SUBSISTENCE PATTERNS OF THE CHUMASH INDIANS
OF SOUTHERN CALIFORNIA

by

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STATEMENT BY AUTHOR

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ABSTRACT

The hunting and gathering subsistence patterns of the semimaritime Chumash Indians of Southern California are reconstructed from an integration of archaeological, ethnographical, floral and faunal data with a detailed examination of historical sources. Seasonal variations in subsistence patterns are inferred, and a partial environmental explanation is proposed for the development of the unique maritime Culture Climax in the Chumash region. In the light of Baumhoff's approach Chumash "subsistence-demographic-sociological" relationships are analyzed and the place of the Chumash within historical-developmental classification is reconsidered. Ideal-complete-classifications such as the Willey-Phillips scheme and Hester's modification of it are unsuitable for the analysis of hunting and gathering societies with unusually rich subsistence bases. This becomes apparent upon examination of groups such as the Chumash.
CHAPTER I
INTRODUCTION

Patterns of subsistence bear a direct relationship to population density and distribution and these, in turn, have certain social correlates functionally linked to them. In the last decade investigations of such relationships have assumed special prominence with the renewed interest in cultural evolution. As part of this trend, the Willey-Phillips (1958) historical-developmental synthesis of New World archaeology has had considerable impact upon archaeological thought. Problems in application of their scheme to certain cultures have highlighted the need for what Baumhoff (1960: 4) calls "subsistence-demographic-sociological analyses on the ethnographic level." The greatest lack of adequate data for analyses of this type is at the level of hunters and gatherers, and, as Baumhoff emphasizes, present data at this level do not provide the necessary bases for sound subsistence-demographic-sociological theory upon which to formulate developmental stages.

Most hunting and gathering cultures fall into Archaic or pre-Archaic stages within the Willey-Phillips classification. In this respect, subsistence-demographic studies of
California Indians are particularly illuminating for an adequate definition of Archaic since most California Indians, exclusive of the Colorado River agriculturists, were living at an Archaic stage of development at European contact (Meighan 1959a). Baumhoff (1960), in reevaluating the place of hunters and gathers within the Willey-Phillips classification, has reexamined the population data for Northern and Central California and has attempted to correlate distribution of population with features of the natural environment. Essentially Baumhoff's method is a statistical approach to determining the subsistence potentials of vegetation areas. In his study he excluded the Southern California Province (Kroeber 1939) from consideration because population data were not adequate for the kind of statistical treatment used.

Ethnographic data for the Southern California Province are sparse by comparison with other regions of California, but studies similar to Baumhoff's, using slightly different source materials, can be made for some Southern California groups. This thesis is such a study of an exceptional group of Southern California Indians called the Chumash, who inhabited the coast slightly north of the Santa Barbara Channel, interior regions to the western edge of the San Joaquin Valley, the Santa Barbara Channel, and the Channel Islands (Fig. 1). Even though ethnographic data for
Fig. 1. Modern political boundaries and Chumash linguistic divisions.
the Chumash are few and population data for them are perhaps inadequate for a statistical appraisal of environmental subsistence potentials, it is still possible to estimate in a slightly different way the "degree to which population size and density were dependent on the amounts of certain food products that were available" (Baumhoff 1960: 5).

The Chumash, like most other coastal Southern Californian groups, were among the first of the California Indians to be missionized by the Spaniards, decimated by European diseases, and dislocated by the tremendous cultural changes pursuant to missionization. This group was extinct as a cultural entity by the time ethnographic research was begun in California, but they were well documented in historical sources of Spanish California due to the attention attracted by their unusually large population aggregates and advanced cultural level relative to the rest of Southern California. The Chumash and maritime Shoshoneans, to whom the Chumash are technologically similar, are exceptional in California because of their maritime-oriented subsistence. Most fishing practiced outside the Santa Barbara region in California was salmon fishing, and technologically it can be viewed as the southernmost extension of Northwest fishing culture. But the maritime fishing culture of the Santa Barbara region cannot be explained in those terms. According to Rostlund (1948: 27): "Exception must at present be
made for the maritime fishing culture in the Santa Barbara region. In many respects it was unique in California, perhaps even in North America, and its origin seems yet to be determined." It is hoped that some environmental factors partially explaining the development of the Chumash maritime industry can be shown while attempting to estimate the environmental subsistence potential of the Chumash area.

Assessment of the natural food supply will be approached from three fronts as suggested by Rostlund (1948: 32): plants, land animals, and fish (and sea mammals). Both ethnographic and historic materials will be supplemented by archaeological data, mostly identified faunal remains, in surmising the nature of Chumash subsistence patterns. Due to the lack of extensive ethnographic observations on the Chumash, subsistence patterns will be reconstructed to some extent by archaeological-environmental inference. Such conclusions, at best, should be taken as tentative.

After a description of the natural landscape, a short sketch of Chumash culture history since European contact and an outline of anthropological research on the Chumash will be presented to provide a frame of reference for the names of several workers and certain kinds of historical data mentioned in this thesis. This will be followed by summaries of
Chumash socio-political organization and technology, both of which are essential for an understanding of subsistence patterns.

Considerable amounts of detail have been assembled on faunal and floral natural histories in the hope that they will be of some use to workers in the area. Integrated within the summaries of the natural histories are data on archaeologically identified fauna and flora; ethnographic information on and inferences about subsistence techniques, as distinct from tools, are included within the natural histories too. For those readers who do not have a specialized interest in the Chumash, perusal of the summary at the start of Chapter IV should be sufficient background to follow arguments presented in this thesis.

In the light of the data presented up to this point, detailed interpretations of certain patterns in Chumash subsistence and a reconstruction of the seasonal round are attempted, based on an integration of archaeological, ethnographical, floral, and faunal data with a detailed examination of the historic sources. Some inferences about regional variations in subsistence are made by way of summaries of sub-regional subsistence patterns. Most of the patterns isolated reflect seasonal patterns in Chumash subsistence. These patterns provide bases for some comments on seasonality in subsistence patterns as it relates to the archaeological
sequence of the area.

After a short summary of population data, the interrelationship between nutrition, population density and distribution, and Culture Climax are discussed as they relate to the Chumash. The place of the Chumash within settlement pattern classifications (Meggers 1956) and in developmental classifications (Willey and Phillips 1958) is then reevaluated and alternatives (Baumhoff 1960; Beals and Hester 1960) to the Willey-Phillips taxonomic system are considered.

Because the Chumash were among the hunting and gathering groups that pointed up certain theoretical difficulties in the Willey-Phillips taxonomy, this study is concluded by a critique of the Willey-Phillips system and a recent modification of it (Hester 1962). The critique is written with reference to both the data amassed within this thesis and previous criticism raised against the Willey-Phillips system.

The exact antiquity of the Southern California maritime orientation in subsistence is not known, but one worker in the area (Meighan 1959b: 56) estimates that by 3000 years ago coastal cultures in this area had become fully maritime. Archaeological data used in this thesis are from historic sites and prehistoric Canaliño sites. The archaeological Canalino culture is essentially the prehistoric counterpart
of Chumash or Chumash-like culture, and even though a great span of time is probably included in the sites compared, it is assumed that Canaliño subsistence patterns are similar enough to those of historic Chumash culture to be used for reliable inferences on subsistence patterns.
CHAPTER II
THE NATURAL LANDSCAPE

**Physiography.** Most of Chumash territory is coterminous with the east-west trending Transverse Ranges geomorphic province. Coastal and interior areas north of San Luis Obispo Bay, however, are part of the Southern Coast Range province, a series of north-south trending mountains and valleys (Fig. 2). The Transverse Ranges because of their unique westerly orientation break the north-south trend of the California coastline and form the Santa Barbara Channel. Offshore channel islands are a structural continuation of the Santa Monica Mountains. Generally, mountain ranges in the Chumash area rise in elevation towards the interior until the edge of the San Joaquin Valley is reached, where the mountains which border it drop sharply to the valley floor.

Along the eastern edge of the Chumash coastline marine terraces front the ocean and are backed by the Santa Monica Mountains; but westwards towards Ventura the terrace cliffs give way to the Santa Monica Mountains, which plunge sharply into the sea, broken only occasionally by stretches of relatively narrow sandy beaches. The Santa Monica Mountains end abruptly at the edge of the broad Santa Clara River Plain. At the western edge of the coastal plain the
Ventura River drains into the Pacific Ocean. Some of the streams emptying into the sea from the Santa Monica Mountains are ponded at their mouths by sand dunes, and on the eastern edge of the Santa Clara River Plain, Calleguas Creek empties into the vast Mugu Lagoon. The mouths of both the Santa Clara and Ventura Rivers form large estuaries.

West of the Ventura River along the coastline, mountains that drop sharply to narrow beaches gradually turn into cliffs by the time Rincon Point is reached. From Rincon Point to the end of Point Conception steep cliffs backed by a broad plain cut by several arroyos characterize most of the shoreline. The Santa Barbara coastal shelf, however, gradually narrows until a short distance west of Gaviota, where it begins to widen again to Point Conception. Many of the mouths of the larger arroyos of the coastal shelf are ponded and form estuaries. Several sloughs and marshes are found along the Santa Barbara coastal shelf wherever there are breaks in the cliffs and lowlands meet the sea.

Low-lying hills known as the Purisima and Casmalia Hills characterize the area between the Santa Ynez River and Santa Maria River Valley. A large coastal plain not quite as large as the Santa Clara River's forms the lower part of Santa Maria River Valley. From Purisima Point north to where San Luis Obispo Bay trends westward, the coast is fronted by extremely large sand dunes, some extending as far
as a mile inland; and stabilized dunes are found even farther inland. Several ponds and lakes are found in these dune areas.

Interior regions of Ventura County become increasingly mountainous with fewer broad valleys. With the exception of the Santa Clara River Valley in Ventura County, broad coastal valleys, which extend considerable distances inland, and interior plains are more characteristic of Santa Barbara and San Luis Obispo counties.

Weather and Climate. Southern California weather patterns are important factors in determining certain aspects of Chumash subsistence. The pattern of rainfall has a critical effect on the kinds of vegetation different areas can support, which, in turn, figure importantly in determining the feeding habits of animals. Also, the pattern of rainfall determines to a large degree the amount of surface water available at any given season. Winds and the seasonal patterns of storms, as we shall see later on, are other factors which are important environmental determinants in certain parts of Chumash subsistence.

The weather and climate of Chumash country are controlled by three pressure systems (Durrenburger 1959: 43-6): the Pacific High, Aleutian Low, and Great Basin High. Most important of these is the Pacific High, which lies west of California most of the year but shifts south during winter.
Air flowing from this high pressure area produces prevailing northwest winds along most of the California coast. These winds are deflected by Point Conception, become weaker in the Santa Barbara Channel, and enter Los Angeles Basin as southwesterly winds. In winter months, when the Pacific High has moved southward, cyclonic storms emanating from the Aleutian Low sweep down from the Gulf of Alaska and move across California in a southeasterly direction. The amount of rainfall received in California is almost directly proportional to the nearness to the Aleutian Low, with rainfall decreasing away from storm centers. Thus, the California coast becomes increasingly arid from north to south. Most precipitation in California occurs in connection with cyclonic storms, usually in the form of rain at low elevations and as snow at higher elevations.

Precipitation in the Chumash area increases with elevation near the coast, but the total annual amount begins to drop proceeding inland because of a rain shadow effect. Not only is there a sharp geographical pattern of rainfall in the Chumash area, but there is a marked seasonal pattern too. Very little or no rain falls during summer months with almost all of it occurring between late fall and early spring (Fig. 3). Winter storms and rains are usually the rule; however, some years the Great Basin High persists during the winter and produces fair but dry winters. Also
Fig. 3. Annual Rainfall.

Stations: San Luis Obispo -- solid line; Santa Barbara -- dashed line; Ventura -- dotted and dashed line.
occasional summer rains in Southern California result from tropical cyclones moving up from Mexico.

Streams in the Chumash area are intermittent because of the concentration of rainfall during winter months and subsequent long, dry summers. They flow during the rainy season, but by summer most streams are reduced to dry, parched stream beds. Some otherwise dry streams contain pools of brackish, stagnant water through summer and fall months; only a few creeks maintain perennial flow. The major rivers also dry up during summer and maintain only a shallow sub-surface flow or a small trickle of water on the surface.

Climatic regions of California are classified according to the Köppen system, which is based on temperature and pattern of rainfall (Durrenburger 1959: 51-7). The distribution of climatic regions in the Chumash area reflects the increasing aridity towards the interior (Fig. 4). Areas near the coast are equable Mediterranean climates, which are characterized by dry summers and periodic rains, with the rainfall of the wettest months being three times that of the driest months:

**Mediterranean Cool Summer with Fog (Csbn)**

- Frequent fogs; Average warm month temperatures between $57^\circ$ and $64^\circ$ F.; Warm month maxima generally below $70^\circ$ F.

**Mediterranean Cool Summer (Csb)**
Fig. 4. Climatic zones

- Mediterranean cool summer with fog
- Mediterranean cool summer
- Mediterranean warm summer
- Steppe
- Hot desert
Average summer temperatures below 71.6° F. but somewhat higher than Csbn summer temperatures, and average winter Csb temperatures higher than average winter Csbn temperatures.

**Mediterranean Warm Summer (Csa)**

Occurs on upland surfaces in Southern California; Average warm month temperatures above 71.6° F., and four months with average temperatures above 50° F.

Hot Steppe is found in the coastal valleys and in the San Joaquin Valley surrounding Hot Desert areas. They are both dry climates; that is, they have an average annual temperature of 55° F. and an annual precipitation of less than 10 inches:

**Hot Steppe**

Average temperature of all months above 32° F.; Precipitation slightly higher than in desert regions.

**Hot Desert**

Summer temperatures reach 100° F.; Winter maxima in the middle and high 50’s; Annual precipitation between 5 and 10 inches.

**Vegetation.** The vegetation map (Fig. 5) included herein is a reconstruction of the natural vegetation before its modification by Europeans (Burcham 1957). It varies in few details from a map of modern vegetation except in areas designated as cultivated and urban, which Burcham reconstructs mostly as California prairie and sagebrush. Vegetation communities occurring in Chumash territory are California prairie, oak woodland, coastal sagebrush,
Fig. 5. Vegetation zones.
chaparral, pinyon-juniper woodland, and ponderosa pine forest. Data for summaries of plant communities are taken from Burcham (1957) and Durrenburger (1959).

California prairie is a grassland community characterized by bunchgrasses. In this community as well as in other communities of the Chumash region a wide variety of herbaceous plants are to be found. Treelessness characterizes most of the California prairie, although in some areas it is widely transgressed by oaks. In those areas where oaks transgress on the grassland, the community is more properly a savanna or foothill woodland; thus, the boundary between California prairie and foothill woodland is often vague.

Foothill woodland is a type of oak woodland. It is discontinuous and widely distributed. Burcham's map shows only predominant types of vegetation. Actually in many parts of Chumash territory labelled as chaparral, foothill woodland intermingles with chaparral. In some areas, such as the Thousand Oaks area for example (Fig. 2), foothill woodland is found in the valley floors of Conejo, Potrero, and Russell valleys but is replaced on the drier hill slopes by chaparral. Foothill woodland is dominated mainly by oaks such as California live oak (Quercus agrifolia) and interior live oak (Q. wislizenii). Associated with these oaks are digger pine (Pinus sabiana), California laurel (Umbellularia
The ground cover of foothill woodland communities consists typically of bunchgrasses, not too different in composition from those of California prairie.

Another kind of oak woodland occurring in the Chumash area is valley woodland. It is typically found on alluvial fans and flood plains. In this region, valley woodland is often a riparian community, characteristically consisting of California white oak (*Q. lobata*), California sycamore (*Platanus racemosa*), cottonwood (*Populus* sp.), and walnut (*Juglans californica*).

Chaparral is characteristic of dry slopes and ridges of foothills and mountains at elevations between sea level and 4,000 feet. This community not only intermingles with foothill woodland but likewise mixes with the lower margins of the pinyon-juniper forest. Dense shrubby vegetation characterizes chaparral. Its composition is highly variable, but nevertheless it always contains several edible plants. The majority of edible plants which can be found in the Chumash area occur mostly in either the coastal sage or chaparral communities; but a large number of grasses were obtainable from California prairie and oak woodland, and acorns, of course, were abundant in oak woodland.

Coastal sagebrush extends from sea level to 3,000 feet and usually is lower in elevation adjacent to
chaparral. It is composed typically of brush plants, usually not reaching the density attained by chaparral cover. Many plants of this community are shared with chaparral and foothill woodland communities. Although the vegetation map shows the Santa Barbara coastal shelf to be predominantly coastal sagebrush, stands of oak associated with gallery forests are found in the arroyos that dissect the shelf and flow into the sea.

Pinyon-juniper woodland is found on the north side of the Transverse Ranges between chaparral and the California prairie of the southern San Joaquin Valley. It occurs at about 5,000 feet and higher elevations. California juniper (*Juniperus californica*) and single-leaf pinyon (*P. monophylla*) are typical trees of this community. A considerable number of shrubs are associated with pinyon-juniper woodland, and herbaceous plants of this community consist mostly of grasses.

Ponderosa pine (*P. ponderosa*) and sugar pine (*P. lambertiana*) are the typical pines of the Ponderosa pine forest. This community, like pinyon-juniper woodland, usually does not occur below 5,000 feet. Locally on dry ridges or rocky canyon sides, this forest blends with a woodland dominated by canyon live oak (*Q. chrysolepis*) or California black oak (*Q. Kelloggii*). Grasses found in this community are much the same as those found in pinyon-juniper woodland.
Other plant communities restricted to coastal areas are coastal strand, coastal salt marsh, and fresh water marsh. These communities are too restricted in distribution and size to show up on a vegetation map of the scale used in this report.

Vegetation on the larger channel islands is much like that on the mainland. Wieslander and Jensen (1946: 6) show only Santa Cruz and Santa Rosa islands on their statewide vegetation map. Both islands have predominantly grass on their northern halves and sagebrush on their southern halves. Pines and oaks are found on both islands. San Miguel Island is covered mostly with sand today, but before overgrazing by sheep in historic times it probably had a cover much the same as those of Santa Rosa and Santa Cruz islands. Anacapa Island is a rock island that supports a vegetative cover consisting predominantly of Coreopsis gigantea with some prickly pear cactus and a little grass. The vegetation of Santa Barbara Island is similar to that of Anacapa Island (Swartz 1960: 7).

The distribution of kelp beds (Fig. 2; Cameron 1914), which forms the distinctive type of marine vegetation along the Chumash coast, is taken from maps made prior to extensive commercial kelp harvesting. Although kelp beds will vary in size or sometimes disappear locally, the general distribution of kelp beds along the California coastline...
was probably much the same in historic and prehistoric times as it was shortly after the turn of the century.

Fauna. Land fauna of the Chumash area consist of a large rodent population; rabbits; small carnivores like badger, racoon, and skunks; large carnivores such as bear, fox, coyote, wildcat, and mountain lion; and artiodactyls, principally deer and antelope. An unusually rich marine fauna is found in the Santa Barbara Channel. Its fisheries are among the best and most abundant in the world; also, seals, sea-lions, and sea-otters were found formerly in great numbers along the Chumash coastline. Many different kinds of shellfish can be obtained easily along the shore. Several species of bird are found in the Chumash area too, and waterfowl are particularly abundant in winter.

Merriam’s life zones are used to describe the distribution of land mammals. Considerable doubt has been cast on the validity of using the classification on a continent-wide basis; however, in western states these zones are descriptively accurate and reflect natural groupings of animals (Daubenmire 1938). The map reproduced herein (Fig. 6) does not take into account micro-environmental variations that would have been important in aboriginal subsistence, but together with Tables 1 and 2, it gives the reader a rough idea of the distribution of land mammals.

Three zones are found in Chumash territory: Lower
Sonoran, Upper Sonoran, and Transition. These zones are essentially latitudinal belts defined primarily by temperature and secondarily by humidity. Principal types of vegetation associated with these life zones are (Leopold 1951: 3-4):

**Lower Sonoran**
1. Semi-arid grassland or shrub grasslands
2. Desert

**Upper Sonoran**
1. Oak woodland
2. Chaparral
3. Sagebrush

**Transition**
1. Coniferous forest
Fig. 6. Life zones.
CHAPTER III
SKETCH OF CHUMASH HISTORY AND CULTURE

Contact, Missionization, and Decline. Chumash culture history in reference to contact with Europeans can be divided into four periods: Period of Spanish Exploration, 1542-1769; Mission Period, 1769-1834; Rancho Period, 1834-1849; and American Period, 1849-present.

Contacts during the Period of Exploration were brief, intermittent visits from Spanish voyages. The Chumash were first visited by Juan Rodríguez Cabrillo in 1542, whose expedition wintered in the Santa Barbara Channel. Unamuno, who is thought to have landed somewhere near Morro Bay in 1587 and marched a short distance inland to a point near San Luis Obispo, was the next Spaniard to visit Chumash country. Rodríguez Cermeño in 1595 stayed for a short time in San Luis Obispo Bay and sailed near San Miguel and Santa Rosa Islands. In 1602 Sebastián Vizcaíno sailed north through the Santa Barbara Channel and returned by the same route on his southward return. Accounts of this voyage which have come down to us are those of Fr. Ascensión and Vizcaíno himself. After Vizcaíno's voyage there is a lapse of known visits until the overland Portolá Expedition
of 1769-1770, which marked the start of the Mission Period and beginning of intensive contact.

From the Portolá Expedition we have accounts of the Chumash by Portola, Crespi, Fages, and Costanso. Another diary kept by Crespi of the second Portola trek from San Diego to San Francisco made in late spring and summer of 1770 is extant too. Also, there is the diary of Fr. Juan Vizcaíno, who accompanied one of the small supply ships for the first Portolá Expedition. After the Portolá Expedition observations were made by Anza (1774), during his first trek to California, Anza and Fr. Font on the second Anza California Expedition (1775-1776), Longinos Martinez (1792), members of the Vancouver Expedition (1792), and Shaler (1808). Five missions were founded in Chumash territory by the Franciscans: San Luis Obispo, 1772; San Buenaventura, 1782; Santa Bárbara, 1786; La Purísima Concepción, 1787; and Santa Inés, 1804. Valuable information for subsistence patterns is contained in the interrogatorios answered by the mission fathers for civil authorities, and additional data can be gained from the priests' private and official correspondence.

Chumash culture was altered probably very little during the Period of Exploration, but their life became radically altered with the impact of the mission system. A program known as "reduction", similar to that instituted
in central Mexico, was soon started to bring the Indians into the missions where they were to be converted to Christianity; civilized by practicing agriculture, speaking Spanish, and living in communities under Spanish sociopolitical institutions; and eventually made into responsible participating citizens of the Spanish Empire.

Reduction of the Indians met with only partial success. Ideally, the missions were supposed to be economically self-supporting and capable of producing surpluses as supply depots for military outposts. Political complications in Europe after the missions were founded made them no longer militarily strategic for the purposes they were intended. Coupled with a lack of interest in the California missions by civil authorities in Mexico, mission agriculture was plagued with a chronic lack of farming supplies and barely got beyond the level of subsistence agriculture. For example, Fr. José Solán of Mission San Buenaventura reported in 1822 (Simpson 1962: 64-4):

Little or nothing can be done to expand our agriculture. The neophytes for several years past have been cultivating the land along the river, which is lined with their garden plots. On them they raise pumpkins, watermelons, muskmelons, and some maize and potatoes, of which they are fond. With these individual contributions, the grain and meat provided by the Mission, fish from the ocean, and the wild seeds and fruits which they love dearly and cannot forget, our neophytes never lack of food, thank the Lord!

At first, Indians were allowed to continue their old subsistence patterns as a necessity so that the fledgling
mission settlements could survive (Webb 1952: 39). Although native food continued to be important in the total subsistence of mission settlements, there were other cogent reasons for allowing the Indians to continue gathering food away from the missions. By being reduced into mission settlements Indians were supposed to become Christianized, but as part of this process the Spanish fathers wished to keep contact of the neophytes with the ranchería pagans at a minimum for fear the newly converted would revert to their native ways. However, the priests had great difficulty in drawing Indians into the missions, and once they were there, the incidence of Indian apostasy from Spanish settlements was high. Because the California missions never were garrisoned adequately to handle a full-scale Indian uprising or forcibly reduce the pagan Indians, the mission fathers granted the neophytes periodic leaves of absence from the mission as a concession to the Indians to reduce dissatisfaction with the mission system and the high incidence of "fugitism:"

...by sharing in their former wild freedom, they retained liking for it and in a few weeks lost the instruction and the civilized habits which it had taken them so long to acquire; but critics finally agreed with me that it was a necessary evil, and a lesser one than not to let them go; because, being continually tempted by their pagan friends and relatives, they would leave without permission, as many of them do anyway. (Fr. Lasuen in Engelhardt 1923: 79-80)

Fr. Gregorio Fernández of Mission La Purísima Concepción estimates that his neophytes were away from the mission
almost half the year collecting wild foods (Engelhardt 1932: 14). From an account given by Fr. Tápis of Santa Barbara we can get some idea how this was handled by the priests (Engelhardt 1923: 79):

...the practice at Santa Barbara Mission has been the following: Every Sunday after holy Mass, at the church door or in front of the priests' rooms, the names are read aloud of one-fifth of the neophytes who might go on an excursion. These names are written in a booklet in order to keep account, so that all may have their turn at going away. To those who hail from distant rancherías two weeks' leave of absence is granted; the others may be absent one week. Moreover, if during the four weeks that they spend at the Mission any one shows a necessity of going away, he is permitted to go. During the week many ask for a day off, in order to go fishing, or visit the presidio, or to go to the beach. These, too, are gratified. Only at the time of harvest, which lasts one month, more or less, the Indians do not leave. After that, however, all leave in parties, alternating every two weeks. Permission to leave is not granted if during the week a holy day of obligation occurs; but in the week immediately following, two-fifths of the Mission people have their outing.

Extended stays away from missions for food gathering and visiting relatives at pagan rancherías no doubt were important in covertly perpetuating native tradition in spite of a program of directed cultural change. Some elements of Chumash supernatural belief persisted among survivors of the Mission Period into the early twentieth century (Lloyd 1955), and considerable knowledge of life-ways was handed down through oral tradition.

Diseases introduced by the Spanish decimated Chumash population, which continued to dwindle throughout the
nineteenth century. Intermarriage with Spanish settlers and garrison troops, together with effects of the missions' program of directed cultural change, contributed to further loss of aboriginal traits and population "decline" by Mexicanization of the Chumash. After the secularization of the missions in 1834, most Mission Indians were relegated to the status of peons on ranchos, and by the turn of the century only a few Indians remained who had memories of aboriginal customs and mission life. Today Chumash aboriginal culture is extinct.

**Anthropological Researches on the Chumash.** Ethnographic notes from Chumash speakers were collected by Bowers (1878), Yates (1891) (Heizer 1957), and Henshaw (1875-1887) (Heizer 1955) in the nineteenth century. Some ethnographic information, as yet unlocated, was collected by the French expedition of De Cessac and Pinart (Heizer 1951). In 1917 Henley and Bizzell reported on an interview with Candelaria, a Sespe Chumash woman. At about the same time, John Peabody Harrington began salvaging Chumash ethnography and continued this work until his death in 1961. Unfortunately, very little of his data have been published, the most complete published source being a Culture Element Distribution Survey (1942). Some cultural data on the Chumash can be gained from reading recollections of early Anglo and Mexican settlers: (Caballeria y Collel 1892; James 1906; and
Recent work has been done at Santa Ynez on Indians presumed to be descendants of Chumash (Lloyd 1955).

Archaeological investigations were begun in the 1870's by the De Cessac-Pinart Expedition and the Wheeler Expedition (Survey West of the 100th Meridian). At this time, independent of the Wheeler Expedition, excavations were made on the Channel Islands and coast north of Point Conception by Paul Schumacher, an archaeologist associated with the Smithsonian Institution. Other excavations done before or right at the turn of the century were those of Ford (1872) (Heizer 1960) at Carpenteria and Jones (1901) (Heizer 1956) on Santa Rosa Island. Several collections made about this time and slightly later have been reported on by Heye (1921), Woodward (1927), Nelson (1936), and Curtis (1960).

Except for publication of Kroeber's Handbook of California Indians (1925), which contained a compilation of ethnographic data on the Chumash, no research on the Chumash was published until Harrington's report on the Burton Mound (1928), an historic site in the city of Santa Barbara. In 1929 D. B. Rogers published his work, Prehistoric Men of the Santa Barbara Coast, in which he defined the three "culture" archaeological sequence of Oak Grove, Hunting People, and Canaliño (prehistoric Chumash) now used in the literature, but with some modifications and refinements. Between 1929
and 1932, Arthur Woodward of the Los Angeles County Museum excavated four historic Chumash sites: Simomo, Muwu, Canterbury Lake site, and Railroad Point site at Avila Beach (Fig. 2). None of these sites has been published, but they are particularly important for interpretation of Chumash subsistence because of extensive identification of faunal remains from them done by members of the museum staff and other qualified specialists. Results of another Canalino excavation done by Los Angeles County Museum during the early 1930's, Deer Canyon, has recently been published by Wissler (1958).

Research on the mainland and Santa Cruz Island was done by Olson (1930). The sequences that Olson defined for the mainland (5 periods) and islands (3 periods) are little used today, Rogers' sequence being preferred. A small salvage operation was conducted at Mishopshonow, an historic village at Carpenteria, by Bryan (1931). Strong (1935) was the first to report at any length on inland Chumash sites, a subject about which little is still known. Rogers (1937) briefly reported on caves from Hurricane Deck in the San Rafael Mountains, the same area in which Strong worked. Later an inland site (Ven-61) at Ojai was excavated by Orr; recently, another portion of this site has been excavated as a salvage operation (Susia 1962). Other reports on non-coastal sites published within the last decade are those by Wire (1961) and Smith and LeFave (1961).
Since Woodward's work at Simomo and Muwu, there has been archaeological investigation on or near the coast by Reinman (1961) at Whalerock Reservoir near Cayucos, Clemmer (1962) at Morro Bay, Pilling (1951) along the Pecho Coast north of Point Conception, Carter (1941) at Point Sal, Wallace (1962) in the Arroyo Grande area, Orr (1942) at Mescalital Island and Rootenberg, Curtis, and Greenwood (1961) at SBa-60 in the Goleta slough, Meighan, et. al. (1956) at Simomo, Wallace (1955) at Little Sycamore Canyon, and Curtis (1959) at Arroyo Sequit. Work on the Channel Islands since Olson's work has been done by Swartz (1960) on Santa Barbara Island, McKusik (1959) on Anacapa Island, and Orr (1951) on Santa Rosa Island.

**Chumash Socio-Political Organization.** Ethnographic information collected by Henshaw (Heizer 1955) and Harrington (1942) supplemented by earlier Spanish accounts give us a broad but fragmentary outline of Chumash socio-political organization.

The basic political unit was the village. It consisted of patrilocal lineages and probably of one or more clans in larger villages (Harrington 1942: 32). Most often dwellings probably were built to house extended families (Kroeber 1925: 557). Crespi (Piette 1946: 240) said that in Santa Barbara Channel villages there were houses that "without a doubt seventy persons could enter."
A village had at least one chief, or "capitan" as he was called by the Spanish, whose position was patrilineally inherited but qualified by required village approval. In most instances a chief was male, but occasionally daughters or sisters of a previously deceased chief inherited the position (Harrington 1942: 33). The consensus from the interrogatorios and Spanish explorers' accounts was that there was usually more than one "capitan" or chief per village. These chiefs were most likely lineage or clan headmen. According to all Spanish accounts, they were the only members of the community allowed to be polygamous; however, this was due perhaps more to their greater wealth than any formal prerogative (Heizer 1955: 149). A chief's main roles were those of war leader and patron of village feasts. He was assisted by a spokesman (paha) and two messengers. There was a rabbit drive official too, but his role relationships are unknown. Regalia for feasts were held in the custody of the village chief, and he also provided property for other ceremonies. At feasts his status was recognized by gifts of "fruits, goods, and beads" (Engelhardt 1933: 52). The chief and his family were set apart from other members of the community by different forms of address (Harrington 1942: 33). Deference was also paid to him and his family by not sitting in front of them (Crespi in Piette 1946: 369). Other than duties of leadership in warfare and feast-giving, chiefs apparently had
little control over extra-lineage affairs of a village:

In their pagan state, these Indians had no caciques or chiefs, although in every rancheria or village they had one or more whom they called captains. These had no control over the others; however; nor did the others obey them, as they had only to summon the people in case trouble broke out with the Indians of another rancheria. At their dances or feasts they would present these chiefs with beads (Engelhardt 1923: 98).

Most conflicts within a village probably were settled by quarreling and eventual compromise. Fishing may have been a lineage enterprise controlled by chiefs, for Fr. Font (Bolton 1931: 259) described an incident at La Laguna where ten to twelve men carried a launch filled with fresh fish to "the house of the master or captain of the launch, distinguished by the bearskin cape."

Villages were linked by exogamous marriages. Unlike neighboring groups, the Chumash, at least of the Santa Barbara Channel mainland, coastal valleys and nearby inland regions, and coastal areas north of Point Conception, were politically integrated into village groups (Engelhardt 1932: 19, Engelhardt 1933: 52, Harrington 1942: 33, Heizer 1955: 194-97, and Piette 1946). A village group was organized around a principal village, from which one of its captains exercised some control over other village chiefs as leader of the association. This position, like village chieftainships, probably was occupied sometimes by females, because Cabrillo in 1542 mentioned that an old Indian woman
was ruler of the villages between Point Conception and Pueblos de las Sardinias (Bolton 1916: 29). Data obtained by Henshaw (Heizer 1955: 189) from a Chumash informant, Juan Pico, gives us some idea how the village groups functioned politically:

Let it be well understood that the natives did not clearly distinguish between these powers and attributes; but they distinguished their chieftains according to kindness and affability of each, by which they won the sympathy of their subjects, and the latter raised the name of the kind chieftain above that of the head chieftain whom they call: \"\'ot y ja, aj\"; and in the general meeting which they annually hold there they asked that that captain be appointed holder of their chieftainship, the latter being considered a greater chieftain than the others of his class.

As these natives recognize certain ranches as principal ones, so they recognize one ranch, which was that of Punta de Duma, as the residence of their head chieftain, whose orders all obeyed and whose commands they executed. To this chieftain I have given for his class the title of President, while to the kind chieftain, as I have said, I have given the title of Governor; those whom I shall call judges /paha ʔ/ are the ones that determine the feasts, how many days they are to last, and in honor of what thing or object. In case of greater crime they also pass sentence by order of the chieftain, and in the name of the people, and first of all the plaintiffs. In this way I have made the comparison as may be seen.

Individual social rank was determined by descent (Harrington 1942: 31), perhaps by a loose hierarchical ranking of patrilineages and clans. Individual wealth was incidental to rank, although village chiefs by virtue of being lineage or clan headmen were considerably more wealthy.
than their fellow villagers. The Chumash had "money" called ponoa made of circular shell beads and fixed rates of exchange for certain goods; however, debt or prisoner slavery and a system of conspicuous consumption such as the potlatch of the Northwest Coast were absent.

Inter-village warfare in the form of formalized duels between towns (Yates in Heizer 1957: 36-37) or surprise attacks (Harrington 1942: 34) occurred. Both the Portola and Anza expeditions observed abandoned villages, some of which they attributed to inter-village warfare. Villages squabbled with one another habitually, but the frequency with which this led to armed conflict is not known. According to Longinos Martinez (Simpson 1961: 58) wars were "frequent." Causes for warfare variously were theft of food stores, unauthorized use of food-gathering grounds, disputes over wives, witchcraft, and social insults to chiefs such as non-attendance at village group feasts and ceremonies. The most frequently mentioned cause for feuding was unauthorized use of food-gathering grounds. These were owned by families or individuals; things such as eagle nests, seed patches, oak trees, and fishing grounds were considered private property.

Although Chumash speakers felt a commonality of kind through sharing a common language and customs, there was no formal socio-political organization above the level of the
village group. Villages and village groups, when not feuding, were linked together by extensive trade relations; furthermore, regional specialization in certain trade goods such as exclusive manufacture of circular shell beads on Santa Rosa Island (Simpson 1961; Henshaw in Heizer 1955), for example, tended to promote economic inter-dependence and cultural integration above the village group level.

Compared to surrounding groups the political unit of the village group reflects in the Chumash a more sedentary existence and greater social complexity afforded by a rich environment. Along with greater political complexity, more leisure time is mirrored in the fineness of Chumash manufactures and part-time craft specialization observed by the Spanish in Chumash villages. Groups of Chumash men were seen doing the following activities in villages along the Santa Barbara Channel: fishing, carpentering, grinding pigments, making beads, woodworking (bowls, trays, etc.), grinding stone to make bowls, and chipping flint. Women were seen seed-gathering and making baskets (Priestley 1937: 34-35).

Other part-time male specialists were shamans. The Chumash had three kinds of these ritual specialists (Harrington 1942: 39): rattlesnake shamans, grizzly bear shamans, and curing shamans. Whether or not these status roles could be combined in one person is not known.
Technology. There are two essential parts of subsistence technology: tools and methods of application of those tools. Utilization of food resources from the viewpoint of subsistence technology can in turn be divided into two phases: exploitation of raw food sources, and preparation and storage of food resources.

The kinds of subsistence tools used by the Chumash will be discussed according to the categories of "exploitation" and "preparation and storage." Discussion of hunting methods, however, will be found in Chapter IV listed according to animal species, since many hunting techniques are specifically dependent on animal behavior.

As Kroeber (1925: 523-6) points out, natural food resources in California are bountiful in variety rather than abundant along special lines. Thus, if one source of food failed for the California Indians, there were several alternatives that could be utilized. Although the Chumash of the Santa Barbara Channel relied heavily on both fish and acorn as staples, the Chumash as a whole were probably as omnivorous as any other group of California Indians. The omnivorous habits of California Indians are reflected in their simple, non-specialized, and highly adaptable technology. Productive specialization, such as the adaptation made to salmon fishing by Northern Californian groups or to maritime fishing by the Santa Barbara Channel Chumash,
required the development of a fairly elaborate technological sub-system. But of other hunting and gathering pursuits, and perhaps of fishing to a certain degree too, Kroeber's general summary of the complexity of California Indian technology can be applied equally well to the Chumash:

The California Indian, then, secured his variety of foods by techniques that were closely inter-related, or, where diverse; connected by innumerable transitions. Few of the processes involved high skill or long experience for their successful application; none entail serious danger, material exposure, or even strenuous effort. A little modification, and each process was capable of successful employment on some other class of food objects. Thus the activities called upon were distinguished by patience, simplicity, and crude adaptability rather than intense endeavor and accurate specialization; and their outcome tended to manifold distribution and approximate balance in place of high yields or concentration along particular lines.

Exploitation

Land Mammals and Birds. Chumash hunting equipment for birds and terrestrial mammals was not too different from other Central and Southern Californian groups. Both the self bow and sinew-backed bow were used, and a variety of projectile point forms of bone, stone, and wood was employed (Harrington 1942: 14).

Supposedly the spearthrower was used in protohistoric times (Harrington 1942: 15), but it is questionable that it was an aboriginal trait. Only one ethnographic specimen is known, collected by the Vancouver Expedition during the
Mission Period; no archaeological remains of spearthrowers have been found. The ethnographic specimen is very similar in detail to spearthrowers used today on Lake Patzcuaro, Mexico. Heizer (1958) surmises from the form of the specimen that it was not aboriginal but introduced by Hispanized Indian settlers from Mexico. Spearthrowers of Alaskan-type have been found on the Channel Islands and were most likely left there by Aleut sea-otter hunters of the early nineteenth century (Heizer 1945).

Unamuno, who presumably landed at Morro Bay in 1587 and marched as far inland as the modern city of San Luis Obispo, observed at one of the villages along his route "poles, which seemed to be of elder, out of which they fashioned their javelins which have oak points hardened by fire" (Wagner 1929: 146).

Other implements used in hunting were curved throwing sticks or clubs for rabbits, deadfalls for small game, slings for small game and birds, and spring-pole snares for small birds (Harrington 1942: 6, 15). Also, nets at one time may have been used for fowling: "their [Chumash] head-dress, made of the net for hunting quail, makes them look like Turks" (Longinos Martinez in Simpson 1961: 59). But Harrington's informants (1942: 6) did not remember nets ever having been used to trap fowl. Booths and blinds were used (Harrington 1942: 6), presumably for fowling.
Fire was used to smoke rodents out of their nests and burrows (Harrington 1942: 6); and the bare hands and probably unshaped clubs or rocks were used incidentally in some hunting methods as tools.

**Insects, Reptiles, and Amphibians.** Insect foods such as chrysalids and larvae can be gathered by hand. Rocks or sticks to dig holes and the bare hands were all the tools that were required to catch grasshoppers. There is no information in the literature as to what tools were used to catch reptiles and amphibians, but most of them can be caught the same way insects are obtained.

**Sea Mammals.** Not much is known about the kinds of implements used by the Chumash to hunt sea mammals. From a survey of the literature by Rostlund (1952) it appears that they had at least two kinds of fish spears: tridents and toggle harpoons. Tridents were undoubtedly distinct from harpoons. For Longinos Martinez (Simpson 1961: 54) observed that "they fish also with tridents *(fisgas)* and harpoons of shell or flint." Fages (Priestley 1939: 51) says the tridents "are of bone; the barb is well shaped and adapted to its use." Fr. Juan Vizcaino in 1769 described harpoons of the Maritime Shoshoneans as shafts with three-barbed harpoon points *(tridents?)* (Woodward 1959: 16). The only other account of fishing spears other than harpoons is by Fr. Crespi, who merely says that "for fish they used spears well made of reeds."
Chumash informants described a toggle harpoon to Harrington (1942: 7) that had an inserted foreshaft with a single barbed toggle. No doubt his informants were referring to the kind of harpoon collected by Vancouver in 1792 in the Santa Barbara Channel (illustrated in Bennyhoff 1950):

A companion piece in the British Museum is a harpoon quite different from any other known Californian one. It has a rather heavy shaft of wood painted red. Into this is set a slenderer foreshaft, a device never reported from California except in arrows. The head is of bone, with a barb and chert point. The line is attached to the head in typical Californian manner: lashed on with cord, over which gum or asphalt has been smeared. The weapon is meant for sea otters or seals, not for fish (Kroeber 1925: 559-60).

Toggle harpoons probably were also used to spear large fish because Fr. Ascensión in describing a similar kind of harpoon used at Santa Catalina Island said they were used to catch seals and large fish (Wagner 1929: 236). However, it cannot be verified from the sources that tridents were used to hunt sea mammals. Multi-barbed bone harpoon heads of Alaskan-type have been found on the Channel Islands, but they are now known to have been left there by Aleut sea-otter hunters of the early nineteenth century (Heizer 1947).

Seacraft used for hunting sea mammals and fishing around the coastal islands and along the Santa Barbara Channel was the famous multi-plank canoe. Plank canoes were swiftly propelled with double-bladed paddles. The size of
plank canoes varied, but the average canoe was about 25 feet long. Usually three to four men went out to fish in them (Crespi in Bolton 1927: 159; Heizer and Massey 1953).

North of Point Conception only tule balsas were used until shortly after the founding of Mission San Luis Obispo, at which time the plank canoe diffused northward to San Luis Obispo Bay (Heizer 1941). Information for the use of the tule balsa canoe by the Santa Barbara Channel Chumash is virtually lacking. Harrington (1942: 11) lists the craft as occurring below Point Conception, presumably as an aboriginal trait. An asphalt-covered tule balsa was reported from the Santa Barbara area circa 1894, but from the description of its construction, Heizer and Massey (1953: 294) consider this unique example to be a late historic development which combined certain features of the old plank canoe complex with the typical Californian method of tule balsa construction. Historically, Spanish explorers and missionaries do not report the tule balsa within the area where plank canoes occurred. From this evidence Heizer and Massey (1953: 293) conclude that although the tule balsa was perhaps known and occasionally used, it was not typical of the Santa Barbara Channel.

Another kind of craft used by the Chumash but not thought by Heizer and Massey (1953: 298) to be pre-Spanish in antiquity is the dugout canoe. Harrington (1942: 11)
lists it as having been used by the coastal Chumash, and there is a description of a dugout canoe from the Santa Barbara region in Taylor's *Indianology*, which is its first mention in the Chumash area. Heizer and Massey think that the dugout is a late historic introduction, possibly in only the last century from either the Luiseno to the south or the Spanish.

**Fish.** Fish were obtained with nets, spears, fish-hooks, poison, and traps. Fr. Font observed that "the implements with which they fish are very large nets, and... an occasional small net made of a very strong thread like hemp" (Bolton 1931: 259). Informants of Harrington (1942: 6) remember seines and dip nets being used. Harrington (1942: 7) lists that stone sinkers with transverse grooves probably were used by the Chumash. Small grooved stones found archaeologically by Rogers (1929: 404-5, and Plate 76) are most likely specimens of these; they are identical with net sinkers used by northwest California Indians (Kroeber and Barrett 1960: 182).

Three kinds of fishhooks were used: single piece circular fishhooks, composite fishhooks, and bone gorge fishhooks. Circular fishhooks were usually made of either mussel or abalone shell, but occasionally they were made of bone. Angling experiments were conducted with reproductions of Chumash circular shell fishhooks by Robinson (1942: 63).
Mostly bottom-feeding varieties of fish such as rockfish, kelp bass, California halibut, sheepshead, sculpin, perch, and kingfish were caught. Chumash composite fishhooks were made of two pieces of bone lashed at one end to form a sharp-angled hook. A bone gorge fishhook was simply a small bi-pointed piece of bone to which a line was fastened around its central portion.

Soaproot (Chlorogalum pomeridianum) was used for poison both on the coast and in interior streams (Harrington 1942: 9).

On the coast baskets were used to catch sardines; Fages (Priestley 1937: 51) describes the method:

For catching sardines, they use large baskets, into which they throw the bait which these fish like, which is the ground up leaves of cactus, so that they come in great numbers; the Indians then make their cast and catch great numbers of sardines.

The coastal Chumash had some form of fish trap too, for Menzies (1924: 320) in 1792 observed near Santa Barbara that "they were always seen out by the dawn of the day examining their fish pots in the Bay or fishing in the middle of the channel..." The Ineñño Chumash used long fishtraps twined of slender sticks (Harrington 1942: 7), presumably along inland streams to catch steelhead trout.

Shellfish. Equipment required for gathering shellfish is minimal. Most shellfish can be gathered with the bare hands. Sticks can be used to dig up clams, and in some
instances Indians manufactured pries to dislodge abalones and mussels from the rocks to which they were attached. Crabs can be easily gathered from tidepools, and lobsters may have been taken accidentally during fishing around kelp beds (Wilson 1948: 75). Crawfish (lobster?) were caught by hand (Harrington 1942: 7). Lobster and crab may also have been taken by devices such as the fish pots used by the Indians of the Santa Barbara Channel, which were mentioned by Menzies (1924: 320) of the Vancouver Expedition.

Plants. Most plants can be gathered by hand. A straight pole was used for knocking acorns off of trees, and cactus tunas or fruits were picked with tongs (Harrington 1942: 8). Digging sticks with "doughnut" stone weights were used to dig up roots (Harrington 1942: 9; Henshaw in Heizer 1955). Seeds were removed from grasses by using a seed beater in one hand and catching the loose seeds in a small basket in the other (Simpson 1961: 53). Seeds and other plant foods gathered in the field were placed in large carrying baskets (Harrington 1942: 21-2).

Preparation and Storage

Chumash utensils for preparing food were the typical Californian implements used for these purposes. They had the usual range of chipped stone tools such as knives, scraper planes, and choppers. Grinding slabs and one-handed mullers were used to grind seeds. Mortars and pestles were
employed for both grinding and pounding operations; they were usually made of stone but some were of wood, for Menzies (1924: 325), in observing Chumash Indians prepare acorns, noted that "mortars used for this purpose are generally of wood though we saw some made of stone and pretty well finished." Finely worked wood plates and trays were made from the "roots of the oak and the alder trees" (Fages in Priestley 1937: 35). Ollas and oomals made of steatite (soapstone) traded from Santa Catalina Island were greatly prized by the Chumash for their high resistance to heat. Foodstuffs were boiled by dropping hot stones in baskets. Stone boiling probably was the commoner method of boiling because of the relative scarcity of steatite, although food could also be boiled in steatite vessels placed directly over fire (Simpson 1961: 54).

Many Chumash foods such as berries, greens, and the meat of fish and game could be eaten raw or dried without further preparation. Others that required further preparation were prepared by one or a combination of the following processes: pounding, grinding, leaching, boiling, and roasting. The meat of birds (?), mammals, fish, and probably shellfish were sundried without smoking. Meat was eaten raw, dried, boiled, or roasted; small mammals such as rodents were pulverized and roasted in their skins (Harrington 1942: 9; Bolton 1916: 25).
Seeds were parched by shaking them in either a large bowl or basket with hot coals or pebbles. After they were sufficiently roasted, the seeds were ground for use in pinoles and mush (Costansó in Hemert-Engert and Teggart 1910: 135). Acorns were removed from their shell, roasted, leached in either a sand basin or basket sieve (Yates in Heizer 1957: 38), and then ground into meal for mush and bread or use in pinoles (Menzies 1924: 325; Harrington 1942). Earth ovens were used to roast acorn bread, Spanish bayonet cabbages (*Yucca whipplei*), and *oacomites* or *ci-hon* (*Onion*-like bulbs) (Harrington 1942; Henshaw in Heizer 1955).

Seeds, nuts, dried meats, and pinoles of various kinds were stored for the winter in large baskets (Harrington 1942) or in other large structures next to dwellings (Longinos Martinez in Simpson 1961: 52).

The Chumash of the Santa Barbara Channel were distinguished technologically from their neighbors by the semi-maritime orientation of their economy. Except for more finely manufactured artifacts, which were a by-product of more leisure time, the Santa Barbara Channel Chumash differed from other Southern Californian groups very little in subsistence artifact inventory. The most important exception was the plank canoe. As an instrument of economic and territorial expansion, one person (Mikesell 1953: 167-8) has likened the plank canoe to the introduction of the horse.
among the Plains Indians. The development of the plank canoe and a relatively simple fishing technology made the utilization of the rich fisheries of the channel and subsequent population growth possible. Without the plank canoe and related implements, the description of Chumash technology would be almost typical of a generalized description of Southern Californian subsistence technology.
Mission interrogatories show that the Chumash utilized just about every food source in their environment. At Mission Santa Bárbara, Fr. Ramón Olbés stated that in paganism the Chumash ate "the meat of deer, rats, squirrels, or of any little animal they can catch; while those on the seashore have a craving for whatever the ocean produces" (Engelhardt 1923: 96). Fr. José Señán elaborates on the list of Chumash edibles by saying the Indians of Mission San Buenaventura ate "acorns, chia, seeds, fruits, zacates [grasses], and other various wild eatables, all of which they do not overlook, being very fond of them. They also eat fish, mussels, ducks, geese, cranes, quail, hares, squirrels, rats, and other animals which are to be had in abundance" (Engelhardt 1930: 37).

Most of the mammals mentioned in the interrogatorios also have been identified from archaeological remains (Table 3). Bones of deer and coyote or domestic dog have been found in most Chumash sites. Remains of rabbits and rodents are frequently found too. Most of the carnivores, particularly large forms such as bears and mountain lions, are sparsely represented in the archaeological record. Elk, antelope, and
perhaps mountain sheep may have been important in interior regions, but from our relatively small sample, of the three only elk and mountain sheep have been tentatively identified. Most coastal sites have remains of sea-lions, seals, sea-otter, whales, and porpoises. Pinnipeds most frequently identified have been Guadalupe fur seal and California sea-lion. Sea-otter also occurs in most coastal sites. Large fur-bearing mammals such as the larger land carnivores and marine forms such as Guadalupe fur seal and sea-otter may have been hunted primarily for their hides and pelts and only secondarily for food. Cetacean remains, for the most part, probably represent animals that became accidentally beached rather than killed pelagically by Indians.

Although fish remains have been identified extensively from only one site, Point Magu (Table 6), most coastal sites contain abundant quantities of fish vertebrae. Fishing was the principal subsistence orientation along the Santa Barbara Channel, but fish have been the least identified class of faunal remains.

Bird remains have been identified from two coastal sites not far apart from each other, Simomo and Point Magu (Table 5). The species represented are mostly shore birds, birds of prey, and migratory waterfowl, all relatively large birds (Appendix A). Undoubtedly along the coast fowling efforts were directed towards capturing the larger-sized birds,
but farther inland, with few exceptions, probably all kinds of birds were hunted.

Archaeological remains tell us little about ethno-botany, except that from the numerous grinding slabs and mullers and mortars and pestles we know that seeds and acorns must have been a very important part of the Chumash diet. This inference is borne out by historical sources, which add that they also ate bulbs, roots, tubers, fruits, stems and leaves of plants, and other kinds of nuts besides acorns such as walnuts and pine-nuts. Only a few of the plants used by the Chumash are known or can be identified to species.

Mammals that are used by the Chumash and discussed in this chapter, exclusive of a few land mammals, whales, and perhaps some species of porpoise, cover the full range of mammalian species found in the Chumash area. If the pattern shown by the identified faunal remains (Table 3) is a fairly reliable representation of subsistence emphases, it appears that of the land mammals the Chumash subsisted mainly on rodents, rabbits, deer, occasionally on small carnivores, and rarely on large carnivores. On the coast seals, sea-lions, and sea-otters were important, perhaps more so than land mammals; and fish formed a staple equal in importance to the acorn. Other than a few species of bird that were avoided because of food taboos, all kinds of birds
were hunted, but when possible fowling was no doubt oriented toward larger species, particularly along the coast. Along the shoreline shellfish were an important source of food which could be obtained the year-round with relatively little effort.

Late spring through early fall would be months of plenty for the Chumash. Seals and sea-lions would be obtainable in greater numbers and more vulnerable during rooking season which lasted from late spring through summer. Many of the Channel Islands, in particular, were and still are favorite rooking grounds for seals and sea-lions. Large schooling fish such as bonito, barracuda, tunas, skipjack, yellowtail, and game fish such as marlin and swordfish are extremely abundant during summer and early fall; however, these species either completely depart from Chumash waters or remain in only greatly reduced small schools, as stragglers, or as solitary fish during winter months. Thus, although the ocean remains a dependable source of food during the winter, winter fish resources are diminished in abundance. Species of bird, however, were probably more abundant in winter because of winter visitant species and transient waterfowl.

Abundance of plants is seasonal too. Generally, spring would be the time of rich harvests for bulbs and greens. In summer some of these plant foods could still be
collected, but seeds, some of which could also be obtained in spring, were harvested mostly during the hot, dry summer and into autumn. Some pine-nuts could be harvested in late summer, but the bulk of pine-nut harvesting would be in autumn. In most areas of California, and probably in the Chumash area, the harvest of pine-nuts and acorns came in succession, with acorns being gathered somewhat later in autumn than pine-nuts. During winter many plants are dormant but new sprouts and greens could be obtained from the fields; however, stored plant foods gathered during summer and fall regardless of available winter plants usually were enough to tide the Indians over until springtime.

Other sources of food were insect larvae and chrysalids, which were used frequently for condiments and as ingredients in pinoles.

Baumhoff (1960) evaluated vegetation associations of northern and central California for their abundance of large game animals according to a classification of primary, secondary, and tertiary game lands. His classification with few revisions is also applicable to the Chumash area:

**Primary Game Land**
- Chaparral
- Grassland (Central Valley, e.g. elk and antelope)
- Oak Woodland

**Secondary Game Land**
- Coniferous Forest at low elevations
Tertiary Game Land

Coniferous Forest at high elevations

Coastal sagebrush and California prairie are not included specifically in Baumhoff's classification. However, California prairie would be included under grassland (Fig. 5) as Baumhoff has defined it above. Coastal sagebrush has few large game animals, but it does contain sizeable rabbit and rodent populations; however, in terms of total number of species of game regardless of size, Chaparral was the richest source of game (Table 2).

The importance of large animals in Chumash subsistence should not be overstressed to the exclusion of smaller-sized mammals such as rabbits and rodents. Almost any kind of animal was food for the Chumash, and from the interrogatories' descriptions of how the Chumash ate we can be sure that throughout the day opportunities for obtaining even the smallest morsels were not ignored: "The meals of the Indians can not be counted, because it may be said that for them the entire day is one continuous meal" (Engelhardt 1923: 95). With perhaps the exception of aboriginal dependence on fish along the Santa Barbara Channel, Kroeber's generalization about the importance of small land mammals in California Indian diet is no doubt applicable to the Chumash:

In spite of the relative abundance of deer, small game perhaps furnished even more meat diet to the California Indians the year around, on
TABLE 1
DISTRIBUTION OF LAND MAMMALS IN CHUMASH REGION
ACCORDING TO LIFE ZONES

<table>
<thead>
<tr>
<th>Animal</th>
<th>L.S.</th>
<th>U.S.</th>
<th>Tr.</th>
<th>Found</th>
<th>Used</th>
<th>Used</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Coyote</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>Fox:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kit</td>
<td>P</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Gray</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raccoon</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>X</td>
<td>-</td>
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</tr>
<tr>
<td>Badger</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>X</td>
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</tr>
<tr>
<td>Skunk:</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Striped</td>
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<td>M</td>
<td>L</td>
<td>X</td>
<td>-</td>
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<td>Spotted</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mountain lion</td>
<td>L</td>
<td>M</td>
<td>M</td>
<td>X</td>
<td>X</td>
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<td>P</td>
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<td>X</td>
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</tr>
<tr>
<td>Bear:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grizzly</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Black</td>
<td></td>
<td>L</td>
<td>M</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
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<td>L*</td>
<td>M</td>
<td>M</td>
<td>X</td>
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<td>X</td>
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<td>M</td>
<td>L</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Elk</td>
<td>P</td>
<td></td>
<td></td>
<td>?</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mountain sheep</td>
<td>P</td>
<td>P</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rabbit:</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Brush</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cottontail</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>X</td>
<td>-</td>
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<td>Jackrabbit</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rodents</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Explanation of symbols:

M = Mainly
L = Locally
P = Present but with no marked preference for particular life zones
X = Present or known
? = Identification tentative

L.S. = Lower Sonoran; U.S. = Upper Sonoran; Tr. = Transition life zones

* Deer are found along riparian associations, particularly at the end of summer.
<table>
<thead>
<tr>
<th>Ocean and Shoreline</th>
<th>Coastal Sage</th>
<th>California Prairie</th>
<th>Oak Woodland</th>
<th>Chaparral</th>
<th>Coniferous</th>
<th>Stream Courses</th>
</tr>
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<tbody>
<tr>
<td>Seaweed</td>
<td>Roots</td>
<td>Roots</td>
<td>Roots</td>
<td>Roots</td>
<td>Berries</td>
<td>Cresses</td>
</tr>
<tr>
<td>Birds</td>
<td>Berries</td>
<td>Seeds</td>
<td>Seeds</td>
<td>Berries</td>
<td>Seads</td>
<td>Reeds</td>
</tr>
<tr>
<td>Eggs</td>
<td>Seeds</td>
<td>Birds</td>
<td>Acorns</td>
<td>Birds</td>
<td>Birds</td>
<td>Cattail</td>
</tr>
<tr>
<td>Shellfish</td>
<td>Birds</td>
<td>Eggs</td>
<td>Acorns</td>
<td>Cactus</td>
<td>Black</td>
<td>Celery</td>
</tr>
<tr>
<td>Fish (Varied and abun-dant)</td>
<td>Coyote</td>
<td>Grasshoppers</td>
<td>Eggs</td>
<td>Black bear</td>
<td>Bear</td>
<td>Edible</td>
</tr>
<tr>
<td>Sea-otter</td>
<td>Racoon</td>
<td>Elk</td>
<td>Rabbits</td>
<td>Edible</td>
<td>Black fruit</td>
<td>Beavers</td>
</tr>
<tr>
<td>Seals</td>
<td>Badger</td>
<td>Antelope</td>
<td>Rabbits</td>
<td>Yucca</td>
<td>Black fruit</td>
<td>Deer</td>
</tr>
<tr>
<td>Sea-lions</td>
<td></td>
<td>Fox</td>
<td>Rodents</td>
<td>Coyote</td>
<td>Rabbits</td>
<td>Coyote</td>
</tr>
</tbody>
</table>

Wildlife:
- Grizzly bear
- Mountain lion
- Wildcat
- Deer
- Fox
- Coyote
- Racoon
- Snakes
- Lizards
- Fros
- Trout
account of the abundance of smaller species. These included above all cottontail rabbits, jack rabbits, ground squirrels, wood rats, and other rodents. They could often be picked up with little trouble and at a short distance from the rancherias and settlements. Also, boys and old men not yet able or no longer able to range through the mountains in pursuit of deer could take this smaller game (1962: 55).

Land Mammals

Artiodactyla. The large game animals in this area were artiodactyls. Forms occurring are mule deer, pronghorn antelope, tule or dwarf elk, and mountain sheep. Mule deer was probably the most important of these in subsistence over the greater part of the Chumash area.

In California during aboriginal times deer probably were most abundant in the Chaparral and Oak Woodland zones of the coastal mountains (Longhurst, et al. 1952: 11, 104). Generally, Longhurst et al. (1952: 11-12) believe that Indian brush burning for purposes of hunting rabbits and insuring a good crop of grass shoots inadvertently contributed to the higher density of deer in these types of vegetation in the coastal ranges by setting back plant successions to levels favorable to high deer population. Although Longinos Martinez (Simpson 1961: 59) stated that brush burning was a universal practice in Upper California, it is not conclusively known whether this practice affected aboriginal deer populations in the Chumash region, because burning for better crops was supposed to have not been practiced (Harrington 1942: 9).
The highest density of deer today in the Chumash area is 10 or more deer per square mile (Fig. 7). Modern densities of deer and other mammals at lower elevations have been greatly affected by urbanization and cultivation, but those of interior regions at higher elevations are probably more similar to aboriginal patterns. Deer herds in the Southern Coast Ranges and Southern California are resident throughout the year, and seasonal movements are at a minimum. Most movements are only down-mountain drifts, although there are a few exceptions to this rule at higher elevations in places such as Frazier Mountain and Mount Pinos (Fig. 2), where deer tend to concentrate at somewhat lower elevations during winter snows. But, more usually, late summer is the critical time of year for deer in Chumash country because of the prevailing aridity before the onset of the rainy season. At this season deer most often concentrate at lower elevations, tending to frequent riparian associations for succulent vegetation and water. At higher altitudes, mule deer during summer months usually move up-slope and "summer" on mountain tops and in areas of coniferous forest. The winter range of mule deer in Chumash country is as large or larger than their summer range (Longhurst et. al. 1952: 44-7).

The Chumash are known to have used two techniques for hunting deer. One was for an individual hunter to run
down a deer (Harrington 1942: 6), and the other was to stalk deer wearing a deer-head disguise until the animals were within shooting range for a bow and arrow (Hemert-Engert and Teggart 1910: 139; Simpson 1961: 60).

Almost all excavated sites have yielded deer remains. This probably reflects the fact that, besides smaller mammals such as rabbits and rodents, deer are the only large land mammals present in sufficient numbers to be depended upon as a staple food source. The importance of deer in aboriginal diet probably was greater in the interior where the Indians' diet was not supplemented by fish, but deer was more than likely an important source of food on the coast too, particularly when fish were not abundant during winter.

Elk, antelope, and mountain sheep are more typical of arid northern interior Chumash regions. The ranges of all these animals have been greatly reduced since the advent of European civilization. These forms are poorly represented in identified archaeological remains, but their distributions for the most part lie outside the area where most archaeological research has been done.

Tule elk within the Chumash area was distributed along the plains of the Cuyama Valley in San Luis Obispo County and extreme northern Santa Barbara County (Grinnell 1933: 206). Harrington (1942) does not mention elk among
the animals eaten by the Chumash; however, the Alamo Creek site, from which a possible base of an elk (?) antler was found (Wire 1961: 117), lies along the drainage of the Cuyama River and not too far from the limits of the pre-1860 distribution of tule elk. Moreover, both elk and antelope have been identified from Southern Yokuts sites at Buena Vista Lake, not far from the northern edge of Chumash territory (Wedel 1941: 11).

Antelope inhabit plains and large valleys. Today they are restricted to a few small herds in desert areas; but Fr. Font of the Anza Expedition observed "a large drove of antelopes" in the Santa Clara River Valley (Bolton 1931: 247). Although he could have mistaken deer for antelope, coastal valleys such as the Santa Maria River and Santa Clara River valleys, outside the humid coastal strip, probably were within the primitive range of prong-horn antelope (Grinnell 1933: 209). Prong-horn antelope were hunted by the Chumash with two methods. One was to communally drive antelope into a prepared enclosure, and another was to individually stalk antelope with a head disguise similar to the one used in hunting deer (Harrington 1942: 6).

Mountain sheep are known to have once inhabited the barren and rough open areas of the Tejon Mountains, Cuyama Valley and Plain, and Caliente Range (Hall and Kelson 1959:
Fig. 7. Modern density of deer per square mile.
Most likely the Alamo Creek site, in which remains of mountain sheep (?) were found, was near or part of the mountain sheep's primitive range.

Rabbits. Rabbits along with deer and a great variety of rodents probably formed a large part of the land mammal portion of Chumash diet. It can be assumed inferentially that the Chumash hunted rabbits in communal drives because they had rabbit-drive officials (Harrington 1942: 33). Longinos Martinez (Simpson 1961: 59) said that "in all New California...the gentiles have the custom of burning brush for...catching rabbits..." Harrington (1942), however, makes no mention of this practice.

Rodents. In the California mammalian population rodents are represented by more individuals than all other mammalian orders combined (Ingles 1954). Rodents were generally abundant in all life zones, and the Chumash utilized them extensively as a food source. Harrington (1942: 7) lists only tree squirrels and moles as the kinds of rodents eaten, but neither of these have been identified archaeologically, and the most frequently occurring archaeological remains are ground squirrels, pocket gopher, and woodrat.

Carnivores. Remains of carnivores are not generally abundant. Although some cultural preference may have been involved which explains their relatively small archaeological
representation, the sparseness of identified remains of some species may be an archaeological reflection of relatively small numbers of those species in the aboriginal landscape. Today, for example, it is estimated that there is an average density of one mountain lion per township (or approximately 36 square miles) in California (McLean 1954: 75), and the modern density of another carnivore, gray fox, in its favored habitat of chaparral is 4 per square mile (Ingles 1954: 121). In most instances population densities of non-carnivores are considerably higher than these.

One species of carnivore, coyote (Canis latrans), is sometimes difficult to distinguish archaeologically from domestic dog (Canis familiaris). Both animals were eaten by the Chumash (Harrington 1942: 7), and from every site in which coyote remains have been identified, domestic dog also occurs. Thus, in many instances identification of Canis to species is uncertain. Remains of either coyote or domestic dog are fairly common.

The distribution of two large carnivores, black bear and grizzly bear, has been altered greatly since aboriginal times. Grizzly bears by the turn of the twentieth century had become extinct in most areas of California. Aboriginally the black bear was probably limited in distribution to the extreme northeastern part of Emigdiaño
Chumash country; however, since the extinction of grizzlies, it has extended its range into Ventura and Santa Barbara counties (Storer and Tevis 1955: 81). Grizzlies before their extinction were distributed universally in the Chumash area wherever there was adequate forage.

Black bears in contrast to grizzly bears were not aggressive or formidable opponents and often were hunted by California Indians. Grizzlies, however, were ferocious creatures and had virtually no natural enemies. They were active both day and night. In California the grizzly bear was active throughout the year, particularly in the lowlands and warmer foothills. At higher elevations grizzlies may have been dormant to a limited degree during winter months in areas where there was inadequate forage; females with cubs probably were inactive for part of the winter.

Grizzly bears because of their ferocity were feared by almost all California Indians. Grizzlies fed on many of the same plants and animals that the Chumash used, and the natives in search of food were "continually in danger of being attacked by bears" (Engelhardt 1932: 15). Those Chumash near Mission San Buenaventura, for instance, during their ceremonies for rain and bountiful food supplies performed rituals so "that no bear might catch them" (Engelhardt 1930: 34). Mission reports of burying neophytes killed by grizzlies (Simpson 1962: 153) and Longinos
Martinez' observation that bears attacked and killed many gentiles in Upper California (Simpson 1961: 46) certainly provide adequate reasons for such fears. Also, the viciousness of grizzly bears was reflected supernaturally in the fact that the Chumash, like other California Indians, attributed malevolent powers to the grizzly. Bearskins, for example, were used by Chumash shamans to supernaturally "kill" an enemy (Voegelin 1938: 64).

There are no descriptions of Chumash hunting bear, but we can infer that they did hunt grizzlies because of archaeological remains of grizzly (Woodward 1932b; Orr 1942: 81). Grizzlies probably were not hunted extensively, and when they were exploited, the Indians probably hunted grizzlies together in groups (Storer and Tevis 1955: 84-6). California Indians used a variety of group techniques to kill grizzlies. One method was to use a pitfall and then dispatch a trapped bear with bow and arrow. Another method was to simply fell a bear with continued showers of arrows. Still another was for several men to hold a grizzly at bay in its den by various devices while other Indians dispatched the animal with bows and arrows. Perhaps the most common method was the one described by Pedro Fages in 1770 near San Luis Obispo (Priestley 1937: 50):

The cubs of this kind of bear which the Indians hunt, stealing them from their mothers, are raised and fattened for eating when they are ready, as is done with pigs.
Where bears were unusually plentiful locally, they may have had an effect on Chumash settlement pattern. The Portolá Expedition found bears most abundant north of Point Conception, and they were particularly plentiful in the "Valley of the Bears", within which Mission San Luís Obispo was later founded. Costansó, engineer of the expedition, noted that there they saw troops of bears, and that the ground was plowed up and full of holes which were made by the bears in search of roots (Teggart 1911: 59); in this valley there was no mention of Indian villages. Palou (Geiger 1955: 128) in discussing the founding of Mission San Luís Obispo mentions that several of the Indians bore wounds from bear claws and that they were pleased the Spanish had come to live among them because the soldiers a few months previous had cleared the country of bears. Aschmann (1959: 51) points out that grizzly bears and Indians place very similar demands for sustenance on their environment, and he proposes that aboriginal man and grizzlies, because of intense competition, had somewhat mutually exclusive distributions. Although Aschmann discusses this hypothesis in connection with the mountain ecologic zone (Fig. 9), data for the Chumash suggest that locally in lowland areas where bears were unusually abundant the Indians may have also accommodated grizzlies by avoiding such places for the establishment of villages.
## TABLE 3
IDENTIFIED MAMMAL, REPTILE, AND AMPHIBIAN REMAINS

<table>
<thead>
<tr>
<th>MAMMALS</th>
<th>Arroyo Seco S</th>
<th>Deer Canyon S</th>
<th>Point Magu S</th>
<th>Simons S</th>
<th>Canterbury Cave S</th>
<th>Ba-60</th>
<th>Railroad Site S</th>
<th>SD-297</th>
<th>SD-159</th>
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<td>Pinnipeds</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Northern Fur Seal (Callorhinus ursinus)</td>
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<td>X</td>
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</tr>
<tr>
<td>Stellar Sea-Lion (Eumetopias jubata)</td>
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<td>X</td>
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<td>Northern Sea Elephant (Mirounga angustirostris)</td>
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<td>Domestic Dog (Canis familiaris)</td>
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<td>Gray Fox (Urocyon cinereoargenteus)</td>
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<td>Striped Skunk (Mephitis mephitis)</td>
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<td>Bobcat (Lycaon rufus)</td>
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<td>Brush Rabbit (Sylvilagus bachmani)</td>
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<td>Cottontail (Sylvilagus auduboni)</td>
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<td>Black-tailed Jackrabbit (Lepus californicus)</td>
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<td>California Ground Squirrel (Spermophilus beecheyi)</td>
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<td>Pocket Gopher (Thomomys bottae)</td>
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<td>Kangaroo Rat (Dipodomys)</td>
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<td>Desert Woodrat (Neotoma lopida)</td>
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<td>Meadow Mouse (Microtus)</td>
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<td>Broad-Footed Mole, (Scapanus latimanus)</td>
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<tr>
<td>Sea-Lion</td>
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<tr>
<td>REPTILES and AMPHIBIANS</td>
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<td>Frog</td>
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Marine Mammals

The most considerable modification in mammalian fauna of the Chumash region since the incursion of Europeans has been among marine mammals. In the course of commercial hunting activities in the nineteenth century two species of seal and the sea-otter were brought to the verge of extinction. Generally speaking, the distribution and habits of sea mammals are still poorly understood. This is due to at least two reasons: 1) near-extinction of some forms before systematic observations could be made on them in their unreduced, primitive ranges, and 2) difficulties involved in studying animals which do not lend themselves readily to zoogeographic mapping and continual observation.

Data were assembled on the life histories of sea-otter and the pinnipeds that occur in Chumash waters in the course of research for this thesis. Since these data have not been assembled with reference to the Chumash area before and are essential as a preface to a discussion of identified marine mammalian remains from a Chumash coastal site, which will follow shortly, they are included in Appendix B. From ethnographic and archaeologic data we know that the Chumash hunted sea-otter, every species of pinniped occurring in Chumash waters, and possibly some species of porpoise.

Sea-otter. Today, in California, only a small herd of otter remains off the Big Sur coast. This is in
sharp contrast to their primitive range along the entire coast of California. When they were abundant, sea-otters inhabited shallow water from 20 to 150 feet deep around kelp beds (Kenyon and Scheffer 1955: 4), (Fig. 2). Most of their time is spent in the sea, but they occasionally come ashore to sun themselves or find shelter from storms or unusually heavy surf. Under normal weather conditions they sleep among the kelp by floating on their backs and anchoring themselves to a few strands of seaweed, which are wrapped around them.

Female sea-otter show great concern for their young, and pups are almost always in the company of their mother. Pups were nursed and carried on the mother's stomach. A pup was only left to float on the surface by himself when his mother dived for food. Such solicitous behavior on the part of the mother was turned to the sea-otter's disadvantage when it was hunted. Although there are no records known which describe Chumash methods of hunting sea-otter, Longinos Martinez (Simpson 1961: 54) said that the Chumash of the Santa Barbara Channel "hunt sea-otter in the same manner as the Indians of Old California." The methods used for hunting sea-otter in Lower California are best described by Fr. Luís Sales (Rudkin 1956: 19-20), who was in that area between 1772 and 1790:

He /the hunter/ has provided a club and a long cord with two hooks, and when he discovers an otter he draws near it. The otter ordinarily swims
carrying its young ones, teaching them to paddle with their little paws. Seeing the canoe she dives under the water and leaves her young on the surface. The Indian comes up immediately and ties the cord to a leg of the little otter so that one hook lies close to the foot and the other a span away. This done the Indian retires with his canoe, paying out the cord, and when a little way off jerks the cord so as to hurt the otter, and it cries out because of the pain. At its call the mother comes and sees the Indian is far away, she approaches it, clasps it and tries to take it away, but since the Indian holds tightly to the cord she cannot. Then the big otter tries by kicking its feet to get the cord off its baby and usually gets entangled with one of the hooks. Now that it is caught the Indian comes up in his canoe with a club in his hand, gives it a blow on the head, and it is his. I have seen how much this operation requires of the poor Indians; sometimes in a whole day they get none, sometimes only one, and sometimes they lose all to a sudden surge of sea and are drowned. They also hunt them when they are asleep on the water or when they come upon the beach to rest.

Pinnipeds. Six species of pinnipeds, each representing a different genus, are found in Chumash waters. Five of these, California sea-lion, Steller sea-lion, Guadalupe fur seal, northern elephant seal, and harbor seal, breed and are resident the year round. The other, northern fur seal, is a pelagic winter visitant (Bartholomew and Boolootian 1960: 366). Present species populations, interspecific population ratios, and distribution of rookeries probably differ considerably from aboriginal conditions due to the disrupting effects of commercial exploitation of certain species. Northern elephant seal and Guadalupe fur seal, for example, were extirpated over most of their range,
the elephant seal being hunted for its blubber and the
Guadalupe fur seal for its fur.

At present no rookeries are found on the mainland; those occurring in the Chumash area are found on the
Channel Islands. During rooking season the various species of pinnipeds occurring in Chumash waters mingle on the same hauling grounds. The main hauling ground today is on San Miguel Island, but there is no reason to assume that it was the only one in the proto- and prehistoric past. Breeding season for northern elephant seals lasts from December through February, but the breeding seasons of other pinniped species are coincident with one another, usually beginning in late spring or early summer and lasting until early fall. At the end of rooking season seals and sea-lions disperse into smaller herds or bands and occupy their preferred habitats at various points along the coast and around the Channel Islands.

From an account of the Vizcaíno Expedition by Fr. Ascensión we know that the maritime Shoshone of Santa Catalina Island harpooned fish and seals from canoes near shore along rocky coasts. The method of harpooning was to draw the fish into the canoe by a line if it was small, or if it was a seal or large fish, play out the line, follow it and play it towards the beach, kill it in shallow water, and then draw the carcass into shore (Wagner 1929: 236).
Unfortunately we have no descriptions of how the Chumash hunted seals and sea-lions. Presumably they harpooned them from canoes near shore as the maritime Shoshoneans did, but seals and sea-lions could also have been hunted, and probably obtained in greater numbers, on land, particularly during breeding season. Neither complicated equipment nor elaborate techniques are necessary to successfully hunt seal on land. Descriptions of hunting methods used by nineteenth century commercial sealers are well documented. All of the techniques they used were also feasible for Indian hunters without firearms. From the description of sealing techniques given by Scammon in Allen (1880), the minimal equipment required to kill a seal would be a lance and club. The method described in the following paragraph, collated from Scammon's descriptions, could be used generally for hunting all types of pinnipeds.

Seals were hunted usually by men in groups. They would approach a rookery while the wind was blowing out to sea and try to get between the herd and the ocean. Once the hunters had maneuvered themselves into position, they startled the herd of seals or sea-lions by screaming and yelling. Individuals of the herd would then panic, some trying to break ranks and reach the safety of the ocean, others remaining stunned and motionless. The hunters would then quickly lance or club the confused and defenseless seals.
A habit of seals and sea-lions which made hunting easier was that in their panic when the animals were awakened they usually attempted to retreat from the hunters in the same direction their heads were pointed. If the seal was headed toward land it scrambled farther away from shore until it was exhausted and killed. Commercial seal hunters tried to keep seals from breaking ranks because, when they attacked a confused and frightened herd in a congested area, individual animals usually lost control of their actions, scrambling and crawling over each other in attempts to escape their killers, thus making it easier for the hunters to dispatch them. In some instances the panic was so great that Scammon (Allen 1880: 756) reported one herd of sea-elephants which smothered many of its members to death before the hunters could wound them. Those members of a herd who broke ranks and gave a fight could be dispatched by a man jabbing a lance in the roof of the animal's mouth causing it to settle back on its haunches until it was clubbed or lanced to death by other hunters. For the more wary and elusive harbor seal, Scammon (Allen 1880: 593) said that the Indians of Puget Sound use a seine drawn around a beach where seals are on shore to capture the animals. Harbor seals, because of their small size, can be dispatched with a single blow to the head.

Similar methods in hunting seals on land undoubtedly were used by the Chumash because the neighboring Gabrieleño
Indians of Los Angeles County are known to have killed seals and sea-lions at night with clubs and rocks while the animals were sleeping in their rookeries (Woodward 1949). Thus, although pelagic seal-hunting in the form of near shore harpooning probably was done, it seems more likely, arguing from the viewpoint of ease of capture and from what is known about the behavior of pinnipeds, that seals and sea-lions were taken more often on land than at sea.

Archaeological evidence. It appears from a survey of identified faunal remains from Chumash sites (see Table 3) that pinniped genera were hunted in the following decreasing order of frequency:

1. Arctocephalus, Zalophus
2. Phoca
3. Eumetopias, Mirounga, and (Callorhinus)\(^1\)

An extensive analysis of pinniped remains has been done for one Chumash site, the Point Magu shellmound (Table 4; Fig. 2), by Lyon (1937). Most of the mound was deposited between the sixteenth and eighteenth centuries; the mammalian material collected is estimated to date late eighteenth and early nineteenth century.

All pinniped genera occurring in the Chumash area today are represented in the Point Magu faunal remains. The relative number of individuals identified to species reflects

\(^1\) Callorhinus is pelagic and probably was not hunted.
basically the same order of frequency per species as the regional pattern. The two most numerous species represented are the Guadalupe fur seal and California sea-lion; other species are present in very small numbers.

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**TABLE 4**

PINNIPED REMAINS FROM POINT MAGU SHELLMOUND
(After Lyon 1937)

<table>
<thead>
<tr>
<th>Number of Individuals</th>
<th>Adults</th>
<th>Juveniles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td><strong>Arotocephalus</strong></td>
<td>4</td>
<td>138</td>
</tr>
<tr>
<td><strong>Zalophus</strong></td>
<td>7</td>
<td>7</td>
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<tr>
<td><strong>Callorhinus</strong></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Mirounga</strong></td>
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</tr>
<tr>
<td><strong>Phoca</strong></td>
<td>1 (or 2?)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Eumatopias</strong></td>
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</table>

Guadalupe fur seal is by far the most numerous species at Point Magu. The overwhelming predominance of Guadalupe fur seal and sea-otter over hair seals suggest that the fur-bearing animals were hunted primarily for their pelts, but such an assumption is qualified by Lyon (1937: 166) who presents two alternative explanations for their abundance: relative abundance of genera and ease of capture,
and fur trade activities of Indians with whites during the Hispano-Anglo periods. Point Magu specimens of the northern fur seal are juveniles and adult females, which indicate they were taken during the winter. The presence of this species may indicate that pelagic seal hunting was practiced, but the seals could also have been forced to land by illness or washed ashore dead. In contrast to conclusions reached from Scammon's accounts of sealing about the ease of hunting pinnipeds on land, Lyon (1937: 166), speaking generally of fur seals, concludes that:

From the fact of the relatively small number of juvenile bones, it is rather doubtful whether the Indians visited many fur-seal rookeries; none may have been easily accessible, or perhaps the natives were interested primarily not in pups but in adults for furs. The first reason would be the more acceptable one, since the Indians had a great need for easily obtained food, and pups constituted the most edible form of pinnipeds. As would be expected, the number of adult males is small, perhaps accounted for by pelagic sealing rather than hunting in rookeries. However, the formidability of the males may have prevented capture on land. At sea there would be far greater number of females and young than adult males, resulting in higher mortality of the first two when pelagic hunters scoured the ocean.

Despite the extremely large number of individuals of Guadalupe fur seal represented at Point Magu shellmound and the possibility that they might have frequented the mainland, Scheffer (1958: 81) thinks that in light of the present distribution of Guadalupe fur seal, which according to him is restricted to the Channel Islands, it was more likely
that their carcasses were brought to the mainland from the islands by the Indians. If this were so, it is possible that the high frequency of adults was due to the fact that Guadalupe fur seal was hunted in rookeries on the Channel Islands with mostly adults being traded to the mainland.

The next most abundant pinniped was the California sea-lion. Their preference for sheltered beaches, where they could be easily hunted, and large year round populations probably accounts for the large number of individuals found at Point Magu. Lyon (1937: 166) infers, from the large number of California sea-lion pup bones, that the Indians probably raided a sea-lion rookery for food; in support of this argument, she points out that the hides of California sea-lion are not considered valuable but that its flesh is considered edible even by white men.

The Steller sea-lion was represented by only two female adults. Their sparse representation at Point Magu can probably be accounted for by a small pre-Columbian population similar in size to the modern one and the difficulty of hunting the Steller sea-lion in its relatively inaccessible habitat of exposed, surf-washed rocks. The absence of males may be due to seasonal factors, but Lyon (1937: 164) also suggest that perhaps bulls were not taken because of their pugnacity and excessive heaviness.

The scarcity of harbor seals can probably be explained by their shyness and wary habits and relatively small
population. Perhaps a cultural preference was also involved, the Chumash preferring larger and easier to catch species. Lyon (1937: 165) attributes the scarcity of northern elephant seal remains to their huge size; but it seems more reasonable to assume from what is known of their vulnerable habits that elephant seals simply were not present in large numbers near Point Magu. However, Lyon (1937: 166) surmises that the Indians had access to an elephant seal rookery because the majority of elephant seal remains are juvenile.

**Cetaceans.** The order Cetacea includes whales, dolphins, and porpoises. Eight species of whale commonly occur along the California coastline (Grinnell 1933: 211-14). Probably none of them were hunted by the Chumash. There are no records of either Chumash or maritime Shoshoneans hunting whale, and in light of our knowledge of their technology and seal-hunting techniques, it is not probable that they did so. They did, however, eat stranded whales; but feasting on whales was an infrequent occasion for the Chumash. In a letter from San Buenaventura Mission, written by Fr. José Señán and dated May 5, 1810, we get some idea of the relative frequency and irregularity with which whales became beached in the Santa Barbara Channel:

> In less than two months five whales have been washed ashore, one of them on the beach of the Mission itself, the other four near by. And so in a short time we have seen five of these monsters stranded, whereas sometimes several years go by without seeing them at all (Simpson 1962: 46).
The Chumash believed that the swordfish and killer whale united in driving whales ashore (Bowers 1878: 318-19; Mohr and Sample 1955: 62). When whales did wash ashore the Chumash apparently did not have a detailed code of whale rights for settling disputes as did some of the northwest California groups. Juan Justo, a Barbareño Chumash Indian, said that when they found a whale there was a big feast, but that if there was not enough to go around, they had a general fight over it (Yates in Heizer 1957: 38).

Nine species of dolphin and porpoise are present in Chumash waters (Grinnell 1933: 214-16). There are no direct observations which state that the Chumash hunted porpoise and dolphin, although it is probable that they did hunt the smaller, less whale-like, species. Several excavated sites have yielded remains of porpoise and dolphin, but in only one instance have such remains been identified to species. Seventeen vertebrae of *Delphinus delphis*, the Common Dolphin, were recovered from Simomo (Woodward 1932b). Also remains of three skulls representing perhaps more than one species of porpoise distinct from *D. delphis* (Howard 1932? a) were taken from the same site. The Common Dolphin, one of the most abundant species of cetacea in Southern Californian waters, is present in inshore waters the year round.

Porpoise and dolphin, like whales, sometimes run ashore; but most species of porpoise and dolphin frequent
shallow, inshore water and could be easily harpooned. Most species with few exceptions are year round residents, but relative abundance of each species varies locally and seasonally.

Other Fauna

Reptiles and Amphibians. Harrington (1942: 7) lists tortoise, lizard, and snakes as having been eaten by the Chumash. Identified archaeological remains of reptiles and amphibians are few (Table 3). Although reptiles and amphibians generally hibernate to a certain extent in colder months, they probably could be taken the year round by seeking out their hibernating spots. Turtles and several species of snakes and frogs are found in the Chumash area.

Insects. Yellow-jacket larvae and caterpillar chrysalids were eaten by the Chumash. Honeydew, the sweet exudations of insects on tule cane, was also eaten; even though honey bees are not native to California, early Spanish explorers, because of honeydew's honeycombed-appearance, mistook it for bee's honey (Woodward 1938). Grasshoppers were caught in prepared pits (Harrington 1942: 8). Aboriginally the use of grasshoppers as food was probably widespread among the Chumash but perhaps not universally, for Juan Justo, a Barbareño Chumash, told Yates (Heizer 1957: 37) in 1891 that the Indians of the Santa Barbara area did not use grasshoppers as food but that "Indians farther down
the coast made pinoles of them, which they ate." However, this statement is contradicted by Fr. Font (Bolton 1931: 458) who observed Indians roasting a number of locusts at one of the villages around Goleta slough near Santa Barbara.

**Birds.** At least 128 resident, breeding species are represented in the avifauna of the Chumash region. They are difficult to classify for generalizations in this study, because most species tend to occupy more than one life zone and to utilize two to three ecologic formations. Miller (1951) attempted several kinds of distributional classifications of the breeding bird species of California. Of those, the two classifications of importance to this study are groupings according to occurrence in Life Zones and Ecologic Formations. According to life zones, previously discussed in connection with mammals, the greatest number of breeding species occur in Upper Sonoran and Transition zones. By ecologic formation the greatest number of breeding species are found in riparian woodland, oak woodland, and montane forest; however, the relative number of species per ecologic formation probably was not the critical factor in determining the species or group of species utilized in aboriginal subsistence. Probably more important from the viewpoint of nutrition was the relative size of species.

Most of the resident avifauna in the Chumash region consist of very small songbirds, the species usually
weighing no more or less than a few ounces per individual (Pough 1957). Exceptions to this rule are carrion-eating birds, birds of prey, waterfowl, and birds of marine and littoral environments. The great disparity in size between these birds and the smaller songbirds can be seen by an examination of a selected list of weights of larger birds found in the Chumash area (Appendix A). The number of species of larger fowl is increased considerably during the winter by an influx of winter transients and migrants, most of whom are waterfowl and birds of littoral environments. Although smaller species such as songbirds probably were taken in fowling, the focus of subsistence fowling most likely was on these larger sized birds.

Fr. José Señán says the Indians of Mission San Buenaventura ate duck, geese, cranes, and quail (Engelhardt 1937: 37). Harrington (1942: 6) lists eagle, hawk, dove, and mudhen as having been used for food by the Chumash, but with owl, buzzard, and raven (crow?) being avoided for food. Avoidance of raven as food may have been due to religious associations of the bird with the Chungichnish cult. The Chungichnish cult is a regional religious system of southern California that diffused from Santa Catalina Island. From the use of toloache in boys' puberty ceremonies, raven temples for initiation, and the archaeological presence of steatite effigies, of which the stone was obtained from
Santa Catalina Island, we know that the Chumash had some traits or perhaps a variant of the Chungichnish cult; and it is known that the Chumash used crow feathers for religious purposes to decorate dancers and ceremonial poles (Henley and Bizzell 1917). Also, according to Omsett, the last Santa Rosa Island Chumash, the Santa Rosa Islanders worshipped the crow (Bowers 1877). In the Luiseno Chungichnish cult the raven is associated with Chungichnish as his messenger and spy and considered a sacred bird. Among the Diegueno the raven, in connection with the Chungichnish cult, is feared because it is considered capable of killing human beings. Spanish explorers on Santa Catalina Island give a description of a "temple" similar to the enclosures used in Chungichnish ceremonies. When they killed two tame ravens within the enclosure the Indians "fell into an agony of fear" (DuBois 1908: 98-99).

From identified archaeological remains (Table 5) it is clear that orientation in fowling along the coast was towards littoral species, migrant waterfowl, and larger birds of the grasslands and inland cliffs (hawks, falcons, etc.). Remains of turkey vulture, California condor, and raven were found too, but it is questionable for reasons mentioned previously whether these species were used for food.

Most of the historic coastal villages were situated close to environments where water birds would tend to
# TABLE 5

**BIRD REMAINS FROM CHUMASH SITES**

<table>
<thead>
<tr>
<th>BIRD</th>
<th>PM</th>
<th>SIM</th>
<th>RPT</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Loon <em>(Gavia immer)</em></td>
<td>X</td>
<td>X</td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Pacific Loon <em>(G. pacifica)</em></td>
<td>X</td>
<td>X</td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Red-throated Loon <em>(G. stellata)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Eared ? Grebe <em>(Columbus caspicus)</em></td>
<td></td>
<td>X</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Western Grebe <em>(Aechmophorus occidentalis)</em></td>
<td>X</td>
<td>X</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Albatross <em>(sp.)</em> <em>(Diomedea sp.)</em></td>
<td>X</td>
<td>?</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Brown Pelican <em>(Pelecanus californicus)</em></td>
<td>X</td>
<td>X</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Gull <em>(sp.)</em> <em>(Larus sp.)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Hudsonian ? Curlew <em>(Numenius phaeopus)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>R?</td>
</tr>
<tr>
<td>Curlew <em>(sp.)</em> <em>(Numenius sp.)</em></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California Murre <em>(Uria aalge)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Farallon Cormorant <em>(Phalaenocorax auritus)</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>R</td>
</tr>
<tr>
<td>Brandt's Cormorant <em>(P. pencillatus)</em></td>
<td>X</td>
<td>X</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Baird's Cormorant <em>(P. pelagicus)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Great Blue Heron <em>(Ardea herodias)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Common Egret <em>(Casmerodias egretta)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Little Brown Crane <em>(Grus canadensis)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Cackling ? Goose <em>(Branta canadensis)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Goose <em>(sp.)</em></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duck <em>(sp.)</em></td>
<td>X</td>
<td>X*</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Turkey Vulture <em>(Cathartes aura)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>California Condor <em>(Gymnogyps californicus)</em></td>
<td></td>
<td>X</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Red-tail Hawk <em>(Buteo jamaicensis)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Hawk <em>(sp.)</em> <em>(Buteo sp.)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Prairie ? Falcon <em>(Falco mexicanus)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Raven <em>(Corvus corax)</em></td>
<td>X</td>
<td></td>
<td></td>
<td>R</td>
</tr>
</tbody>
</table>

Explanation of symbols:

- **W** = winter visitant
- **R** = resident
- **-** = identification too general to determine seasonality
- **PM** = Point Magu
- **SIM** = Simomo
- **RPT** = Railroad Point Site

* At least two species represented.
gather: estuaries of rivers and large streams, lagoons, and sloughs. North of Point Conception, favorable environments for water birds were ponds and lakes formed in the depressions of the large coastal sand dunes and extensive marshy areas back of them in some places.

Juan Justo, a Barbareño Chumash, said ducks were hunted by the following method:

They built an enclosure of tules leaving an opening through which the ducks were driven. The hunters followed them into the enclosure and captured the game (Yates in Heizer 1957: 36).

**Fish.** The Chumash coastline can be divided into two sections with respect to fish resources. One region that can be handled as a unit is the Santa Barbara Channel, and the other is the coast north of Point Conception, which will be referred to as the "north coast." Point Conception marks an important break in the distribution of fish along the California coast. It is the northward limit of distribution of the larger, warm-water, schooling game and commercial fish such as marlin, swordfish, tunas, albacore, yellowtail, and barracuda. North of Point Conception the number of species drops sharply; not only are the seasonal, larger schooling fish absent from these waters, but the number of smaller, near shore year-round species is greatly reduced (Roedel 1953). The Santa Barbara Channel, which includes the Channel Islands, has an unusually rich marine fishery. During summer and early fall the large schooling
fish just mentioned are to be found in the channel. Moreover, the southerly distribution of many fish found on the north coast extends into the Santa Barbara Channel. Thick kelp beds (Fig. 2), nowhere else in California more extensive than along the Santa Barbara Coast and around the Channel Islands, support a rich year-round marine fauna of sea-otter, seal, shellfish, and bottom-dwelling fish such as croakers, jewfish, kelp bass, white sea bass, and sheep-head. Sharks, skates, and rays also provide a year-round source of meat along the Chumash coastline. Smaller schooling fish such as sardines, mackerels, herring, and anchovies are present all year along the Chumash coast, but their appearance in any one spot is erratic.

Freshwater fishing was probably of little importance except for the exploitation of the annual steelhead trout runs. This species ascended the streams and rivers during the rainy seasons to spawn. The large rivers had consistent runs. After spawning, young steelhead remained in streams and usually returned to sea in the rainy season of the next year. As a source of food in interior regions, trout probably were not too important except during their runs in winter and early spring.

At present there is no way of accurately determining the effect of modern commercial fisheries on the relative abundance of fish per species, but early accounts always
made mention of the great abundance of fish to be found in the Santa Barbara Channel. Crespi in 1770 (Bolton 1927: 39) said that the Santa Barbara Channel abounded in fish, "the bonito being especially abundant in August." Pedro Fages (Priestley 1937: 35), on the same expedition, speaking of the Santa Barbara Channel claimed "The fishing is so good, and so great is the variety of fish, known in other seas, that this industry alone would suffice to provide sustenance to all the settlers which this vast stretch of country could receive." From a letter of Fr. José Señán of Mission San Buenaventura, written in the year 1822, we can get some idea of what conditions were like in pre-historic and early historic times (Simpson 1962: 164):

...although our small cove, called Nuestra Señora de los Remedios, does not abound in fish, a number of species of excellent quality are found at a great distance of 3, 4, or 5 leagues. These include swordfish which, despite the disagreeable appearance of this ferocious cetacean, has very white flesh, tender and delicate in flavor ...a single one, supplemented by ordinary rations, is sufficient for 40 persons.

Near the Islands many cabezon (sculpin) are caught. This too is an excellent fish, either fresh or dried. Also near the islands, as well as along our beaches at a distance of about 4 leagues, an abundance of chimuya (rockfish) is to be found. This fish much resembles the cabezon, but is red in color and not so fine in quality. It is worth mentioning that for every 200 or 300 chimuya caught, there are two or three cod (probably the California ling).

In the waters 5 leagues to the west, large numbers of needlefish, yellowtail, and sardines (mostly of the herring species) are taken. A good many small whales and sea lions pass along our coast, but (fur) seals
are rare. In years gone by the Mission used to catch many sea otters, by dint of great effort and skill, but hunting them now is a waste of time, for the Anglo-Americans and the Russians have finished them off. The remaining ones have fled, disgusted by so much persecution.

An intensive maritime fishing industry usually associated with the Chumash was characteristic only of the Channel Islands and coast below Point Conception. High density of population in the Chumash area was coincident with the greatest degree of maritime subsistence orientation. It is apparent from Fr. Crespi's narrative of the Portolá Expedition (Bolton 1927: 175-87) that dependence on fishing made the difference between a relatively comfortable existence and a meager subsistence level. At the end of the Santa Barbara Channel and north of it along the coast, the number and size of villages decreased sharply. The people in these villages had no canoes and were very poor. Some fishing was done north of Point Conception, but judging from Spanish narratives the amount of fishing done was extremely little by comparison to the Santa Barbara Channel Chumash. Probably the fisheries of the north coast were less environmentally attractive to the Indians. The north coast is more exposed and windswept, and considerable parts of the coastline are rocky and very rugged. Aside from topography, absence of dependable runs of large schooling fish and the generally diminished fish resources of the north coast are important factors for explaining a
non-maritime subsistence orientation north of Point Conception.

Considerable stores of fish can be caught throughout the year, but there are seasonal variations in abundance of fish just as there are for other kinds of fauna. Summer and early fall are the months of plenty for fish along the Santa Barbara Channel. During these months the large schooling fish (Fig. 8) are at peak abundance and several of the year round bottom-dwelling species are also caught in greater abundance at this time. By December almost all of the larger fish have departed from these waters leaving the fisherman only bottom-dwelling species and small sardine-like schools of fish to exploit. Although the smaller schooling fish occur in huge numbers and are usually more abundant in winter, their presence in any one place is more unpredictable than the larger schooling fish. On the channel great stores of fish were accumulated by the Chumash from summer and fall runs of fish. Fishing continued during winter when weather permitted. Large schooling fish, typical of late summer and early fall catches, were, as staples, equivalent to the salmon runs of northern California fishing areas. Bottom-dwelling fish, occasional catches of bonito (either solitary or in small schools), and schools of sardines, mackerels, etc. were caught during winter, but the total amount of pounds of fish caught during the winter
probably dropped considerably in comparison to summer catches. From the historic records it appears that summer stores of fish were consumed by January and several villages were then without fresh supplies of fish, or had smaller and less dependable supplies of fish, being more dependent on other resources such as various kinds of pinoles, stores of acorns, and raw plants (Bolton 1916: 35; Bolton 1927: 266).

It is easy to see why fishing was the dominant subsistence orientation along the Santa Barbara Channel for a greater part of the year when one considers the pounds of potentially usable meat per fish (Appendix A) and quantity of fish that could be caught. Fish was probably the most efficient source of meat and protein in terms of the amount of usable meat obtained for time expended in its exploitation. Data are not adequate to determine conclusively if land mammals were of such minor importance to the Chumash as they were to maritime-oriented Northwest Coast groups (Forde 1956: 80). Almost certainly along the Santa Barbara Channel marine resources such as fish were used in preference to land mammals when they were abundant and when there were dependable runs of fish. However, the Chumash were apparently as omnivorous as most other southern California Indians, and therefore it seems reasonable to assume that utilization of land resources both plant and
animal were considerably more important to the Chumash than among Northwest Coast Indians.

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**TABLE 6**

**FISH REMAINS FROM CHUMASH SITES**

**Point Magu**

- Swordfish (*Xiphias gladius*)
- California Yellowtail (*Seriola dorsalis*)
- California Bonito (*Sarda lineolata*)
- California Barracuda (*Sphyraena argentea*)
- California Halibut (*Paralichthys californicus*)
- Sheep-head (*Pimelometopon pulchrum*)
- Rockfish, probably Bocaccio (*Sebastodes sp.*)
- Bonito Shark (*Isurus glaucus*)
- Great White Shark (*Carcharodon carcharias*)
- Eagle Stingray (*Holorhinus californicus*)

**Burton Mound** (Harrington 1928)

- Broadbill Swordfish (*Xiphias gladius*)
- Eagle Stingray (*Holorhinus californicus*)
- Large Shark

**SBa-60** (Rootenberg 1961, Curtis 1961)

- Broadbill Swordfish (*Xiphias gladius*)
- Fish vertebrae

**Alamo Creek** (Wire 1961)

- Shark
- Fish vertebrae

**Arroyo Grande area** (Wallace 1962)

- Sheep-head (*Pimelometopon pulchrum*)

---

*Shellfish. Mollusks, barnacles, crabs, lobster, and sea urchin have been identified from archaeological*
<table>
<thead>
<tr>
<th>Species</th>
<th>DJFMAMJJASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Striped Marlin</td>
<td></td>
</tr>
<tr>
<td>Swordfish</td>
<td></td>
</tr>
<tr>
<td>Dolphinfish</td>
<td></td>
</tr>
<tr>
<td>Yellowtail</td>
<td></td>
</tr>
<tr>
<td>Bonito</td>
<td></td>
</tr>
<tr>
<td>Skipjack</td>
<td></td>
</tr>
<tr>
<td>Yellowfin Tuna</td>
<td></td>
</tr>
<tr>
<td>Bluefin Tuna</td>
<td></td>
</tr>
<tr>
<td>Albacore</td>
<td></td>
</tr>
<tr>
<td>Barracuda</td>
<td></td>
</tr>
<tr>
<td>Horse Mackerel</td>
<td></td>
</tr>
<tr>
<td>Pacific Mackerel</td>
<td></td>
</tr>
<tr>
<td>Pacific Sardine</td>
<td></td>
</tr>
<tr>
<td>Pacific Herring</td>
<td></td>
</tr>
<tr>
<td>Northern Anchovy</td>
<td></td>
</tr>
<tr>
<td>Sablefish</td>
<td></td>
</tr>
<tr>
<td>Saury</td>
<td></td>
</tr>
</tbody>
</table>

Maximum abundance ■ ■ ■ ■ ■ , Sporadically present but not abundant ■ ■ ■ ■ ■ ,
Virtually absent except for a few stragglers ■ ■ ■ ■ ■.

Fig. 8. Annual Distribution of Selected Species of Fish in Chumash Region
sites. Of the mollusks, the most numerous recurring species in Chumash sites are the large bivalves of the California coast (Table 8). The number of large univalves is considerably fewer than bivalves; of those, the most frequently recurring species in shell middens is abalone. Quantitatively, the proportions of species will vary from one site to another depending on local environments. As a rule, however, the percentage of California sea-mussel is consistently high in Chumash and late Canalino sites. Particularly favorable areas for rich shellfish faunas are lagoons and sloughs. Other resources perhaps utilized by the Chumash but which would not be found archaeologically were sea anemones and sea cucumbers. Octopus are known to have been eaten by the Chumash (Harrington 1942: 8).

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**TABLE 7**

**SHELLFISH MOST FREQUENTLY FOUND IN CHUMASH SITES**

*Open Coast*

Abalone (*Haliotis oracherodii*, *H. rufescens*), California sea-mussel (*Mytilus californianus*), Pismo clam (*Tivela stultorum*)

*Enclosed Bays and Estuaries*

Spanish explorers mention almost nothing about the Chumash gathering shellfish, but from the large accumulation of shell found in archaeological sites we know that shellfish must have been an important item of food, although perhaps archaeologically over-represented in proportion to their total importance in aboriginal diet. Only Font and Crespi noted Chumash gathering shellfish. Fr. Font observed Indians in one of the villages around Goleta slough roasting some large crabs (Bolton 1930: 458), and Fr. Crespi saw Indians near Morro Bay gathering clams in the middle of May (Piette 1946: 373). The general lack of detailed observations on shellfish gathering may be due to the fact that this activity did not catch the eyes of the Spaniards as fishing with plank canoes did and was not considered worthy of mention. Another factor to consider is that most observations on Chumash villages were made during times of good fishing; and it may be that shellfish were relatively unimportant during good fishing seasons and used only as a reserve food as among the Northwest Coast Nootka and Kwakiutl (Forde 1956: 80). Speaking generally of the Santa Barbara Channel villages, Crespi mentions the following sea foods, all of which must have been seen frequently by the Spanish (Piette 1946: 236): "much sardines, many large clams, many large and good bonitos,
aguasgrandes [large needle-fish], lobsters, octopus, and many other fish."

Most mollusks can be gathered the year round, but gathering of some species, particularly those of the open coast, may have been seasonally affected by storms which annually scour sandy beaches along the Santa Barbara Channel down to cobbled pavement during winter months. Also, during the rainy season local silting may occur occasionally and alter the location of shellfish in enclosed bays and lagoons. In highly localized areas for short periods during mid-summer and fall months, mollusks of the open coast, especially mussels, become highly toxic due to high concentrations of a plankton, *Gonyaulax*, ingested by the shellfish. Consumption of infected shellfish can result in paralysis or death. Some California Indian groups were aware of the poison. For those who were, the signs were easy to spot because the plankton turns the ocean red and causes waves to luminesce at night. By analogy with more northernly California Indian groups, it is assumed that shellfish were exploited most intensively during summer and fall months (Greengough 1952).

Shellfish remains are most abundant in coastal middens where most often they form a major part of the deposit; however, utilization of shellfish was not

\[2\] This is probably a generic term.
## Table 8

**Shellfish Found in Archaeological Sites**

<table>
<thead>
<tr>
<th></th>
<th>Arrow Canyon</th>
<th>Deer Point (U.C.L.A.)</th>
<th>Morro Bay</th>
<th>S10-156</th>
<th>S10-157</th>
<th>S10-158</th>
<th>Anacapa Care</th>
<th>Van-61</th>
<th>Alamo Creek</th>
<th>S10-297</th>
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<tbody>
<tr>
<td><strong>Mollusks</strong></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bivalves</strong></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Native Oyster (Ostrea lurida)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Speckled scallop (Pecten circularis)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Rock scallop (Limpida ruggosus)</td>
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<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abalone jingle (Pectesomus macloschisma)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California sea-mussel (Mytilus californianus)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Bay mussel (Mytilus edulis)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Branch-ribbed mussel (Septifer bifurcatus)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Agate chama (Chama pelludata)</td>
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<td></td>
<td></td>
<td>X</td>
<td>X</td>
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<td></td>
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<td>Reversed chama (Pseudochama exotyla)</td>
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<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Spiny cockle (Trachycardium quadrugulatum)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Smoothflattened cockle (Laevicardium platum)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Basket cockle (Cleridarium nutallii)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Pistio clam (Tivela stultorum)</td>
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<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<td>Sea cockle (Ailantias calloma)</td>
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<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Washington clam (Saxidomus nutallii)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Chiome or Hard shell cockle (Chiome sp.)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Ribbed rock cockle (Protobolus staminea)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Folded rock cockle (P. Jacinta)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<td>Bent-nose clam (Magnum pacifica)</td>
<td>X</td>
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<td></td>
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<td>X</td>
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<td></td>
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<tr>
<td>Clipped scallop (Scolole deca)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Purple clam (Sanguinaria nutallii)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Jackknife clam (Tagelus californianus)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Bean clam (Donax Gouldi)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
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<tr>
<td>Northern razor clam (Siliqua patula)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>California nastra (Nastra californica)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Gaper (Galeothorax nuttalli)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Wart-necked piddock (Poladidea ovoldea)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td><strong>Univalves</strong></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black abalone (Halotis cracherodii)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Red abalone (Halotis rufescens)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Green abalone (Halotis fulgens)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Pink abalone (Halotis corrugata)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Abalone - species unidentified</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td><strong>Echinodermes</strong></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea urchin</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Arthropods**

- Barnacles (Balene sp.)
- Crab
- Lobster

**Echinodermes**

- Sea urchin
restricted to coastal sites. Marine products were used as food, although perhaps not as staples, well into interior regions. Sites with heavy concentration of shell are found 15-20 miles inland along the major river valleys. Many of the more interior villages or bands utilized sea resources too by making annual expeditions to coastal areas to trade (Woodward 1934: 119) and fish (Carlson 1959: 19-20).

Flora

We know from historical accounts of the Chumash that they must have utilized plant foods as extensively as other Southern Californian groups. Moreover, the great accumulations of grinding slabs and mullers and mortars and pestles found in sites are an archaeological reflection of this fact. Most Chumash ethnobotanical lore, however, is lost. Plants usually are not preserved archaeologically in this environment, and descriptions of plants used by the Chumash are rarely detailed enough to permit accurate identification to species.

Plant foods provide several nutrients that meat cannot give; for this reason vegetal foods were undoubtedly an important part of Chumash diet throughout the year. Seeds; bulbs, roots, and tubers; greens -- stems and leaves; fruits; and nuts were gathered by the Chumash. Acorns were a staple, equally important as fish. Seeds were
important too because they could be stored along with acorns and dried meat for lean winter months.

The kinds of acorns that the Chumash could have used are several. Every group of California Indians that ate acorns had preference as to which species of oak they used. Preferences were based on several factors: abundance of species, regularity of crop, crop yield, high oil content in nuts, and ease of processing acorns. Individual oak trees, regardless of species, usually produce at least 100 pounds of acorns (Table 9), but probably only a small proportion of every yield per tree was gathered before rains and insects spoiled the remainder (Wolf 1945). Baumhoff (1960: 23-25) summarized from the literature preferences of California Indians for various species of oak. The kinds of acorns used by each group were scored for order of favoritism using a three point scale of 1 for preferred species, 2 for commonly used species, and 3 for undesirable species. Ratings of each species by various groups were then totaled and the average rating of each species calculated. These data for species occurring in Chumash territory are presented in Table 10.

Thirteen "chews -- vegetable matter which had been chewed by the Indians for its juice and then expectorated" (Woodward 1932 ?a) were found at the Canterbury Cave Site. Burned acorns, manzanita ? seeds (Arctostaphylos sp.), and
TABLE 9
RELIABILITY OF ACORN CROPS AND YIELD PER TREE*
(Taken from Baumhoff 1960)

<table>
<thead>
<tr>
<th>Acorn Type</th>
<th>Reliability Description</th>
<th>Yield Per Tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanbark Oak (L. densiflora)</td>
<td>Partial crop every year, but size of crop varies.</td>
<td>125#</td>
</tr>
<tr>
<td>Blue Oak (Q. douglasii)</td>
<td>Fails frequently Good crop no often-er than one year out of three.</td>
<td>200-300#</td>
</tr>
<tr>
<td>Black Oak (Q. kelloggii)</td>
<td>Regular producer. One good crop every two years.</td>
<td>160#</td>
</tr>
<tr>
<td>Coast Live Oak (Q. agrifolia)</td>
<td>Acorns small. Crops variable. One good crop in two years or less.</td>
<td>100# or less</td>
</tr>
<tr>
<td>Valley Oak (Q. lobata)</td>
<td>One good crop one out 175# of three years, and a partial crop two out of three years.</td>
<td></td>
</tr>
<tr>
<td>Maul Oak (Q. chrysolepis)</td>
<td>Size of crop irregular. One good crop in three years.</td>
<td>150-200#</td>
</tr>
<tr>
<td>Interior Live Oak (Q. Wizlizenii)</td>
<td>One good crop in one out of two years.</td>
<td>100#</td>
</tr>
<tr>
<td>Scrub Oak (Q. dumosa)</td>
<td>No data.</td>
<td>---</td>
</tr>
</tbody>
</table>

TABLE 10
PREFERENCE OF ACORNS BY CALIFORNIA INDIANS*

<table>
<thead>
<tr>
<th>Oak Species</th>
<th>Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanbark Oak (Lithocarpus densiflora)</td>
<td>1.0</td>
</tr>
<tr>
<td>Blue Oak (Quercus Douglasii)</td>
<td>1.5</td>
</tr>
<tr>
<td>Black Oak (Quercus Kelloggii)</td>
<td>1.5</td>
</tr>
<tr>
<td>Valley Oak (Quercus lobata)</td>
<td>1.9</td>
</tr>
<tr>
<td>Coast Live Oak (Quercus agrifolia)</td>
<td>2.0</td>
</tr>
<tr>
<td>Maul Oak (Quercus chrysolepis)</td>
<td>2.2</td>
</tr>
<tr>
<td>Interior Live Oak (Quercus Wizlizenii)</td>
<td>2.3</td>
</tr>
<tr>
<td>Scrub Oak (Quercus dumosa)</td>
<td>2.5</td>
</tr>
</tbody>
</table>

*The Santa Barbara Channel Island Indians had little choice of oak species. Very few species of oak are found on the islands, and because many of them are indigenous to the islands, there is no way to evaluate the relative importance of each species in aboriginal subsistence.

Charred seeds of pigweed and chia (Salvia columbariae) were found in burials at Simomo (Woodward 1932b). Remains of chia were also recovered from sites in the Santa Barbara region dug by the Wheeler Expedition (Yarrow 1879). Red maid seeds (Calandrinia ciliata) were found with a Canalino burial on Santa Rosa Island (Fergusson and Libby 1962: 109). At Carpenteria Ford (Heizer 1960: 16) found acorns and "large quantities of a small, black seed."

From the narratives of the Spanish explorers (Appendix B) we know the Chumash ate acorns, walnuts,
pine-nuts, yucca (probably *Yucca Whipplei*), greens, root and tubers, fruits, and various kinds of seeds. Pages (Priestley 1937: 50) observed that at the beginning of the rainy season (October-November) the Chumash gathered "cresses, celery and amaranth" and ate "a kind of sweet flower similar to the wild rose although smaller." The mission interrogatorios mention no foods that were not included in earlier accounts or found archaeologically. They do, however, provide calendrical data describing when certain categories of plants important to the Chumash were in season. These data will be discussed in Chapter V.

Some information on plant foods can also be obtained from local histories and pioneer recollections. Dr. Cephas L. Bard, a local Anglo pioneer of the Ventura-Santa Barbara counties area, recalled near the turn of the century that "The pinon was largely used, and until now annual expeditions are made by the few surviving members of the coast tribes to the mountains for a supply" (James 1906: 64-65). In his history of the City of Santa Barbara Caballeria y Collel (1892: 18-19) says the following of Chumash plant foods:

*Yslay, one of their fruits, is a species of wild cherry, though it is more commonly known by the name of wild plum. This fruit possesses a large stock which the Indians removed, ground and made into balls which were, in turn, thoroughly cooked and eaten with uncommon gusto. A seed called **ohla** somewhat resembling the ordinary bird seed— and such berries as
"tollones" ([toyon] and "quata" were utilized by cooking them in large quantities. Their principal delicacies consisted of blackberries, prickly pears and wild onions, and, although no stimulant was known to them, they extracted a beverage with an exceedingly bitter taste from a certain seed, the name of which cannot be learned.

Juan Justo, a Barbareño informant of Yates in 1891, said both the pulp and seed of the wild cherry were eaten. Also, he said chia seeds were made into loaves and that acorns were used extensively (Heizer 1957: 37-38).

Soaproot (Chlorogalum pomeridianum) (Harrington 1942: 9) and the "root of an unknown reed" were eaten (Orr 1943: 58). Other plants listed by Orr (1943: 58) that were supposed to have been used by the Chumash are buckeye nuts, wild strawberries, laurel berries (Umbellularia californica), "a fruit about the size of a pear", and an olive-like fruit that was most likely either madrone or manzanita, ground nut or rush nut, mushrooms, cattail seeds, and "a seed, like yellow rice" which was abundant when it rained.

Seaweed was used as a food along the coast (Harrington 1943: 8). The kind of seaweed was probably Porphyra perforata, an annual that grows on rocks up to the limit of high tides. Porphyra is not very abundant during winter, when storms leave only a few colonies in sheltered places undisturbed, but in spring the plant
spreads quickly and by April rocks are covered with dense growths of the plant (Bonnot 1931: 43).

Several ethnobotanical sources for California Indians were checked for edible plants that occur in the Chumash region. Distribution of the plants was checked against Munz and Keck (1959), Smith (1952), and Van Rensselaer (1948). The following sources were examined: Chestnut (1902), Close (1960), Curtis (1959), DeLisle (1961), Kroeber (1908), Medsger (1939), Meighan, et. al. (1956), Murphey (1959), Powers (1874), Schenck and Gifford (1952), Sparkman (1908), Sweet (1962), and Yanovsky (1936). Data were collected according to species, part of plant used, and what time of year the part of the plant in question was used by an ethnographic group. If data were not available from ethnographic sources as to season, these sometimes could be filled in for certain classes of plant food such as fruits, for example, by floral natural histories. The number of plants occurring in the Chumash area are considerable; however, an exhaustive list of edible plants for any area compiled from ethnographic sources other than from the group being studied represents, in a sense, only a maximum potential. A comparative study (Schenck and Gifford 1952: 391-2) of plants used by California Indians shows that not all edible plants were used for food in all areas of California.
Data gathered on the time of year plants would be usable as food or were actually gathered by the Indians reflected some patterns in seasonality. Generally, some seeds were available in spring, but mainly they were obtained during summer and into autumn. Bulbs, roots, and tubers were gathered mostly in spring and into summer. Greens -- stems and leaves -- usually were picked when young, mostly in spring but also summer. Fruits were picked during summer and autumn, and a few species could be obtained even in winter. Most nuts were gathered in autumn, although the harvest of some pine-nuts (*Pinus monophylla*) began in late summer and continued into autumn. Most plants were dormant in winter, and during that time the Chumash turned to their stores of seeds and nuts supplemented by fresh sprouts and plants which were available during the rainy season.
CHAPTER V
SEASONALITY IN CHUMASH CULTURE

Most hunters and gatherers are dependent entirely upon undomesticated food sources, consequently their utilization of the landscape is subject to the abundance and distribution of natural resources. Seasonal variation in food supply plays a determining role in the kinds of settlement pattern, density of population, and size of settlements that are possible in any given area for hunters and gatherers. Understanding the nature of seasonality in Chumash culture, therefore, is important as a prerequisite for making inferences about their subsistence patterns.

Historical Evidence for Seasonality

Historical evidence for seasonality in Chumash culture comes from Spanish diaries, in which there were observations on: seasonal shifts in utilization of food resources and abandoned villages. In this chapter, besides discussing the evidence for seasonality, a reconstructed seasonal subsistence round is derived from archaeological data, historical records, and faunal and floral natural histories; subsistence patterns for sub-regions of the Chumash area are also summarized. In light of these
interpretations, the chapter is concluded by remarks on the traditional archaeological sequence of the Chumash region and suggested interpretations of certain parts of it in terms of seasonality.

Seasonal shifts in utilization of food resources.
The first hint in historical sources of seasonal variation in Chumash subsistence is found in Ferrell's account of Cabrillo's voyage of 1542. Cabrillo sailed into the Santa Barbara Channel in the first part of October, where he found both the islands and mainland "densely populated." Canoes met the ships with fish to barter, and at Pueblo de las Sardinas (exact location not known) on October 17, "the Indians brought for them many sardines, fresh and very good" (Bolton 1916: 27). By the 1st of November Cabrillo had sailed north of Point Conception, encountered strong winds and storms, returned to Pueblo de las Sardinas, and then sailed north again. While sailing northward for the second time "they could make no use of the Indians who came aboard with water and fish" (Bolton 1916: 30) along the Santa Barbara Channel. After having rounded Point Conception for the second time, Cabrillo sailed as far north as Drake's Bay and then returned south to winter in the Santa Barbara Channel.

Cabrillo's crew passed the winter on San Miguel Island from the last of November until the middle of January; during all this time there were heavy, violent
winds and rains. On the 19th of January, they weighed anchor to go to the mainland for wood and other supplies that were not on the islands, but heavy winds forced them to sail around the Channel Islands for eight days in search of shelter. On the 14th of February they weighed anchor to take on supplies at Pueblo de las Sardinas and found that "there were not so many Indians as at first, nor any fishing at all, because it is winter. The natives were eating acorns from the oaks, and another seed, and raw plants from the field" (Bolton 1916: 35). Cabrillo's ship then set sail northward in search of its consort ship and returned to the channel again in March. Even after their March return to the Santa Barbara Channel, they encountered high winds and heavy seas.

Without the existence of other narratives one could discount the shift in subsistence observed by Cabrillo as being due to an exceptionally bad year; however, 227 years later the Portolá Expedition noticed a similar winter shift in subsistence. Portolá's Expedition on its northward trek passed through the Santa Clara River Valley, Santa Barbara Channel, and the coast north of Point Conception in August and September and returned by the same route in December and January. Going north along the Santa Barbara Channel the Indians gave the Spaniards copious gifts of fish, particularly "bonitos" which according to
the accounts of Crespi and Costansó were in season and extremely abundant (Fig. 8). In fact, fish were in such great abundance and the natives so generous with their catch that Crespi (Bolton 1927: 162) wrote as follows of the Indians at Pueblo del Baylarín (August 16, 1769):

As soon as we arrived all the people came to visit us, and brought us a great supply of roasted fish to eat until the canoes should arrive with fresh ones. They soon landed on the beach, and in a little while afterwards they brought us an abundance of bonitos and perch, which they gave us in such quantities that we could have loaded the entire pack train if we had any means of preparing and salting them. They gave us also fish dried without salt, which they do not use in their food.

At Pueblo de la Laguna (August 18, 1769), shortly after the Spaniards arrived in the village, "the people came with a generous gift of fish, which they brought in seven very large loads ... In a little while the canoes that were out fishing came in, and immediately all the people, old and young, returned with a present of fresh fish, making about four loads of this alone" (Bolton 1927: 165). The villages of Mescalitán (Goleta slough) were well supplied with food, "especially with plenty of fish of all kinds; in fact they brought to the camp so much that it was necessary to tell them not to bring any more, for it would eventually have to spoil" (Crespi in Bolton 1927: 167-68). Generous gifts of fish and other foods were received along the rest of the channel too.
On the expedition's return in winter, gifts of fish were received only from villages along the western half of the Santa Barbara Channel. In these villages fresh fish was plentiful. The kinds of fish received probably were those described at Ranchería del Cojo (January 4, 1770): "a great deal of fish, fresh and dried, sardines and bonito" (Crespi in Bolton 1927: 264). However, farther on the expedition passed by Pueblo de la Laguna and Pueblo del Baylarín and halted at the villages of Mescaltitlá or Pueblos de las Islas and Pueblo de la Asumpta, all of which were without fish (Bolton 1927: 266):

All of these people, who, when we came, had plenty of fish and gave us a lot of it, are now without any, and we perceive they are hungry [January 11, 1770]

On their return, no specific mention was made of Santa Conefundís, a small temporary fishing village at Pitos Point between Pueblo del Baylarín and Pueblo de la Asumpta. If there were people in this village during January, no doubt they were without fish too. But Santa Conefundís may have been seasonally occupied only during summer and fall months to take advantage of the abundant supply of large, summer schooling fish such as bonito, for Fr. Font of the second Anza Expedition, which passed through this village on 24 February, 1776, found it unoccupied (Bolton 1931: 249).
The amount of fish given to the Portola Expedition in summer by the Indians may be somewhat over-representative of the abundance of fish, because it is obvious from the narratives that each village was trying to outdo the previous one in generosity towards the Spaniards. However, from what is known about the modern annual distribution of fish in the Santa Barbara Channel, it is reasonable to assume that the contrast between summer and winter supplies of fish observed by the Portola Expedition does reflect a seasonal pattern.

The narrative of Fr. Juan Vizcaíno, who sailed on the San Antonio, one of Portolá's supply ships, tends to support the hypothesis for a seasonal variation in the abundance of fish. Fr. Vizcaíno visited the southern California islands and the Santa Barbara Channel in the months of March and April. In neither place did he receive as large a quantity of fish from the Indians as that given to the land expedition in summer and early fall. He received on the islands only octopus and bottom-dwelling fish such as toadheads, sheep-head, and rock sculpin. No mention of large, schooling fish such as bonito was made. Fr. Vizcaíno never mentions receiving more than a few fish at any one anchorage. In fact, most of the gifts received by comparison to the amount of fish given to the land complement of the expedition in summer seem to be very
parsimonious. For example, Fr. Vizcaíno relates the following typical incident that occurred near the mainland along the Santa Barbara Channel, April 3, 1770 (Woodward 1959: 26):

There came two canoes of Indians, and they were pleasant. They spoke some words of our language and gave us some of the sardines which they used for bait, but these they gave one by one until they gave eight sardines and we gave them maize.

Also, the Indians visiting Vizcaíno, in contrast to the summer accounts of gifts to the Spaniards, gave him very little plant food. Fr. Vizcaíno mentions receiving onion-like roots (Allium sp. ?) from maritime Shoshoneans on March 21 and dried acorns from mainland Chumash along the Santa Barbara Channel on April 2. The stinginess of the Indians probably reflects a general scarcity of food in winter, but most particularly of fish. Thus, the land complement of the expedition received copious supplies of fish and other foods when they first went through the area during late summer and early fall, which would have been months of plenty (Fig. 8), but Portolá's troops returned in January in the midst of winter and found some of the villages without fish. That winter was generally not a time of plenty is also borne out by the description of a village of sixty inhabitants, slightly inland in the Thousand Oaks area, visited by the Portolá Expedition in January. They found the natives "very poor and thin"
These data correlate well with Cabrillo's much earlier account of winter conditions in the village of Pueblo de las Sardinas and Fr. Juan Vizcaíno's account of the sea expedition, which was in Chumash and maritime Shoshonean waters at the end of the winter rainy season during March and April, a few months after Portolá's expedition had passed south through the channel.

For most California Indians the rainy season was the leanest time of year when food sources were few and stored foods had to be consumed. We know from Longinos Martinez's journal that the Chumash stored "seeds, dried fish, sardines, and other things against the winter when the cold, rain, and roughness of the sea prevent foraging" (Simpson 1961: 52). From a collection of kinds of food mentioned in the Spanish narratives, listed according to months (Appendix C), we can be reasonably sure the Chumash, during the rainy season, were subsisting on dried acorns, pinole of different kinds of seeds and acorns, greens and roots, dried fish, bottom-dwelling fish, sardine-like schooling fish, some larger fish such as bonito which are not so nearly abundant in winter as in summer and fall, seals, and shellfish. Other sources of food not mentioned by the Spaniards but likely to have been utilized in winter were land mammals and waterfowl.
Abandoned villages. Both the Portolá and Anza expeditions passed through abandoned villages. They can be divided into two categories: villages that were seen occupied but later found abandoned, and villages found empty but not previously observed by the Spanish. Seasonal variation in community mobility explains most incidents of the first category (Appendix D); however, not all villages in the second category can be attributed to seasonal abandonment. Some of these villages undoubtedly were destroyed or voluntarily abandoned because of inter-village hostilities.

The Anza Expedition of 1775 passed through two abandoned villages between San Guido and San Luís Rey (Fig. 2) at the end of February. A small village not mentioned by previous expeditions was also found in this stretch. One of the abandoned villages was said to have been left by the Indians because of inter-village warfare; its inhabitants were supposed to have gone to "Ranchería Nueva / San Guido / because of war which their enemies made on them" (Bolton 1931: 262). Reasons for abandonment of the other village was not given. On August 18, 1769, the Portolá Expedition traveled through two ruined villages between the towns of Pueblo de la Carpentería and Pueblo de la Laguna (Fig. 2). The Indians said the first one was destroyed "three months ago / by / the Sierra Indians / who /
had come down to fight and had killed all the people" (Bolton 1927: 164). Although the other village was thought to have suffered the same fate, it appears from cross-checking the narratives of Crespi, Portolá (Smith and Teggart 1904: 27), and Costansó (Teggart 1911: 39) that similar causes for abandonment were inferred but not verified.

The incident reported by Portolá's expedition occurred in the middle of May. Reasons for attacking the village could have been numerous, but the time of year at which it happened suggests a partial explanation in terms of seasonal movements of inland bands down to the coast in spring and summer. Along much of the California coast, interior groups used to come down to the sea to trade with coastal groups and to fish. Pilling (1950: 438-40) discusses early records of annual visits by Yokuts to the coast near Monterey, slightly north of the Chumash area. They came over in May and kept caches of mortars and pestles at various points along the coast. According to some Indians who could recall such visits, many of the archaeological deposits of shell found on various points and headlands around Monterey Bay were made by visiting Yokuts, who came down to the coast to bathe and collect mussels and abalones.

There are records of southern valley Yokuts (Latta 1949: 67), Tɨbatulabul (Voegelin 1938: 52-53), and
interior Chumash making trips to Chumash coastal regions for fishing and trading. From inland areas the coast is easily accessible through several long river valleys. As an estimate, most interior areas were not more than a few days travel from the coast. According to the Tilbatulabul, a group northeast of the Chumash, it took two days to travel from Fort Tejon (Emigdiano Chumash) to Chumash villages near Ventura (Voegelin 1938: 51). Longinos Martinez (Simpson 1961: 54) mentions that the Chumash traded "frequently with mountain people, bringing fish and beadwork and exchanging them for seeds, tapalos of fox skin, and a kind of blanket made of the fibers of of a plant resembling cotton, preferring it to their own made of otter." Bands of Indians from Tulare country /southern San Joaquin Valley, e.g. Buena Vista Lake/ during the mission period would come over to the coast once a year in bands consisting of twenty to thirty females and males to trade pine-nuts, packages of honeydew, sweet carrizo cane, and tobacco for circular shell beads brought to the mainland from Santa Rosa Island (Woodward 1934: 119). Diego Villa, a pioneer of the Santa Maria Valley, recalled that before 1860 Indians from Tejon and other points would come down to the coast to fish and then raid on the way back (Carlson 1959: 19-20).

According to Pilling's account of Yokuts coastal visits at Monterey, contact with resident groups was often
violent because the Yokuts' presence was considered trespassing and precipitated feuds and bloodshed. In the light of these data, it is plausible to assume that a similar situation might have obtained in the incident reported by the Portolá Expedition.

Small villages in interior valleys sometimes had to be abandoned because of failing water supplies with the onset of summer months (Font in Bolton 1931: 459-60), but along the Santa Barbara Channel rich land and marine resources permitted the Chumash to maintain large, permanent villages located near dependable sources of water such as estuaries or perennial streams. Subsistence ranges for groups along the Santa Barbara Channel, and perhaps a short distance inland in coastal valleys, probably were smaller in area because of richer resources; thus, changes in degree of community mobility would not involve long migrations or extensive periods of nomadism.

Main coastal villages seldom had to be abandoned because of failing resources; however, inhabitants of larger coastal villages probably were less sedentary during spring and summer months in order to harvest wild crops. During these seasons temporary outlier camps were set up near hunting and gathering grounds. Small camps and villages were established along the coast either by groups from the interior who made visits to the seashore or by
inhabitants of larger coastal villages who were living in subsidiary summer fishing camps. We have in the historic record examples of such seasonally occupied villages. The small fishing village of Santa Conefundis seems to have been seasonally occupied only during the summer fishing season. Crespi (Piette 1946: 238) on his second trip up the California coast observed a village named Ranchería Santíssima Cruz on May 4, 1770, near San Guido that "was not there previously." North of Point Conception, the Portolá Expedition observed two camps in summer and early fall that were not there later in winter. The first of these was Ranchería del Bayle de los Indios (Fig. 2), which was first visited on 31 August. It consisted of a group of Indians with no shelter camped near a lake in the sand dunes; upon returning in January, the Spanish found no one there. On September 1st, the day after they first visited Ranchería del Bayle de los Indios, the Portolá Expedition found two villages at Guadalupe Lake, which was farther along the coast north of Ranchería del Bayle de los Indios. One was composed of several houses, and the other was "small and miserable" (Pages in Priestley 1937: 38). There was apparently only one village there upon their return in winter, but later in spring Crespi definitely recorded only one village there. That spring along the coast north of Point Conception Crespi noted that people were out gathering seeds.
Another example of greater community mobility in springtime reported by Fr. Crespi is his account of the village of San Adriano near Morro Bay. At that place in September Crespi noted a temporary campsite of about sixty inhabitants, but in May at the same site he found no people and only three or four empty houses. Crespi surmised that "they must have been in the field collecting seeds" (Piette 1946: 371).

Four small villages found in the Thousand Oaks area by the second Anza Expedition in February were found abandoned in April. The Spanish attribute abandonment to failure of water supplies because of a dry winter; however, drying up of water supplies in spring may have been an annual phenomenon, and the shift in settlement could perhaps be partially interpreted as a seasonal movement down to the coast which is only a few miles away (Fig. 2). Many of the small canyon mouths have seasonal campsites, such as the one nearby at Deer Canyon (Wissler 1958), which could be archaeologically representative of such shifts.

The fishing season was at its height in late summer and early fall, and at that time there may have been a greater concentration of population in channel villages to take advantage of good fishing, perhaps to the exclusion of most other subsistence activities. By late fall the Chumash were harvesting acorns. If stands of oaks were not
near villages, harvesting of acorns required that some or most of the people in that village had to go a short distance away to oak groves. Menzies (1924), for example, in November stopped at a village next to Goleta slough, found only a few old decrepit Indians, and was told that the rest of the Indians were a short distance inland harvesting acorns.

Food stores were accumulated by winter, and, at least along the Santa Barbara Channel, people probably settled down for the winter in the larger villages. The level of food intake dropped somewhat during winter months, for it was the rainy season and time of year when food became scarce and people were hungry (Table 11). On the average there was no doubt less reliance on the sea and more dependence on winter stores and varied food sources. If winter stores ran out, provided winter fishing was not too good, dispersal of population for forage over a wider area would have been required to maintain a level of food intake comparable to "comfortable" winters. The degree of change in community mobility in the larger villages of the Santa Barbara Channel during any season was probably never so great as to cause complete abandonment of villages, although in the interior, settlements probably were much less stable with greater seasonal variations in community mobility. Permanent villages in favorable locations along
the coast were maintained the year round, and, in exceptionally mild winters with abundant fish supplies, there was probably very little or no decrease in village population levels. However, there probably was always a population pressure on food supply; that is, Chumash population rose to meet the efficient limits of their technology. Thus, most winters would be times of hunger or at least of reduced food intake.

In the absence of large schooling fish during summer harvest months, bands north of Point Conception may have made more use of ocean resources in winter during runs of near shore schooling fish such as sardines, smelts, etc. In December, for example, the Portolá Expedition found along the coast near Point Estero three villages of not more than sixty inhabitants each that had not been seen on the same route on the outward journey (Teggart 1910: 75).

There may have been some cyclicity in the occurrence of good winters. Today Southern California is subject to climatic cycles of abnormally heavy precipitation (Mikesell 1953: 38-42). Winters of exceptionally poor fishing may have been correlated with such periods, for Portolá's Expedition, which observed Chumash villages without fish in winter, noted flowing springs and running water in the barrancas along the Santa Barbara Channel in late summer. In contrast to this report, members of Anza's Expedition in 1775, five years later, noted no particular
hardships among the Chumash in winter and spring and said most of the arroyos were dry. To support the cyclic precipitation argument, Mikesell (1953: 41) also adds the fact that there are continuous records of summer drought following the establishment of Mission Santa Barbara in 1786. It is reasonable to assume that during winters of abnormally heavy precipitation the frequency of storms and gales would also increase. If this were so, the number of winter fishing days would be greatly reduced compared to those of a "normal" winter. Although the plank canoe was swift, it probably was not used in the Santa Barbara Channel during bad weather. Even though the Santa Barbara Channel is relatively calm compared to coastal regions north of Point Conception, waters in the channel can become very rough and choppy. This can be inferred from remarks made by Longinos Martinez (Simpson 1961: 53, 58-9) about the hunger suffered generally during winter by Indians of New California when the cold, rain, storms, and roughness of the sea prevented them from fishing. Winter stores were laid up as a backstop against poor fishing weather. Longinos Martinez probably observed in some Chumash villages what Cabrillo in 1542 noted in winter at the village of Pueblo de las Sardinas, for he wrote:

The gentiles living between San Diego and San Buenaventura store up against the winter the plants that bear the most seeds, many rancherias displaying great skill in it; but when the rains
are long and the cold is severe these natives also suffer from hunger, because their scanty supplies give out and their sources of food are cut off. Their necessities have obliged them to accustom themselves to consume everything that Nature offers: weeds, seeds, roots, etc.

We can be fairly certain from the Spanish narratives that most of the larger villages along the Santa Barbara Channel were continuously occupied throughout the year. Also, there is confirmatory archaeological evidence. Faunal remains from Point Magu shellmound, a representative large coastal site, indicate that the site was occupied the year round. Many of the fish species identified from the faunal remains are typically summer and early fall fish (Fig. 8; Table 6), while some species of bird represented (Table 5) are winter visitants. Remains of Northern fur seal (Table 3) show that Point Magu shellmound was definitely inhabited during winter months. Other mammals identified from the site could have been obtained at any time of year.

The smaller temporary campsites noted by both the Portola and Anza expeditions attest to at least one, and perhaps two, seasonal changes in population distribution:

1) Definitely a dispersal of population during late spring and summer harvest months to take advantage of wild crops.

2) Probably an overall increase of coastal populations from late spring through the
middle of summer or into early fall
created by an influx of interior groups
coming down to the shore to fish and gather
shellfish.

Canoe counts and seasonality. One class of data
in the Spanish chronicles that could be interpreted to
reflect a seasonal pattern in navigation and perhaps fishing, but certainly more equivocally than previous examples, are canoe counts. Crespi (Bolton 1927: 40) said the largest number of canoes he counted for a single village was fifteen. Anza (Bolton 1930: 104), however, said of the Santa Barbara Channel that "in each village they have fifteen or twenty canoes in use and in each one they were making not less than seven to ten new ones." The discrepancies in canoe counts between the Portolá and Anza expeditions, other than just over or under-estimates, may have been a function of the time of year the expeditions passed through the channel.

Portolá's expedition, of which Crespi was a member, came through the channel in late summer when fishing was good and counted fewer canoes than Anza. This expedition returned in winter and found several villages without fish, but made no mention of the number of canoes seen per village during their return. Anza on his first expedition to California in 1774 passed through the channel in the middle
of April. At that time he observed more canoes per village than did Crespi. This time of year, depending on the severity of the winter, would be either the very end of the stormy season or the beginning of spring and fairer weather. To be sure, the Chumash undoubtedly were fishing and making trips to the Channel Islands during winter when weather permitted, but winter probably was the time of canoe-building and repair before the big summer fishing season began. Late spring and summer were not only big fishing months (Fig. 8), but also they probably marked an increase in inter-island and mainland to island voyages. The reason for such an assumption is an incident related by Crespi. On 30 April, 1770, at the beginning of May, when he stopped at Pueblo de la Asumpta (Fig. 2; now Ventura) to obtain some fish and found the village almost empty except for four or six old men and a few women, all of whom were without fish, he was told by the Indians that the reason why they had no fish was "that all of the people were with canoes on the islands" (Piette 1946: 114).

The Seasonal Round

Calendrical data from interrogatorios (Table 9) give us some idea what the important subsistence activities were at different times of the year. These data, together with other historical evidence and information collated from natural histories of plants and animals of the region,
provide material for a tentative reconstruction of Chumash subsistence patterns.

The Chumash had a descriptive calendar in which the winter solstice was observed. Although data from interrogatories generally show four seasons corresponding to winter, spring, summer and autumn (Table 11), in terms of subsistence activity clusters, it is probably more realistic to look at the seasonal round as consisting of three seasons as Gayton (1946: 254-5) has done with the Southern Valley Yokuts: Winter (late November through February), a period of rains, productive lull in plant production, and sometimes hunger; Spring (March or slightly later through May), the appearance of new plants and blooming of flowers; and Summer (June through early November), the hot dry season in which seeds were gathered, culminated by the acorn harvest. However, in keeping with the data as given by the interrogatories, the Chumash seasonal round will be described with reference to the more traditional four seasons of the year.

There are some ceremonies centered around food which give us some idea what parts of the environment were important to the Chumash in subsistence. Every interrogatorio mentions offertory sticks or poles to which the Chumash attached bunches of feathers and made offerings of deer, fish, meal, seeds, beads, and feathers to a
guardian spirit, Chupu, for bountiful wild crops and good luck in fishing and hunting. Sometimes these shrines were stones painted with different colors (Priestley 1937: 33). Offertory poles were placed in cleared, high places; and on the coast when the Indians went out to fish, they were placed where they could be seen from the sea (Simpson 1961: 53). From the end of the mission period until the late nineteenth century some Ventureño Chumash had a first fruit ceremony of sorts at the winter solstice (Henley and Bizzell 1917). Each year the offertory pole from the previous year was burned and a new one for the next year erected at the winter solstice. Offerings were made and dances performed for two days around the pole. Visits were also made to the shrine during the acorn harvest, and offerings of whatever were harvested were offered and more dances performed. Along game trails the Chumash had roadside shrines of small sticks and feathers at which similar offerings were left for insuring a bounteous food supply.

Although we know that late summer and early fall runs of large migratory schooling fish such as bonito, tunas, albacore, etc. were important to the Chumash as staple foods, no ceremonies similar to the first salmon rites of Northwestern Californian groups are known for the Chumash. Absence of such kinds of ceremonies is not
necessarily negative evidence for a separate origin of the Southern Californian maritime complex, for the appearance of these schooling fish was probably more gradual and less spectacular than the ascent of salmon upstream. Furthermore, aside from a less auspicious appearance, first salmon rites were an important integrative device among most Northwestern Californian groups, and elaborate first salmon rites were dependent to a certain degree upon a Northwest-type culture, which was clearly absent in Southern California. The Chumash semi-maritime Climax probably is not historically related to the Northwest Coast, and later on in this thesis a partial environmental explanation for the local development of this complex will be presented.

Winter. Winter was the rainy season, and people were hungry because food was generally scarce. Although there was a drop in food intake during winter months, reliance on dried foods and winter fishing tided over coastal dwellers until spring and permitted the maintenance of permanent coastal communities. Winter for interior groups without access to ocean resources was a considerably more severe time of year. Village life during winter, by analogy with other California Indian groups, was probably more sedentary than in spring and summer months. When food stores ran low or winter fishing was erratic and
undependable, population pressures on the food supply would require coastal villagers to forage for fresh food sources and perhaps induce greater community mobility. It seems unlikely, however, that periods of winter hunger ever reached famine proportions.

**Spring.** After the end of the rainy season in April fresh growths of plants and sprouts of grass appeared. Bulbs, roots, and tubers were also obtainable in large numbers during the months of spring. From late spring through early fall, there was a dispersal of population and greater community mobility in order to harvest wild crops. Campsites were established near hunting and gathering grounds, and small temporary fishing villages, perhaps outliers of larger coastal villages, were to be found along the coast during the spring and summer months. These camps were established mostly out of convenience, although in some areas drying up of water supplies in late spring and summer may have necessitated the breaking up of larger groups. On the islands, seals and sea-lions would have been more easy to capture during spring and summer when these creatures were at their rookeries.

**Summer.** Summer would be the period of maximum abundance of food. Some bulbs, roots, and tubers could be obtained in summer, but seeds, which could be gathered from spring until autumn, predominated as the primary food
gathering activity during the hot, dry summer months. At the end of the summer and into early fall, there may have been a re-concentration of population at the large coastal villages during the peak of the fishing season for the large schooling fish such as bonito, tunas, yellowtail, and skipjack. Groups from the interior may have come down in spring and summer months to the seashore to fish and gather mollusks and probably established temporary campsites along the coast. Also, trading expeditions to the coast from the interior probably increased in frequency with the onset of fair weather in spring and summer.

Subsistence orientation on the coast north of Point Conception and in interior areas during summer months in the absence of large schooling fish was primarily land-oriented, with seed gathering figuring importantly as a subsistence activity. Of the two, hunting was more important than fishing in these areas, because land mammals generally were more abundant in spring and summer. Fishing north of Point Conception at any time of year probably played a very minor role in aboriginal subsistence relative to its importance in the Santa Barbara Channel area; however, in winter, fishing may have been relatively more important in this region because of availability of sardine, smelt, mackerel, and anchovy runs and reduced abundance of land game.
**Autumn.** In mountainous areas harvest of pine-nuts began in August but reached its peak in autumn. Acorns were harvested in the fall. In most areas of California, including the Tübatulabal area north of the Chumash (Voegelin 1938: 11), the acorn harvest followed the pine-nut harvest or in some instances they overlapped slightly. Acorn or pinyon gathering usually involved both sexes with the women and children gathering nuts and the men hunting small game and deer. Wild fruits could be gathered in summer, but the majority of them were obtained in fall and early winter. By the beginning of December after the end of the harvest season, the lean months of winter began and lasted until the end of the rainy season.

Along the coast, fishing reached a climax in late summer and early fall, but by December most of the large schooling fish that had formed the larger part of the catches during these months were gone or present in winter only in very small numbers. Nevertheless, fishing continued throughout the year with perhaps more dependence being placed on bottom-dwelling species and smaller schooling fish in winter months. At any rate, the potential amount of fish available for coastal populations diminished greatly in winter months, and, most certainly, the types of fish remaining did not provide the kind of staple found in larger summer schooling fish, which yielded considerably more pounds of meat per fish for effort expended.
Fowling was a year round activity. However, it was a more profitable venture in late fall and winter, particularly along the coast, where, with the arrival of visitant and transient species, there was an increase in the number of large-sized shore birds and flocks of waterfowl in estuaries and lagoons. With the departure of the large schooling fish, birds in coastal areas may have been an important protein supplement during winter.

Land mammals were hunted throughout the year. In the interior they probably were more important in the total diet than on the Santa Barbara Channel, although on the coast when fish were not plentiful they undoubtedly assumed considerable importance too. The islanders, because of an impoverished land fauna, relied almost exclusively on shellfish, fish, seals, and sea-lions for animal protein.

Subsistence Patterns of Chumash Sub-regions

Historic accounts of Chumash subsistence activities are geographically and chronologically detailed enough that together with inferences from archaeological data areal summaries indicating sub-regional variations in subsistence patterns can be made. Four sub-regions are defined herein: Channel Islands, Channel Mainland, Northern Coast, and Interior. The first category is self-explanatory, and the second needs little qualification except to say that this zone is coterminous with Aschmann's coastal zone below
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<td>December</td>
<td>&quot;When it rains they say the water falls.&quot;</td>
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<td>&quot;Rains and the cold weather&quot;</td>
<td>&quot;Harvest time and when people get hungry&quot;</td>
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<td>January</td>
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<td>&quot;Means to be hungry and food is scarce&quot;</td>
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<td>February</td>
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<td>&quot;Rains and the cold weather&quot;</td>
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<td>April</td>
<td>&quot;When there are flowers, they say that they have seeds.&quot;</td>
<td>&quot;First wild seeds&quot;</td>
<td>&quot;Fresh growth of plants and the sprouting of grass (Spring)&quot;</td>
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<td>August</td>
<td>&quot;Heat&quot;</td>
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<td>September</td>
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<td>October (Autumn?)</td>
<td>&quot;Acorns of the live oak and the oak which are in season in the fall&quot;</td>
<td>&quot;Harvest of acorns&quot;</td>
<td>&quot;Harvest time and when people get hungry&quot;</td>
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Point Conception (Fig. 9). The Northern Coast includes the coastline and adjacent areas to an approximate distance of 10 miles inland north of Point Conception. The remainder of the Chumash area is designated as the Interior.

**Channel Islands.** The flora and fauna of the Channel Islands consist of few species and are impoverished by comparison to that of the mainland. Thirty-two resident species of bird are found on the Channel Islands, slightly less than half the number of resident species found in the poorest mainland faunal district (Miller 1951) of Chumash territory. Only three species of land mammal are indigenous to the islands. Gray fox is found on San Miguel, Santa Rosa, and Santa Cruz islands. Spotted skunk occurs on Santa Rosa and Santa Cruz islands, and white-footed mouse is found on all channel islands and Santa Barbara Island (Grinnell 1923). The Indians also had the domestic dog. Archaeological remains of mule deer found on the islands were either traded from the mainland or were once indigenous to the islands but exterminated before the arrival of the Spanish (Dickey in Rogers 1929: 448). Island plant resources are also reduced in number of species compared to the mainland flora (Eastwood 1941). The Islander Chumash undoubtedly used available plant food as much as possible, but due to environmental limitations or population pressures on abundance of supply, vegetal foods
Coastal zone
Most populous, large permanent villages.

Alluvial valleys and included hills
More or less permanent villages populations between 150 and 400.

Interior uplands
Villages small and occupied only seasonally in summer and fall. Usually not more than 100 persons per village.

Mountains
No permanent residence but zone utilized for pine nut harvest.

Fig. 9. Ecologic zones

Climax areas
Culture climaxes of Southern California (Kroeber 1936)
probably were quantitatively of less importance in the total diet than on the mainland: "Pa-hi-la-toet stated that the Santa Rosa islanders did not eat seeds -- in fact they had none to eat -- but lived entirely on fish" (Henshaw in Heizer 1955: 154). The islanders' supply of plant foods was also supplemented by seeds and acorns obtained from the mainland (Davis 1961: 24), perhaps in exchange for handicrafts and seal meat from island rookeries.

The islands of San Miguel, Santa Rosa, and Santa Cruz were occupied permanently. Anacapa (Rogers 1929; McKusick 1959) and Santa Barbara Island (Swartz 1960: 9) probably were visited only periodically for quarrying stone, gathering shellfish, and hunting seals and sea-lions at rookeries:

Pico [á Chumash informant] says ... Anacapa and Santa Barbara Islands were inhabited only temporarily, if indeed they can be said to have been inhabited at all, as they contain no permanent water. It was usual for the islanders to make trips to them at night during calm weather for the purpose of gathering shells, pebbles, etc. (Henshaw in Heizer 1955: 151).

Sites on the larger islands (Rogers 1929; Orr 1951) are located near the mouths of arroyos or inland near sources of water. Sources of potable water on the larger islands are confined to a few good springs and trickles of water in arroyos. San Miguel Island, the most poorly watered of the three large islands, might have had considerably
different vegetation cover and water resources in aboriginal
times. Now the island is mostly a sandy waste, but Rogers
(1929: 265) says that within historic times there was
"considerable forest growth" of trees and shrubs on the
island and that there were still some people in the 1920's
who could "remember the lush vegetation that once covered
the surface of the island." Denudation of San Miguel
Island is attributed to overgrazing by sheep, which reduced
ground cover and lowered the water table.

Island subsistence was oriented primarily towards
fishing and mammal hunting. Compared to the mainland,
the standard of living was probably somewhat lower and the
balance between famine and plenty more precarious:

The Indians of these islands are very poor.
They are fishermen, and they eat nothing but
fish. They sleep on the ground. Their sole
business and employment is fishing ... They
live very swinishly, and go about naked
(Cabrillo in Bolton 1916: 34).

The only record of a famine among the Chumash comes from
correspondence of Fr. José Señán of Mission San Buenaventura
dated June 15, 1816. It occurred on Santa Rosa Island, and
from his description it appears that when meat supplies ran
low on the islands, there are few alternative food resources
to turn to:

Ignacio and certain others of our neophytes
returned yesterday from a trip to the Islands,
where they had gone to look for some gentiles who
wished to become converts. Our people brought
back 16 of them, and on their first trip last week
they brought 20. Among the crowd of yesterday there were four Russian Indians /Aleut sea-otter hunters left on the island by Russians/, or from Russian territory. They seem to have come willingly enough because of famine conditions on Guima Island and because they had been told that meat is plentiful at San Buenaventura (Simpson 1962: 86).

The Indians were removed en masse from the islands a few years later by Spanish authorities. One can question what their motives were for doing so, but the following information obtained by Taylor (1860-63: 9) on disputes over island fishing grounds seems reasonable in light of what we know about Chumash ownership rights and inter-village warfare and from what has been inferred so far about Channel Islands subsistence patterns:

An old American resident of Santa Barbara informs me that the Santa Barbara Islands were pretty thickly populated in the early part of this century prior to 1816. They had such bloody wars among themselves for the fishing grounds of each island, or each rancheria, that priests had them all brought over to the mainland...

Distribution of island sites cannot be explained in terms of a single factor, but it is interesting to note that although the west ends of San Miguel, Santa Rosa, and Santa Cruz islands are exposed to prevailing northwest winds and appear uninhabitable today, they were clearly areas of intensive occupation. Orr (1951: 221) thinks "This is doubtless due to the abundance of sea foods which even today is more plentiful on the west ends of San Nicholas, Santa Cruz, San Miguel and Santa Rosa Islands."
The more abundant sea food at the western ends of these islands is, in turn, most likely due to the heavy concentration of kelp beds found at these vicinities (Fig. 2; Kroeber 1925: 921-22; Rogers 1929: 263, 271, 275; Orr 1951: 222).

**Channel Mainland.** The area defined as Channel Mainland is a coastal strip in front of the first mountain range; where mountains or coastal valleys meet the sea, the zone is usually not more than 10 miles deep. All historical accounts agree that the Santa Barbara Channel was the most populous coastal area south of San Francisco Bay. Large, permanent villages were found spaced relatively close together, generally 8 to 10 miles apart from each other. Their location was determined by several factors, of which one of the most important was availability of water. Villages on the Santa Barbara coastal shelf, which extends westward from Rincon Point, were generally situated on headlands next to mouths of streams, many of which formed estuaries. Usually these villages were on the bluffs that form a greater part of the Santa Barbara coastline and afford an excellent view. Some villages, and quite often more than one village, were to be found around lagoons and sloughs such as at Magu Lagoon and Goleta slough. Remains of smaller campsites are found at the mouths of many of the canyons emptying into the sea along the channel and farther inland along stream courses.
An unusually rich ocean fauna made the maintenance of large coastal villages possible along the Santa Barbara Channel. Several species of large schooling fish come into the channel between late spring and late fall, but even without these the number of resident species is quite large. The fishing season in the Santa Barbara Channel was at its height during late summer and early fall at the peak of the influx of migrant schooling species. Kelp beds near shore support a rich marine fauna the year round. It is interesting to note that the greatest concentration of kelp beds along the California coast occurs along the Santa Barbara Channel. This fact, in part, accounts for the unusual richness of the fishing in the channel. On the islands, where the inhabitants were almost exclusively dependent on sea resources for meat, there is a striking coincidence between areas of intensive occupation and densest kelp beds. Estuaries, lagoons, and sloughs on the mainland offered excellent fowling grounds, and the land fauna certainly was as rich as other parts of Chumash country.

Archaeological remains (Tables 3, 5, 6 and 8) show that coastal villages utilized the complete environmental range of meat sources: fish, shellfish, seals, sea-lions, sea-otters, whale, coyote or dog, fox, badger, skunk, bobcat, mountain lion, deer, rabbits, rodents, and birds. Probably the most important focus of subsistence activity
was on ocean resources with land resources forming a supplement or backstop in times of poor fishing. The bias of the archaeological record, however, obscures a very important part of Chumash subsistence, that is, plant gathering which undoubtedly was equal in importance to fishing.

**Northern Coast.** The Northern Coast has land resources similar to those of the Santa Barbara Channel, but it lacks the rich fish resources of the channel and would not be environmentally permissive to the establishment and maintenance of large, permanent, maritime-oriented villages. Indeed, the historical sources mention no large coastal villages and describe only a few small villages north of Point Conception; moreover, the standard of living dropped sharply in the Chumash region where ocean fishing was not of importance. This, in turn, is correlated with a drastic drop in overall population. In summer, for example, members of the Portola Expedition estimated that the total population of the coastal region north of Point Conception was barely greater than 700 souls, slightly less than one-seventh of the estimated total population of the Santa Barbara Channel. (Cook 1943: 189).

Most sites near the coast are located next to banks of creeks, or if slightly inland and away from river terraces, next to springs (Schumacher 1875: 336; Wallace 1962). Much
of the northern coastline is exposed, windswept, and fronted by large sand dunes on which are found remains of several temporary campsites (Schumacher in Heizer 1960: 20). Faunal remains from these campsites, which are between Port San Luis and Point Sal, consist mostly of shellfish with only a very limited number of bones of fish and land mammals; however, Schumacher believes that at Point Sal there may have been a permanent village where there are remains of several kinds of shellfish and bones of many land and sea animals. Some villages with evidence of permanent dwellings are found a few miles in back of the dune area (Schumacher 1875: 336). Carter (1941) did work at Point Sal, but it is difficult to draw any conclusions about subsistence from his data because it does not deal with faunal remains. Similarly, Pilling's work along the Pecho Coast, the coastline between San Luis Obispo Bay and Estero Bay (1951), offers little information on subsistence, but the Los Angeles County Museum excavated the Railroad Point site at Avila Beach, probably Schumacher's "Fossil Point" site (1875), and identified some of the faunal remains. Remains of fish, shark, crab, several kinds of mollusks, sea-otter, California sea-lion, porpoise, badger, coyote, deer, domestic dog, Farallon cormorant, and California condor were found (Tables 3, 5, 6 and 8). By far the greatest number of bones identified were those of deer.
At Whale Rock Reservoir near Cayucos at the edge Chumash territory, Reinman (1961) excavated three sites in which faunal remains were extremely scarce (Tables 3, 6 and 8). Deer was found in all sites, Guadalupe fur seal and sea-otter were identified at one site, shellfish were found in all sites, and fishbone was almost totally absent. He infers that vegetal foods were important by the presence of mortars and pestles, and Crespi's account of extensive seed gathering being done in this area in springtime corroborates this assumption (Plette 1946). Although there is some mention of fishing activities along the Northern Coast (Plette 1946), fishing is nowhere important as it was along the Santa Barbara Channel. Probably it was more efficient to utilize land mammals and shellfish rather than depend heavily on fish as a source of animal protein.

**Interior.** Interior Chumash regions were sparsely populated if Aschmann's generalizations about the relative density of settlement in ecologic zones of Southern California are applicable to the Chumash area (Fig. 9). Moreover, if this were so, seasonal community mobility in these regions was probably greater than along the Santa Barbara Channel. Thus far, we have seen that Aschmann's generalizations about the coastal zone are valid with the exception of the Northern Coast, where there is a marked decrease in demographic density due to poorer ocean
resources north of Point Conception. The population density of the Northern Coast, discussed in the next chapter, probably can be projected with a fair degree of accuracy to interior regions away from the coastal zone. Archaeological evidence tends to support the hypothesis that the distribution of population in interior regions decreases with ecologic zones of increasingly higher elevations.

Except for occasional trips to the coast it is doubtful that ocean resources played much of a role in the subsistence of interior groups; however, archaeological remains in this respect may be misleading. Remains of fish and shellfish have been found in sites as far inland as thirty-five miles, but considerably more meat, dried and without bone, was probably transported inland too. Land mammals represented in interior sites are deer, coyote (?), rabbits, California ground squirrel, pocket gopher, wood rat, and possibly bear, elk, and mountain sheep. No remains of birds have been identified.

Strong (1935) excavated three village sites in the Cuyama Valley and two in the Upper Sisquoc region. Some house floors, which might have been winter villages, were found in both areas. Also, "several irregular summer shelters with juniper posts showing on the surface" were found in the Cuyama Valley, and in the Upper Sisquoc region in the vicinity of Hurricane Deck several caves and small
rock and plank lined cists were found which contained coiled basketry, twined water bottles, tule matting and a few other artifacts. Artifact-wise, interior sites excavated by Strong were found to be poverty stricken compared to those of the coast:

In general, our reconnaissance of the eastern Chumash country revealed a considerable number of sites but a great paucity of artifacts. It would appear that the people of this area were peripheral to the main Chumash centers on the coast and in the main possessed a simple culture like that of the valley Yokuts.

Smith (1961: 167) reached much the same conclusion about the population of the Vaqueros Dam vicinity; that is, the area was characterized by low population density with probable seasonal fluctuation in total population. The watershed of the Vaqueros Dam was surveyed (Smith 1961), and two sites within it were excavated, Alamo Creek Site (Wire 1961) and SLO-297 (Smith and Le Fave 1961), both on Alamo Creek about a mile from each other. In interior regions, as elsewhere in the Chumash area, nearby dependable sources of water were a prime consideration for location of sites. Sites in the Vaqueros Dam vicinity are located on hilltops and edges of stream terraces.

The depth of deposit and extent of cultural remains in Alamo Creek Site and SLO-297 do not indicate intensive occupation. Smith and Le Fave (1961: 154), for example, believe that because of the exposed position of SLO-297
and its apparent occasional inundation, the site was intermittently occupied. SLO-297 was probably either an ancillary camp of one of the more permanent villages in the vicinity or perhaps simply a subsidiary camp of the nearby Alamo Creek Site. Wire (1961: 118) believes that Alamo Creek Site was occupied during late summer and early winter months. She assumes that it was either a seasonal camp or a stopping-over-place between two permanent villages nearby, one on Alamo Creek (Walekhe, Schumacher 1875) and the other on Santa Maria River. Alamo Creek is on the trade route to the coast known to have been used by Valley Yokuts (Latta 1949: 67). The presence of obsidian flakes in the Alamo Creek Site gives evidence of eastward contacts. In fact, the similarity of many cultural items with those of Buena Vista Lake (Wedel 1941) suggests that this site could have been inhabited also by Valley Yokuts as a stop-over on the way to or back from the coast.

Seasonality and Archaeological Interpretation

Thomsen (1939) studied the subsistence round and the influence of the seasonal factor on the material culture of a group of Northern Australian aborigines from an archaeological point of view. Of his studies, he (Thomsen 1939: 209) said:

In the interpretation of the evidence provided by archaeological investigation it is important to realize its limitations, and to appreciate the complexity of the factors involved ... It will be
apparent to an onlooker, seeing these people \( \text{the aborigines} \) at different seasons of the year, would find them engaged in occupations so diverse, and with weapons and utensils differing so much in character, that if he were unaware of the seasonal influence on food supply, and consequently upon occupation, he would be led to conclude that they were different groups.

Even though the Chumash lived in large, permanent villages along the Santa Barbara Coast and were fairly sedentary, it should be apparent in light of the data presented in this chapter that the seasonal factor was still operative in their culture. It is suggested here that in most archaeology done in the Santa Barbara region the seasonal factor has not been considered seriously enough in dating artifact assemblages and in interpretations of the local, now traditional, archaeological sequence defined by Rogers (1929). Before Rogers' sequence is examined, the problem of dating artifact assemblages must be discussed as a prerequisite.

Ideally artifact assemblages should be dated without reference to cultural criteria, but, as is so often the case, in many regions this is not possible. California archaeological sequences demonstrate unusual conservatism in artifact forms, so much so that crudity of form is by no means a reliable criterion of great antiquity. As Meighan (1959a) illustrates for the California Archaic, there are very few devices of great complexity in Californian
technology, but the Archaic in California was characterized through time by increasingly specialized adaptation to local environments by means of a highly adaptable, but simple, technology rather than technological elaboration of subsistence implements. In regions of high population density and relatively sedentary populations where a greater degree of craft specialization was possible, such as Central California and the Santa Barbara Channel, the archaeological sequence is characterized by increasing elaboration of detail and fineness of manufacture in artifact forms through time. In these areas it is sometimes possible to relatively date a site by the presence of unmistakably late forms, but dating a site by the absence of such forms is clearly a less reliable procedure. Nevertheless, without due consideration of the importance of the seasonal factor in determining the content of artifact assemblages, this is essentially what has been done in several instances in the archaeology of the Santa Barbara region.

Workers in the past or even today for that matter cannot be blamed entirely for this oversight. California archaeology has no sensitive cultural time markers such as pottery, and it has been only recently that radiocarbon dates have been obtained from sites in this region. In attempting to arrive at chronology, workers in the field
have perhaps been too quick to overlook the variety of artifact assemblages or "archaeological cultures" that might have been present at any one time in the past if seasonality was important in the subsistence round of the Indians. Certainly Pilling's researches on Yokut visits to the coast suggest also for the Chumash area that some of the archaeological assemblages found on the coast actually may be representative of non-indigenous groups. A corollary of this would be that it is reasonable to assume that the material culture, or the content of the assemblages, of groups visiting the coast might be at considerable variance with that of the resident groups because of cultural differences, and a selection for easily transportable items which probably would be involved because of the great distances that had to be traveled to reach the coast. Moreover, it is also reasonable to infer that artifact assemblages at any given time in the past varied regionally and seasonally with the kinds of food sources being utilized. Thus it might be expected that seasonal camps would not have the full range of the typical artifacts for a horizon, nor should it be expected that heavy artifacts such as mortars and pestles were invariably present. Also, certain segments of material culture environmentally linked such as fishing apparatus need not necessarily occur in inland sites and so on.
The traditional archaeological sequence used in the Chumash area was defined by Rogers (1929). His tripartite classification of Oak Grove, Hunting People, and Canaliño was seen to represent three sub-racially and culturally distinct peoples who successively replaced or displaced each other. Rogers' evidence for racially distinct populations is not convincing, and his evidence for Hunting People, the middle period, is somewhat vague; nevertheless, most workers continue to use either his sequence or slight modifications of it. Since Rogers' time, however, the culture history of the region has been re-interpreted as a gradual adaptation to use of maritime resources from a Great Basin Desert Culture-type base (Neighan 1959b: 54), of which Oak Grove is the Santa Barbara area representative.

Oak Grove sites are found on crests of high, rounded hills, adjacent to mountains, and usually some distance away from the sea. A few Oak Grove sites are found near the sea but never on low ground. Milling stones and millers, several of which are usually found in Oak Grove sites, attest to considerable plant or seed gathering activities. Bones of large game animals are absent according to Rogers (1929: 353), and fish bones are equally rare. Remains of mollusks and sea urchins, however, are found in some Oak Grove sites.
Sites of the Hunting People are found on coastal headlands and on hillocks bordering sloughs. Unlike Oak Grove sites, Hunting People sites contain numerous projectile points. This in turn is connected with the presence of considerable quantities of animal bone, particularly those of land mammals. Forms represented are deer, elk, mountain lion, black bear, grizzly bear, and smaller animals. A fair proportion of sea mammal bones, mainly those of seal, are present. Fish remains are few, but there are considerable quantities of shellfish. No traces of Hunting People dwellings were found by Rogers, and according to him the only type of mortar they had was the basket hopper-type. A number of small to medium-sized bowls are found in Hunting People sites. The soil of Hunting People sites lacks the greasy texture so characteristic of later Canaliño sites, also materials recovered from Hunting People sites, as distinct from later Canaliño sites, are supposed to be in an advanced stage of disintegration and show signs of calcareous films leached from layers above. There are few but large Hunting People sites in comparison to the groups which came before and after them. Hunting People sites do not reach great depths such as the later Canaliño sites do.

The distribution of and the content within Santa Barbara Coast Canaliño-proto-historic Chumash sites has been previously summarized in this thesis.
Rogers' "cultures" are defined on the basis of hypothecated significant shifts in subsistence through time, with these important changes mirrored in mutually exclusive settlement patterns, for the most part, and correspondingly distinctive site content for each culture. Oak Grove and Canaliño sites have been demonstrated stratigraphically to be valid entities, but evidence for the Hunting People is ambiguous. Although several sites are shown by Rogers (1929) to contain all three cultures, which in themselves are seeming contradictions of his archaeological definitions of these cultures, the data are so poorly presented by modern standards that this writer is inclined to question the validity of Hunting People as a distinct culture. Also one of his criteria for the greater antiquity of Hunting People sites, calcareous films on artifacts leached from overlying deposits which contain shell, is not necessarily an indicator of great age. Artifacts from historic sites in the area sometimes will have such calcareous films if there is a large enough amount of shell in the deposit and certain soil conditions are present. Moreover, the more recent interpretation of increasing use of maritime resources through time developing out of a Desert Culture-like base would allow for similar shifts in subsistence emphases, as Rogers claims to have observed in the form of three separate cultures, without
introducing a hypothesized intrusive culture of nomadic hunters. If one assumes that hunting activities were important throughout the archaeological sequence, and perhaps more important seasonally at any given point in time, without recourse to radiocarbon dating for chronological ordering, quite a different interpretation of Hunting People sites is possible. Since most archaeology done in the Santa Barbara region was before the advent of radiocarbon dating, it is quite likely that many, but perhaps not all, Hunting People sites are seasonal manifestations of Oak Grove-like or Canaliño-like archaeological cultures at various points in time.

Unfortunately, this writer cannot offer any alternatives to placing or interpreting sites chronologically according to artifact similarities and dissimilarities when dating by non-cultural indicators is not possible, other than working with local "complexes" in isolation rather than building regional chronologies, as some California archaeologists have done in the past. But in the future with radiocarbon dating providing a more reliable basis for chronology, archaeologists working in the Chumash area should reconsider the data of their sites and their areal chronologies in terms of seasonality and not take pre-radiocarbon dating chronologies as one of their unquestioned givens, nor make the assumption of too much cultural uniformity at any given time in the past.
CHAPTER VI
NUTRITION, POPULATION AND
SOCIO-CULTURAL COMPLEXITY

Population. Kroeber (1939: 137) estimates the total aboriginal population of the Chumash to have been 10,000. Cook (1943: 188-90) re-evaluated Kroeber's data and arrived at an estimate of between 8,000 and 10,000. His estimate of mainland population is derived mainly from estimates made by members of Portolá’s expedition, but that of the islands is extrapolated from baptismal records. Members of Portolá's expedition estimated that between 5,200 and 5,800 people inhabited the region extending from the mouth of the Santa Clara River to Point Conception. North of Point Conception to San Luis Obispo their estimates of the total population range between 720 and 780 persons. Cook estimates an island population of at least 1,000 people. Elaborating on figures from estimates made by members of the Portolá Expedition, Cook allows 3,000 for the unobserved interior and another 1,000 for the northwestern section, thus bringing the total population to 10,000. However, assuming that estimates from the Portola Expedition were slightly exaggerated, he scales down his estimate of the total population to 8,000.
There was an overall population density of approximately 1.3 persons per square mile, but, as Cook points out, gross area estimates are of little value as indicators of population distribution because of clustering by the Indians in preferred or favorable habitats. The greatest concentration of people was along the coastal strip of the Santa Barbara Channel, roughly coterminous with the ecologic coastal zone defined by Aschmann (Fig. 9). Here the population density is estimated to have been 4.0 persons per square mile. Inland territory, farther than 10 miles from the coast and including the coastal region from Point Conception to San Luis Obispo, was estimated to have a much smaller population with a density of 0.7 persons per square mile.

Mean village population along the Santa Barbara Channel is estimated at 450 persons per village; other areas had a mean village population of 75 persons. Some coastal villages along the Santa Barbara Channel reached populations of 1000 or more, but most of them were far below that size (Font in Bolton 1931: 257):

...for although it is true that there are villages which may exceed a thousand persons, most of them, I judged, contain less than a thousand, and there are some small ones which I think do not reach five hundred souls.

Cook estimates that the average number of persons per house along the Santa Barbara Channel and coast north of
Point Conception was nearly eight; however, in interior valleys the average number of persons per house was somewhat less. In 1798, Fr. Tápis estimated that the population was slightly more than 1000 persons in an area varying from 6.5 to 31.5 miles from Calahuasa (Fig. 2), later the site of Mission Santa Inés. This calculation was made on the basis of four persons per house, the number of persons Fr. Tápis claims to have counted for each dwelling (Engelhardt 1932: 4).

Nutrition, Population, and Culture Climax. For the Chumash area the region of richest food supply, the Santa Barbara Channel, had the greatest population density and was the locus of the southern California Climax. In fact, the Climax area is again coterminous with the coastal ecologic zone (Fig. 9). Efficient utilization of ocean resources was clearly the determining factor in growth of large coastal and island populations. Efficiency, as it is used here, is the same concept as the one used by Close (1960: 27) in discussing the Chumash:

The concept of cultural efficiency assumes that a people living in a constant environment over a period of time will develop the best way of living within that environment. In short, efficiency is a measure of cultural adjustment to environment. ...However, no situation is ideally static, and the increasing technological range of a culture, influences from other peoples, and even changes in environment affect the degree of adjustment possible. Thus, as new techniques are introduced, the range of environment available for exploitation increases.
Although the whole range of food getting is rendered more efficient by the addition of fishing to a hunting and gathering economy, the technique itself when introduced may not necessarily be very effective compared to its potential.

Technologically, the Santa Barbara Channel Chumash differed very little from their neighbors except for a maritime fishing complex, which was also shared with maritime Shoshoneans. Even though the Chumash had large populations, it is doubtful that they had exploited their environment to maximum efficiency. Like other human groups they were selective in use of their environment; moreover, a rich environment, which afforded smaller subsistence ranges, probably was a partial social block to higher levels of socio-cultural integration and more efficient use of the environment by reinforcing intense definition and maintenance of territoriality among the Chumash. Also, it is almost certain that social and technological innovations could have been made among the Chumash at the hunting and gathering level of energy utilization that would have allowed greater population growth. Nevertheless, Close (1960: 29) points out, that although maritime fishing may not have been particularly efficient, the important thing for population growth was that the range of economy had been broadened to include more food resources. Thus, there could be population growth within the same area due to increase in the food supply.
An increase in quality as well as quantity of food supply was probably involved as an important factor in population growth too. Nutritionally, the qualitative change was the widening of the range of protein source and, to a certain extent, stabilizing the dependability of high protein intake. This, in turn, probably correlates with the expansion of Chumash population and development of large, permanent coastal villages. Linton (1940) proposed a significant correlation between high level of protein intake, large populations, and the development of New World agricultural civilizations which, with few modifications, could be applied here to partially explain the Chumash Climax. There are four essential points to Linton's thesis:

1) The number of persons that can be fed from a certain area depends on the quality of the diet, i.e. balanced rations, rather than a surplus of any one element of the food supply.

2) Although human beings can live on starchless diets, proteins and fats are required for survival. Thus, a protein deficiency imposes limitations on population growth.

3) The local domestication or introduction of protein yielding plant, such as beans, would remove the limitation for population growth in an agricultural community and thereby set a new ceiling for size of population.

4) With population growth resulting from the introduction of a new protein source, "the size of local aggregates could be greatly increased and the stage set for rapid cultural advance."
Speaking generally of hunters and gatherers, Linton goes on to say that to exploit wild foods successfully, small and widely spaced communities would be required and the potential for greater social complexity greatly reduced. Moreover, the supply of wild proteins would place a definite limit beyond which hunting and gathering societies could not increase without encountering serious dietary deficiencies.

Excluding from consideration societies in marginal environments that subsist almost entirely on meat, e.g. Eskimos, large populations equal to or approaching those of incipient agriculturists could be maintained where there were areas of adequate wild plant food and rich wild protein sources, such as the Santa Barbara Channel region. In fact, Cook (1947) believes wild foods in the form of game animals and fish may have formed a considerable part of the diet as a protein source and as a potential for population growth in Central Mexico, an area ecologically similar to California, at the period of transition from hunting and gathering to agriculture. At this level of subsistence, it can also be argued that animal protein is more efficient than plant protein as a potential for population growth, that is, of course, not considering the important factors of predictability and size of food supply. Cook (1947: 46) discusses the distinction between
the two kinds of protein and their importance for population growth in connection with a criticism of Linton's thesis:

...he [Linton] fails to differentiate between animal protein of high biological value and vegetable protein of low biological value. As to pure quantity, 500 grams each of corn and beans can easily supply 100 grams of protein, a great sufficiency were it not for the high energy cost of utilization and the lack of essential amino acids. On the other hand a relatively small amount of animal protein can so supplement the vegetable as to render the diet quite suitable for maintenance and even growth.

The Chumash by modern standards probably had a fairly well balanced diet, although intake of certain nutrients such as carbohydrates, etc. might have been marked by seasonal peaks in annual consumption rather than a steady level of intake of each nutrient throughout the year. Chumash population centers correlate with areas of greatest animal protein potential, which for the Santa Barbara Channel area was abundant fish resources. Fish is high in both protein and fat, and, on the whole, fish show little inter-specific or seasonal variation in food value (Driver 1961: 63). Acorns, the other staple of the Chumash, provided a source of carbohydrates, a nutritional element almost entirely lacking in fish; moreover, acorns are somewhat high in fat too. Fish and acorns are complementary staples, though if fish were not too plentiful, land game could be exploited as an alternate or subsidiary
protein source. If acorns failed as a harvest crop, carbohydrates could be obtained by falling back on a variety of plant foods such as several kinds of seeds which were a standard part of Chumash diet. In terms of Chumash technological competence and just considering pounds of meat per animal, large schooling fish such as bonito were probably the most efficient protein source. These fish occur in large schools, and several of them could have been taken with comparatively little effort. Ten average-sized bonitos, for instance, would be equivalent in weight to one deer (Appendix A).

It is clear that areas along the Pacific Coast of North America that were aboriginal population centers had abundant protein sources in the form of either riverine salmon or ocean fish. These population centers, which had a more sedentary mode of existence, are in turn coincident for the most part with Kroeber's culture climax areas for the Pacific Coast (Kroeber 1939). One exception to the correlation between high fish protein potential and culture climax is the Southern California climax of the land-oriented Juaneno and Luiseno. However, the traits which Kroeber uses to define that area as a regional cultural climax are by tradition supposed to have come from Santa Catalina as part of the Chumiohnish Cult.

Community Mobility. Community patterning or mobility varied regionally in the Chumash area according
to differing environmental potentials for subsistence. All Chumash groups were at least Central-Based Wanderers according to the 1955 Seminars in Archaeology typology of community patterning (Meggers 1956: 138): "A community that spends part of each year wandering and the rest at a settlement or 'central base,' to which it may or may not consistently return in subsequent years." This, in turn, is substantially the same definition given for semi-sedentary communities in Murdock's settlement pattern classification (1962: 268): "...members shift from one to another fixed settlement at different seasons or ... occupy more or less permanently a single settlement from which, however, a substantial proportion of the population departs seasonally to occupy shifting camps..." It is difficult to neatly fit the Chumash into any one type defined by the 1955 Seminar. The Santa Barbara Channel Chumash seem to be intermediate between Central-Based Wandering and the next more complex type, Semi-Permanent Sedentary (Meggers 1956: 140): "A community, which can be identified with a village, that establishes itself in successive locations, occupying each for a period of successive years. The population is stable and continuously sedentary, but able to be so only by moving the village periodically."

First of all, none of the Chumash in historically observed areas seemed to have been wanderers or nomadic
in the sense implied by the 1955 Seminars' definition of Central-Based Wandering. Some of the unobserved groups in interior regions may have been typically Central-Based Wanderers, but it is more likely that all Chumash groups, and most certainly those historically observed, were nomadic in the sense that some southern Diegueño groups in Baja California were: "semi-sedentary residents of local areas or base camps" (Owens 1959: 56).

Second, it may be argued from the 1955 Seminars' criteria of permanent villages and socio-cultural traits, that along the Santa Barbara Channel, where villages were larger and occupied year round, Chumash communities were more nearly like Semi-Permanent Sedentary communities. Ethnographic examples for this group are with but one exception, the Northwest Coast, shifting agriculturists. The nature of the food supply for both the Northwest Coast and Chumash may have lessened the necessity for successive relocation of villages after a period of years since soil exhaustion would not be a factor in their subsistence; moreover, an adequate protein supply rendered possible by marine fisheries provided the same degree of community stability as shifting agriculture. Certainly the socio-cultural criteria for Semi-Permanent Sedentary describes the Santa Barbara Channel Chumash more adequately than does the criteria for Central-Based Wandering; and, even
though populations outside of the channel were considerably less, clustered in smaller aggregates, and probably less sedentary throughout a greater part of the year, the basic outline of Chumash socio-political organization presented earlier in Chapter III seems to have applied generally.

Rather than pigeonhole the Chumash as Central-Based Wandering or Semi-Permanent Sedentary, perhaps it is more appropriate to define an intermediate type for groups with a subsistence base other than shifting agriculture that fills the socio-cultural criteria for Semi-Permanent Sedentary, but which are still "central based" hunters and gatherers. A more accurate term for the Santa Barbara Channel Chumash community patterning would be Permanent-Based Semi-sedentary. More specifically, the Chumash of the channel should be described as semi-sedentary residents of local areas, who, by virtue of an unusually rich environment, had relatively small subsistence ranges and could live in large, permanent base camps. The population of coastal villages remained fairly constant throughout the year except for short excursions to nearby oak groves, seed patches, etc. during harvest season or trading expeditions to the islands or interior. Temporary outlier harvest camps along the channel were established more for convenience than out of environmental necessity.

Although winter months were more severe than other parts of the year, staples were abundant enough to allow
the Chumash to maintain permanent villages and develop slightly more elaborate social forms than are generally characteristic of hunting and gathering groups.

Population Density, Social Complexity, and the Development of Clans. Goldschmidt (1948) proposes that not only agriculturists but also hunting and gathering groups with an efficient technology in a fairly rich environment can maintain large enough populations to be conducive to the evolution of clans. Clans are by no means the only possible kind of more complex social organization which can develop from family band organization. Other forms such as bilateral organization are feasible, but taking California, which is typically an area of unilinear kin groups as an example, Goldschmidt suggests that there is a significant correlation in Central California between well-developed unilinear kin groups and areas of high population density. Baumhoff's (1960: 155-56) re-examination of Central California aboriginal population estimates supports a correlation between areas in which well-developed unilinear kin groups are found, some approaching full-fledged clans, and centers of high population density.

Goldschmidt argues that it is not the larger density of population per se that determines if clans are to develop. Instead, the causative factor is the greater intensity and increased number of social relations that an individual
tends to have in an expanding population. The critical point for the formation of clans, or other integrative mechanisms in place of the face-to-face type of family-band organization, is reached when a person is reacting to several other persons without full knowledge of their personalities. That is, at the level of hunting and gathering family-bands, the social system can be comprehended in terms of direct relationships or organized according to such criterion as age because the number of actual social relationships an individual has are few. However, if the population increases to sufficiently large numbers, the number of impersonal social relationships will increase. They will reach a point at which "the individual will have to react with and toward people without full knowledge of the personalities involved. Under such circumstances they will increasingly react toward persons in terms of some symbolic system." (Goldschmidt 1948). Although other systems may fulfill this need, the clan is, according to Goldschmidt, a natural response at this level of social complexity. Once the clan is established, it functions as an integrative device for unifying a larger territory. "Such unity, when further implemented with ceremonial devices, can serve to inhibit inter-village hostility and eventually to weld a larger territory into the semblance of nationhood."
The Chumash were supposed to have patrilocally lineages and non-localized clans, and villages were identified with certain clans and lineages. What the exact political nature of Chumash lineages and clans was is difficult to say from Harrington's Culture Element Distribution Survey (1942), but certainly the Santa Barbara Channel Chumash, as an area of high population density, had a higher level of socio-cultural integration in the form of village groups and village group chieftains. It is not known if selection of village group chieftains and maintenance of their authority was determined through kinship, but certainly their existence tended to inhibit to some degree serious inter-village hostilities. Moreover, there was some ceremonial integration around the village group; but, again, it is not known if it was centered around the clan system. Nevertheless, Goldschmidt's speculation that a more efficient system of integration would tend to spread to neighboring groups tends to be borne out from the historical records. For example, north of Point Conception, an area considerably less populous than the Santa Barbara Channel and probably with slightly different aboriginal settlement patterns, El Buohón, whose village was near San Luis Obispo, apparently was a village group chieftain who wielded considerable power from Point Conception to the northern edge of Chumash territory (Piette 1946). Indeed
the village group, and perhaps the clan if further research can be done on the nature of Chumash clanship, is exemplification of Goldschmidt's hypothesis that "clan organization / village group organization/ is a response to the developed needs of a society under increased population density, and that the clan system when fully realized offers competitive advantages as an integrating mechanism."

California Hunters and Gatherers and Agriculture. There has been considerable speculation about why the California Indians did not accept agriculture (Sauer 1936; Heizer 1958; Baumhoff 1960; and Close 1960). Although it is known that some Indians were planting corn and other garden vegetables during and after the Mission Period, some people feel that without Spanish-introduced metal tools corn could not have been aboriginally introduced into California, an area of heavy soils and winter rains. Even if agriculture was introduced, domesticated plants would not have filled any dietary needs not already taken care of by wild plants and game. Acorns, for instance, fulfilled the same dietary needs as corn, the staple of Southwestern agriculturists. Crop yield of acorns also compares favorably with that of modern corn. Acorns yield 1400 pounds per acre compared to 1960 pounds per acre for corn, and it would take 2.12 acres of acorns to produce the equivalent calories of one acre of corn (Wolf 1945: 3-4).
Large populations along the Santa Barbara Channel were possible because of the development of an adequately efficient technology which could be used to take advantage of an environmental conjunction of rich land and marine resources. It is interesting to note, however, that the large population attained by the Santa Barbara Channel Chumash and other groups of California Indians probably militated against the acceptance of agriculture, for as Baumhoff (1960) points out, the large aboriginal populations of California were in Malthusian equilibrium and under such circumstances agriculture would not be as efficient as hunting and gathering in its initial stages of introduction. Thus, unlike the Southwest, which probably had relatively small populations when agriculture was introduced, dependence on newly introduced agricultural techniques by populous aboriginal Californian groups probably would have caused them hardship and perhaps frequent periods of starvation.

The Place of the Chumash within Developmental Classifications. Since the Chumash did not accept agriculture, but had an unusually high population density and level of cultural achievement, they caused Willey and Phillips (1955 and 1958) considerable difficulty in placing them within their historical-developmental taxonomy. The Willey-Phillips classification resembles recent settlement
pattern classifications and other developmental classifications of cultures in predicking significant sets of "subsistence-demographic-society relationships" (Baumhoff 1960: 4). No attempt will be made in this thesis to review all such classifications; comments will be oriented toward the Willey-Phillips (1958) historical-developmental classification, since the theoretical importance of the Chumash and certain other hunting and gathering groups highlight weaknesses in the conceptual model and approach. It is worth reviewing some of the criticisms of the Willey-Phillips system because similar "ideal-complete-classifications" (Brew 1946) seem to be gaining wider acceptance, e.g. Hester (1962).

In their original classification Willey and Phillips (1955) proposed six stages: Early Lithic, Archaic, Preformative, Formative, Classic, and Post Classic. The artifactual criteria for each stage will not be reviewed in detail here, since for our purposes, Baumhoff's (1960: 2-3) succinct summary of the pertinent demographic-social criteria for each stage will suffice:

**Early Lithic**

Small nomadic groups of big game hunters. 
Socio-economic inferences meager.

**Archaic**

Dependence shifts from hunting to mixed subsistence pattern based on hunting, fishing, and gathering. Main consequence
of this change is found in the evolution of a year round or seasonally fixed settlement pattern and slightly larger populations.

**Preformative**

Differs from Archaic only in that agriculture forms a small part of the economy.

**Formative**

Fully adapted to agriculture. Greater population density because of increased quantity and reliability of food supply. Sedentary settlement pattern, craft specialization, and increased ceremonialism.

**Classic**

Little change in social organization, but ceremonialism and craft specialization further emphasized. Intense artistic development --- monumental architecture.

**Post Classic**

Development of cities, militarism, and imperial dominance.

After receiving criticisms from McKern (1956) for placing too heavy an emphasis on agriculture as a determinant in their classification, Willey and Phillips (1958) dropped the Preformative stage from their scheme. It is the problems of defining Archaic vs. Formative and their practical application that will concern us here.

The Central California late horizon, Late Canaúño-Chumash, and historic tribes of the Northwest Coast, all of which had relatively high population densities and advanced levels of cultural development because of stabilized food
supplies, presented problems in historical-developmental classification. Willey and Phillips resolved the problem in their 1958 volume although not to their complete satisfaction, by considering these cultures as a florescence within the limits imposed by their hunting and gathering economies and leaving them within the Archaic stage. These groups were considered to represent the "older" pattern, and as both Willey and Phillips (1958: 144) and Baumhoff (1960) point out, it would be a mistake to classify hunting and gathering groups within the Formative, regardless of their demographic density and social complexity, because the nature of hunting and gathering economies block them from "forming" a subsequent stage. As an alternative to hesitating between classifying groups such as the Chumash as either Archaic or Formative, Baumhoff (1960: 158-59) wishes to distinguish between agriculturists and non-agriculturists and work with more elaborate classifications of pre-agriculturists. He prefers a classification based on at least two dimensions: traditional subsistence patterns, and environment. The method preferred by Baumhoff for the definition of stages and study of evolutionary process would be more in keeping with the method of cultural ecology proposed by Steward (1955) for the study of multilinear evolution. An ecological typology of California Indians using the coordinates suggested by Baumhoff and apparently inspired by Steward's work
was proposed by Beals and Hester (1960). The Chumash were placed into two types, with those living on the Channel Islands and mainland coastal zone below Point Conception classed as Coastal Sea Hunters and Fishers (Table 12). Inland Chumash, apparently not including coastal dwellers north of Point Conception, were considered Foothill type. Although they did not consider the coastal dwellers specifically, these groups probably varied between Foothill and Coastal Tidelands Gatherers. Generally speaking, their appraisal of Chumash subsistence seems congruent with conclusions reached by this writer.

Meighan (1959) suggests another alternate view of the California Archaic to circumvent the unilinearity of the Willey-Phillips conceptual model and comfortably accommodate cultural climaxes with hunting and gathering bases within their developmental classification (Fig. 10). He suggests that the California Archaic can be viewed in terms of traditions as defined by Thompson (1956). The Archaic in California could then be interpreted as representing a Direct Tradition in persistence of basic tool types but an Elaborating Tradition of ornaments, art, and other leisure activities, all within an Archaic cultural stage. Meighan's interpretation of the California Archaic fits the archaeological data quite well; moreover, climax areas such as maritime Southern California and Central California
TABLE 12

ECOLOGICAL TYPOLOGY
OF
CALIFORNIA INDIANS
(Beals and Hester 1960: 411)

<table>
<thead>
<tr>
<th>Ecologic Type</th>
<th>Subsistence staples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(In order of decreasing importance; all use seeds, bulbs, and greens in varying amounts as supplements to the staples.)</td>
</tr>
<tr>
<td>I. Coastal</td>
<td></td>
</tr>
<tr>
<td>(a) Tidelands Gatherers</td>
<td>Shellfish, surf fish, acorns, game.</td>
</tr>
<tr>
<td>(b) Sea Hunter and Fishers</td>
<td>Sea fish, shellfish, game, acorns.</td>
</tr>
<tr>
<td>II. Riverine (salmon cultures)</td>
<td>Fish, acorns/tule, game.</td>
</tr>
<tr>
<td>III. Lake</td>
<td>Fish, tule/acorns, waterfowl, game.</td>
</tr>
<tr>
<td>IV. Valley or Plains (a mixed type.)</td>
<td>Acorns/tule, game, fish.</td>
</tr>
<tr>
<td>V. Foothill</td>
<td>Acorns, game, fish.</td>
</tr>
<tr>
<td>VI. Desert</td>
<td></td>
</tr>
<tr>
<td>(a) Hunters and Gatherers</td>
<td>Pinyon/mesquite, game.</td>
</tr>
<tr>
<td>(b) Farmers</td>
<td>Farm produce, mesquite, fish.</td>
</tr>
</tbody>
</table>
Fig. 10. Alternate Views of Developmental Stages
(Meighan 1959: 304)
can be seen intelligibly within these traditions as intensive local developments of the basic California Archaic pattern.

Another difficulty in definition of categories within the Willey-Phillips system stems from the fact that there are no consistent sets of criteria from stage to stage. Thus as criteria change from class to class we get such incongruities as climax hunting and gathering cultures of high population density and unusually advanced cultural complexity being classified together with certain agricultural groups with crude material culture (Meggers and Evans 1958: 196).

In this respect, the 1955 Seminars in Archaeology community patterning classification (Meggers 1956) is similar to the Willey-Phillips taxonomy in that both consist of a series of stages or types, each of which is based upon multiple criteria. Placement of the Chumash within either of these schemes illustrates the difficulty involved with using multi-dimensional classifications. In both typologies the multiple criteria for each type, although they often tend to cluster together, are not necessarily causally or "dynamically" inter-connected according to the assumptions upon which the types were built. In each case, attempting to measure too many dimensions simultaneously results in poor control of the classifications' parameters and dimensional heterogeneity (Spaulding
Spaulding, in criticizing the Willey-Phillips taxonomy, is emphatic in stressing that dimensions of classification are discrete, that each dimension has its distinctive scaling units, and that they should not be mixed indiscriminately. In a phrase, classifications should be internally consistent and systematic.

A modification of the Willey-Phillips classification has been attempted by Hester (1962). In it he integrates ecology with historical-developmental classification in a taxonomy based on "cultural core" features of Steward (1955) -- elements most closely related to subsistence activities and the adaptation to the environment -- which will provide broad, general stages more accurately reflecting cultural facts that can be used for the archaeological study of multilinear evolution. In fact, Hester's aim is to build one comparative system by means of which all New World cultures may be categorized for cross-cultural comparisons. He includes in his modifications of the Willey-Phillips typology the ideas of Kroeber (1939), Meggers (1954, 1956), and Steward (1955). Hester (1962: 1014) says the desired aim of such a classification is to build a system from which cross-cultural [archaeological] comparisons can be made "without undue stretching of the cultural facts." This writer, however, believes that at our present state of knowledge ideal-complete-classifications, such as the one proposed by Hester, used as a means for setting up consistent,
archaeological cross-cultural functional correlates are premature, if not methodologically unsound.

In a sense, classifications of the type proposed by Hester fill in "missing systems" in the archaeological record by analogy with living cultures at a similar level of technology. Hopefully, such taxonomies are supposed to establish scales of successively interrelated traits for inference of non-observable cultural systems, but before they can be used with any degree of certainty, certain assumptions about the nature of archaeological data must be examined. There is probably a limit to the number of systems that archaeologists can study with any degree of certainty without resort to pre-conceived taxonomic relationships, and undoubtedly the list is considerably smaller compared to those observable in living cultures. Certainly the nature of archaeological remains is an important factor in determining how many facets of the past we can perceive. Factors such as preservation and the level of socio-cultural complexity of the groups being studied have obvious bearing on the number of systems that can be isolated.

In this regard the Chumash challenge the usefulness of Hester's classification. Ethnographically we know that the Chumash had plank canoes, certain social institutions, and a type of settlement pattern which distinguished them from other Southern and Central Californian groups.
Archaeologically, however, the technological complexity of the Chumash is very similar to neighboring Southern Californian coastal groups who lacked these traits. Assuming for the moment that ethnographic data were not available, certain details of artifact manufacture, such as more sophisticated craftsmanship in stonework and shellwork, might lead the archaeologist to suspect that the Chumash had more leisure time, and therefore probably a more stable subsistence base. This in turn might lead him to postulate a community mobility patterning different from other groups not possessing such finely made artifacts, and a form of boat suitable for use in open seas could also be inferred from shell fishhooks, identified remains of deep water fish, and the presence of large sites on the Channel Islands. But without recourse to ethnographic or historic information, unilinear kin groups rather than bilateral organization, for example, could not be inferred for the Chumash, except perhaps uncertainly by ethnographic analogy with other Southern and Central Californian groups. Moreover, the village group organization of the Chumash undoubtedly would go unrecorded by the archaeologist.

As part of Hester's attempt to build a single comparative system he attempts to integrate community patterning classification (Meggers 1956) with modifications of the Willey-Phillips scheme, which were based on a summary
analysis of 88 New World cultures. These correlations of New World stage classifications are postulated from an axiom generally long-recognized by anthropologists, which Hester (1962: 1003-4) calls the law of cultural attainment, that is, "The level to which a culture can develop is dependent upon the food resources utilized within the area it occupies with the technology possessed by that culture." In the modified Willey-Phillips stages agriculturists and non-agriculturists are differentiated (Hester 1962: 1005). From what we know ethnographically of the Chumash they fit Hester's definition of Climax Archaic (Fig. 13). However, from the description of the relatively simple Chumash technology given previously in this thesis, Chumash archaeological remains without supplementary ethnographic data could just as reasonably be called Subsistence Archaic, or if historical factors were known, perhaps the archaeological data could be construed as Regressive Archaic. If we were to guess right and place the Chumash within Climax Archaic, some of Hester's alternative types of social organization would fit the Chumash ethnographic situation quite well. But, in the case of the Chumash, there are insufficient archaeological data from which to distinguish Climax Archaic from Subsistence Archaic without additional ethnographic documentation. For example, in Chumash coastal areas most archaeological remains do not allow us
### TABLE 13

**CORRELATION OF SOME STAGES WITH COMMUNITY PATTERN AND SOCIAL STRUCTURE PROPOSED BY HESTER (1962)**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Community Pattern</th>
<th>Social Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subsistence Archaic:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>economy based on fairly constant supply of food. Settled village life allows the accumulation of large middens. Population density greater than in Gathering stage. Villages are commonly inhabited for only part of the year, due to seasonal changes in food supply. Tools are primarily shaped for use. Tools of ground and polished stone common, with much use of bone and shell.</td>
<td>Central Based Lineages</td>
<td>Composite Band, Lineages</td>
</tr>
<tr>
<td><strong>Climax Archaic:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>food surplus during at least part of the year, plus utilization of food storage and preservation techniques, enables population growth to the maximum possible in a non-agricultural culture. Development of a distinctive and elaborate art style. Rise of class distinctions and craft specialists. This stage may be more common in coastal areas due to the great productivity of the sea.</td>
<td>Semi Permanent Lineages, Clans, Classes, Moieties, Multilineage villages, and Confederacies</td>
<td></td>
</tr>
<tr>
<td><strong>Regressive Archaic:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>loss of developed art style, diminution of population, regression to the level of Subsistence Archaic.</td>
<td>Central Based Lineages</td>
<td>Composite Band, perhaps Multilineage villages</td>
</tr>
</tbody>
</table>
to distinguish between these two types of Archaic. If the distribution of the regional art style in steatite were taken as an indication of Climax Archaic, we would be forced by the archaeological data to include within the Climax Archaic the northern Chumash coastal sites, which are artifactually similar but demographically dissimilar to those of the Santa Barbara Channel. On the other hand, if we placed the Chumash within the Subsistence Archaic stage and depended on Hester's correlated alternative types for this stage, the ethnographically known multilineage villages and confederacies would be lacking in our reconstructions.

The discrepancies which would creep into culture-historical generalizations if archaeologists were to depend upon a system of the type proposed by Hester should by now be apparent. In light of the discussion of the place of the Chumash within a community patterning classification (Meggers 1956), the discrepancy between the real, ethnographic situation and the stage-community pattern-social correlations become even more glaring, in that the Chumash fit neither the criteria for Central Based Wandering nor Semi Permanent Sedentary. Before devising methods for archaeological inference of social aspects of culture, archaeologists should construct models of the past which come "as near to a historical framework as the differing
source-material will admit " (Piggott 1959: 9). A prerequisite to a "stage" classification is a more realistic assessment of the nature of archaeological evidence and methods used to interpret it. A more rigorous appraisal is needed of archaeological data in terms of their potential for ethnographic reconstruction and a determination of how far these interpretations can be pushed without violence to cultural facts, checked against artifactually similar surviving or known historic cultures. For example, is it possible to establish consistent and valid analogies between similar artifact assemblages in the archaeologic and ethnographic records? Also, as a corollary of this, to what degree does increasing material culture necessarily parallel social complexity? The Chumash, as an example certainly point up the need for refinements towards this direction in our archaeological thinking.

This writer questions whether Hester's ideal-complete-classification does provide a reliable historical framework for socio-cultural inference. The Chumash, because of their poor fit in the Willey-Phillips system and Hester's modification of it, illustrate the danger of assuming that social reality exists in a taxonomic system (Swanson 1959: 122) and then proceeding on that assumption to interpret additional data in terms of the classification. Any classification is simply a means for organizing and
expressing relationships between data. We should always keep in mind that although some classifications suit the data better than others, there is nothing final about a classification. Classifications are working hypotheses, and they do, or at least should be capable of, change with new data.

Archaeologists always have had difficulty in constructing classifications that correlate more than two dimensions simultaneously, and both the Willey-Phillips system and Hester's modification of it, each of whose multi-criteria parameters are poorly controlled, encountered such difficulties and fell into the pitfall of ideal-complete-classification discussed by Brew (1946: 51):

...if such an "ideal-complete-classification can be worked out, what shall we have and have and how shall we use it? ...First let us consider what it is. By this ideal system, we would have all the pottery of the world, or the cultures of the world, arranged according to a single descriptive classification according to criteria arbitrarily agreed upon. This would be a nice orderly thing and to some workers, apparently, a sufficient end in itself. But what would it show? From it would appear certain real or fortuitous relationships, and I fear in most cases it would be impossible to tell which, based upon the agreed criteria. To establish other relationships and to check those suggested by the system itself it would still be necessary to reanalyze and reclassify the material according to other criteria. This would of necessity result in re-grouping and in the production of various more limited classifications which would not conform to the basic one.

In the course of this discussion there has been no intention of arguing that classifications such as Willey
and Phillips' and Hester's schemes do not have some usefulness. They do, but they should be looked upon as hypotheses about the interrelationship of data, subject to modification, and not as final socio-cultural functional or structural interpretations. It is perhaps unfair to prejudge as a vain hope some archaeologists' desire for universal complete classifications, which provide complete sociological explanations, but until we control more data, perhaps it is better to work towards establishing limited parallels as Steward (1955) suggests in his method for studying multilinear evolution. Rather than rely on pre-conceived taxonomic relationships for explanations in archaeology, it would seem more fruitful to work with classifications of more limited scope such as the one defined by Beals and Hester (1960), in which, for example, environment is contrasted against traditional subsistence economy. Generalizations can then be derived and expanded as additional coordinates are added to the classifications. At each step, we will need to test the suitability of taxonomies and the reliability of interpretations with cultures having archaeological depth and abundant ethnographic and historic data as well. The Chumash, as has been shown here, serve well for this purpose and clearly demonstrate the weakness of premature and overly-inclusive classifications.
CHAPTER VII
CONCLUSIONS

An abundant animal protein supply along the Santa Barbara Channel in the form of seafish allowed high Chumash population growth after an efficient maritime technology had been developed. A more stable food supply, in turn, provided the foundation for the Culture Climax within this region. North of the Santa Barbara Channel large population aggregates approaching those of the channel region were not environmentally possible at the same level of technology. The northern coastline is exposed to strong prevailing northwest winds, and much of the coastline is rugged and rocky; moreover, aside from the protection from northwest winds given to the Santa Barbara Channel by the east-west orientation of the Transverse Ranges, the marine fauna in the channel was considerably richer than in coastal areas north of Point Conception. The total number of fish species north of Point Conception is greatly reduced compared to the Santa Barbara Channel. Point Conception also marks the northward limit of the distribution of the large summer schooling fish which are very important in the subsistence of the Santa Barbara Channel Chumash. These large migratory
schooling fish were particularly important between late summer and early fall. For the Chumash they were as a staple equivalent to the salmon in Northwest California. Perhaps equally important for maintenance of large permanent, maritime-oriented villages was the rich marine fauna associated with kelp beds, which are nowhere more dense and continuous in distribution along the California coast than in the Santa Barbara Channel, that provided a dependable year-round fish resource. Kelp beds north of Point Conception are greatly reduced in number and extent.

There are regional variations in subsistence emphases within the Chumash area. According to the ecological typology of Beals and Hester (1960), Santa Barbara Channel Chumash were Sea Hunters and Fishers, Chumash outside the channel coastal zone were Foothill ecologic type, and Chumash living along the northern coast probably varied between Tidelands Gatherers and Foothill ecologic types. Game animals which the Chumash subsisted on were mainly rodents, rabbits, and deer, occasionally small carnivores, and rarely on large carnivores. However, sea mammals, fish, and shellfish probably were more important than land game along the Santa Barbara Channel.

A seasonal round was reconstructed from historic, ethnographic, faunistic, and floristic data. The months of plenty would have been from late spring through early fall.
Bulbs, roots, tubers were obtained mostly in spring, and seeds were harvested during summer and into autumn. The fishing season reached its peak between late summer and early fall when the large schooling fish were at maximum abundance. Harvest of pine-nuts began at higher altitudes in late summer and continued into fall. In late fall, near the end of the pine-nut harvest, acorns were gathered. Some wild fruits were gathered in summer, but the majority of them were obtained in fall and early winter. By December the lean "hungry" months of winter began and lasted until the end of the rainy season. Most plants were dormant during winter. During these months the amount of fish was decreased by the departure of most of the large schooling fish, but in their stead the Chumash could turn more to hunting land mammals. Even though the Chumash had a rich environment from which to draw, it appears that the level of population was usually pushing the efficient limits of their technology. Thus, although dried meat, seeds, pine-nuts and acorns were stored up for winter, exhaustion of food stores by January or February seems to have been a fairly regular pattern.

At least one, and perhaps two, seasonal changes in population distribution could be isolated from historic and ethnographic data:

1. Definitely a dispersal of population during late spring and summer harvest months to take advantage of wild crops.
2. Probably an overall increase of coastal populations from late spring through the middle of summer or into early fall created by an influx of interior groups coming down to the shore to fish and gather shellfish.

The traditional archaeological sequence of the Chumash region was reexamined in light of these data. It is suggested that the seasonal factor has not been considered seriously enough in dating artifact assemblages and in interpretations of the archaeological sequence. Because Rogers defined his three-fold sequence before radiocarbon dating and the middle period of his sequence, Hunting People, has not been adequately demonstrated stratigraphically, it is quite possible that some "Hunting People" sites, as Rogers defines the archaeological culture, may be seasonal reflections of either Oak Grove-like or Canaliño-like cultures at various points in time. Until Rogers' sequence is verified by non-cultural time indicators such as radiocarbon dating, archaeologists should not accept the Rogers chronology without question nor assume too much cultural uniformity at any given time in the past. Conservatism of artifact forms and possible absence of diagnostic time indicators caused by seasonal variations in artifact assemblages make dating with reference only to artifact form extremely risky.

The Chumash area, as a center of high population density, had as a political unit the village group which
federated villages into a higher level of socio-cultural integration. From available data it seems that the Chumash were socio-politically more complex than less populous groups surrounding them. The Chumash and certain areas of Central California tend to support Goldschmidt's (1948) proposed correlation between areas of high population density and the evolution of clans. However, data are not complete enough to determine the exact nature of Chumash unilinear kin groups, but the village group is exemplary of Goldschmidt's hypothesis that in areas of high population density more complex socio-political forms will tend to develop as a socio-cultural integrative mechanism. Moreover, the existence of village group organization north of Point Conception, an area considerably less populous than the channel, also tends to bear out Goldschmidt's speculation that a more efficient system of integration would tend to spread to neighboring groups.

The place of the Chumash within settlement pattern and developmental classification was examined. It was found that the Chumash, at least along the Santa Barbara Channel, do not fit the criteria for either Central Based Wanderer or Semi-Permanent Sedentary in the Seminars in Archaeology community patterning classification (Meggers 1956). The Chumash were still "central based" hunters and gatherers but had the social characteristics of Semi-Permanent
Sedentary. As a refinement of the classification, it is suggested that a type distinct from the shifting agriculturist-linked Semi-Permanent Sedentary community pattern be defined for hunters and gatherers who are central-based in permanent villages and fulfill the sociological criteria for Semi-Permanent Sedentary. The proposed type is called "Permanent-Based Semi-Sedentary." A description of this type, as it applies to the Chumash, would be sedentary residents of local areas, who, by virtue of an unusually rich environment, had relatively small subsistence ranges and could live in large, permanent base camps.

The Chumash within the Willey-Phillips developmental classification should be grouped under the Archaic, because the nature of their hunting and gathering economy blocked them from "forming" subsequent stages as Willey and Phillips (1958) have defined them. However, it is suggested that ideal-complete-classifications (Brew 1946), such as the one of Willey and Phillips or modifications of it, are not the only kind of classification needed in archaeology for significant cultural generalizations. Although the Willey-Phillips scheme presented American archaeology with an impressive synthesis of New World archaeology, the classification should not be taken as necessarily mirroring cultural realities. Instead, the Willey-Phillips
classification and its taxonomic theory should be taken as working hypotheses about the interrelationship of data subject to further modifications. Most importantly, we should not let our taxonomic efforts become end-points in themselves without reference to culture-historical problems. In this respect, the Chumash point up the difficulties of using premature, more elaborate, and untested taxonomic systems based on a multi-dimensional classification such as the Willey-Phillips model, whose parameters are poorly controlled because the interrelationships of the criteria upon which the types were built have not been scrutinized adequately. Rather than work with so many variables simultaneously, it is suggested that at our present state of knowledge it is perhaps better to work with two dimensional models and compare other variables against them until we can devise methods of measurement which can competently control several dimensions simultaneously. In the final analysis, Brew's (1946: 51) remarks about ideal-complete-classifications apply very well to the problems of application of the Willey-Phillips typology highlighted by the Chumash and certain other hunting and gathering groups. That is, in order to establish relationships other than those proposed by the classification, and to check those suggested by a taxonomic system, it is necessary to reanalyze and reclassify the data according to other criteria.
T. E. White's (1953: 397-8) table of percentages and pounds of usable meat was used in compiling similar tables for fauna found in the Chumash region. Weights and estimates of land mammals are taken from White's list. Data for sea mammals have been added from Bonnott (1951), Kenyon and Scheffer (1955), and Scheffer (1958). White's data for birds are in a few instances slightly modified, but information for those species not found in his list is added from Pough (1957). Raw data for the estimates on fish are taken from Barnhart (1936), Roedel (1953), Roedel and Ripley (1950), and Walford (1937). Estimates on fish are probably conservative estimates; if changes are made later, revisions of estimates probably will have to be upwards.
## Percentages and Pounds of Usable Meat

<table>
<thead>
<tr>
<th>Animal</th>
<th>Avg. Live Weight (Pounds)</th>
<th>Percentage Usable Meat</th>
<th>Pounds of Usable Meat</th>
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<td>350</td>
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<tr>
<td>(female)</td>
<td>200</td>
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<tr>
<td>Steller Sea-Lion (male)</td>
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<td>1300</td>
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<tr>
<td>(female)</td>
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### Percentages and Pounds of Usable Meat

<table>
<thead>
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<th>Percentage Usable Meat</th>
<th>Pounds of Usable Meat</th>
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<td>Horned Grebe</td>
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<tr>
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<tr>
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<td>1.05 oz.</td>
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<td>Pintail</td>
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<td>Red-tailed Hawk</td>
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<tr>
<td>(male)</td>
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<td>70</td>
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</tr>
<tr>
<td>(female)</td>
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<tr>
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<tr>
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<tr>
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### Percentages and Pounds of Usable Meat

<table>
<thead>
<tr>
<th>Animal</th>
<th>Avg. Live Weight (Pounds)</th>
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California Sea-Lion (Zalophus californianus)

The California sea-lion is the most abundant pinniped along the California coast. They are present in all seasons. Breeding populations congregate in rookeries between May and August and tend to be slightly larger than the coastal population at other times of the year. Rookeries of California sea-lion are found on the Southern California coastal islands, the Channel Island rookery being on San Miguel Island (Bartholomew and Boolootian 1960: 368). Pups are born in June and July and, by August, the rookery herds scatter along the coast of California.

The short seasonal migrations of Zalophus are not yet fully understood, but Bartholomew and Boolootian (1960: 368), in their population survey of Channel Island pinnipeds, state that the winter population of bulls was greater than in summer and, conversely, that the summer population of cows exceeded the winter population.

The preferred habitat of California sea-lions is sheltered beaches, and throughout most of the year they travel and fish in small groups.

Steller Sea-Lion (Eumetopias jubata)

The Steller sea-lion ranges from the Channel Islands northward to the Bering Sea. Unlike the California sea-lion (Zalophus), the Steller sea-lion is usually found along open sea coast, rarely in bays, inhabiting relatively inaccessible, surf-washed rocks (Kenyon and Scheffer 1955: 11; Lyon 1937: 164). Eumetopias breeds throughout its range, and today, in the Channel Islands, shares its sole rookery in the Chumash area with the California sea-lion on San Miguel Island. The distribution of Steller sea-lion rookeries, however, need not have been the same in the past, for although Bartholomew and Boolootian (1960: 370) reported the Steller sea-lion to have been breeding on San Miguel Island, they interpret Bonnot (1951: 374) to mean that Eumetopias has also been seen breeding on Santa Rosa Island.

The breeding habits of the Steller sea-lion are similar to those of the California sea-lion, and both species' breeding seasons are coincident. Adult Steller
sea-lion bulls are absent in winter, probably migrating north, but females and young males are present the year round (Bartholomew and Boolootian 1960: 370; Bonnott 1951: 377). The number of Steller sea-lions in Chumash waters at any time of year compared to other pinnipeds is very small. Its population on the Channel Islands is roughly equivalent to that of the Harbor seal's (Bartholomew and Boolootian 1960: 368).

Northern Fur Seal (Callorhinus ursinus)

Northern fur seal migrate yearly from their southern Alaskan breeding grounds to the south during winter. By the time northern fur seals reach Chumash water they are pelagic, and are either solitary or swimming in bands from 10 to 15 animals. During their southward migration, they are usually found 10 to 50 miles from shore. Rarely a few stragglers may come ashore while migrating southward, but most of them that do are usually either sick or injured (Kenyon and Wilke 1953: 96).

Only females and young of both sexes are normally found in Chumash waters; adult males tend to remain in more northerly waters. Northern fur seals reach the Chumash coast by December and remain offshore until about the end of April (Kenyon and Wilke 1953: 88-89).

Guadalupe Fur Seal (Arctocephalus townsendi)

Before being brought to the verge of extinction, the primitive range of the Guadalupe fur seal was from the Mexican and Californian coast to as far north as Farallon Islands and on the offshore coastal islands (Grinnell 1933: 117). Their breeding range probably did not extend north of Point Conception (Scheffer 1958: 81). Habits of the Guadalupe fur seal are poorly known because the species was not distinguished from the northern fur seal until it was almost completely exterminated (Lyon 1937: 164). However, it is assumed that their breeding habits were similar to the northern fur seal (Callorhinus ursinus), but unlike Callorhinus, Guadalupe fur seals do not appear to make lengthy migrations. Instead, they are thought to remain near breeding grounds during most of the year, leaving only occasionally in search of food (Lyon 1937: 165). Guadalupe fur seals apparently were not as intelligent or adjustable to predation by man as were other pinnipeds. Once one of their rookeries was located, they could be killed easily, because even after a rookery was intensively hunted, fur seals would return year after year to the same rookery until that particular herd was exterminated (Bonnott 1951: 383-84).
Northern Elephant Seal (*Mirounga angustirostris*)

The present range of the northern elephant seal is from Mexican waters to British Columbia; however, its breeding range does not extend north of the Channel Islands (Bartholomew and Boolootian 1960: 367; Scheffer 1958: 134). Although the elephant seal was almost reduced to the point of extinction by the turn of the century, under the protection of game laws it has begun to rebound in population and extend itself over its former range. Today, rookeries are found on San Miguel Island during breeding season, which lasts from December through February; and transient individuals are reported from other channel islands and adjacent waters. Winter and spring populations of elephant seal on the Channel Islands tends to be larger than summer populations (Bartholomew and Boolootian 1960: 367).

At sea, elephant seals are solitary, but while ashore on hauling grounds they are highly gregarious and congregate in congested groups. An elephant seal's powers of terrestrial locomotion are very poorly developed, and it is incapable of moving rapidly on land. While on shore elephant seals seem to be by their very nature inert. They spend most of their time sleeping and are, for the most part, highly indifferent to the presence of man. Usually they can be approached without disturbing them; in fact, sometimes one can sit or lie on a sleeping individual without waking him. Thus, despite their immense size, they are easy prey for hunters because of their slow reaction to man's presence. If they are disturbed, usually one-half to two-thirds of a herd will have reached water by the time their disturber has reached the group, but there always seems to be some individuals who will either remain sleeping or simply not move. Elephant seals when they flee to water are still easy prey because they usually remain in shallow surf only half submerged. Their reaction to man does not seem to vary even during breeding season, except for females with young, who become very aggressive (Bartholomew 1952: 385-6).

California Harbor Seal (*Phoca vitulina*)

The harbor seal is typically a near shore dweller; of the six genera of pinnipeds present in Chumash waters, it is the only one that habitually frequents shallow waters (Kenyon and Scheffer 1955: 20-21). Characteristically, they travel in very small bands and inhabit protected bays, estuaries, and occasionally bodies of fresh water near the ocean. Harbor seals also frequent the hauling grounds of other pinnipeds on the Santa Barbara Channel.
Islands, but their herds are very small and locally restricted in distribution (Bartholomew and Boolootian 1961: 369-70). Of all the pinniped genera in the area, with perhaps the exception of the Steller sea-lion (Eumetopias jubata), Phoca probably had the smallest population in pre-Columbian times too.

Although harbor seals can be found occasionally on hauling grounds, they spend little time on land. They become easily frightened when on shore and take to the water at the slightest disturbance. Harbor seals do not breed in organized rookeries or maintain harems. Mating takes place between June and late September; a female bears a single pup somewhere between late May and August. Pups can swim at birth, and are most often born on land, usually on a sandbar or outlying reef, but they can also be delivered at sea.
APPENDIX C

LIST OF FOODS DESCRIBED
IN SPANISH NARRATIVES

June
No data.

July
No data.

August

Santa Clara River Valley:

"Different kinds of seeds", "a sort of sweet preserve like raisins", honeydew, acorns, walnuts, pine-nuts, and "pinole made of sage and other kinds of grasses" [Crespi 17627].

Santa Barbara Channel:

Great abundance of bonito all along channel, "perch" (Crespi) or "bass" (Costansó) at one village, seeds, acorns, atole, and "other kinds of food". Spaniards received liberal presents of both seeds and fish ---"especially the savory bonito" [Crespi 17627].

September

North Coast:

Received mostly gifts of seeds and pinoles. Also received a few fish. Saw Indians taming a bear cub. [Crespi 17627].

October

Santa Barbara Channel:

"Raw fish; they were eating maguey also", "fish", "sardines" [Cabrillo 15427].

November

Santa Catalina Island:
"Roasted sardines, a small fruit like sweet potatoes", prickly pears, and "a grain like the gofio of the Canary Islands" [Vizcaíno 16027].

"Seals and large fish" [Ascensión 16027].

Santa Barbara Channel:

"Fish", "acorns and a seed the size of maize" [Cabrillo 15427].

"Great quantity of fish and a porridge made of acorn meal" [Vizcaíno 16027].

San Luis Obispo:

"Cresses, celery, and amaranth", wild rose [Pages 1777].

December

San Miguel and Santa Rosa Islands:

"Twelve fish and a small seal" [Cermeño 15927].

North Coast:

"Acorn mush, fish, and shellfish" [Cermeño 15927].

Sardines [Ascensión 16027].

Received liberal presents of pinole and atole --- some made of acorns and seeds, "and some very good tamales which seemed to be made of corn." Also received some fish (Estero Bay), but in most places gifts were exclusively of pinole and atole; however, at another small village on Estero Bay they received a "great deal of fish" [Crespi 1779].

"Cresses, celery, amaranth", wild rose [Pages 1777].

January

Santa Catalina Island:

Fish [Ascensión 16027].

Channel Islands:

"Eat nothing but fish" [Cabrillo 15427].
Santa Barbara Channel (Mainland):

At one village on western end of channel received "great deal of fish, fresh and dried, sardines and bonito". Given fish at villages all along channel until Mesoaltitán. From Mesoaltitán eastward along the rest of the channel the villages were without fish, and "we perceive they are hungry"  /Crespi 17707./

Roasted mescales in village in Thousand Oaks area /Crespi 17707/.

February

Santa Barbara Channel:

(Pueblo de las Sardinas) no fish, "acorns from the oaks, and another seed, and raw plants from the field /Cabrillo 15437/.

"Several very good fish of different kinds and of different colors and shapes", "Large sardines about a palm long", "and along the people provided themselves /the Spaniards/ with fish in such abundance that we left a part of what ... had /been/ obtained for everybody, because there was nobody who wished to carry it /Font 17757/.

All of the channel villages abounding in fish. At Mesoaltitán "great abundance of fish and sardines than at former ones." "Abundance of good fish, some of which have been estimated are more than a foot long exclusive of tail, especially the female sardines which are full of spawn"  /Anza 17757/.

March

Southern California Islands:

Sheep-head, toadhead, rockfish, octopus, and onion-like roots /Fr. J. Vizcaíno 17707/.

April

Santa Barbara Channel:

/In Thousand Oaks area/ "two roasted head of mescales" /Crespi 17707/.

Acorns and sardines /Fr. J. Vizcaíno 17707/.
"Locusts and large crabs" /Font 17757.

May

Santa Barbara Channel:

At Mescaltitán "they gave us much fish" /Crespi 17707.

North of Point Conception:

Inhabitants of Ranchería del Buchón brought "some 16 fish of very good size", "pinole and atole with pieces of fresh venison and four fish", seeds, and "tamales". Women and children of the village were observed gathering seeds. Crespi says the people brought more than enough food, particularly pinole /Crespi 17707.

Between Ranchería del Buchón and Morro Bay twelve women and a few children were seen gathering seeds. Another small village was found abandoned, from which the Spanish surmised the inhabitants were out gathering seeds too /Crespi 17707.

Somewhere between Morro Bay and Point Estero people were seen gathering clams and fishing. Natives also brought a good portion of pinole and fish /Crespi 17707.
APPENDIX D

ACCOUNTS OF VILLAGES TAKEN FROM PORTOLA AND ANZA EXPEDITION
NARRATIVES INDICATING SEASONALITY

Thousand Oaks Area

23 February, 1776
We saw four small villages. The campsite is somewhat lacking in firewood and the river is very miry and bad when it rises, but it was low now (Font in Bolton 1931: 247).

12 January, 1770
Indian village containing somewhat more or less than sixty people, very poor and thin (Costanso in Teggart 1911: 315).

13 January, 1770
A small village whose heathen treated us to roasted mescales...and...another village of heathen (Crespi in Bolton 1927: 267).

14 January, 1770
In Russell Valley the Portola Expedition found a village.

Pueblo de la Asumpta

14 August, 1769
They gave us a lot of fish, especially very savory bonito. Judging by the great abundance of it and

11 January, 1769
All of these people, who, when we came, had plenty of fish and gave us a lot of it, are now without any, and we
the ease with which it was caught, this must be the season for it (Crespi in Bolton 1927: 159).

perceive they are hungry (Crespi in Bolton 1927: 299).

30 April, 1770

...on arriving we passed through the rancheria because we felt like eating fish, and we found the rancheria almost entirely empty with only four or six old men and a few women, and they did not have a single fish; and they told us that all of the people were with the canoes on the islands and for this reason they did not have any fish (Crespi in Piette 1946: 114).

Santa Conefundis (Los Pitos)

16 August, 1769

"A small village which had little grass houses", a canoe, and "many large fish" (Crespi in Bolton 1927: 161).

24 February, 1776

A very small village of four little huts and without people (Font in Bolton 1931: 249).

Pueblo del Baylarin

16 August, 1769

As soon as we arrived all the people came to visit us, and brought us a great supply of roasted fish to eat until the canoes should arrive with fresh ones. They soon landed on the beach, and in a little while afterwards they brought us an abundance of bonitos and perch which they gave us in such

11 January, 1770

Portola's expedition did not stop at Pueblo del Baylarin but passed through it. But, from the remarks made about the villages they passed through after Mescaltitán (see 11 January, 1769, under Pueblo de la Asumpta), it is inferred this village was without fish on the expedition's return.
quantities that we could have loaded the entire pack train if we had means of preparing and salting them (Crespi in Bolton 1927: 162).

Mescalitán (Pueblos de las Islas)

18 August, 1769
These heathen seem to be very well supplied with everything, especially with plenty of fish of all kinds; in fact they brought to camp so much that it was necessary to tell them not to bring any more, for it would eventually have to spoil (Crespi in Bolton 1927: 167-68).

9 January, 1770
Here there was no fish; I do not know whether it was because there was none at this season, or whether the Indians had not gone out for it (Crespi in Bolton 1927: 265-66).

Ranchería Santíssima Cruz

4 May, 1770
Shortly before arriving at San Guido, one arroyo away, a small ranchería of 'good and affable gentiles' was found that was not there previously (Crespi in Piette 1946: 238). Note: This village was not observed by other expeditions.

Ranchería del Bayle de los Indios (La Graciosa)

31 August, 1769
Village..."These people were very poor and without shelter of houses, so that we doubted if this were their permanent abode (Fages in Priestley 1937: 37).

1 January, 1770
Today the village was not found here (Crespi in Bolton 1927: 263).
1 March and 22 April, 1776

The Anza Expedition stopped here and mentioned no villages.

8 May, 1770

We did not find this time the small ranchería near the poza which was there the last time (Crespi in Piette 1946: 242-243).

Guadalupe Lake

1 September, 1769

Portola said here there were two villages of about 100 natives. "One small and miserable, the other larger, being composed of several small houses (Costanso in Teggart 1911).

"...two villages, the one small and insignificant, the other containing a few more small houses made after their fashion" (Pages in Priestley 1937: 38).

31 December, 1769

Village was occupied, but a few years later the Anza Expedition on...

1 March and 23 April, 1776

noted only one village at Guadalupe Lake: "near which there is a village (Font in Bolton 1931: 277), "the village of Laguna Larga" (Anza in Bolton 1930: 163).

9 May, 1770

Crespi saw only one ranchería of 12 houses (Piette 1946: 368)

San Adriano
(Near Morro Bay in Cañada del Oso)

8 September, 1769

The Portola Expedition observed a very small village of about 60 inhabitants who were without fire and "seemed nomadic, for we did not see a single house" (Crespi in Bolton 1927: 186).

13 May, 1770

No people observed in village "which they saw coming and going... 3 or 4 empty houses... they must have been in the field collecting seeds" (Crespi in Piette 1946: 271)
Circa 27 December, 1769

By inference from observations made 13 May, 1770 by Crespi it is assumed village was occupied.

Near Point Estero

24 and 25 December, 1769

The Portolá Expedition saw three small villages of not more than 60 inhabitants each that "had not been seen on the outward journey" (Portolá in Smith and Teggart 1910: 75).
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