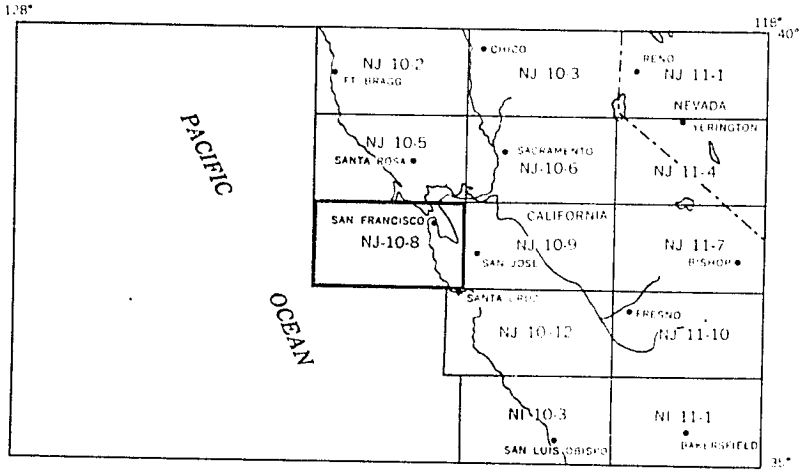
COMPOSITE MAP OF THE SANTA CRUZ MOUNTAINS

Based on Army Map Service Maps
NJ 10-8, printed in 1955
NJ 10-9, printed in 1956
NJ 10-12, printed in 1955



LEGEND
ROAD DATA 1947

POPULATED PLACES
Small; Large built-up area
500,000 or over — BOSTON
100,000 to 500,000 — RICHMOND
25,000 to 100,000 — ALEXANDRIA
5,000 to 25,000 — Marion
1,000 to 5,000 — Old Dominion
1,000 or less — Stowell

Hard surface, heavy duty road, more than two lanes wide — 3 LANES 4 LANES
Hard surface, heavy duty road, two lanes wide
Hard surface, medium duty road, more than two lanes wide — 3 LANES 4 LANES
Hard surface, medium duty road, two lanes wide
Loose surface, graded and drained road
Dirt road; Trail
Route markers: Federal; State — 155 — 25

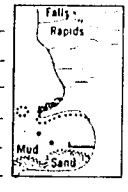
RAILROADS
Standard gauge — Single track — Multiple track
Narrow gauge

Vegetation
Mine

BOUNDARIES
International
State
County
Park and reservation
Horizontal control point — △
Spot elevation in feet — .121

Principal navigation light
Military airfield
Municipal or commercial airfield
Auxiliary airfield
Seaplane base
Seaplane anchorage

Falls; Rapids
Intermittent stream
Swamp, marsh
Reef; Limit of danger line
Rocks awash; Wharf, pier
Foreshore flats



Scale 1:250,000

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CONTOUR INTERVAL 500 FEET

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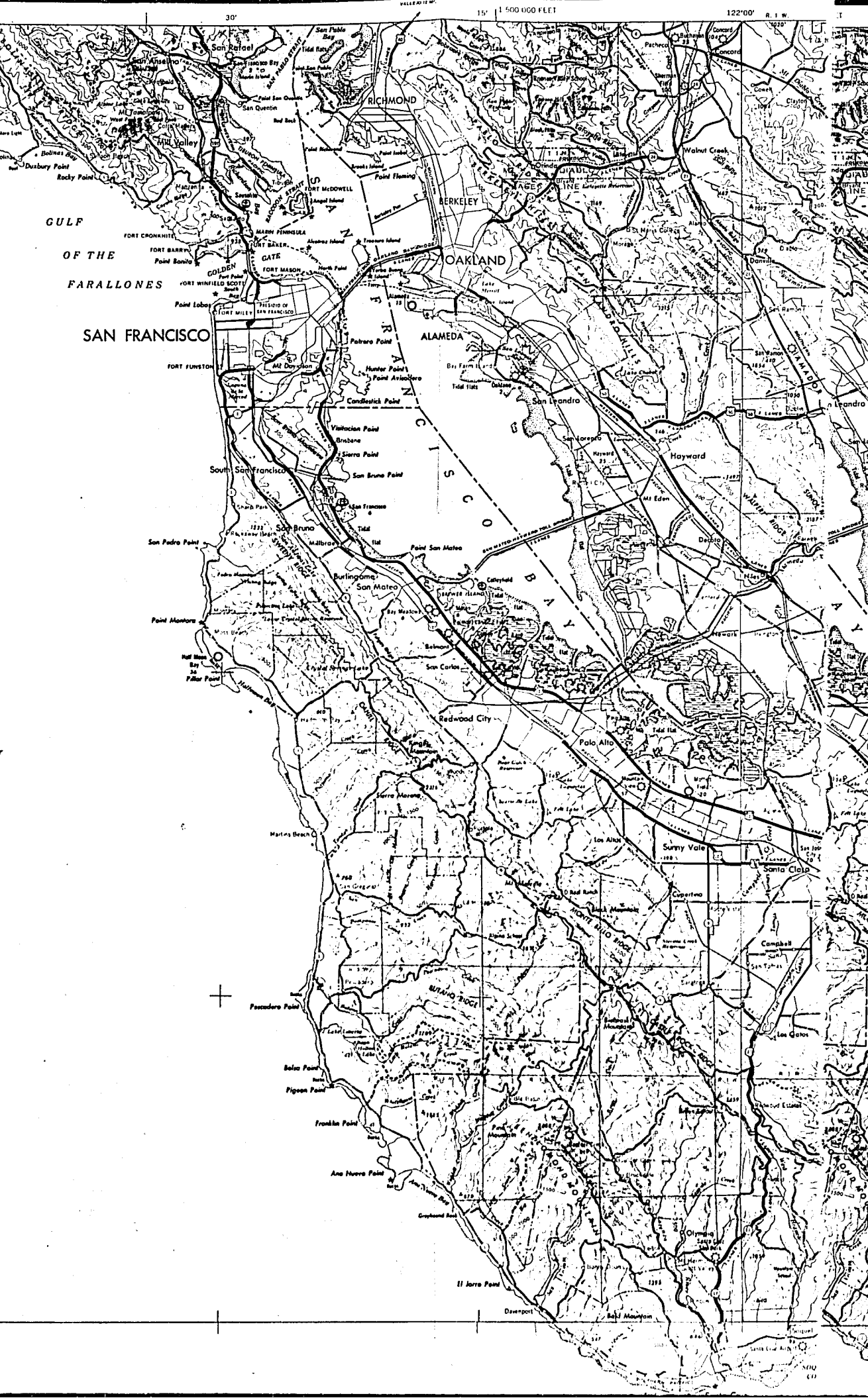

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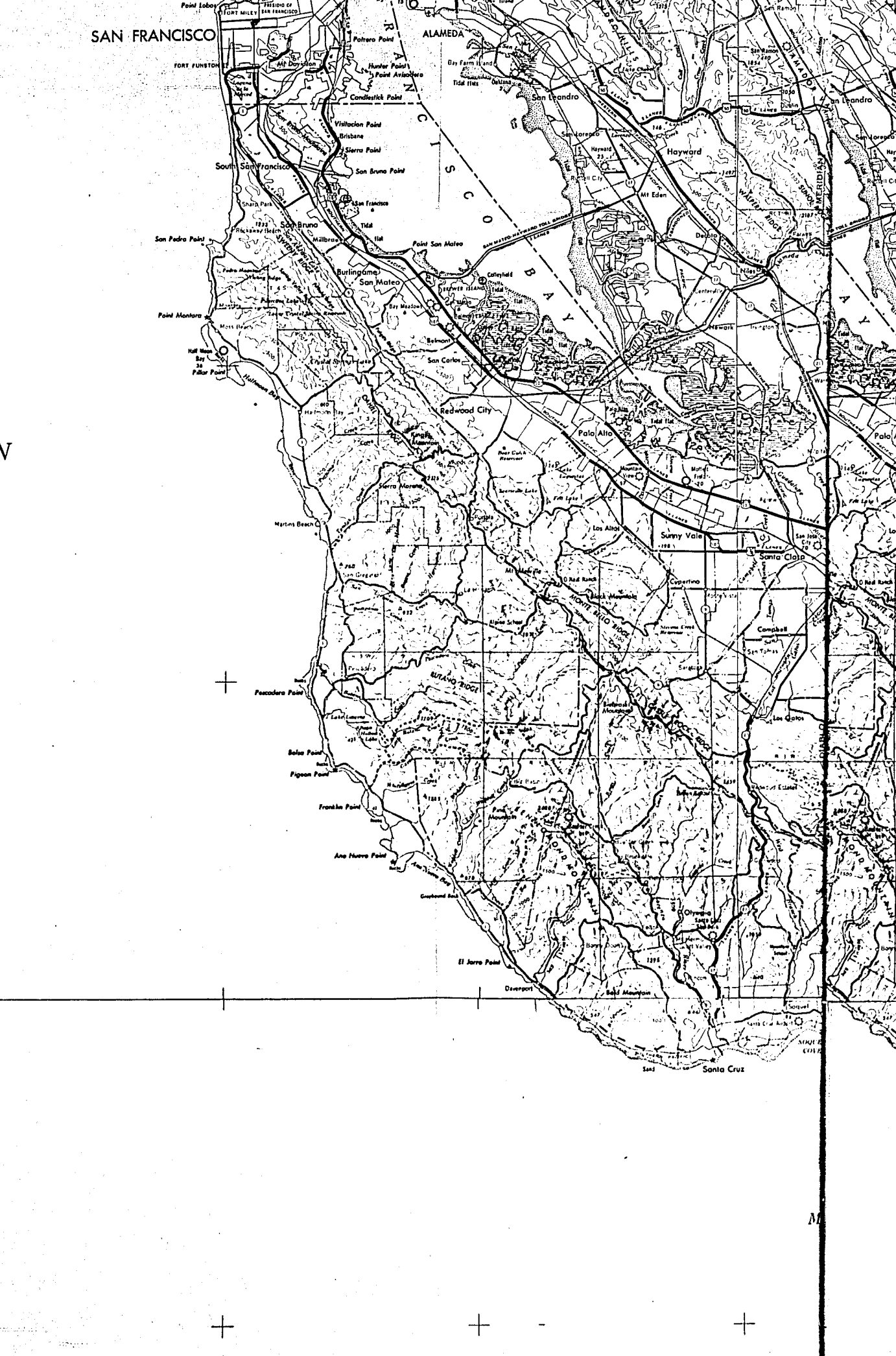

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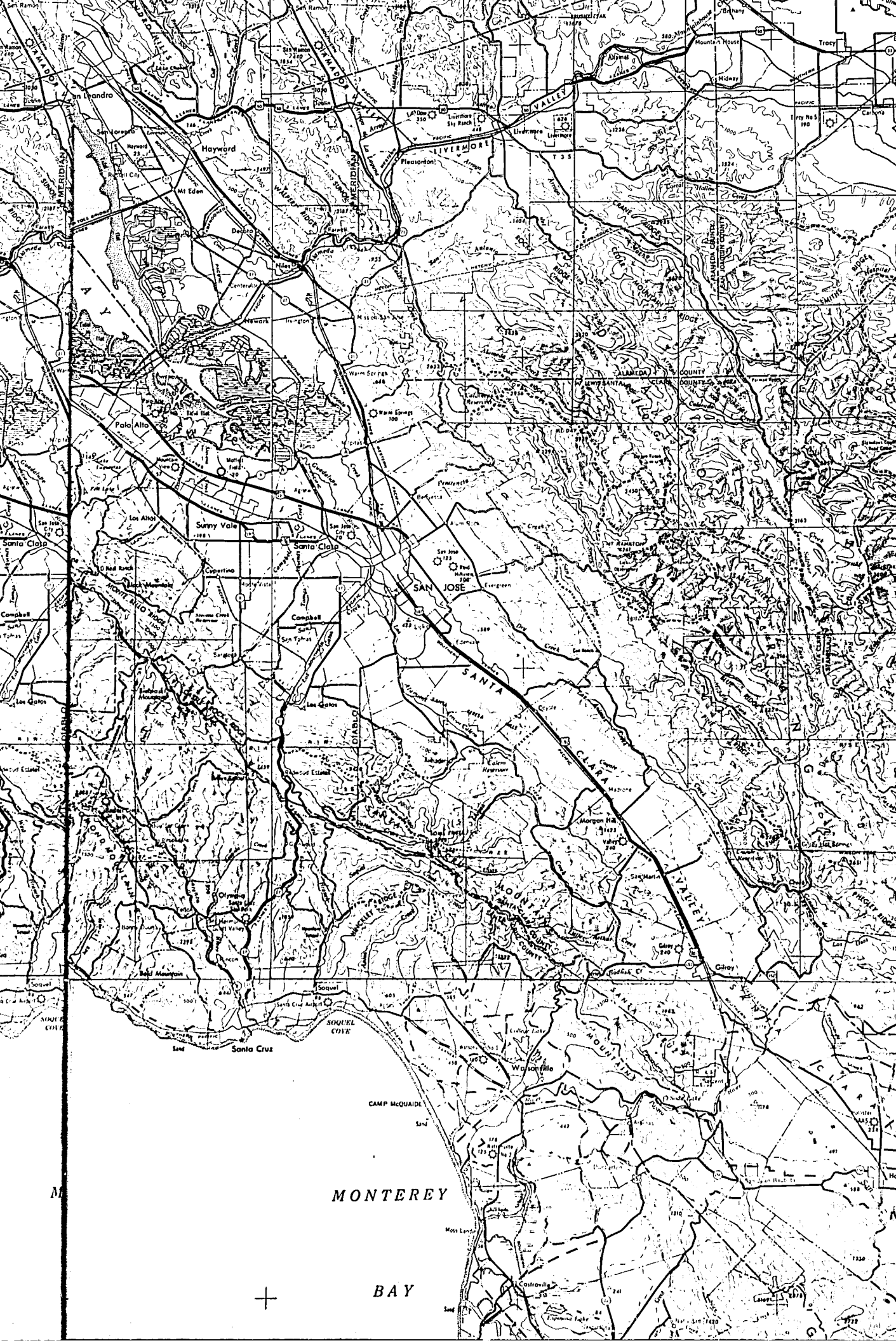

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