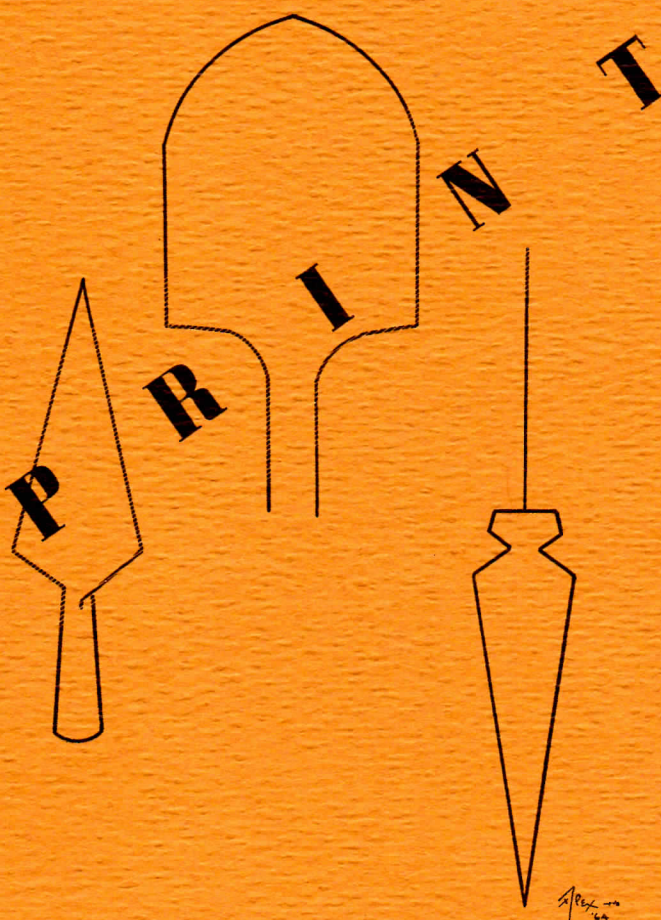


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FISH REMAINS FROM A SIXTEENTH CENTURY SITE
ON DRAKES BAY, CALIFORNIA

W. I. Follett

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FISH REMAINS FROM A SIXTEENTH CENTURY SITE
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ABSTRACT

A collection of 64 fish remains from an archaeological site on Estero de Limantour, Drakes Bay, Marin County, California - which was occupied between about 1450 and 1600 A. D. - represents six species, all of which enter that estero: *Triakis semifasciata* (leopard shark), *Platichthys stellatus rugosus* (southern starry flounder), *Hyperprosopon argenteum* (walleye surfperch), *Embiotoca jacksoni* (bay blackperch), *Damalichthys vacca* (pileperch), and *Rhacochilus toxotes* (rubberlip seaperch). All these fishes are good eating and are readily captured by hook and line or by net. The absence of stingray material is noteworthy. The bat stingray, *Myliobatis californica*, is known to have been utilized by aborigines elsewhere in California. It enters Estero de Limantour, but is not known to occur there during the winter months. The absence of its remains in this collection therefore suggests that the aborigines occupied the site only during the winter months.

INTRODUCTION

It has been my privilege to examine the fish remains collected by Clement W. Meighan, of the University of California, Los Angeles, at a sixteenth century archaeological site (Mrn-307) on an estero of Drakes Bay, Marin County, California.

This site is located on the east shore of Estero de Limantour (38°02'10" N. lat., 122°54'19" W. long.; see U. S. Coast and Geodetic Survey Chart 5599, Drakes Bay), about half a mile above the mouth of the estero.

Mrn-307 was within the territory of the Coast Miwok (Meighan and Heizer 1953:73). It is one of the seven shellmounds of the Drakes Bay region that are known to contain historic materials over 350 years old (Meighan 1950:27). On the basis of these materials, it appears that the site was occupied between about 1450 and 1600 A. D. (C. W. Meighan, *in litt.*, October 17, 1952).

* The present paper is a revision of the manuscript (1956) listed by Follett (1963a:309) as "Fish Remains. In 'The Archaeology of the Estero de Limantour Site, Mrn-307.' MS, California Academy of Sciences, San Francisco."

The specimens are deposited in the Museum of Anthropology, University of California, Berkeley.

A detailed report on the site and its archaeology will be published by C. W. Meighan.

FISHES REPRESENTED

The collection comprises 64 fish remains, of which 24 are complete, 30 are incomplete, and 10 are fragmentary. (See Table 1 for a list of these remains by catalog number, species, and skeletal element.) Six species, referable to three families, are represented, as follows:

Family TRIAKIDIDAE - Smoothhounds

Triakis semifasciata Girard

The leopard shark (Roedel and Ripley 1950: Figure 35) is good eating. A male specimen (California Academy of Sciences No. 27074) collected at Elkhorn Slough, Monterey County, California, measured 135 cm in total length and weighed 11.4 kg. Females reach a total length of 183 cm (Limbaugh 1955:52).

Material: 4 centra, the largest from a shark about 122 cm in total length. (See Follett 1957: Figure 1a, for a photograph of a centrum of *Triakis semifasciata*.)

Family PLEURONECTIDAE - Righteyed Flounders

Platichthys stellatus rugosus Girard

The southern starry flounder (Orcutt 1950: Frontispiece) is a very good food fish. It averages about 41 cm in total length and about 1 kg in weight (Baxter 1950:26). Reports published during the nineteenth century indicating that this fish attained a much larger size have been noted by Follett (1957:68).

Material: 2 precaudal vertebrae, the larger from a fish about 63 cm in total length and perhaps 4 kg in weight; 1 first interhaemal (Plate 1a).

Family EMBIOTOCIDAE - Viviparous-perches

Hyperprosopon argenteum Gibbons

The walleye surfperch (Roedel 1953: Figure 99) attains a total length of 27.3 cm (Baxter 1960:45). It is one of the best food fishes of its family.

Material: 1 lower pharyngeal, from a fish about 27 cm in total length.

Embiotoca jacksoni Agassiz

The bay blackperch (Tarp 1952: Figure 24) is said to attain a total length of 30.5 cm and a weight of 0.6 kg (Baxter 1960:47). It is a fair food fish.

Material: 6 supraoccipitals; 3 hyomandibulars; 1 opercle; 1 urohyal (Plate 1b); 7 cleithra; 1 postcleithrum; 1 scapula; 1 pelvic; 1 precaudal vertebra. (Identification to genus and species of the vertebra is doubtful.) These elements are from fish about 25 to 33 cm in total length.

Damalichthys vacca Girard

The pileperch (Roedel 1948: Figure 54) is a common food fish, though not of high quality (Jordan and Starks 1895:797, as *Damalichthys argyrosomus*). It attains a total length of about 41 cm (Cannon 1953:302). A specimen (California Academy of Sciences No. 26197), collected in San Francisco Bay, California, measured 40 cm in total length and weighed 1 kg.

Material: 10 lower pharyngeals (see Follett 1957: Figure 1c, for a photograph of a lower pharyngeal of *Damalichthys vacca*); 5 cleithra; 3 postcleithra; 3 scapulae; 3 pelvics; 1 caudal vertebra; 1 rib. (Identification to genus and species of the vertebra and rib is doubtful.) These elements are from fish about 33 to 41 cm in total length.

Rhacochilus toxotes Agassiz

The rubberlip seaperch (Walford 1931: Figure 84) is considered the finest food fish of its family (Tarp 1952:56). It is said to attain a total length of 45.7 cm (Cannon 1953:302) and a weight of 1.8 kg (Jordan and Gilbert 1881:49). A gravid female (California Academy of Sciences No. 26209), collected in Tomales Bay, Marin County, California, measured 45.7 cm in total length and weighed 1.6 kg.

Material: 1 parasphenoid (Plate 1c); 3 lower pharyngeals (the largest, Plate 1d); 1 postcleithrum; 2 pelvics; 1 precaudal vertebra. (Identification to genus and species of the vertebra is doubtful.) These elements are from fish about 30 to 38 cm in total length.

DISCUSSION

All species represented in this collection (including *Triakis semi-fasciata*, the leopard shark) are good eating. These fishes commonly occur in the shallow water of bays and mud-bottomed esteros, and probably enter Estero de Limantour throughout the year. They are readily captured by hook and line or by net.

Remains of a southern starry flounder, a walleye surfperch, and a pile-perch represent individuals of about the maximum size that those fishes are known to attain. All other remains in this collection represent individuals of about average size.

The absence of stingray material from this collection is noteworthy. The bat stingray, *Myliobatis californica* Gill, is edible and is known to have been utilized by the aborigines. Remains of this species were found in several shellmounds of the San Francisco Bay shoreline - including those at Ellis Landing (Nelson 1910:378), West Berkeley (Follett 1954), Emeryville (Schenck 1926:179-180; Gifford 1940:170), Strawberry Point (Follett 1957:69), Belvedere, Site 39, N. C. Nelson survey (Nelson 1909: Map 1). [According to Albert Elsasser (personal communication), the location of Site 39 is indicated on the map of Nelson (1909) by the large unnumbered dot approximately midway between the letter "D" of "RICHARDSON BAY" and the letter "E" of "TIBURON PEN." Richard K. Beardsley kindly permitted me to examine Nelson's material from this site.] Elsewhere in California, remains of the bat stingray were found at San Miguel Island (Heye 1921:110), Arroyo Sequit (Follett 1963b:115), and Tomales Bay, McClure Site, Mrn-266 (Beardsley 1954:iii, 23-24; stingray material identified by W. I. Follett). The bat stingray enters Estero de Limantour - but it is not known to occur there during the winter months. The absence of stingray material in the Mrn-307 collection therefore suggests that the aborigines occupied this site only during the winter months. [It may be significant that stingray material is absent from collections of fish remains (which I have examined) from two nearby archaeological sites: the Estero Site, Mrn-232b (Beardsley 1954:iii, 22-23), which is only about 200 yards south and 100 yards west of Mrn-307; and the Cauley Site, Mrn-242 (Beardsley 1954:iii, 21-22), which is less than two miles (generally northwest) from Mrn-307.]

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TABLE 1

FISH REMAINS FROM SITE MRN-307, DRAKES BAY, CALIFORNIA

UCMA No.	Species	Skeletal Element
1-120581	<i>Platichthys stellatus rugosus</i>	Precaudal vertebra (ca. 9th), incomplete
1-120653	<i>Triakis semifasciata</i>	Centrum, complete
1-120754	<i>Damalichthys vacca</i> (?)	Caudal vertebra (ca. 9th), complete
1-120783	<i>Damalichthys vacca</i>	Lower pharyngeal, complete
1-120784	<i>Embiotoca jacksoni</i>	Urohyal, incomplete; Plate 1b
1-120785	<i>Embiotoca jacksoni</i>	Supraoccipital, incomplete
1-120798	<i>Damalichthys vacca</i>	Lower pharyngeal, complete
1-127758	<i>Embiotoca jacksoni</i>	Cleithrum (left), incomplete
1-127786A	<i>Embiotoca jacksoni</i>	Supraoccipital, incomplete
1-127786B	<i>Damalichthys vacca</i>	Postcleithrum (right), complete
1-127787A	<i>Damalichthys vacca</i>	Cleithrum (right), incomplete
1-127787B	<i>Damalichthys vacca</i>	Pelvic (right), complete
1-127787C	<i>Damalichthys vacca</i>	Pelvic (right), complete
1-127790	<i>Triakis semifasciata</i>	Centrum, complete
1-127791	<i>Embiotoca jacksoni</i>	Cleithrum (right), incomplete
1-127795A	<i>Embiotoca jacksoni</i>	Cleithrum (right), incomplete
1-127795B	<i>Embiotoca jacksoni</i>	Cleithrum (left), fragment
1-127798	<i>Damalichthys vacca</i>	Lower pharyngeal, incomplete
1-128371A	<i>Damalichthys vacca</i>	Postcleithrum (right), incomplete
1-128371B	<i>Damalichthys vacca</i> (?)	Rib (ca. 3rd left), complete
1-128372	<i>Damalichthys vacca</i>	Cleithrum (right), fragment
1-128373A	<i>Damalichthys vacca</i>	Lower pharyngeal, incomplete
1-128373B	<i>Rhacochilus toxotes</i>	Lower pharyngeal, incomplete

TABLE 1: (CONTINUED)

UCMA No.	Species	Skeletal Element
1-128373C	<i>Embiotoca jacksoni</i>	Cleithrum (right), fragment
1-128373D	<i>Rhacochilus toxotes</i>	Lower pharyngeal, complete
1-128373E	<i>Embiotoca jacksoni</i> (?)	Precaudal vertebra (ca. 15th), incomplete
1-128374A	<i>Triakis semifasciata</i>	Centrum, complete
1-128374B	<i>Triakis semifasciata</i>	Centrum, complete
1-128374C	<i>Platichthys stellatus rugosus</i>	First interhaemal, incomplete; Plate 1a
1-128374D	<i>Embiotoca jacksoni</i>	Supraoccipital, incomplete
1-128375A	<i>Damalichthys vacca</i>	Pelvic (left), fragment
1-128375B	<i>Rhacochilus toxotes</i>	Postcleithrum (left), incomplete
1-128375C	<i>Hyperprosopon argenteum</i>	Lower pharyngeal, complete
1-128378A	<i>Embiotoca jacksoni</i>	Cleithrum (left), incomplete
1-128378B	<i>Embiotoca jacksoni</i>	Opercle (right), incomplete
1-128378C	<i>Damalichthys vacca</i>	Scapula (right), complete
1-128378D	<i>Embiotoca jacksoni</i>	Hyomandibular (right), complete
1-128378E	<i>Rhacochilus toxotes</i>	Pelvic (left), fragment
1-128378F	<i>Damalichthys vacca</i>	Lower pharyngeal, complete
1-128378G	<i>Damalichthys vacca</i>	Lower pharyngeal, complete
1-128383A	<i>Embiotoca jacksoni</i>	Supraoccipital, incomplete
1-128383B	<i>Rhacochilus toxotes</i>	Parasphenoid, incomplete; Plate 1c
1-128383C	<i>Rhacochilus toxotes</i> (?)	Precaudal vertebra (ca. 13th), complete
1-128384A	<i>Damalichthys vacca</i>	Cleithrum (right), incomplete
1-128384B	<i>Damalichthys vacca</i>	Lower pharyngeal, incomplete
1-128386A	<i>Damalichthys vacca</i>	Cleithrum (left), fragment
1-128386B	<i>Damalichthys vacca</i>	Lower pharyngeal, complete

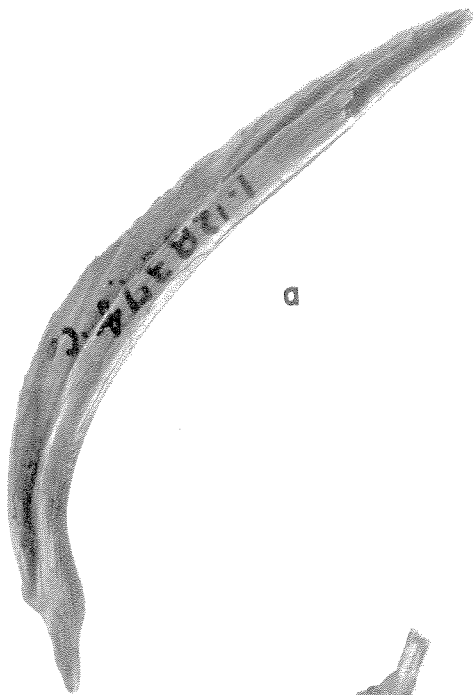
TABLE 1: (CONTINUED)

UCMA No.	Species	Skeletal Element
1-128386C	<i>Damalichthys vacca</i>	Lower pharyngeal, incomplete
1-128387A	<i>Embiotoca jacksoni</i>	Postcleithrum (left), incomplete
1-128387B	<i>Embiotoca jacksoni</i>	Hyomandibular (right), complete
1-128387C	<i>Damalichthys vacca</i>	Lower pharyngeal, complete
1-128387D	<i>Embiotoca jacksoni</i>	Scapula (left), complete
1-128388A	<i>Damalichthys vacca</i>	Postcleithrum (left), fragment
1-128388B	<i>Rhacochilus toxotes</i>	Pelvic (right), fragment
1-128388C	<i>Damalichthys vacca</i>	Cleithrum (left), fragment
1-128388D	<i>Damalichthys vacca</i>	Scapula (left), incomplete
1-128388E	<i>Embiotoca jacksoni</i>	Hyomandibular (right), fragment
1-128389A	<i>Rhacochilus toxotes</i>	Lower pharyngeal, complete; Plate 1d
1-128389B	<i>Embiotoca jacksoni</i>	Supraoccipital, incomplete
1-128389C	<i>Embiotoca jacksoni</i>	Supraoccipital, incomplete
1-128389D	<i>Embiotoca jacksoni</i>	Cleithrum (right), incomplete
1-128389F	<i>Embiotoca jacksoni</i>	Pelvic (right), incomplete
1-128389G	<i>Platichthys stellatus</i> <i>rugosus</i>	Precaudal vertebra (ca. 10th), incomplete
1-128389H	<i>Damalichthys vacca</i>	Scapula (left), complete

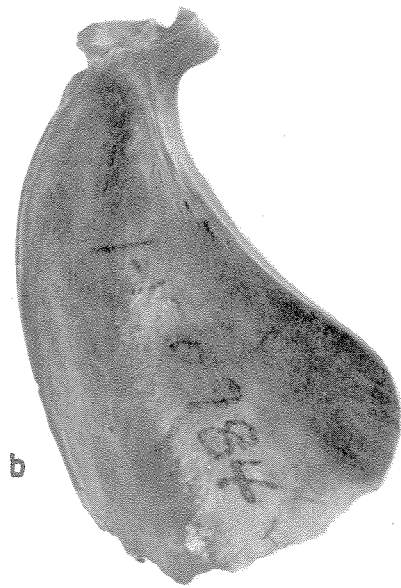
EXPLANATION OF ILLUSTRATIONS

PLATE 1. Fish Remains from Mrn-307 (Follett)

- a, *Platichthys stellatus rugosus* (southern starry flounder): First interhaemal, length 60 mm; UCMA 1-128374C.
- b, *Embiotoca jacksoni* (bay blackperch): Urohyal, length 25 mm; UCMA 1-120784.
- c, *Rhacochilus toxotes* (rubberlip seaperch): Parasphenoid, length 43 mm; UCMA 1-128383B.
- d, *Rhacochilus toxotes* (rubberlip seaperch): Lower pharyngeal, width 27 mm; UCMA 1-128389A.



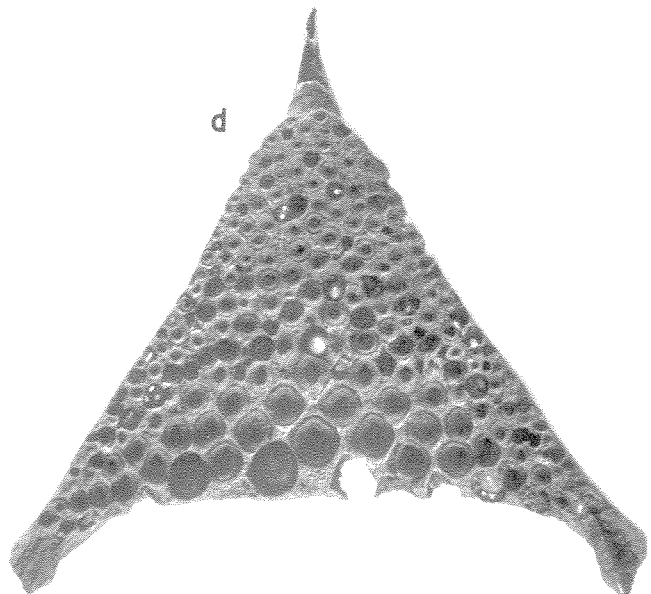
a



b



c



d

PLATE I: Fish Remains From Mrn-307 (Follett)