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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.

24. Callophrys dumetorum (Bdv.)*Callophrys viridis (Edwards, 1862)

For many years C. viridis was considered a synonym of C. dumetorum. Until 1944, when Clench revised the genus and cited viridis as a species, all green hairstreaks collected in San Francisco were labeled C. dumetorum; all the older records are under that name. The present weight of opinion is that dumetorum and viridis are separate species, and that all those taken here are viridis.

Williams (1910) noted, "Thecla dumetorum - a common insect occupying a considerable area in the western portion of the city."

Although Eriogonum latifolium still grows abundantly on Twin Peaks, this emerald elfin has not recently been recorded there. In June 1978 it was noted that many flower heads were loaded with flea beetle larvae. Possibly this competition was too much for viridis. (AO) 8-VII-62

Records: (O.M) Twin Peaks 20-III-47, 3; 22-IV-45, 2; 14-III-47, 1; Corona Heights 22-IV-45, 5. (JWT) 16-III-57. (HVR) Presidio near Bakers Beach IV-75, 2; 9-IV-78, 2. Golden Gate Heights 30-V-78, 5. (CAS) 25-IV-37 (LIH); Twin Peaks 3-IV-49 (LIH); San Miguel Hills, 29-III-60 (C.D. MacNeill) (HVR) Bayview Hill 1-IV-79, 13 IV-79. Sight record: Barbara Deutsch, Bayview Hill 23-III-86.

25. Lycaena heteronea Bdv. 1852.

Williams (1910) states, "Not found here at present. The location given by Behr is the hilly region in the vicinity of Mountain Lake." Perhaps this information was given orally to Cottle, as it is not to be found in Behr's writings.

Though corroborating records are lacking, it seems not impossible that the blue copper flew among the wild buckwheats on this side of the Golden Gate as it does today at Fort Baker across the strait.

Williams gives detailed descriptions of larvae and pupae found in Marin County.

26. *Lycaena helloides Bdv 1852 "Aux environs de San Francisco."

Williams 1910) says, "Not uncommon in places where its foodplant grows: Lone Mountain, Presidio, Mountain Lake, Lake Merced, etc." Cottle (1928) also lists it.

Comstock (1927) describes and illustrates the early stages. The larval foodplant is Polygonum aviculare and probably other Polygonaceae.

It is hard to believe that the vivid little purplish copper is not still with us. Its foodplant, dooryard knotweed, is one of our commonest plants.

(Howell, Raven, and Rubtzoff, 1958).

Ferris (1977) found no helioides from San Francisco among 3500 specimens studied. He notes (letter) that the species is highly vagile, and appears in the area of Laramie, Wyoming only in late summer.

Records: (CAS) Sunset District, 18-VI-13(W. N. Wholey); V-08 (JCH); 19-V-03, 7-V-08, 22-III-08, Lake Merced; 22-IX-09 (all FXW). 12-V-61 (R. M. Brown).

27.* Plebejus icarioides missionensis (Hovanitz 1937).

Type locality, San Francisco, Twin Peaks, west slope, 700 feet elevation. Type specimens, one male, one female, in CAS.

The Mission blue was not described as a distant subspecies until 1937. It has been found at several San Francisco locations, the nearby Mt. San Bruno, and across the strait at Fort Baker in Marin County. This writer has found wide variation even among siblings.

Early stages of the species are described and illustrated by Comstock and Dammers. Downey (in Howe, 1975) narrates the life history, including relationships with ants. Missionensis' larval foodplant is Lupinus albifrons.

Records: (CAS) Glen Park Canyon, 8-V-56; 20-V-56 (Ron Wilson). Twin Peaks, 7-IV-56, 22-IV-50 (JWT). (OM)19-IV-47, 15-IV-47; 30-IV-47^{*}; Corona Heights, 22-IV-45 (6); Glen Park 30-IV-47 (5); Gilman Beach 22-IV-45 (5); Mt. Davidson 28-IV-37 (2); 13-V-37 (2). *All Twin Peaks.

Sight records: Twin Peaks, 8-IV-78; 22-IV-79; 17-V-79; 7-IV-79. IV-82, several. 11-V-86,(2).

The Mission blue is now a federally listed endangered species.

28. Plebejus icarioides pheres Bdv. 1852.

Early writers quite evidently considered all icarioides from San Francisco to be pheres. Williams in 1910 wrote: "This butterfly is subject to considerable variation on the underside of the wings." J. C. Huguenin told in 1917 of finding pheres in great numbers on the "west slope of Twin Peaks, alt. 200-800 feet." This includes the exact type locality of the Mission blue. By the time that the latter was described the dunes population was separated by a wide band of housing. Mission blues from Twin Peaks, however, show more variation toward the pheres type than those from Mt. San Bruno, presumably because before separation they overlapped and interbred.

Electrophoresis tests have shown that the pheres which fly today at Point Reyes are unrelated to Twin Peaks blues genetically. Their resemblance to the former dunes population of San Francisco may be due to similarity of environ-

ment. The difference in appearance from missionensis consists in more white spotting and scaling, often found in populations in cool, humid habitats (Brower & Brower 1954)
 San Francisco's dunes population no longer exists.

Records: (CAS) May (2)(Korbele colln.); 5-V-40 (2)(LIH); Elev. 350 feet 16-V-13 (2)(JCH); Twin Peaks 29-IV-1916 (JCH). (JWV) S.F. no date; S.F. 4-V-24 leg. Sternitzky. (OM) Ingle side, S.F. 6-4-38. Parkside, S.F. 6-4-38.

29. Plebejus acmon (Westwood and Hewitson, 1852).

All of the early writers mention this small blue as a San Francisco resident. Behr (1867) and Boisduval (1869) refer to it as Lycaena antaegon, Cottle (1928) and Williams (1910) as L. acmon. Williams comment that, the acmon blue is "still quite common and enjoying a long season" is still true today.

Comstock (1927) provides good descriptions of early stages. Foodplants include Astragalus, Lupinus, Lotus, and Eriogonum.

Records: (SFSU) 12-III-59 (D. M. Hansen); 24-X-66 (Hawk). (OM) Mt. Davidson 12-VI-37 (3); Twin Peaks 27-III-48, 19-IV-47, 30-II-48; Lake Merced 14-IV-47. (CAS) S. F. Cemetery 8-V-38 (LIH); San Miguel Hills 17-III-60 (DCR); Lake Merced 12-IX-09, 28-VIII-07 (both FXW). (HVR) Twin Peaks, IV-75 (2); Glen Canyon 25-V-78 (WJR); Bayview Hill 17-VIII-78 (5) 18-VIII-78 (3); Arboretum 31-VIII-78.

Sight Records: Bayview Hill 20-VI-88 Barbara Deutsch.

30. Everes amyntula (Boisduval) or comyntas (Godart).

Williams (1910) states: "...it is quite possible that such species as amyntula . . . flew in this region." Behr (1867) reports "Lycaena amyntula from the Contra Costa Hills." These are the only references to the (now) genus Everes in the Bay Region.

Records: John Hafernik took a specimen of Everes comyntas in Glen Park Canyon 31-V-79.

31. Euphilotes enoptes (Boisduval 1852)

Behr (1867) states that the dotted blue was found on hills near the Mission Dolores and (in the San Bruno Hills. Williams (1910) reports: "I have taken one male at Lone Mountain in about 1902. None seen since."

Robert Langston in a letter says, "I will give the older workers credit . . . Plenty of suitable Eriogonum foodplant on the lower S.E. and E. slopes of the San Brunos."

Langston and Comstock (1966) describe and illustrate all stages in the life history of enoptes bayensis, the subspecies most likely to have been found

in San Francisco. Eriogonum latifolium auriculatum and E. n. nudum are food-plants, and larvae accepted no others.

32. Glauchopsyche piasus (Boisduval, 1852) Type in USNM.)

F. M. Brown (1971) says that this type, of what became known as the arrowhead blue, probably came from the area of San Francisco. The name L. sagittigera was for many years applied to the ~~applied to the~~ species which Boisduval had described as piasus, and piasus was applied to what we now know as Celastrina argiolus echo.

Cottle (1928) says that in former times L. sagittigera flew at Mountain Lake. Williams (1910) says, "Mr. Cottle tells me that he took one specimen of this handsome blue years ago at Mountain Lake. None have been taken since."

33. Glauchopsyche lygdamus incognitus Tilden (-behrii Auct.)

Tilden (1973) says, "F. M. Brown has shown that the name Lycaena behrii Edwards pertains to G. xerces (Boisd.) and not to G. lygdamus (Doubleday)." So he names the central California subspecies G. lygdamus incognitus, and deposits at CAS a holotype from Alum Rock Park 3-III-40.

Behr (1867) in listing "Lycaena antiacis Boisd. May. Different localities," is presumably referring to this species. Williams (1908), in listing the characteristics which distinguish L. behrii from L. xerces, antiacis, and mertila (probably all one species), is evidently referring to the species generally known until 1973 as G. lygdamus behrii.

Comstock (1927) repeats Williams' description of the larva. Foodplants are Lotis, Lupinus, and Astragalus.

Records: (OM) Mt. Davidson 23-V-37; 14-III-47; 20-III-47; 24-IV-46; Corona Heights 22-IV-45; Gilman Beach 22-IV-45 (9). (JWT) Twin Peaks 7-IV-56. (SFSU) 2-IV-59 (D. M. Hansen). (HVR) Bayview Hill, 1-IV-79 (4), 13-IV-79 (2). (CAS) San Miguel Hills, 17-III-60 (DCR).

34. Glauchopsyche xerces (Boisd 1852) L. antiacis, polyphemus, mertila.

This species showed much variation in the macules on the underside. The names given as synonyms distinguished such variations, but all the forms interbred freely. (Skinner, 1914.)

The last known specimens of G. xerces were collected at the Presidio during May of 1941. A female was observed laying eggs, but later search failed to find pupae. It is surmised that the climate that season may have been

unfavorable to xerces -- or too favorable to its natural enemies, such as wasps and parasitic flies. A very complete account of this butterfly is given by Downey and Lange (1956), who studied the literature, made observations in the field, and reared larvae between 1939 and 1941.

Williams (1908) previously described the life history, and found that larvae would eat Lotus glaber, Lupinus arboreus, L. micranthus, and Astragalus menziesii. Drawings of immature stages can also be found in Comstock (1927).

Records: (CAS) San Francisco, CA. Total more than 60 specimens. Dates 1902 to 1941, earliest March 7, latest July 11. Locations: Lake Merced, Presidio, Lone Mountain, Taraval Street. Collectors: F. X. Williams, R. F. Sternitzky, G. Shultz, J. E. Cottle, L. I. Hewes, W. N. Wholey, W. H. Lange, E. J. Newcomer.

(OM) Ingleside, 6-V-32; S. F. 5-III-33 (3); 11-III-33 (2).

35.*Celastrina ladon echo (Edwards 1864) TL restricted to San Francisco by F. M. Brown (1970). Description of type was of a specimen from H. H. Behr, presumed lost in the 1906 fire. Neotype designated by Brown was collected by Henry Edwards, labeled "San Francisco district". It is in the W. H. Edwards collection at Carnegie Museum.

All of the early writers confused the echo blue with piasus: Behr (1867); W. H. Edwards (1884); Holland (1898); Wright (1905). Williams (1910) says, "Lycaena piasus Bdv. Occurs in the Lake Merced region and probably also at Lobos Creek. Wanders occasionally into the city."

The planting of urban gardens seems to have benefited the echo blue, whose larvae feed on a wide variety flowers. It has recently been reported as fairly common at a number of locations through the city.

Langston (1975) describes early stages. There are two broods. In the 1987 butterfly count it is second to Pieris rapae in number of sightings in the city.

Records: (CAS) Glen Park Hills, 31-III-45 (D. Giu liani).
(JH) Glen Park Canyon, 11-VI-79; 8 Mizpah Street, 9-VI-79; Sansome and Lombard, at the bottom of Telegraph Hill, 11-VI-79. (HVR) 23 Belmont Avenue, 5-VII-77(3).

Sight record: 23 Belmont Ave. 4-VIII-88.

36. Limenitis lorquini (Behr, 1853).

Williams (1910) says that the Lorquin's admiral "Occurs sparingly in the Lake Merced area." Willows still grow in places near the lake. Other possible habitats include Glen Canyon, Lobos Creek, and Golden Gate Park. One was perhaps sighted in the Glen Park area recently.

Early stages are described by Comstock (1927) and by Tilden (1965).

Records: (AMNH) S. Frisco; no date. (CAS) 12-VI-09 (JCH).

Sight records: (JH) 8 Mizpah Street 5-VI-79 -- either this or the following species.

37. Adelpha bredowii californica (Butler, 1865).

Williams (1910) says of the California sister: "Occasionally seen. It probably breeds in the oak thickets." There are still native oaks in San Francisco, mostly Quercus agrifolia but some Q. chrysolepis, the foodplant of choice for this choice nymphalid. But we found no specimen of the butterfly taken here.

Early stages are described by Comstock (1927) and by Tilden (1965)

If the sighting by John Hafernik on 5 June 1979 was not L. lorquini it was of this species.

38. Vanessa atalanta rubria (Fruhstorfer, 1909).

This subspecies of red admiral found in North America differs little from that found in North Africa and Europe.

Cottle (1928) listed atalanta among species that flew at Mountain Lake, and Williams (1910) commented "Cannot be said to be a rarity here."

Some believe its appearance where nettles do not grow is due to utilization as larval food of baby tears (Helxine soleirolei Requiem). Though chemically acceptable, this plant's extreme difference in form would require much adaptation in larval habits. On nettle a larva shelters itself by rolling a leaf. When I gave a larva baby tears for the last few days of development it ate reluctantly and emerged undersized.

An alternative explanation might be that after the breeding season butterflies leave foodplant localities seeking nectar and places to overwinter. There may be a gradual migration to this area from more extreme climates, as occurs in Europe.

Early stages are described by Tilden (1965) and by Emmel and Emmel (1973).

Records: (OM) 5-VI-37 (2); (AO) 27-VIII-62; ^(OM) 8-IV-32; 20-IX-37; Balboa

Park 25-X-44. (HVR) Mt Davidson 8-IV-78 (worn); Golden Gate Park 31-V-78; Glen Canyon 29-V-78, larvae, em. VII-78. (AO) 27-VIII-62.

Sight records 1978 (HVR): Mt. Davidson 8-IV, 22-IV; Arboretum: 29-VI; 23-VIII, 14-IX, 12-X; 1979: 3-II (2). Belmont Avenue (upper Haight Ashbury) 6-VIII-79; Lobos Creek 9-II-79; Mt. Sutro 19-III-79.

39. Vanessa (Cynthia) virginiensis (Drury 1773).

Hunter's butterfly became the Virginia lady when it was found that virginiensis had precedence over huntera, the name by which early collectors called this butterfly.

Behr (1864a) states that he found Huntera only in the later part of the season. Cottle (1928) lists huntera from Mountain Lake, and Williams (1910) says that it is "Resident here and not uncommon." It is still fairly common.

Caterpillars feed on Gnaphalium species, where they shelter in nests made by tying together flower fragments and leaf fuzz with silk. Early stages are described by Clench (1975, in Howe) and by Emmel and Emmel (1973).

Records: (CAS) Golden Gate Park, 11-IV-43; San Francisco, 9-III-05. (OM) 11-IX-35. (HVR) Roadsides in Sutro Forest, larvae, emerged 28-IX-68 (2); VI-69, 29-X-69; VI, VII, VIII-70; X-71; 8larvae, 2-VII-78, emerged 28-VII-78 to 6-VIII-78. Yerba Buena Island, 2 larvae 2-XI-78, emerged XII-78.

Sight records, 1978-79: (HVR) Bayview Hill, 6-IX, (2); Lobos Creek, 11-X; Bay view Hill, 13-IV-79; Mt. Sutro, 19-III-79.

40. Vanessa (Cynthia) cardui. Linnaeus. A cosmopolitan species, the painted lady, according to Field (1971) shows no geographical differences which hold up.

Behr (1864a) writes of cardui frequenting thickets of Silybum marianum around the outskirts of San Francisco which sprang up as the native shrubs were removed. Williams (1910) states, "It is quite common in certain locations where the larva feeds principally on Cirsium occidentale."

When winter rains are heavy in Mexico, where this species maintains a reservoir, huge numbers of V. cardui appear and migrate northward by the millions in spring (Emmel and Emmel, 1973). A very large migration was observed here 9 April 1968. Arnaud (1969) reports details of this flight. A less massive movement is recorded by Langston (1974 b). Probably most reports of cardui in the bay area are of butterflies that have flown in. However, Langston (1978) lists "worn hibernants. C. Costa Co; Alameda Co., late Jan..Feb." A larva I collected

from mallow at Buena Vista Park in January 1974 emerged as cardui in February; and a little later that year painted ladies were sighted on Twin Peaks in a thistle patch. Winter survival occurs.

A truly "far out" part of San Francisco, the Farallon Islands, 32 miles west of the Golden Gate, has yielded this species. In the CAS are two specimens taken on the South Farallon Islands, 18-III-70, by A. R. Moldenke; and three collected on the Southeast Farallon Island 15-IX-78, by Vincent F. Lee and C. L. Mullinex. A massive movement which might place survivors so far from the mainland was observed in 1968. The average winter temperature there is 48° F., only 5° colder than in summer. Coulter (1972) found many of the 36 plant species well advanced in flowering when he arrived on 3 April 1968, and at least 16 in flower when he left on 10 July.

Vincent Lee (15 Sept. 1978) found V. cardui hovering around Lavatera arborea, which was flowering. This is a possible foodplant, and others present include Cirsium vulgare, Amsinkia spectabilis, and Urtica urens.

Early stages are described by Tilden (1965), Clench (1975 in Howe) and Emmel and Emmel (1973).

Other records: (CAS) 4-XI-54. (AO) 20-VIII-63. (HVR) 3 larvae on thistle, Sutro Forest, emerged VI-68; Golden Gate Park, 14, 16-IX-78. (CAS) Strawberry Hill, 4-VIII-66 (PHA); G.G. Park 9-IV-68 (PHA)(4); Lake Merced, 18-IV-68 (PHA).

Sight records, 1978: Golden Gate Park, 19-IX, 22-X, 9-XI; Lobos Creek, 11-X, 25-X; Golden Gate Heights, 24-X; Yerba Buena Island, 2-XI.

41. Vanessa (Cynthia) annabella Field, 1971.

The West Coast lady, V. carye, was found to be two species; the name carye properly belongs to the South American species, and the one in North America, newly described though long known, is named annabella. (Field, 1971)

Lorquin in a letter to Boisduval after arrival in San Francisco commented on the abundance of carye. Behr (1864a) said that this was by far the most common butterfly in California; Williams (1910) also commented on its abundance. In the Arboretum in Golden Gate Park on favored nectar sources such as lantana, seaside daisy, or Grindelia it is easy to count a dozen sipping ladies at a glance. In San Francisco today it can be found on any day of the year in most residential neighborhoods. Its great success is due to use of the introduced Malva parviflora as foodplant. Growers of cultivated mallows find it a pest. Nettle is also used by larvae.

Early stages are described by Tilden (1965), and by Emmel and Emmel (1973)

Records: (OM) 6-III-36, 31-III-36, 4-IV-37, 5-III-36, 24-VII-36. (JWT) Twin Peaks, larvae on Sidalcea malvaeflora, em. 7, 14-IV-87 (3). (HVR) 7-X-68; Lake Merced, 15-IV-69; Arboretum, 4-VII-78; 31-X-68; 10-XI-68. (CAS) 5-1-18. 4-IX-45 (LH), Presidio 21-II-31 (LH); 4-XII-47 (FXW).

Sight records, 1978: Twin Peaks, 8-IV; Mt. Davidson, 8-IV, 22-IV, 11-VI; Glen Park, 11-VI, ovipositing on nettle; 25-V, 29-V. Golden Gate Park, 31-V, 29-VI, 4-VII, 23-VIII; Brotherhood Way, 16-VI; Buena Vista Park, 4-VII; Balboa Park, 7-VII; Arboretum, 4-IX, 14-IX; Lobos Creek, 2-X, 11-X; Fort Funston, 13-X. 23-VI-87, Vulcan Stairs, (2).

42. Junonia coenia Hubner 1822.

Cottle (1927) does not mention coenia among the butterflies of his youth; and Williams (1910), while noting that it is occasionally seen, concludes, "Probably only a visitor here." Evidently the buckeye, like the West Coast lady, has increased its population by using introduced weeds, in this case plantains: Plantago major and P. lanceolata, but it has nowhere nearly exploited the available resources, and is found mostly in the wilder areas of the city. For some years we have noted its flight near the edges of Sutro Forest and on the south slope of Twin Peaks, and in 1978 found it common in Glen Canyon and the Bayview Hills.

Early stages are described by Comstock (1927) and by Tilden (1975). Larvae have been found feeding on various Scrophulariaceae and on Veronica in stream beds.

Records: (CAS) 7-V-24 (JCH). (OM) Ingleside 15-VI-38. (IACM) San Francisco, Mission Park, 28-VI-20 (J. Huguenin). (JDR) 24-VII-36 (2); 23-IX-36, (2); 15-VII-44. (HVR) Twin Peaks, pair in copula, 20-III-76; 12-II-76; Golden Gate Park, Arboretum 29-V-78.

Sight records, 1978: Glen Canyon 25-V, many; 29-V, 4-VI, 11-VI, 6-VIII, 17-IX. Bayview Hill, 17-VIII, 6-IX, many; Arboretum, 14-IX, 12-X; Lobos Creek, 25-X, pair in cop.; Glen Canyon, 5-II-79, pair in cop.

43. Nymphalis californica Bdv. 1852

Williams (1910) says, "This erratic insect has been observed here, and in early days when Ceanothus thyrsiflorus grew in profusion was probably not

uncommon. Dr. Behr has taken migrants of this species in San Francisco." Behr (1864a) states, "Vanessa californica. Nov. 15, 1856, numbers of this butterfly flew over San Francisco in a general direction of S.S.E." In days when there was ample ceanothus to maintain a substantial population here, the California tortoiseshell was known primarily as a migrant. Henry Edwards (1875) vividly describes an outbreak in Marin County. In early May he found "Myriads of caterpillars ... bushes of Ceanothus 12 - 15 feet high utterly stripped." On returning a month later he found "the insect far from abundant, many crippled and dead." Population expansions and mass movements are treated by Powell (1972a). Struble (1952) and Stoner (1954) give interesting details.

Early in 1972 San Francisco saw its most recent migration of California tortoiseshells. Butterflies flying past the Bank of America building, observed from an office window at an elevation of over 600 feet, were believed to be of this species (Arnaud, 1972a). On 15 January 1974, I saw eight or ten tortoiseshells flying near the edge of Sutro Forest toward Twin Peaks. It appears that these insects had survived through the two years since the migration by breeding on plantings of ceanothus in the University of California housing project there.

A partial description of early stages is given by Comstock (1927), Tilden (1965) and Emmel and Emmel (1973), and is supplemented by Reinhard (1981).

Records: (CAS) San Francisco, 16-X-60; San Miguel Hills, 17-III-60 (4) (D. C. Rentze). HVR, sight: Parnassus Heights, 3-III-72, many; south edge of Sutro Forest, 15-I-74, 8 or 10. B. Deutsch, Potrero Hill,

44. Nymphalis antiopa, Linnaeus 1758.

Behr (1864a) says, "Vanessa Antiopa . . . feeds here on willows," and Williams (1910) makes only the comment "not uncommon." The rich maroon mourning cloak, with its blue spots and pale yellow edging, shows willingness to breed on suitable trees even in long-built-up neighborhoods. Larvae have been found in the Haight Ashbury, the Richmond, and the Parnassus Heights areas, on sidewalk trees or in backyards. Adults are infrequently sighted.

Early stages described by Tilden (1965), Gorelick (1975 in Howe), and by Emmel and Emmel (1973). Known foodplants include willow, cottonwood, elm, and hawthorne. The species is at least sometimes doublebrooded, as shown by the record of larvae taken in October.

Records: (SFSU) IX-29 (2); 1-IV-71; 24-X-71(Yee). (CAS) Arguello Blvd. off Fulton Street, larvae beneath elm, 4-X-71, em. 28,30,31-X-71 (5)(S. E. Tatro).

(AO) 7-VIII-63. (CAS) larvae, toward downtown, em. 1-X-63 (15)(PHA). (HVR) Roosevelt Way, pupa, em. VI-56; Alma St., many larvae, hawthorne, em. VI-66; Parnassus Heights, (larvae, many, willow) em. VI-68, larva, em. 29-VI-78. Below Mt. Davidson, adult, 11-VI-78.

Sight records, HVR: Glen Canyon, 6-III-79, 2-IV-79. Mt. Sutro 19-III-79; Lobos Creek, 24-III-79; Arboretum 29-III-79.

45. Polygonia satyrus Edwards 1869.

Behr (1864a) refers to "Grapta C-album not common in immediate vicinity of San Francisco." Edwards (1865-72) quotes a letter from Henry Edwards about satyrus larvae that he had brought home, ". . . they died . . . their food was stinging nettles and I could not get any in the city." The city of today includes at least four times what was then considered the "immediate vicinity", and nettles are readily found in several places.

Williams (1910) states: "I have several times seen in Golden Gate Park a Grapta probably of this species, and on July 26, 1909, caught a worn female in a garden." Search through bay region collections turned up only one more, from 1923. So it was a stunning surprise to find it breeding in Glen Canyon in May 1978, on a patch of the rare local endemic Urtica californica.

Early stages are described by Comstock (1927), Tilden (1965) and Emmel and Emmel (1973).

Records: (EM) San Francisco, 21-VIII-23. (HVR) Glen Canyon 29-V-78, five last instar larvae, em. 13, 14, 16-VI-78. (JH) Glen Park Canyon, 31-V-79. (Keith Wolfe) Glen Canyon, larvae.

Sight record, Jerry Powell, Lafayette Park, 7-II-87.

46. *Phyciodes mylitta, Edwards 1861. Neotype designated by F. M. Brown (1965), specimen from Stanyan Hill, San Francisco, 28-V-39 (L. I. Hewes).

Behr (1863) describes as new species "Melitea collina, vicinity of San Francisco and hills of Contra Costa." This has been determined to be a synonym of the Mylitta crescent. Williams (1910) says that it is common and "on the wing from early spring to late autumn." Apparently this quick little orange-brown butterfly was readily found until about 1950, but it is rather scarce today. This may be due to the relative lack of suitable thistles, the larval foodplants.

Early stages are described by Comstock (1927), Tilden (1963) and Emmel and Emmel (1973).

Records: (CAS) 20 specimens. Dates, 1903 - 1945; earliest, 20 March, latest, 24 September; collectors, F. X. Williams, C. L. Fox, L. I. Hewes, J. C. Huguenin, R. F. Sternitzky; locations, Twin Peaks, Stanyan Hill (base of Mt. Sutro), Lone Mountain, Presidio, Visitacion Valley, Lake Merced. (OM) 14-III-47. (LACM) 5-VI-24 (Sternitzky); 23-VIII-30 (R. Reid). (HVR) Arboretum 22-X-78; Glen Canyon 2-IV-79. (JH) Glen Canyon III-79, several; base of Telegraph Hill, Sansome and Lombard Sts. 11-VI-79.

Sight records: 6-III-79, 2-IV-79; Lobos Creek 24-III-79 (all HVR). March and June, 1979, (JH), Glen Canyon.

47. Phyciodes campestris Behr, 1863

Behr (1863) describes as new species Melitaea campestris and M. pratensis. "M. pratensis is common enough in some areas near San Francisco." While later authors regarded these names as synonyms and gave precedence to campestris, Cottle (1925) and Williams (1910) refer to the field crescent as P. pratensis.

Williams (1910) says that it is "an abundant insect". It is still widespread and fairly common. The larval foodplants are asters, probably usually Aster chilensis here.

Emmel and Emmel (1973) describe early stages.

Records: (CAS) Stanyan Street Hill 28-V-39 (3) (LIH). (OM) Gilman Beach 22-IV-45; Glen Park 30-IV-47 (2); Ingleside 9-VIII-37; Lake Merced 25-V-37; Twin Peaks 15-IV-47; Mt. Davidson 14-IV-46. (JWT) Twin Peaks 7-IV-56. (HVR) Twin Peaks, 8-IV-69, 11-IV-73; Glen Canyon 25-V-78.

Sight records: Presidio 9-IV-78, several; Glen Canyon 25, 29-V-78, several; 6-VIII-78 (4); Twin Peaks 28-IX-78. Glen Canyon 6-VI-85 (2).

48. Chlosyne palla Boisduval 1852.

Behr (1863) says "Melitaea Palla is the only one of this type found in the vicinity of San Francisco where it is rather common." According to Williams (1910) there was "One male taken years ago in a garden by Mr. Cottle. Today it cannot be said to be a resident of San Francisco."

Early stages are described by Comstock (1927) and by Bauer (1975 in Howe). Bauer states that the species flies in many areas without Castilleja, the known larval foodplant.

Records: (CAS) Sunset District 18-VI-13 (W. N. Wholey). (AMNH) "S. Frisco, Cal.", no date.

49. *Chlosyne leanira* Felder and Felder, 1860

Comstock (1927) on Plate 37, figures 17 and 18, illustrates "M. leanira F. & F., ♂, San Francisco, Cal., 1902." The specimen depicted was probably from the author's own collection, as it was his habit to acknowledge the courtesy of other collectors in loaning material. There would seem to be no reason to use this particular specimen if he had any doubt about the correctness of the data.

Bauer (in Howe, 1975) describes the early stages and gives the foodplant as Castilleja.

Records: (AMNH) "S. Frisco, Cal.", no date, (2).

50. *Euphydryas chalcedona* Doubleday, 1847.

Behr (1863) says that this species is "Very common around the bay of San Francisco." Cottle (1928) mentions that it flew at Mountain Lake. Williams (1910) says "Still an abundant insect," but "It is not destined to remain many years in San Francisco." Seventy-five years later the Chalcedon checkerspot is alive and well here. Its favored foodplant, Mimulus aurantiaca, the sticky monkey flower, persists on almost every steep slope that has escaped the builder -- on Twin Peaks, the upper rocky slopes of Bayview Hill, above Bakers Beach in the Presidio, and on the higher slopes of Glen Canyon. In spring the Chalcedon checkerspot may readily be found in these places.

Checkerspots as larvae undergo a long diapause during the part of the year foodplants are not edible. Hovanitz in 1941 reported experience of wild-bred larvae going into a second diapause in the laboratory. This happened with one of my Twin Peaks larvae in 1975; it resumed feeding on 24 January 1976, and emerged normally 29 March 1976. The second diapause might be an important survival mechanism in drought years.

Additional foodplants are Scrophularia and plantains. Early stages are described by Bauer (in Howe, 1975).

Records: (LACM) 7-V-23 (R. Sternitzky). (OM) L. Merced, 2-V-37 (2); 20-IV-37; 25-IV-36; Twin Peaks 19-IV-47 (2); Mt. Davidson 24-IV-46. (HVR) Twin Peaks 8-IV-73; larvae, 13-III-74, em. IV-74 (20); larvae, III-75, em. IV-75; Presidio 9-IV-78. (CAS) 8-V-38; Presidio 25-IV-35, 24-IV-38 (all LIH). Presidio 15-IV-60 (2) (DCR); Presidio 12-IV-50 (ESR) (3); 25-IV-25 (JCH); Twin Peaks 28-IV-58 (6) (PAO).

Sight Records: 8-IV-78, Twin Peaks, larvae on M. aurantiaca; 17-V-78; Presidio 9-IV-78, common; Bayview Hill 5-V-78; Glen Canyon 25, 29-V-78, 14-IV-79; 4-VI-78, common; 8-VI-85, many.

51. Euphydryas editha Boisduval 1853 bayensis Sternitzky.

The Editha checkerspot was found in different locations near San Francisco according to Behr (1863). Cottle (1928) writes of a field near Lake Merced which is now a golf course, "Melitaea editha could there be taken by the hundred." Williams (1910) says, "This species has been taken here but at present is not common." More recent specimens were all taken on Twin Peaks or Mt. Davidson. Bert Walker, who collected those in the Josephine D. Randall Junior Museum and the Oakland Museum, says (telephone conversation) that he took them on the lower slopes, an area now covered with housing. Plantago erecta and Orthocarpis densiflora, favored foodplants, still grow on the small remaining natural area of Mt. Davidson.

Records: (OM) Twin Peaks, 14-III-47 (5); 20-III-47 (6); 6-IV-47 (2); 27-III-48 (2); Mt. Davidson 14-III-47 (3). (JDR) Twin Peaks 20-III-47; 27-III-48. (JWT) 7-IV-56 (2). (LACM) 20-III-59 (3) (Ray Stanford). (HVR) Twin Peaks 20-III-47 (Bert Walker) 17-III-48 (BW). (J.V.T) 16-III-57.

52. Boloria epithore Edwards 1864.

The original description by Edwards was of a specimen from H. H. Behr, presumably returned and destroyed in the 1906 fire. F. M. Brown (1965) expresses the view that Behr's specimen came from the immediate vicinity of San Francisco. Perkins and Meyer (1973) cite Edwards (1868-1872) statement regarding Argynnis callippe, "The most common or only species of Argynnis found in the vicinity of San Francisco, according to Dr. Behr," as indicating that Behr's epithore did not come from this city. However, Behr (1862b) made the statement two years before the description of A. epithore, so could have found it meanwhile.

Williams (1910) lists, "Brenthis epithore Bdv. Taken a good many years ago by Messrs. Cottle and Mueller in the commencement of Golden Gate Park, but not met with since."

Neither Behr (1891) nor Brandege (1892) lists among the flora of San Francisco any of the Viola species known as foodplants for B. epithore elsewhere. According to Perkins and Meyer (1973) the foodplant in the Santa Cruz Mountains is V. ocellata Torrey and Gray; in Mendocino County, V. sempervirens Greene, and in the higher mountains, V. glabella Nuttall.

We do not know whether violets grew at onetime in the area taken over by Golden Gate Park. But we have no evidence for the presence of B. epithore in San Francisco except Williams (1910) statement. Cottle does not mention this species in his retrospective article.

53*. Speyeria callippe Boisduval 1852. The type location was fixed as San Francisco by dos Passos and Gray (1947); type specimen in USNM.

Behr (1862) refers to "Argynnis Callippe Bdv., the only Argynnis found in our city." Cottle (1928) says, in retrospect, "One half mile south of this lake (Merced) , one early June morning, I captured, 'single-handed and alone', ninety-two Argynnis callippe." He then continues that the site was taken over by vegetable gardeners, then became a golf course. This is probably now part of the San Francisco Golf Club, which extends almost to the lake's eastern shore. Viola pedunculata, the recognized foodplant for callippe, was collected from the "Open grassy hills east of Lake Merced" by Raven (Howell, Raven, and Rubtzoff, 1953).

V. pedunculata may formerly have grown on lower slopes of Twin Peaks, where callippe is said to still fly (Howe, 1975). Nearby Mt. Davidson is carpeted with these yellow violets, and I have seen them on Corona Heights. There are plenty for a colony on Bayview Hill, right above Visitacion Valley.

Emmel and Emmel (1973) describe the early stages of S. callippe comstocki; these would differ little from the more northern S. callippe callippe.

Records: (EM) 28-V-30. (CAS) Visitacion Valley, San Francisco (illustrated in Howe, 1975, Plate 28, no. 8). Bayview Hill, Larry Orsak, 12-VI-82.

53a. Speyeria coronis Behr.

In May of 1988; John Hafernik sighted what appeared to be a stray S. coronis in Glen Canyon. This species has not been collected closer to San Francisco than the Santa Cruz Mountains or the East Bay hills, and there is no way it could breed in Glen Canyon.

54. Agraulis vanillae Linnaeus.

The gulf fritillary is often found in the counties surrounding San Francisco. It is migratory and fans out each summer toward the north, colonizing each vine it finds of its foodplant Passiflora, a plant not native to the Bay Area.

The only specimens that I have found are a pair in the collection of Lawrence McCready, a long time amateur collector, tagged "San Francisco, Aug. 1962."

Barbara Deutsch reports that she saw a gulf fritillary on Potrero Hill on 10 May 1987.

55. Danaus plexippus Linnaeus 1759.

H. H. Behr writes of the monarch, "We see through our whole summer and autumn our Danaus in the very streets of the city, struggling against the western

gale . . . the nearest habitat of the plants (Asclepias) is on the other side of the bay." The same author (1895) says that it was rare here until 1856, when suddenly great numbers appeared, but since 1880 they have not visited the city. Probably the fluctuations here were due to waxing and waning of east-bay breeding populations.

Williams (1910) reports: "This butterfly is frequently seen in San Francisco, especially in the fall of the year." At present monarchs migrate to coastal California for the winter from all the states west of the Rockies, beginning to appear usually in September, and leaving by April. By some estimates as many as 20% are lost through flying out to sea; as Behr (1862a) expressed it, "A considerable number is constantly seen sea-faring themselves out on the Pacific." In September, 1978, one battered monarch was sighted on the Southeast Farallon Island, thirty-two miles west of the Golden Gate.

P. H. Arnaud has observed a monarch "roost" in Golden Gate Park. Huguenin (1918) recorded many D. plexippus taken on the west slope of Twin Peaks in February, March, and April of 1917.

Records: (SFSU) 24-IX-58 (D.M. Hansen); 25-X-70 (M. Tieger); 11-II-71 R. Patterson. (HVR) Golden Gate Park 22-X-78; Lobos Creek 24-III-74.

Sight records: S.E. Farallon Island 15-IX-78 (V. F. Lee). Yerba Buena Island 2-XI-78 (HVR); Arboretum, half-grown larvae on Asclepias, 23-VI-83; 23 Belmont, adult, 21-VI-83 (WJR).

56. Coenonympha tullia californica Westwood 1851.

Behr (1864b) states, "Coenonympha California Double. is one of the commonest species in California." That is equally true today. Williams (1910) apparently saw but few. California ringlets fly today wherever there is grass unmowed. In 1978 they were far less common than usual, perhaps the result of severe drought during the two preceding winters.

Comstock (1927) describes and illustrates the early stages; these may also be found in Tilden (1965) and in Emmel and Emmel (1973).

Records: (CAS) Presidio 24-IV-38; Stanyan Hill 10-VII-43, 8-V-56,; 21-VIII-54 (5) (Ron Wilson); Presidio 24-IV-38; 25-IV-37. (OM) Twin Peaks 24-IV-47 (6); Corona Heights 22-IV-45 (3); Mt. Davidson 13, 14-V-37 (2); 25-IV-37; Glen Park 30-IV-47. (HVR) Twin Peaks 18-III-74, 17-IV-76, 28-IX-78; Glen Canyon 25-V-78(2).

Sight records: Glen Canyon 25-V-78, 24-IV-79; Bayview Hill 17-VIII-78.

sthenele

57.*Cercyonis sthenele Boisduval 1852. Boisduval's type is in the Barnes collection at the USNM. Holland (1931) writes, "There are five specimens in the Edwards collection in my possession;" presumably at the CM. Behr's specimens in the CAS collection were burned in 1906. A specimen now there, compared by Barnes with the type and illustrated by Howe (1975), carries as data only "California". This specimen has a very distinct wavy band bordered with black across the underside of the lower wing, quite unlike other subspecies listed under sthenele. The upperside is shown by Orsak (1979).

Behr (1864b) says of the sthenele satyr it "Is rather common near San Francisco, where it is common in June. Only one generation annually." He adds that sthenele settles on the ground, unlike silvestris which settles on the underside of oak branches. Wright (1905) says that it flew at Lone Mountain.

Williams (1910) says, "This insect, to the best of my knowledge, has not been taken here within the last thirty years or more. Mr. Cottle says that the locality given him by Dr. Behr as the habitat of sthenele is in Golden Gate Park south of Strawberry Hill. This region, though quite grassy in places, has been much disturbed by man, and is now clothed for the most part with various trees. . . . I believe the butterfly extinct here."

Probably the little satyr had a wider range than the area of the park described. But adjoining land was being used for grazing cattle and horses. This is proved by the large numbers of these animals shown to have been impounded in reports to the park commissioners. J. T. Fleming (1875) reports that in 1874 a total of 224 domestic animals, including a few goats and pigs, were impounded for trespassing on Golden Gate Park. (The ransom for these creatures helped to fund the park.) While no one knows which grasses were used by sthenele, the same were doubtless palatable to the livestock.

Thus sometime before 1880, victim not of modern pollution nor pesticides but of the sort of disturbance caused by man since his tribal beginnings, passed into extinction the first of San Francisco's local endemics, the sthenele satyr.

Conclusion

Butterflies still living in San Francisco are urban survivors. Some have succeeded in adopting introduced flora as foodplants and are widespread in the city. The others are confined to the remaining open spaces in which their needed larval hosts still grow. Most such areas are now city parks, and in some, at least, an effort is finally being made to foster native plants.

The growing butterfly population in the native plant section of the Arboretum in Golden Gate Park proves that these insects can discover and utilize plantings at some distance from their usual haunts. That pipe vine larvae were found there in May, 1988 was startling, as the nearest known habitat is miles away. The rest of this park has been landscaped mostly with exotic flora.

Glen Canyon Park's southwest wall has never been cleared of its natural cover of coastal scrub, but the opposite wall was used as a dairy pasture for many years and is clothed mostly with oat grass. A small remnant of Islais Creek trickles through the bottom of the valley, maintaining a line of willows which widens at the upper end into a grove. Lush vegetation flourishes beneath the trees. There are several swampy areas of spring seepage. Because of its varied plant life, Glen Canyon hosts all but a few of San Francisco's remaining kinds of butterflies.

The summit areas of Twin Peaks and Mt. Davidson are also under city ownership and still nurture a valuable butterfly fauna. Twin Peaks is the type location for the Mission blue, and the only one remaining in the city. Mission blues were recorded as recently as the forties and fifties from Mt. Davidson, Corona Heights, Glen Canyon, and Gilman Beach.

Gilman Beach no longer exists, having been replaced by several blocks of landfill, but the species found there have in recent years been taken on the nearby Bay View Hill. Bay View Hill is largely grassland, with some coastal scrub, especially in the summit area. The upper slopes of Bay View Hill are also a city park.

Lone Mountain has been landscaped, and Mountain Lake is bordered by a playground and a crowded highway leading to the Golden Gate Bridge.

A tiny park on the peak of Golden Gate Heights sustains large enough patches of wild buckwheats to nourish a colony of green hairstreaks. Sea fig menaces it.

Corona Heights has been a good butterfly location in the past, but since construction of the Josephine D. Randall Junior Museum and the Corona Heights Playground foot traffic has become heavy.

Very little of the Lake Merced region is now available for butterflies to breed. Several Golf courses have been developed there, and houses built in the woods where Aristolochia grows. But while no pipe vine swallowtails have been seen in the last few years, eight larvae were taken there by Barbara Deutsch on 20 June 1988. At Fort Funston, sea fig has encroached on that dunes habitat.

The Presidio, largest and best of all butterfly habitats in San Francisco, belongs to the federal government. Much of the Presidio has long been planted with Monterey pine and cypress trees, which have blocked out the varied flora formerly growing there, but the extensive unforested area has more native plant species than any other in the city. Lobos Creek flows its short course from the large spring where it arises to the sea along the edge of the Presidio. Oaks and other native trees grow undisturbed in its canyon. Most surviving species of San Francisco butterflies have populations near Lobos Creek or elsewhere in the Presidio.

Recently, all of these refuges have come under seige. Aggressive introduced plants, French broom, fennel, eucalyptus, have almost overrun Mt. Davidson and Mt. Sutro. The two small pine trees that have grown for years on slopes of Twin Peaks have matured to the point of producing groves of seedlings. Unfortunately, these are springing up just where the best surviving colonies of Mission blues breed. Since a federally listed endangered species is involved, it can be hoped that the city will act to save Twin Peaks -- what is left of it. Euphydryas editha bayensis, another threatened species which formerly flew there, is already wiped out.

Glen Canyon is similarly menaced by intrusive exotic flora, which threaten to destroy rare plants found nowhere else in the city, as well as foodplants for its many butterfly species. Open areas of the Presidio are also being invaded.

An additional danger to the diversity of our butterfly population is the planned development of housing on the lower slopes of Bay View Hill. The project will come perilously close to the possible habitat of the endangered callippe silverspot in the pansy patch near the radio tower. These lower slopes are the only location here where the sylvan skipper has been taken in the last sixty years; Behr's silver blues and green hairstreaks have few other habitats in San Francisco.

On 17 August 1988, I saw a western tiger swallowtail fly up Market Street to Hyde Street, where I was waiting for a bus. This species thrives on the plane trees which have been planted on Market Street and in the financial district: a truly urbanized insect. Other urbanized butterflies breed on introduced weeds, for instance anise swallowtails on fennel, and have greatly expanded

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their populations as a result. Umber and fiery skippers exploit the grasses in lawns, and echo blues' larvae feed on flowers in gardens. But only about a dozen of the thirty or so species we can still hope to see can live without their native foodplants found now only in the open spaces to which they have retreated. These last natural areas must be rescued if most of our butterflies are to survive at all in San Francisco.

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ABBREVIATIONS USED FOR NAMES OF COLLECTIONS AND COLLECTORS IN RECORDS.

PHA - Paul H. Arnaud
TWD - Thomas W. Davies
AMNH - American Museum of Natural History
JH - John Hafernik
JCH - Julius Caesar Huguenin
LIH - L. I. Hewes
PMNH - Peabody Museum of Natural History (Yale)
RLL - Robert L. Langston
USNM - U. S. National Museum
EM - Essig Museum, Univ. of California, Berkeley
LACM - Los Angeles County Museum
CM - Carnegie Museum
QM - Oakland Museum, Oakland, California
AO - Al Ottoboni's collection
PAO - Paul A. Opler
ESR - Edwin S. Ross
DCR - D. C. Reeves
HVR - Harriet V. Reinhard
JDR - Josephine D. Randall Junior Museum, San Francisco
WJR - Walter J. Reinhard
CAS - California Academy of Sciences, San Francisco
JWT - J. W. Tilden
SFSU - San Francisco State University
FXW - Francis X. Williams
RW - Ron Wilson
WNW - W. N. Wholey

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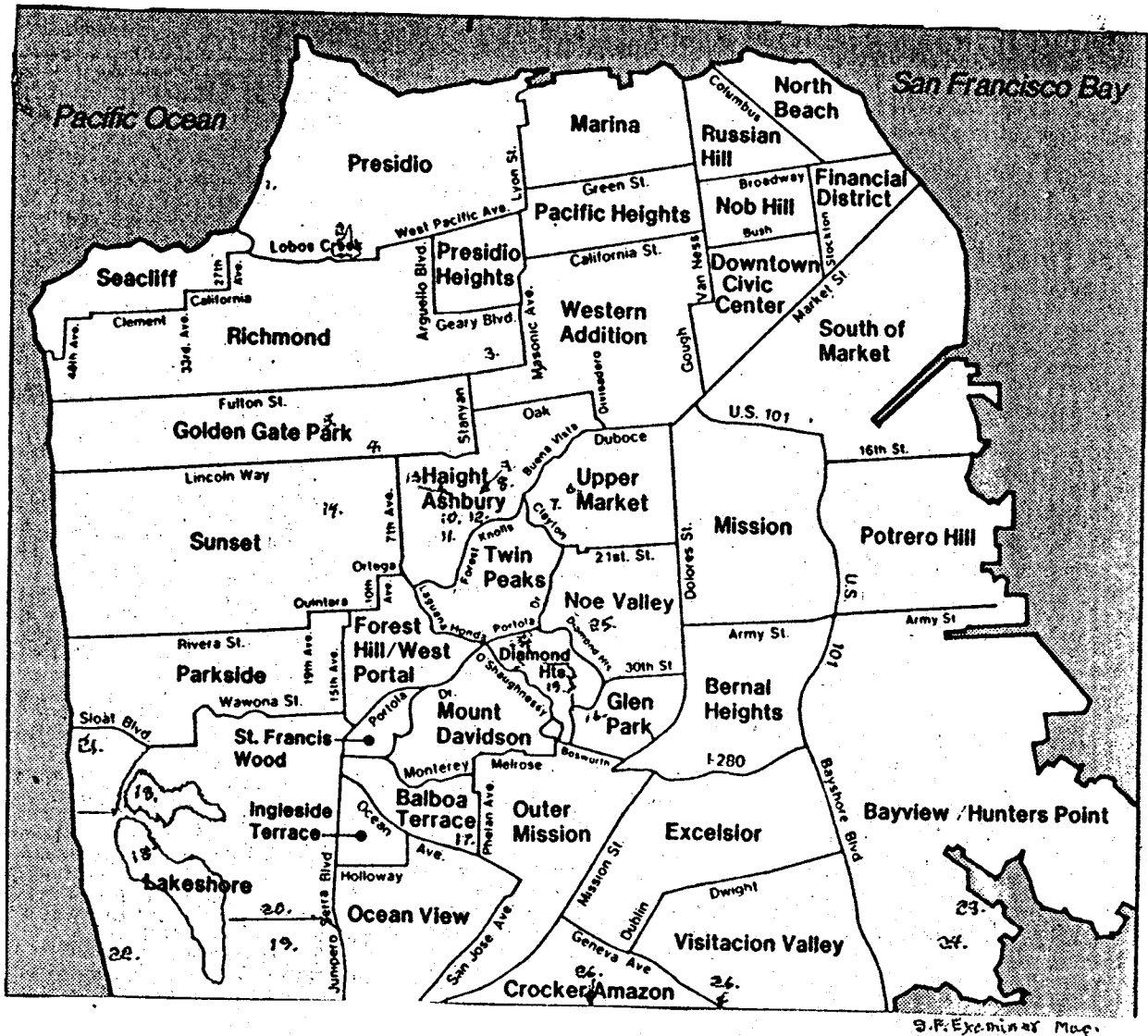
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SAN FRANCISCO NEIGHBORHOODS AND LOCATIONS CITED IN RECORDS

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|---------------------------|-------------------------|----------------------------|
| 1. Baker Beach | 10. Mt. Sutro | 19. S. F. Golf Club |
| 2. Mountain Lake | 11. Sutro Forest | 20. Brotherhood Way |
| 3. Lone Mountain | 12. Stanyan Hill | 21. Fleishhacker Zoo |
| 4. Arboretum | 13. Parnassus Heights | 22. Fort Funston |
| 5. Strawberry Hill | 14. Golden Gate Heights | 23. Gilman Beach |
| 6. Corona Heights | 15. Glen Canyon | 24. Bayview Hill |
| 7. Vulcan Steps | 16. Mizpah Street | 25. San Miguel Hills |
| 8. Alma Street | 17. Balboa Park | 26. To San Bruno Mountains |
| 9. Edgewood-Belmont Aves. | 18. Lake Merced | |