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URBAN SURVIVORS: SAN FRANCISCO'S BUTTERFLIES TODAY

Abstract: This paper describes the climate and terrain that have made San Francisco a unique environment for butterflies, and tells about the early-day collectors from whose writings we know about the butterflies of the city. A list and accounts of all species cited by authors as occurring in San Francisco or found in collections with San Francisco labels follow. In conclusion, the habitats where butterflies are found today and their prospects for continued survival are assessed.

Introduction

Pacific breakers crash on sandy beaches to the west, to the north strong currents surge through the rocky Golden Gate, and on the east waters of the bay lap against wharves and piers. San Francisco is roughly square, seven or eight miles from north to south and from west to east. A high ridge dominates the area, with the highest peaks, Mt. Davidson, Twin Peaks, and Mt. Sutro, all over 900 feet in elevation. Red chert, green serpentine, and yellow shale show at summits and on steep slopes. In places such rocks have weathered into clay, but most of the soil of the city is sandy. Old maps show a "Great Sand Bank" occupying its western third. Extensive dunes persisted until developers built the Sunset District housing in the thirties.

In summer moist cool marine air sweeps across the city, and especially through the Golden Gate, to the void created by rising air in the blistering central valleys. As a result, fog frequently shrouds much of San Francisco, and the climate is mild all year, in contrast with hotter summers and colder winters farther south on the peninsula. The unique environment of the area that was to become San Francisco produced unique kinds of butterflies. Because some species had no populations elsewhere, the expansion of the city resulted in their extinction.

San Francisco attracted a diverse and diverting group of researchers to study her butterflies. Francis X. Williams, author of a 1910 paper on San Francisco butterflies, was the first college-trained entomologist among them. California butterflies were a lifelong interest; he retired to Mill Valley in 1949, later to San Diego. Helping to bridge the gap between pioneers of the mid-19th century and 20th century entomologists by writing, in 1928, his recollections going back to boyhood collecting in 1873, was James E. Cottle, who as one writer quipped, "Chased butterflies by day and burglars by night". (He was a policeman.) Alas, no booking officer recorded when or where those insects were apprehended. Cottle did little labeling (Leach 1956). Julius Caesar Huguenin (1918), a watchmaker from Switzerland, collected many species and kept invaluable notes and collection data which he published. Henry Edwards, who carefully recorded, during the 1870s, the previously unknown life history of many butterflies, was a professional actor. And the two great pioneers who came in the forty-niner era.

were a French lawyer and a German physician: Lorquin and Behr.

Pierre Joseph Michel Lorquin came to the city with the gold rush, but the treasures he sought were species new to science. He sent the butterflies he collected to his friend physician-naturalist Jean Alphonse Boisduval in Paris, who described and named them. Forty-three new species from throughout California were sent to Paris by Lorquin. Eight of these types were from San Francisco. Lorquin left after a few years to seek discoveries in other lands.

Hans Herman Behr was a Berlin medical graduate and accomplished linguist, who had political views not accepted in his homeland. He had spent seven years in travel, visiting or residing in Australia, Java, the East Indies, Manila, South Africa, and South America, before, in 1851, he came to San Francisco. Kept busy treating the sick in epidemics encouraged by unsanitary conditions in early San Francisco, he found some time to collect butterflies. He sent them to W. H. Edwards to be described, named, and published. Three were new to science. Behr was an early member and curator in the California Academy of Sciences, the first such center of learning west of Philadelphia. He brought a bride to San Francisco and resided here until his death in 1904. He was 85.

The California Academy of Sciences collection, which included Behr's types and much other irreplaceable material, was incinerated in the fire of 1906 (Blaisdel). Almost all private collections also burned. The loss of pioneer collections makes it impossible to determine with certainty whether some butterflies ever flew here. Fifty-seven species are cited by one author or another, or represented in collections by specimens with San Francisco labels; but some of the citations are scarcely more than hearsay, and some of the labels bear no information beyond the name of the city.

Back in 1910, Williams wrote, "Of the 43 species of butterflies given as inhabiting the city at one time probably not more than thirty could now be taken in several seasons." But in 1978 we collected 33 kinds, and since that date three additional species have been reported by highly qualified observers. Only about a dozen are urbanized butterflies, adopting imported weeds as foodplants for their larvae.

Lists and species accounts follow.

	Cited Lit. "Old Times"	Williams 1910 Status	Records in Collections	1970s Status
1. <u>Paratrytone melane</u> (Edw)			+	very common
2. <u>Ochlodes sylvanoides</u> (Boisd.)			+	scarce
3. <u>Ochlodes agricola</u> (Boisd)			+	
4. <u>Atalopedes campestris</u> (Bdv)			+	
5. <u>Polites sabuleti</u> (Boisd)		very common	+	not rare
6. <u>Hesperia juba</u> (Scudder)	+	doubtful		
7. <u>Hylephila phyleus</u> (Drury)			+	abundant
8. <u>Pyrgus communis</u> (Grote)		plentiful	+	common
9. <u>Erynnis propertius</u> (Scud & Burg)		not common	+	
10. <u>Erynnis tristis</u> (Boisd.)			+	
11. <u>Battus philenor hirsuta</u> (Skin) +		not uncommon	+	locally common
12. <u>Papilio zelicaon</u> Lucas		scarce	+	common
13. <u>Papilio rutulus</u> Lucas		rare or extinct	+	common
14. <u>Papilio eurymedon</u> Lucas		probably extinct	?	
15. <u>Pieris napi venosa</u> Scudder		uncommon	+	doubtful
16. <u>Pieris rapae</u> (Linnaeus)		abundant	+	abundant
17. <u>Colias eurytheme</u> Boisd.	+	common	+	common at times
18. <u>Zerene eurydice</u> Boisd.	+	1 stray taken		
19.* <u>Anthocharis sara</u> Lucas	+	rare or extinct	+	scarce
20.* <u>Euchloe ausonides</u> Lucas	+		+	not uncommon
21.* <u>Incisalia aug. iroides</u> (Bdv)	+	doubtful	+	
22. <u>Incisalia eryphon</u> (Boisd)			+	
23. <u>Strymon melin. pudica</u> (H.Edw)	+	scarce	+	locally common
24.* <u>Callophrys viridis</u> (Edw)			+	locally common
(<u>Callophrys dumetorum</u>)(Boisd)	+	common		
25. <u>Lycaena heteronea</u> (Boisd)	?	not present		
26.* <u>Lycaena helloides</u> (Boisd)	+	not uncommon	+	
27.* <u>Plebejus icarioides</u> <u>missionensis</u> Hovanitz		not yet described	+	locally common
28.* <u>Plebejus icarioides pheres</u> (Boisd)	+	not uncommon	+	

*Type locality San Francisco

continued

	Cited Lit. "Old Times"	Williams 1910 Status	Records in Collections	1970s Status
29. <u>Plebejus acmon</u> Westw & Hewit	+	quite common	+	fairly common
30. <u>Everes comyntas</u> Godart			+	scarce
31. <u>Euphilotes enoptes</u> Bdv	+	none since 1902		
32. <u>Glaucopsyche piasus</u> Bdv	+	not recently	?	
33. <u>Glaucopsyche lygdamus</u> <u>incognitus</u> Tilden			+	occurs locally
34.* <u>Glaucopsyche xerces</u> Bdv (<u>antiacis</u> , <u>mertila</u>)	+	<u>antiacis</u> less rare form	+	
35.* <u>Celastrina ladon echo</u> Edw	+	occurs locally	+	locally common
36. <u>Limenitis lorquini</u> Bdv	+	seen sparingly	+	seen 1979 ?
37. <u>Adelpha bredowii californica</u> Butler		occasionally seen		seen 1979 ?
38. <u>Vanessa atalanta rubria</u> Fruh	+	not rare	+	fairly common
39. <u>Cynthia virginiensis</u> Drury	+	not uncommon	+	fairly common
40. <u>Cynthia cardui</u> Linnaeus	+	not uncommon	+	common at times
41. <u>Cynthia annabella</u> Field	+	abundant	+	abundant
42. <u>Precis coenia</u> Hubner		probably visitor	+	fairly common
43. <u>Nymphalis californica</u> Bdv	+	migrant	+	after migration
44. <u>Nymphalis antiopa</u> Linnaeus	+	not uncommon	+	not uncommon
45. <u>Polygonia satyrus</u> Edwards	+	rarely seen	+	scarce
46.* <u>Phyciodes mylitta</u> Edwards	+	abundant	+	rather scarce
47. <u>Phyciodes campestris</u> Behr	+	abundant	+	fairly common
48. <u>Chlosyne palla</u> Boisduval	+	not here now	+	
49. <u>Chlosyne leanira</u> Feld & Feld	+		+	
50. <u>Euphydryas chalcedona</u> Doub	+	abundant	+	common locally
51. <u>Euphydryas editha</u> Bdv	+	not uncommon	+	
52. <u>Boloria epithore</u>	+	not recent		
53.* <u>Speyeria callippe</u> Boisduval	+		+	Bayview Hill
53a <u>Speyeria coronis</u> Behr				stray seen 1988
54. <u>Agraulis vanillae</u> Linnaeus			+	seen 1986
55. <u>Danaus plexippus</u> Linnaeus	+	common in fall	+	common IX to IV
56. <u>Coenonympha californica</u> Westw	+	occurs	+	common
57.* <u>Cercyonis sthenele</u> Boisduval	+	extinct	+	

* Type locality San Francisco.

1. Paratrytone melane (Edwards, 1869). Wright (1905) says, "It was not seen for 16 years, but in 1885 it was rediscovered by the Author. Since it has spread over the whole south of the state and has become quite common . . . The butterfly was found before the late coming Bermuda Grass." But the spread of the grass may have helped to increase the population of the Umber Skipper and its territory.

Apparently none of the early San Francisco collectors records it, but Coolidge (1908) lists this skipper for Santa Clara county; and Heppner (1972) has records from 1905 on for Palo Alto (San Mateo county). Only in 1960 do San Francisco records appear. It thrives in residential neighborhoods and parks here, is widespread, and in many locations abundant.

That it uses as foodplants both wild and lawn grasses makes possible its urban success. Heppner (1972) regards it as essentially a streamside dweller. While I have found it most abundant near creeks, in Glen Canyon and at Lobos Creek, it is also found on hilltops.

Early stages are described by MacNeill (1975, in Howe).

Records: from Heppner, 1972; 19-IV-60 (P. H. Arnaud); 12, 14-IV-61 (R. W. Brown); Lobos Creek, Presidio Park, 14-X-62 (C. A. Toschi). (SFSU) 9-V-70 (T. Jordan). (HVR): Edgewood Av., 23, 24-68, 2♂, 1♀; Bayview Hills, 5-V-78, 1♀; Glen Canyon, 26-V-78, 1♂; Mt. Davidson, 11-VI-78; Lobos Creek, 2-X-78, several (WJR).

Sight records, HVR, 1978: Glen Canyon, 29-V many, 11-VI, 6-VIII many. Bayview Park, 5-V. S. F. Golf Club, 16-V. Mt. Davidson, 11-V. Pine Lake, 24-VI. Golden Gate Park, 31-VIII; 4-IX (many), 23-X. Twin Peaks, 28-IX. Lobos Creek, 2-X (many), 24-X (many).

2. Ochlodes sylvanoides (Boisd, 1852) .

But for one specimen taken by J. C. Huguenin, it would appear that we might have a new county record here. This is surprising, as the sylvan skipper is very common in parts of the Bay Area.

MacNeill (1975, in Howe) describes the early stages. He writes that "It occurs only rarely in the larger cities. It is ecologically versatile, however, as much at home in extremely disturbed areas as on undisturbed dry hillsides during late summer. . . . The foodplants are grasses, particularly several fairly broad-bladed, tall species."

Records: (CAS) 25-IV-25♀ (JCH). (HVR) Bayview Hills, lower north slopes, 17-VIII-78, 3 ♂.

3. Ochlodes agricola (Boisd.)

This species, called the farmer, is also very common in uncultivated parts of the Bay Area, and is believed to use native grasses as foodplants. Some of the early stages are described by MacNeill (1975, in Howe).

Records: (CAS) 24-IV-25, 1♂ (JCH); 22-III-15, 1 ♂; (both JCH)

4. Atalopedes campestris (Boisd. 1852)

There seems to be no reason why the field skipper should not be found in present day San Francisco.

MacNeill (1975, in Howe) says, "This species is as much at home in urban gardens as in rural areas. It seems even more common in such disturbed places than in undisturbed areas."

Early stages are described also by MacNeill (1975), who says, "The species is evidently able to feed on a variety of grasses."

Records: (CAS) 6-V-10 1♂ (JCH); 26-IV-25 1♂ (JCH); 1-VIII-20, 1♀ (JCH).

5. Polites sabuleti (Boisd., 1852)

Williams (1910) says: "Pamphila sabuleti, Bdv. A very common insect and frequently seen in gardens and public squares . . . quite generally distributed over the western half of the city."

The little sandhill skipper seems to be much less common in San Francisco today than formerly, and when found, to be in open areas rather than around urban lawns. Reasons for this are not apparent. Large numbers of Paratrytone melane and of Hylephila phyleus have moved in, but surely there is grass enough!

Early stages are described by MacNeill (1975, in Howe). He states that "P. sabuleti feeds naturally on several lawn grasses in central California."

Records: (EM) Lobos Creek, 16-V-60. (CAS) 25-VII-07 1♀ (FXW); 24-XI-02 1♀, ex

larva (FXW); Lone Mountain, 21-VIII-09, 2♂ (FXW). 28-V-56 ♂, 11-IX-56 ♂, 10-IX-55 ♀, 29-V-56 2♂, 27-X-55 ♀; Presidio, 25-IV-37 2 ♂ (all LIH). 26-IV-25 ♀ (JCH) 11-X-24 ♂, ♀ (JCH); 26-V-18 ♀ (C. L. Fox). (JWT) 7-IV-56 ♂. (RLL) Twin Peaks, 4-VI-73 ♂. (HVR) Glen Canyon, 25-V-78 ♂, 2♀; 4-VI-78 ♂, ♀; 6-VIII-78 ♂, worn; Bayview Hills, 17-VIII-78, 2 ♀; Lobos Creek, 2-X-78 2 ♂.

Sight records: (Dennis Murphy) Golden Gate Park near 41st Ave., IX-76. (HVR) Glen Canyon, 25-V-78; Lobos Creek, 11-X-78.

6. Hesperia juba (Scudder, 1862)

Quoting Williams (1910): "Pamphila juba Scudd. Taken by Mr. Cottle in a marshy area at Mountain Lake. May perhaps be still found there." This appears to be the only mention of H. juba in San Francisco. J. Emmel (1978, letter) states: "I never found this in the San Brunos." However, he and Robert Langston did find one Hesperia sp. in that location — Hesperia comma dodgei (Bell); and it seems that at the time that Cottle was collecting there was enough confusion regarding members of the genus Hesperia that he might have mistaken the species.

We have looked for H. c. dodgei without success on the Bayview Hills — separated from the San Brunos only by Visitacion Valley; and including in its flora Festuca rubra Linnaeus, which is said by MacNeill (1975 in Howe) to be the favorite foodplant of this species in Marin county, as well as several other perennial bunchgrasses. Suitable grasses are found also on Mt. Davidson and Twin Peaks and in the Presidio (near to Cottle's reported location), but so far no records of Hesperia species in San Francisco.

7. Hylephila phyleus (Drury, 1773)

The fiery skipper, one of the brightest of all the "golden skippers", is unrecorded by early San Francisco collectors; perhaps its range had not yet extended here. Wright (1905), calling it Pamphila Brettoides, states: "There is a little valley in Southern California where this species is found. . . . It is extremely local". The specimens he figures are dated 1885 and 1889. Comstock (1927) reports it as "a familiar sight around the lawns of residential districts and public parks", in a range including the Bay Region.

Early stages are described by MacNeill (1975, in Howe). The larvae are able to thrive in lawns because of larval shelters horizontal in the basal parts of the grass. They feed on a large variety of grasses.

This is another species which has greatly expanded its population because of urbanization. It is widely distributed in the city; where lawns and suitable nectar sources are found (marigolds are a favorite) it becomes super-abundant. The earliest records we have come across are from 1937.

Records: (CAS) Arboretum, GG Park, 3-X-76 ♂, ♀; 4-XI-76, 4 ♂, 2 ♀; (all PHA). Presidio, 4-VII-37, 2 ♂; 25-IV-37, 2 ♂; 3-IV-38 ♀; 1-IX-47 ♀; (all LIH). Glen Park, 21-IV-45 ♂ (D. Giuliani) (AO) 28-IV-63. (HVR) Twin Peaks, V-75, ♂; S.F. Golf Club, 16-VI-78; Arboretum, GG Park, 29-VI-78 ♂, ♀; Lobos Creek, 2-X-78, 2 ♂ (WJR)

Sight records, 1978: Glen Canyon, 25-V. S.F. Golf Club, 16-VI. GG Park, Conservatory Valley and Arboretum, 29-VI, 4-VII, 16-VII, 31-VII, 4-IX, 7-IX (all abundant). Pine Lake, 24-VI. Lobos Creek, 2-X (abundant), 24-X.

8. Pyrgus communis (Grote, 1872)

Although using the same larval hosts as the west coast lady, the common checkered skipper is not usually found in long-settled areas. It is widespread in the city, and common in open areas.

Williams (1910) found it quite plentiful, and recorded foodplants as "Malva and probably also Sidalcea." J. W. Tilden (letter, 1978) reported having found larvae on these two plants on Twin Peaks. I found larvae on mallow in the residential area along Clarendon Avenue in August of 1969 which emerged in April, 1970, but this Twin Peaks area had only recently been filled with houses.

Early stages are described by Comstock (1927), and by MacNeill (1975, in Howe).

Records: (LACM) 5-IV-40, ♂ (Munroe Walton). (CAS) Twin Peaks, 22-V-43 ♂ (LIH); Lone Mountain, 9-IX-09, ♀ (FXW); S.F., 10-V-03 ♀ (FXW). (HVR) VIII-69, larvae on mallow, em. 10-IV-70 ♂, 5-IV-70 ♀; Twin Peaks, 17-IV-76 ♂; Glen Canyon, 25-V-78, ♂; Lobos Creek, 2-X-78 ♂.

Sight records, (HVR), 1978: Twin Peaks, 8-IV, 22-IV, 17-V, 28-IX. Mt. Davidson, 8-IV. Bayview Park, 5-V. Glen Canyon, 25-V, 29-V, 6-VIII, 17-IX. Presidio, 9-IV. 1979: Lobos Creek, 11-X, 24-X.

Erynnis propertius (Scudder and Burgess, 1870). Williams (1910) says of the propertius dusky-wing: "Not common at present. Probably breeds in the oak thickets." There are still undisturbed oak thickets at Lobos Creek, along the edge of the Presidio. Whether the small area of oak woodland remaining in the Lake Merced district between the San Francisco Golf Club and the buildings along Brotherhood Way might maintain a population is doubtful. There are also native live oaks surviving in Golden Gate Park.

Records from literature: Burns (1964), (AMNH) San Francisco, undated, 1♂, 1♀.

10. Erynnis tristis (Boisd.) If E. propertius bred in the San Francisco oak thickets, why not E. tristis too? Apparently it did. Burns (1964) reports: (CAS) 24-IX-10, 1♂.

This species is multivoltine. We have found caterpillars on live oaks at Antioch in midwinter.

Records: (CAS)24-IX-10, 1♂ (JCH)

11. Battus philenor hirsuta (Skinner, 1908). A railway connecting the city of San Francisco and Lake Merced formerly ran for half its last mile along the edge of a wooded gully, where a small creek made its way to the lake. In the 1950s the railroad had disappeared, except for a few rotting timbers; but the live oaks and willows still grew above the creek, and beneath them, among many shrubs, twined Aristolochia californica, the Dutchman's pipevine. Along fairway edges of the San Francisco Golf Club, which adjoined this natural area on the south, circled in and out from the vines the blue swallowtail. Then the creekbed was bulldozed and filled, the sizeable building sites thus created quickly occupied by a diversity of religious organizations, and the highway which served them christened Brotherhood Way. But there is still a narrow wooded strip between the buildings and the golf course, where despite massive invasions of mattress vine and acacia, the vines still thrive and the shining butterflies still glide. This is the last bit of habitat for this species in San Francisco. Brandegee (1892) lists other localities for A. californica as Laguna de la Puerca (Pine Lake) and Strawberry Hill. These places are now included in public parks, and would seem eminently suitable sites for re-introduction of pipevine. Though B. philenor is in many places an abundant insect, it is so striking in appearance that its loss to San Francisco would be sad.

Cottle (1928) says that in his youth he found "Papilio hirsuta in great numbers" near Lake Merced. Williams (1910) lists: "Papilio hirsuta Linn. Not uncommon in Lake Merced region where Aristolochia californica grows."

Today the area where pipevine grows had become very small and butterflies have not been seen the last few years, but larvae were found in 1988. Comstock (1927) describes and pictures the early stages, and Tilden (1965) gives a brief description.

Records: (SFSU) 9-IV-62 ♂; 10-IV-62 ♂. (OM) 1-V-45, 4 ♂, 2 ♀. (CAS) Lake Merced, 14-VI-55, 6♂, 2♀; 5-IV-54, 8♀ (all RW). (HVR) S. F. Golf Club, woods along north border, larvae, em, V-68, 2 ♂, 1 ♀; 26-IV-69, ♀. 17-VI-78, adult ♀, many ova and larvae; 25-VI-78, ♂. (CAS) Lake Merced, 28-IV-56, 4♀; 20-V-56, 3♂ (all RW) Brotherhood Way, 20-VI-88: 3 larvae (B. Deutsch) V-88 Arboretum; 4 larvae.

Sight records (HVR) 1978: Brotherhood Way, behind buildings, 23-IV, 5; 17-VI, many.

12. Papilio zelicaon Lucas, 1852. Williams (1910) said of this pretty species: "Resident of San Francisco, where it is scarce." But the anise swallowtail has prospered greatly in the city as the introduced weed Foeniculum vulgare has spread widely into waste places and even gardens. Hilltopping males dash about Mt. Davidson and Twin Peaks, sometimes as early as February; females can readily be found seeking tender shoots on which to lay their eggs. To rear larvae from ova is probably the easiest way to obtain perfect specimens, as young wild larvae are frequently parasitized by a small wasp. In San Francisco there are several broods. Late pupae of course overwinter, and when this happens they may remain dormant for two or even more years. Early stages are described by Comstock (1927), by Tilden (1965), and by Emmel and Emmel (1973).

Records: (CAS) Strawberry Hill, 4-VIII-66 ♂ (PHA); Twin Peaks 10-IV-39 2♂; 23-VIII-67 (SFSU) 11-III-59, 10-IV-74; Corona Heights, 10-IV-72. (OM) Corona Heights, 5-III-47 ♂, 14-III-47 ♂; Twin Peaks, 14-III-47; Mt. Davidson 14-III-47, ♀. (AO) 15-IX-63. (HVR) Corona Heights 21-IV-78 ♂ ova, last em. 15-VI-78; Bayview Park, larvae, 5-V-78; Mt. Davidson 11-VI-78. Potrero Hill, 1-VII-88, larvae (B. Deutsch).

Sight records (HVR) 1978: Twin Peaks 8-IV, 28-IX; Corona Heights 21-IV; Mt. Davidson 22-IV, 11-VI, 10-X; Bayview Hills 5-V, 17-VIII, common, some hilltopping; Glen Canyon 4-VI, 6-VIII; McLaren Park, 4-V, ovipositing.

13. Papilio rutulus Lucas 1852. The handsome western tiger swallowtail not infrequently sails through San Francisco's parks and gardens, pausing to feed on flowers. So one reads with some surprise Williams (1910) statement: "It is scarce or extinct at present." Apparently park plantings and residential gardens have provided far more trees useful as larval hosts, and suitable nectar sources, than were present originally. Larval foodplants include willows, poplars, alders, sycamores, and probably others. *This species thrives in San Francisco's financial district, on street trees.*

Comstock provides descriptions of the early stages, as do Tilden (1965) and Emmel and Emmel (1973).

Records: (SFSU) 3-V-65; 8-IV-69 ♂ (CAS) Pacific Heights, pupa on bldg., XI-79. (PHA) Lobos Creek, 28-III-60 ♂; 18-IV-60 ♂. (AO) 17-VI-63. (HVR) Sutro Forest 22-IV-73 ♂, VI-75 ♂; Glen Canyon, 29-V-78 ♀. (CAS) GG Park, pupa on sycamore, em. 2-IV-75 (TWD)

Sight records (HVR) 1978: Glen Canyon 25-V, 29-V, 4-VI (common), 11-VI. Mt. Davidson, 11-VI; Golden Gate Park, 13-VI, 29-VI; Pine Lake, 24-VI; Parnassus Heights, 28-VI; Lobos Creek, 2-X. Market Street at Hyde 17-VIII-88.

14. Papilio eurymedon Lucas, 1852. It appears that Williams (1910) was right in his assessment that the lovely pale swallowtail is probably extinct here. It was reported to have been taken in early days in the Lake Merced area. Rhamnus californica, one of its favorite foodplants, still grows there, though not in large quantity; and Ceanothus thyrsiflorus survives only on bluffs above the sea at Lands End and the Presidio. There is one specimen that probably was taken in San Francisco in the Reeves collection at CAS. It is in a large Riker mount; all the other specimens in the mount are B. p. hirsuta taken in San Francisco at Lake Merced. Unless the label which is below one hirsuta and above the eurymedon, San Francisco, V-2-32, applies to both, the eurymedon is unlabelled. No other definite records have been found.

15. Pieris napi venosa Scudder, 1861. The veined white was uncommon in San Francisco in 1910, according to Williams, but "The forms venosa Scudder and castoria Reak. have been observed at Lobos Creek." Dr. Behr's valuable series of papers for the CAS included none on the Pierids. Cottle does not mention this species. One specimen is found in the SFSU collection, dated 8-V-71.

Dentaria californica, the favorite larval foodplant, grows in San Francisco, notably in Sutro Forest. There is also watercress, found by Shapiro (1975) to serve as a foodplant, in Glen Canyon, Lobos Creek, probably other locations. Comstock (1927) describes the early stages.

Records: (AMNH) "S. Frisco, Cal.", no date, 2♂. PMNH "San Francisco", 21-IV-28. (SFSU) 8-V-71 (F. Lurz).

16. Pieris rapae (Linnaeus, 1758). The European cabbage white had not yet reached California in the years when Pierre Lorquin, Herman Behr, and Henry Edwards were making their notable collections in San Francisco. According to Brown (1967) there were no rapae west of the Rocky Mountains in 1883. They had been introduced to the east coast from Europe some years earlier.

Williams (1910) says: "I well remember when rapae was scarce about the streets of the city; at present it is more abundant than Pyrameis caryae." Today it is abundant everywhere; in gardens its larva feeds on nasturtiums, and on the open hillsides on mustards. San Franciscans are likely to say, "The only butterflies in the city are cabbage butterflies." Presence of a lazy-flying white butterfly can't be missed; those who note the two cabbage whites in a garden may have overlooked dozens of fiery skippers sipping on the flowers.

Descriptions of early stages may be found in Comstock (1927), Tilden (1965) and Emmel and Emmel (1973).

Records: (SFSU) Visitacion Valley, 7-III-70 ♀, 12-III-59 ♂; 7-V-72 ♂; 20-X-76 ♂.
(CAS) Strawberry Hill, 4-VIII-66 ♀ (PHA); III-03 ♂ (FXW), 21-III-08 ♂ (FXW) (AO) 1-XI-62.
(HVR) Presidio, 21-IV-76 ♀; Brotherhood Way, 25-VI-78 ♀; Belmont Av., VII-68, 1♂ 2♀.
(CAS) 17-IX-39 ♀ (LIH); 1-III-05 ♀ (FXW); 31-III-09 ♀ (FXW)

Sight records, 1978. Everywhere! Twin Peaks, 8-IV; Presidio, 9-IV; Glen Canyon, 25-V; 23 Belmont, 2-VI, 11-X (and every day between); 19th Ave., 17-VI; Forest Hills, 30-V; Mt. Davidson, 11-VI; Pine Lake, 24-VI; Glen Canyon, 6-VIII; Golden Gate Park, 16-IX; Lobos Creek, 11-X.

17. Colias eurytheme Boisid. 1852. Our common sulfur had not yet become the

alfalfa butterfly when Cottle (1928) collected it in his youth at Mountain Lake. It bred on whatever native legumes were available. Williams (1910) noted that it was "Quite abundant in undisturbed areas." Today it is not abundant, but fairly common in some places.

Reported foodplants include clovers, rattleweed, deerweed, sweetclover, and alfalfa. Early stages are described by Comstock (1927) and by Emmel and Emmel (1973)

J. C. Huguenin (1918) records C. eurytheme from the west slope of Twin Peaks 5-II-17 (2), 11-II-17 (2); 11-III-17 (2); 15-III-17 (2). Records from collections; (OM)28-IX-36; Balboa Park, 8-VI-37 ♂, 11-VI-37 ♀. (CAS) Sunset, 5-VII-13, 2-IX-13 (WNW). (SFSU) 18-IX-57 ♀; 27-X-58 2♀, 1 alb.; Golden Gate Park, ^{25-X-71} ♀ alb. (HVR) Twin Peaks, 18-III-74 ♀; Lobos Creek, 2-X-78, 1 ♂, 2 ♀, 2 ♀ alb.; 11-X-78, ♂, ♀ alb. (CAS) 29-III-14 (WNW). 10-IX-62. (AO) 14-X-62.

Sight records (HVR) 1978: Fort Funston 25-VI, 13-X (several); Lobos Creek, 2-X, 11-X (common), 25-X (3); Twin Peaks, 10-X; Golden Gate Park, 12-X, 9-XI; Golden Gate Heights, 24-X (3); Fleischhacker Zoo, 13-X (2); 36 Alma St., 7-XI; Bayview Hill, 5-III-79; 1-IV-79, 13-IV-79. Glen Canyon, 13-VI-75.

18. Zerene eurydice Bois. 1855. No one has claimed that the beautiful state insect, the California dogface, better described as the flying pansy, was ever resident in San Francisco; its larval foodplant, Amorpha californica, is not native here. But Edwards (1868 - 1872) quotes a letter from San Francisco by Henry Edwards: "I have occasionally seen it flying in the streets of this city." And Williams (1910) states: "I took a female on the ocean beach west of San Francisco." It seems by no means impossible that this strong flier, which has substantial populations in Marin county, might visit us again.

19. *Anthocharis sara Lucas, 1852, reakirtii Edw. 1862. On the basis of Boisduval's (1869) description of sara "from the vicinity of San Francisco" and Edwards (1862) description of the spring form reakirtii (TL restricted to San Francisco by Brown, 1973), it appears that San Francisco may be regarded as TL for this species, (although not mentioned by Boisduval in 1852). It is evident that Williams (1910) considers it so when he says, of the sara orangetip, "Described from a specimen taken in San Francisco, where it is at present rare or extinct." Cottle (1928) said that he had formerly found it at Mountain Lake. Few records are to be found in Bay Region collections. But on 25 May 1978 I took a beautiful fresh second brood female in Glen Canyon.

Descriptions of early stages may be found in Emmel and Emmel (1973) and in Howe (1975). Foodplants include many genera and species in the mustard family.

Records: (CAS) 20-III-05 ♂ (FXW); 2-IV-14 ♂ (JCH); 28-III-21 ♀ (JCH); (HVR) 25-V-78.

20. *Euchloe ausonides Lucas 1852. Opler (1966) restricts the TL of E. ausonides to San Francisco.

Cottle (1928), recalling old days at Mountain Lake, says, "Here . . . flew Anthocharis hyantis," an easy mistake since Wright (1905) pictured ausonides as hyantis (Tilden, 1975). Williams (1910) failed to include the large marble in his list. A contemporary collector, Huguenin (1918), reports taking it almost daily on the slope of Twin Peaks. It still may be found there in spring, and also at other locations. Records indicate captures in three far corners of the city, as well as in the central highlands.

Larval foodplants include various Cruciferae. Now there is little choice except mustards and wild radish, possibly watercress at Lobos Creek and Glen Canyon. Early stages are described and illustrated by Comstock (1927).

Records: (CAS) Stanyan Hill, 9-VI-40 (LIH); Glen Park 8-V-56, 2♂ (RW). (JDR) Twin Peaks, 5-V-36, 6-IV-47; Gilman Beach 22-IV-45 (2). (OM) Lake Merced 23-III-47; Gilman Beach 22-IV-45; Mt. Davidson 20-III-45. (HVR) Twin Peaks 8-IV-73, ♂; 22-IV-78; Glen Canyon 25-V-78; Bayview Hills 5-III-79 (WJR). (OM) Twin Peaks, 20-III-48.

Sight records (HVR): Twin Peaks 8-IV-78, 22-IV-78; Glen Canyon 25, 29-V-78, 2-IV-79; Bayview Hill 13-IV-79.

21. *Incisalia augustinus iroides (Boisd. 1852). TL San Francisco fixed by dos Passos (1943), with type specimen in USNM.

Cottle (1928) lists Thecla augustus among species which formerly flew at Mountain Lake, and Williams (1910) says: "Thecla iroides Bdv. has been observed in a nursery in the northern part of the city by Mr. Cottle." These names are a part of the synonymy of the western brown elfin.

Comstock and Dammers (1933) describe all stages. Powell (1968a) gives interesting notes on adult behavior, and (1968b) discusses foodplants. These include Cuscuta in southern California, and also Chlorogallum, Gaultheria, and Arbutus

Menziesii; but over much of the range, Ceanothus serves as the larval foodplant. A number of species and varieties of Ceanothus are represented in the Strybing Arboretum in Golden Gate Park, and it would be possible for larvae to be transplanted along with their hosts. But we have no records to show that this has happened. Native Ceanothus survives at Lands End and along the northern bluffs of the Presidio. Here again we have been unable to find records, *aside from the type, in the United States National Museum.*

22. Incisalia eryphon (Boisd. 1852). The possibility of an elfin colonizing introduced plantings, mentioned with regard to the preceding species, is a certainty with this relative, the western banded elfin.

The pine trees in the Presidio are all from plantings; largely Arbor Day plantings by school children, inspired by Adolph Sutro. (See Gilliam , 1967). But the banded elfin has been taken there. It seems probable that this tiny, fragile creature was introduced clinging to its host trees as a larva, not that it winged across the Marin headlands and the Golden Gate.

Newcomer (1973) discusses larval feeding habits and describes all early stages.

Records: (CAS) Presidio 16-IV-49, 9♂, 2♀ (LIH); Presidio 12-IV-50 ♀ (E.S. Ross); 15-IV-50 ♂, ♀ (JWT). (JWT) Presidio near Baker Beach 15-IV-50 ♂, ♀ (JWT).

23. Strymon melinus pudica (H. Edwards, 1876) The common hairstreak was among the species which flew in old days at Mountain Lake, according to Cottle (1928). Apparently in 1910 it was rare. Williams writes, "I took one example of this Hairstreak at Lake Merced. It has several times been observed in the city."

~~We have certainly not found it common, either in records or on the wing, but~~ It has recently been taken in widely separated parts of San Francisco. The larvae are notable for the wide variety of foodplants which they enjoy; according to Scott (1975a, in Howe) they are known to feed on no less than 46 genera of plants in 21 families! ~~So if it is scarce here, it must be the people or the climate it dislikes.~~ Comstock (1927) writes that the plant of choice seems to be common mallow. He describes and illustrates the early stages.

Records: (CAS) ?-IX-54. (JWT) 14-III-59 ♀. (JH) Glen Park Canyon, 8-III-79; Bernal Heights, 30-III-79. (HVR) Bayview Hill 17-VIII-78 ♀; Lobos Creek 2-X-78 ♂. (B Deutsch) 23-IV-87 Potrero Hill (HVR) 23-IV-87, Vulcan St 5, 2. GG Park nr. Stanyan VII-88.