Chapter 3. West-Central California Cultural and Genetic Groups

In this chapter we describe the cultures of west-central California at the time of Spanish entry, then look at the evidence from archaeology, physical anthropology, and linguistic prehistory that might explain the culture patterns. The first section examines the concept of a cultural unit in California ethnography. The second section reviews attempts to quantify cultural similarities and differences among ethnographic groups in western North America. The third section summarizes evidence for specific cultural variation among Costanoan-speaking cultures at Spanish contact. Next follows a section on archaeology, osteology, DNA studies, and proto-language reconstuctions as they pertain to the emergence of contact-period Ohlone/Costanoan cultures. This chapter concludes with a summary of the strong evidence for a significant separation between the cultures of Monterey Bay and San Francisco Bay Costanoan groups.

LANGUAGE AND CULTURE

Anthropologists organize data about native Californians as though language groups, and sometimes native language families (as in the case of the Costanoans), were unified cultural units. In this section we examine that approach to data organization, its history, and its consequences.

Culture is Related to Language

"Culture" is both a simple concept and one nearly impossible to define with a few words. Anthropologists Alfred Kroeber and Clyde Kluckhohn published a list of 160 different definitions of culture in 1952. Having struggled through their list without finding a single definition to be completely satisfactory, we offer our own definition of culture here:

> Culture is the shared constellation of concepts (ideals, values, material templates, and rules for living) and patterned behaviors (at times contrary to the concepts) that enables a human group to survive and solve problems together.

The act of defining the degree of cultural similarity between any two groups involves some sort of comparison between the patterned behaviors and concepts of the one group and the other. However, no agreement has been reached about how to weight the relative importance of various aspects of culture to construct an acceptable taxonomic classification of the world's cultures.

Shared ideas and meanings are expressed by language. When a language spreads into a new area, either through population movement or through borrowing, a package of material practices, religious traditions, and attitudes spreads with it. Thus Arabic culture spread as the Arabs spread across North Africa after the death of Mohammed. Overseas Chinese brought a cultural package with them as they spread among the cities of southeast Asia. Hispanic culture spread across the Americas following the voyage of Columbus. The list of traits that often spread with a language is vast. Ceremonial events and mythic narratives, ways of tracking time, cuisines, attitudes toward particular body parts, political structures, and attitudes towards property are just a few examples. Language affinity, therefore, is often accepted as a proxy for cultural affinity.

The Language-Culture Relationship is Inexact

The relationship between language and culture is not straitforward. We know that speakers of different member languages of a language family may have different cultures. The Germans and the French speak two distinct languages of the Indo-European family, and many aspects of their cultures, including legal systems, cuisines, and artistic sensibilities, are also quite distinct. However, German and French cultures are nearly identical when compared with the culture of their fellow Indo-European speakers in Iran. In North America, the Hopi are speakers of a Shoshonean language, but their Pueblo culture has more in common with non-Shoshonean Zuni and Keres speakers than with speakers of other Shoshonean languages, such as the Paiute, Gabrieleño, and Tubatulabal. Likewise, the Hupa of Northern California are culturally closer to the neighboring Yurok and Karok, than to the linguistically affiliated Navajo of the Southwest.

Cultural differences within a language or language family tend to be strongest when the group is geographically widespread and disjunct. In such cases, a number of factors generate cultural separation. New groups that bring their technologies and language into an area may incorporate other aspects of the older cultures they absorb; such incorporation led to the present differences between Mexican and Spanish cuisines, for instance. Cultural differences among widespread members of a language group can also arise through independent development of newly emerging technologies. Driving on the left side of the road, for instance, is shared by Australians and British, but not by English-speaking Americans.

The spread of a language or language family does not always co-occur with the physical replacement of one population by another, a fact that accounts for language sharing by genetically dissimilar peoples in many times and places. Regarding the diffusion of languages, Dyen (1956:613) noted:

> The migration of a language is the migration of some number of its speakers. In actual fact a language can be spread by a number of speakers too small to constitute a noticeable population movement. Consequently, if a language is said to migrate, the question whether its speakers have migrated in significant numbers is left to be determined.

Populations have changed language in the past after being conquered by small numbers of invading elites. Through such conquest the language of Britain changed from Celtic, to Latin, to Germanic Old English, to Old Danish in some places, then to Normanized English, over little more than a thousand years. By the same token, Latin America became Hispanic and Greek Anatolia became Turkic through the invasion of elites.

Language shift without population replacement is best known among sedentary farming peoples conquered by invaders with distinct advantages in military technology. In less densely populated lands held by hunter-gatherers, relative prestige has been a factor in language shift, as in the case of the shift of the upland Wailakis to the Athabascan language in Northwest California, in emulation of their Hupa neighbors (Dyen 1956). In summary, people who share a language or

language family relationship do not always have a common background as a genetic population. This must be kept in mind as we proceed with the study of the cultural and possible genetic relationships among the various speakers of Costanoan languages at the time of Spanish entry into California

Kroeber's "Linguistic Group Package" Approach to Cultural Identity

A. L. Kroeber argued that California language groups shared a cultural identity, which, although abstract, might be likened to a national identity. He developed the argument thoroughly in various writings about the Pomoan language family; he applied the argument to the Costanoans by treating them as a single cultural group in his 1925 *Handbook of the Indians of California*. The Pomoans were his favorite example for his ideas about cultural nationalities because they had continued their pre-European lifeways alive in their North Coast Range homelands well into the late nineteenth century, thus providing a much more detailed body of ethnographic information to anthropologists than did the Costanoans.

The Pomoan people spoke seven languages that were as different from one another as the Romance languages (Kroeber 1925:226). All were contiguous to one another except the Northeast Pomo language, which was cut off from the others by only a few miles of Patwin territory northeast of Clear Lake. Despite the distinctness of the Pomoan languages, Kroeber considered the Pomoans to have a single culture.

> In some cases the dialects cut clear across the topography… Customs too, diverged surprisingly little according to habitat. Clothing, houses, boats, and a few other manufactured objects differed somewhat according to districts; but basketry was nearly uniform and religious and social life scarcely affected unless by more or less intimate contact with human neighbors. Pomo civilization was a substantially homogenous unit, on which natural environment exercized relatively superficial influence (Kroeber 1925:226).

Kroeber compared the Pomoans and Germans as ethnic nationalities in an article written in 1954 and published in 1962.

> To the question, if not a tribe, just what then do the Pomo constitute, the best answer seems to be, in comparable civilized European terms, a nationality. A hundred years ago the Germans were indubitably a nationality with common language, general customs, ideas, and a sense of being related, but were not yet a Nation in the sense of having a unified political government or supreme State. They were a nationality comprising many regional variants, such as Prussians, Bavarians, Saxons, Hessians, Westphalians, and others. It is these regional groups, and their particularistic governments, that might in some measure be said to correspond to the Masut, Elem, Yokaia, and other tribelets whose aggregate composed the Pomo nationality (Kroeber 1962:39).

However, Edward W. Gifford considered "Pomo culture" to be an imposed abstraction, in an article he wrote with Kroeber, in 1937.

> What we call Pomo—the Indian had no word for it—refers to no definable cultural entity, but only to a sort of nationality expressed in speech varying around a basic type. The Pomo would have said he was among "non-Pomo" only when the language of a locality changed from being partly intelligible to being nonintelligible. There was therefore no Pomo culture except as an abstraction made by ethnographers and other white men. There was a series of highly similar but never quite identical Pomo cultures, each carried by one of the independent communities or tribelets just described (Gifford and Kroeber 1937:118-119).

The question of whether or not a speaker of a given Pomo language would identify as the same kind of person as the speaker of another Pomo language is one of ethnic identity. It is a different question than whether or not all Pomos shared cultural traits with one another that distinguished them from speakers of neighboring Coast Miwok, Wappo, or Patwin languages. Both concepts are important for judging degrees of cultural affinity among groups.

Most ethnographers, ethnohistorians, and popular writers have followed Kroeber in treating the Costanoan language family area as a single cultural unit (Heizer 1974, 1978; Margolin 1978; Shanks 2006). Following the language/culture logic further, Levy (1978a:485) equated the speakers of the specific Costanoan languages with distinct ethnic groups. The linguistic group approach to culture is an important tool for organizing information about the hundreds of local groups that once inhabited central California, but it oversimplifies a more complex mosaic of cultural variation. Some cultural traits did covary with linguistic distributions, but others were shared in restricted local areas by neighbors who spoke distinct languages.

CULTURE AREA STUDIES IN WESTERN NORTH AMERICA

Studies of western North American Indian cultures have used language groups as the basic unit of comparison, because comparing the hundreds or thousands of local independent groups was seen as impractical. In this section we review the various attempts to lump the many language-based tribal cultures of California and western North America into larger cultural wholes. Part of this history has involved a reliance on quantitative methods that have not been completely successful. As the reader will see, Costanoan culture (or cultures) have remained a problem for the larger comparative studies, due to a paucity of detailed information on Costanoan practices prior to the Mission Period cultural disruption.

Intuitive Culture Areas of Wissler and Kroeber

The practice of dividing sections of the North American continent into separate culture areas was developed in the late nineteenth century as a means of organizing museum collections. An influential culture area classification was initiated by Clark Wissler in his 1917 book *The American Indian*. Wissler divided North America into nine distinct culture areas based on contrasts in environment and subsistence systems. For Wissler (1917), California was part of a large western area of generalized wild food gatherers, distinct from the intensive fishing people of the Northwest Coast or the Pueblo farmers of the Southwest.

Subsequently, Kroeber (1925:898-904) divided California into five areas "of distinctive civilization" in the Cultural Provinces chapter of his *Handbook*. The greater part of the state fell within his Central California area, while the other four areas were actually centered outside of California and only marginally reached into it. The Central California area included the lands of the Costanoan, Miwokan, Salinan, Pomoan, Yokutsan, Maiduan, Wintuan, Yana, and Achomawi-Atsugewi language families. Separate culture areas on the north included Northwestern California (Hupa, Karok, Yurok, Shasta, Tolowa and other groups up into Oregon) and the Lutuami area around Klamath Lake (including Modoc in California). To the east was his Great Basin culture area (Washoe, Paiute, Shoshone). His Southern California area reached from the Santa Barbara Coast (Chumash) and desert (Kawaiisu, Chemehuevi) through southern Califonia Shoshonean and Yuman areas into Baja California. Kroeber stated that his 1925 California cultural grouping paralleled his map of religious divisions within California.

> In part this coincidence may be due to a rather heavy weighting of religious factors in the estimation of culture wholes—a procedure that seems necessary, since a definitely organized set of cults is like the flower to the plant—unquestionably one of the highest products of civilization (Kroeber 1925:901).

Kroeber was not interested in cultural mapping for its own sake, so much as in trying to determine the historic sources of contact period cultures. The latter portion of his *Handbook's* Culture Provinces chapter examines Central California and Southern California culture areas in terms of processes outside of California. He argued that Colorado River and Gabrieleno subtypes of Southern California culture derived from complex reconfigurations of Southwest elements. Central California culture, on the other hand, had historic ties to the Great Basin.

> It is certain that central California and the Great Basin are regions of close cultural kinship…. The civilization of central California is less sharply characterized and less vigorous than that of the coast of British Columbia. Its influences could therefore hardly have been as penetrating. There must have been more give and take between Nevada and central California than between the interior and the coastal districts of British Columbia. But the kinship is clearly of the same kind, and the preponderance of cultural energy is as positively (though less strikingly) on the coast in one tract as in the other (Kroeber 1925:917).

We repeat these quotes not because we are certain that they are true, but because they illustrate that Kroeber was concerned in 1925 about culture areas as windows into pre-contact centers of innovation in time and space.

Kroeber's final work on comparative culture in western North America, *Cultural and Natural Areas of Native North America*, was completed in 1931and published in 1939. Kroeber's culture areas are little different from Wissler's. They are intuitively based on environment and subsistance practices. But Kroeber was responding to Wissler at a different level. Wissler had elaborated the age-areas concept, using culture trait distributions to surmise the areas of origin of agriculture, textile arts, and other aspects of ethnographic culture. In 1931 Kroeber (1939) criticized Wissler for failing to link considerations of culture history to limited centers of richness and complexity within each overall culture area. Kroeber (1939) examined cultural trait distributions for each culture area to identify more restricted centers of innovation, or cultural "climax"areas.

Kroeber's (1939:pocket Map 6) California Culture area of 1931 split off the northwestern, transmontane, and southern portions of the state to culture areas outside the state (Figure 9). This left essentially the same central California zone as his 1925 California Culture area. He described the California Culture area and proposed a climax center as follows:

> This [Central California] culture… evidently began as one similar to that of the adjoining Great Basin, and has never diverged very far from it. However, subsistence in California was so much easier that culture-surplus growths developed. These found a definite climax, though not a very high one, among the Pomo, Patwin, and Valley Maidu (Kuksu cult, Hesi ceremony, Pomo basketry) about the center of the northern half of the area. The rest of the area is not classifiable according to broadly significant distributions, except into better-off valley and poorer hill tracts (Kroeber 1939:54).

Note that three important groups that Kroeber failed to include in his list of "climax" cultures—Costanoan, Plains Miwok, or Delta Yokuts—were those that were never documented by trained anthropologists prior to their transformation by the mission experience.

Klimek's Statistical Approach to California Culture and Prehistory

A program of quantitative comparison of native California cultures began when Stanislaw Klimek came to Berkeley in the early 1930s. Working with cultural data on about 60 ethnographic California Indian tribes, he published "The Structure of California Culture" in 1935. In it he reported on findings based upon 411 elements of California cultures, including behaviors, techniques, and

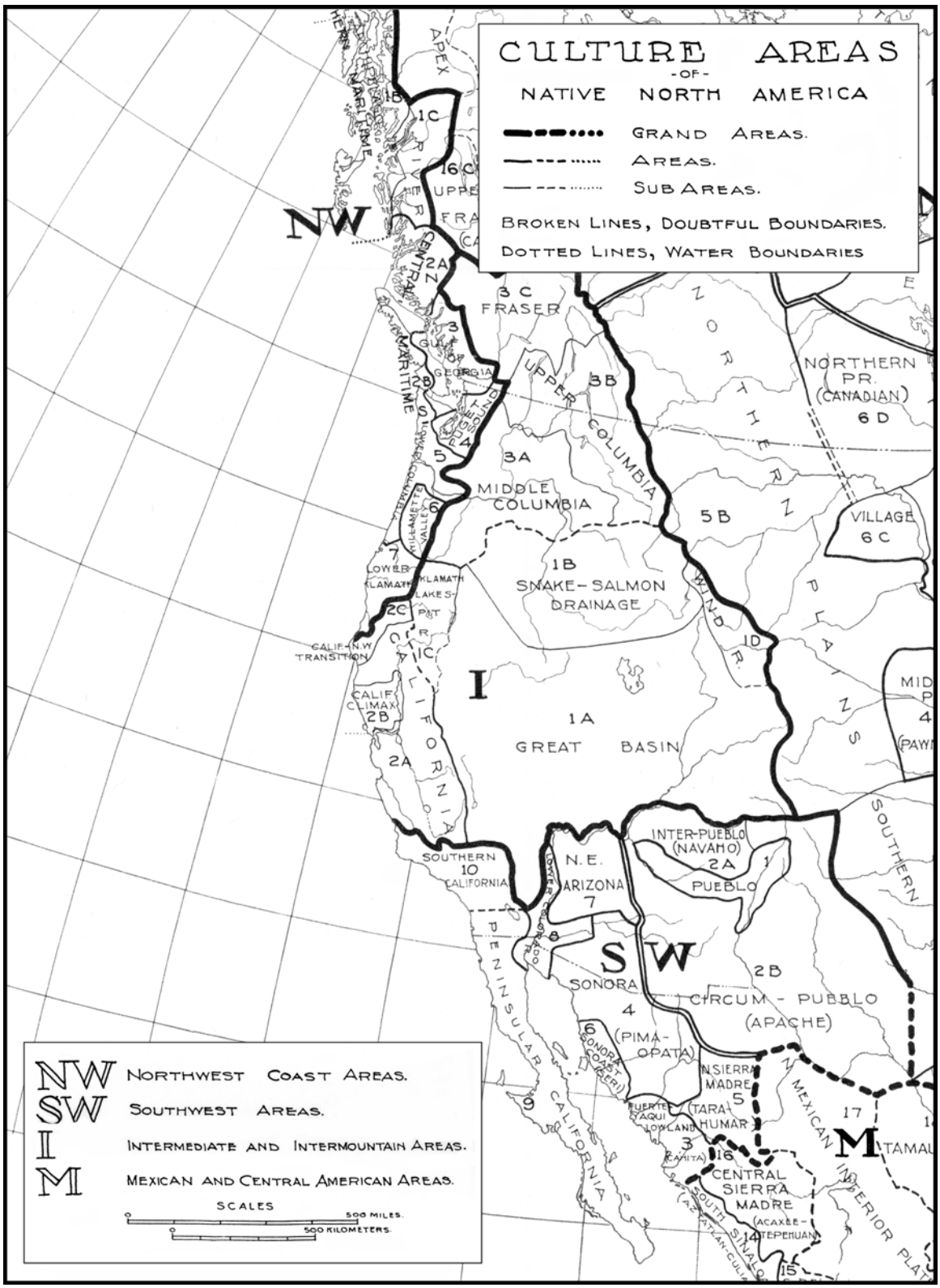

Figure 9. Kroeber's 1939 [1931] Map of Culture Areas of Western North America.

attitudes that had been documented by Kroeber and his associates. The 60 "tribes" he compared were the standard language groups that formed Kroeber's 1925 chapters, with the larger groups broken down into linguistically defined sub-areas. For instance, five Pomo linguistic sub-areas, four Wintuan sub-areas, four Eastern Miwok sub-areas, and two Costanoan sub-areas (Northern and Southern) were initially considered discrete groups for comparative purposes. The two Costanoan sub-areas were lumped together during the analysis, due to the paucity of useful information for each Costanoan sub-area alone (Klimek 1935:50).[20]

Klimek applied Pearson's coefficient of similarity to generate quantitative expressions of cultural relationships. He matched groups of traits to see which were most highly intercorrelated. Most important for our purposes, he compared the traits of each pair of territorial entities in order to distinguish groups of tribes that fell into distinct cultural areas. The sub-areas, or provinces were the Colorado River, Southern California (including Chumash), San Joaquin Valley, Central California (including all Maiduan, Miwokan, Pomoan, and Yukian groups, Patwin and Nomlaki within Wintuan, and Washoe), Northwestern (Achomawi-Atsugewi, Yana, Shasta, Wintu, Wiyot, and most Athabascans), and Northwest Coast (Hupa, Karok, Yurok, and Tolowa), and Northeastern (Modoc).

The Costanoan sample was left out of Klimek's (1935:35) two-by-two table graphically presenting the intertribal coefficients of similarity. He noted in text that the Costanoan data set was limited with regard to ritual culture and cosmology, and most valuable in the area of material culture (Klimek 1935). On his map of cultural provinces, Klimek (1935:52) marked the Costanoan area ambiguously, indicating that its affiliations were with both the San Joaquin Valley and Central California cultural provinces (Figure 10). In text, however, he argued that the Costanoans occupied an intermediate position between the Central California (west central sub-province) and a different area, the Southern California province (Klimek 1935:51).

Klimek attempted to reconstruct the source areas of innovation and change in California prehistory by first generating sets of traits that he deemed to represent "older" and "younger" cultural strata, then proceeding with a series of correlations between those trait sets and the languages and physical types of the 60 tribes. Relying upon intuitive, rather than quantitative, procedures, he argued that the root culture, or "oldest historical phenomenon" in California was represented historically by the Yuki and the Hokans, the latter including Chumash and Salinan (Klimek 1935:61). He visualized a later new cultural infusion, brought a Penutian migration into California from north or east; "The original territory of Penutian expansion must have been where coiling, bullroarer, and parent-in-law avoidance occurred together" (Klimek 1935:65). Kroeber (in Klimek 1935:4) expressed doubt about Klimek's prehistoric cultural strata in his separate preface to "The Structure of California Culture." Kroeber (in Klimek 1935:4) was pleased, however, with Klimek's quantitative determination of seven cultural sub-areas in California.

The "Culture Element Distribution" Research Program, 1935-1945

Kroeber considered Klimek's attempt to reconstruct California prehistory through cultural trait comparison akin to his own work, which he published with Plains Culture examples in "Area and Climax" (Kroeber 1936). But Kroeber was also finding that the data he and his associates had been collecting for years from California groups had been gathered in a spotty and inconsistent

[20] Prior to Klimek's arrival in Berkeley, Harold Driver, a student of A. L. Kroeber, advocated the use of two-by-two tables to measure quantitative relationships between cultures. In 1932, Kroeber partnered with Driver to reconstruct the origin of the Plains Sun Dance through quantitative trait list comparison (Driver and Kroeber 1932). See Jorgensen (1980:8) for a review of that study and other early quantitative studies.

fashion, rendering many trait comparisons impossible. This prompted him to initiate the Culture Element Distribution survey (CED) to collect comparable ethnographic data from the oldest and best-informed people in all of the native societies of California, the Northwest Coast, Plateau, Great Basin, and Southwest.

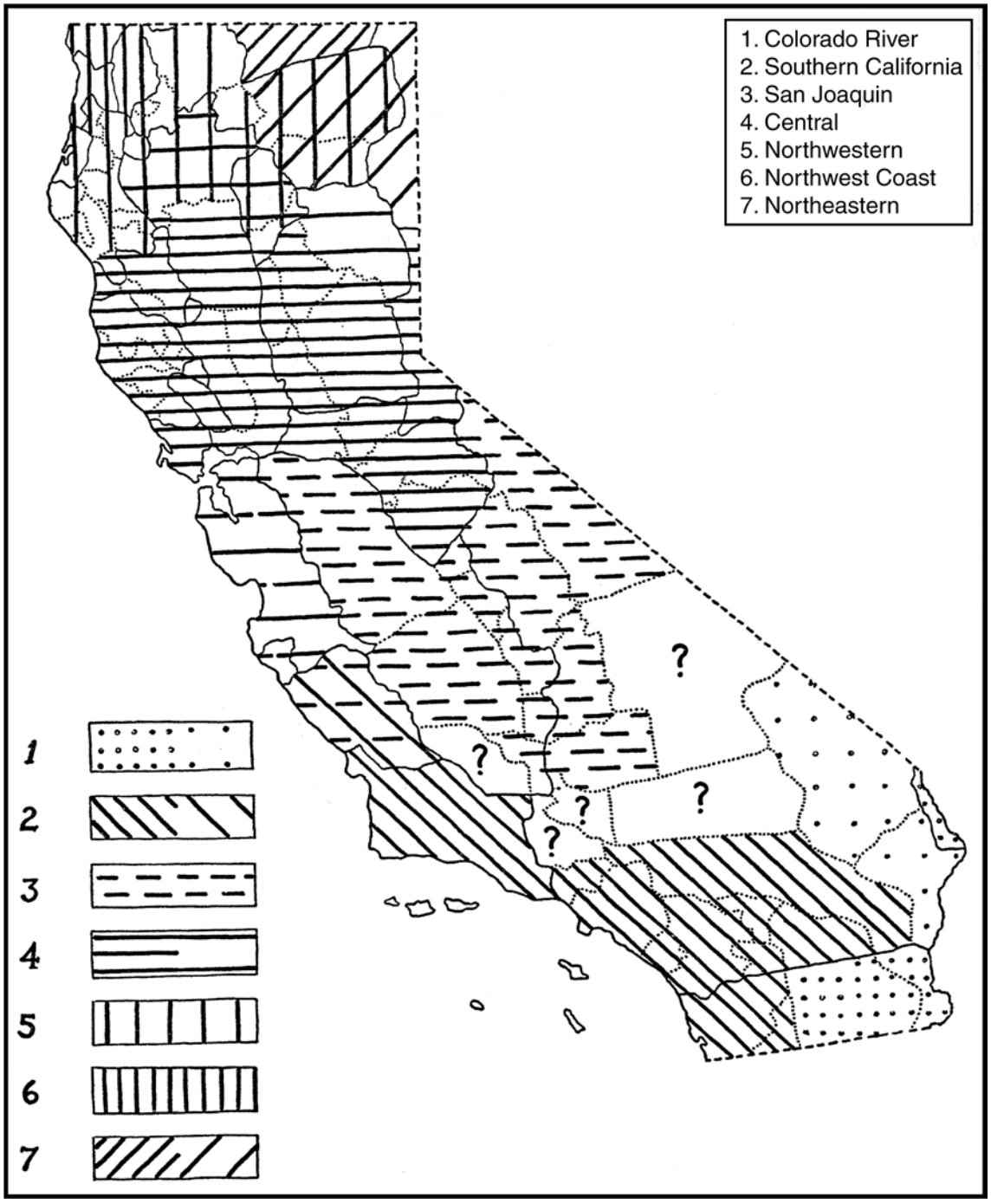

Figure 10. Klimek's 1935 Map of Cultural Provinces in California.

Kroeber sent colleagues and students into the field armed with checklists of possible cultural traits, with the intent of documenting "recall ethnology" about native cultures prior to European contact (Jorgensen 1980:10).[21] Jorgensen characterizes the ambiguity that most anthropologists, including the field workers themselves, felt toward the studies:

> The Culture Element Distributions that were published for each tribe became known as "checklists," though a more popular and pejorative referent used by anthropologists over the years has been "laundry lists." The lists were collected during the depths of the Great Depression, and many of the fledgling anthropologists found the job distasteful and mindless, a rote procedure leading nowhere, an exercise that robbed culture of everything—its life, its spirit, its intricate connections, and its sentiments (Jorgensen 1980:10).

Kroeber himself saw the CED checklists as supplements to careful monographs, rather than substitutes for them, when possible. The checklists attempted to cover the widest possible range of inquiry to allow exploratory quantitative comparison of cultures. In some cases, careful monographs did follow the checklist work; in other cases no follow-up monographs were ever written.

The Costanoan language family areas were considered to be part of the "Central California Coast" area for purposes of the CED. The checklist for that area was filled out by John P. Harrington (1942) in a different way than the checklists for other areas. He filled it out from his notebooks, rather than from direct fieldwork. The special situation was explained by A. L. Kroeber in his introduction to the "Central California Coast" report.

> In the spring of 1935… Mr. J. P. Harrington, of the Bureau of American Ethnology, suggested that he could probably furnish more information from his notebooks than could still be secured from living natives of the southern coastal tracts of California…. Inasmuch as Mr. Harrington began collecting data from the few surviving descendants of the missionized Gabrielino, Chumash, and Salinans nearly thirty years before, had repeatedly interviewed probably every such informant, and as most of these old people had since died, I accepted the offer with gratitude. Mr. Harrington merely stipulated that in return we should not worry or upset the very few remaining aged survivors, among groups like the Kitanemuk and Chumash, with whom he enjoyed carefully cultivated relations. This we refrained from doing; and he, in turn added list data on the Northern and Southern Costano (Kroeber in Harrington 1942:1).
>
> The Harrington checklist consisted of questions from a larger list numbered between 1 and 1,706, but he found fewer than 1,000 of the questions pertinent to his Central Coast area. Harrington gave checks of "present," "absent," or "no information," for 18 discrete groups from three Gabrieleno groups on the south to two Costanoan groups (combined areas) on the north. Kroeber then collapsed them into 11 groups or areas for purposes of comparative quantitative analysis, consisting of two Gabrielino areas on the south, one Kitenamuk area, four Chumash areas, two Salinan areas, and two Costanoan areas (Southern and Northern) on the north.

[21] The first published CED research effort was a Yana study by Gifford and Klimek (1936). Next followed Gifford and Kroeber's (1937) Pomo study. Drucker's CED study for Southern California and Driver's for Southern Sierra groups were published in 1937. Following a pause of a few years, a series of CED studies appeared rapidly in 1942 and 1943. Among them were studies about the "Central California Coast" tribes (Harrington 1942), "Northeast California" (Voegelin 1942), "Round Valley" (Essene 1942), the "Ute-Southern Paiute" (Stewart 1942), and the "Central Sierra" (Aginsky 1943).

Harrington's list did provide Kroeber with enough responses to characterize cultural relationships among the language-based groups of the central coast. Keeping in mind that Kroeber's "statistical" conclusions have been rejected because they were based upon a fallacy in Klimik's statistical method (Chrétain 1946), we examine two of Kroeber's conclusions from the Central Coast data set pertinent to our examination of Ohlone/Costanoan cultures.

> First, all pairs of groups with high coefficients of similarity were geographic neighbors of the same language family. "In short, ethnic relationship as evidenced by speech made for closer cultural similarity than did geographical proximity" (Kroeber in Harrington 1942:4).
>
> Second, the two Costanoan areas/groups were highly correlated with each other, but "have only negative coefficients" with the Salinans and more southerly groups, indicating that they "possess much the most divergent culture in the area" (Kroeber in Harrington 1942:4).

Surprisingly, Harrington found perfect agreement, no differences between the northern and southern Costanoans for every one of the 288 traits for which both gave information. Seemingly, then, the CED list proved that the Monterey Bay Costanoans and the San Francisco Bay Costanoans were culturally very close to one another. The data set, however, is highly suspect. One problem lies in the fact that 265 of the 288 answers were positive, i.e., negative information that would rule out the presence of a given trait in either or both areas was seldom available. Furthermore, the answered items tended to be traits that were either unique to the Costanoans or items of general California culture that most California groups answered positively.

The second conclusion, that the CED information suggests a negative relationship between the Salinans and Costanoans, is also suspect. Only 213 checklist items were addressed for both the Costanoans and the Salinans. Regarding the weak comparative data set, Kroeber noted:

> This short list probably reflects meagerness of Costano-Salinan culture, largely. It may however be partly due to the list being constructed with reference to Yokuts-Chumash-Gabrielino and weighted for elements known to occur there, with nothing to compensate on behalf of the two northern groups (Kroeber in Harrington 1942:2).

The Costanoans and Salinans shared traits (or stated absence of traits) in 206 of the 213 items that were answered by both groups. Three of the seven areas of disagreement had to do with basketry forms and manufacturing techniques. Another stated that Costanoans "smoke" cured meat, something no other central or southern Californians claimed. Still another indicated Costanoans made flutes, but not of elderberry, again contrary to other central and southern Californians. The basketry differences are interesting and probably meaningful. The only listed disagreement of real ethnographic value between Salinans and Costanoans was an indication that women could be shamans among the Costanoans, but only men could be shamans farther south. Overall, the data sets indicate near identity of Salinan and Costanoan culture, but the weakness of the overall data set renders that conclusion as usubstantiatable as Kroeber's conclusion that the two cultures were quite divergent.

Kroeber never compared the Costanoan CED checklist with more northerly central Californian linguistic groups, even though he and Gifford did develop a checklist and publication for the various Pomo language groups and neighboring Lake Miwok and Patwin (Gifford and Kroeber 1937). The two lists are very difficult to compare, because Kroeber and Gifford (1937) used a completely different "trait numbering" system than Harrington (1942). Nevertheless, we were able to identify 42 important traits that could be compared between the Costanoans in the Harrington (1942) study and four of the most southerly groups in the Kroeber and Gifford (1937) study, the latter being the Cloverdale Southern Pomo, Santa Rosa Southern Pomo, Fort Ross Southwest Pomo, and Coyote Valley Lake Miwok. Complete cultural agreement can be descerned in only 23 of the 42

traits. In four cases one or another northern group concurred with the Costanoans, while other northern groups differed. The Costanoans gave very different answers than any of the northerners in 15 cases. Examples of differences were: Costanoans claimed that their chiefs doubled as their orators, while northerners had a separate office for the orator; Costanoans claimed to have killed unsuccessful shamans, while northerners did not do so; Costanoans plucked excess facial hair with tweezers, while northerners reportedly shaved with sharp flakes; Costanoans used slings to hunt, but not in warfare, while northerners used slings for both; Costanoans played both shinny and a "football race," while the northerners only played shinny; and Costanoans claim to have used feathers to wave smoke down holes to flush out gophers, while northerners hunted the same way without using feathers.

Overall, Kroeber concluded that his CED studies supported language groups as cultural units in south-central California, at least so far as they differentiated Costanoans from Salinans, and Salinans from Chumash. But the complete agreement for 288 traits for the northern and southern Costanoans, as provided by Harrington (1942) is suspect. Harrington was a linguist who learned ethnography in the context of documenting words, phrases, and stories. He brought the texts from one Costanoan person in one area and read them over to people in other areas. The absence of disagreement about cultural practices from one area to the next may have been partly a sign of lack of knowledge, partly a matter of politeness. Farther north, the far more substantial Pomo CED checklist illustrates tremendous variation in cultural detail within the overall Pomo culture area (Gifford and Kroeber 1939). That pattern leads us to suspect that there had been similar variation within the Costanoan language family area. Good evidence for such internal cultural variation will be presented below in this chapter.

Statistical Classification in Western North America Since 1945

Kroeber retired from the University of California in 1946. He never did use the information from the CED checklists to attempt a formal quantitative comparison of western North American groups, nor even of California groups, although he did continue to write about California Indian cultures until his death in 1960. Chrétien's (1946) negative review of his statistical methods may have caused Kroeber to sour on the quantitative approach. Also, Richard Beardsley's (1948) *American Antiquity* paper entitled "Culture Sequences in Central California Archaeology" may have shown Kroeber that archaeological evidence is more useful than strained ethnographic inference for reconstructing past patterns of innovation and diffusion. Be that as it may, other scholars did continue to study quantitative relationships among native North American cultures, most notably Harold Driver (with William C. Massey, 1957; with James L. Coffin 1975) and Joseph Jorgensen (1980).

Driver and Massey (1957:173) produced an atlas of trait distributions across native North America prior to westernization using data from the CED and from George P. Murdock's (1954) world-wide Human Relations Area Files. The underlying purpose of Driver and Massey's work, explained in their final chapter, entitled "An Integration of Functional, Evolutionary, and Historical Theory," was to disentangle the processes of evolution and diffusion in the creation of cultures across traditional native North America. This was the same interest that had provoked Kroeber, one of Driver and Massey's mentors, to begin the CED project. Much of their conclusion is a response to Murdock (1949), who proposed a single functional evolutionary sequence in cultural development around the world involving correlated shifts in subsistance strategy, division of labor, and kinship terminology. Driver and Massey (1957:438) found variations in trait combinations across North America that did not fit the predictions of the single evolutionary model. They did not, however, directly address our research question regarding the cultural and genetic relationships of the native language groups of west-central California.

Driver and Coffin (1975) used computer punch cards and one form of cluster analysis to classify cultural relationships among 245 language-based societies in *Classification and Development of North American Indian Cultures: A Statistical Analysis of the Driver-Massey Sample*. They produced

separate tree diagrams for tribes in each of seven intuitively defined culture provinces of North America. Data for 36 key groups were then re-sorted to form a single tree indicating that a nine-area division best describes the higher level of contact-period cultural diversity across North America. In the nine-fold scheme, all California groups (with the exception of the Tolowa in the far northwest of the state) were merged with the Great Basin and northern Baja California groups into a single California-Great Basin cultural unit.[22] Costanoans were excluded from the study, for want of a robust data set.

The most recent publication in the long series of quantitative analyses of cultural relationships among language-based tribes is Joseph Jorgensen's *Western Indians* (1980). Jorgensen was a student of Harold Driver. His study applied more sophisticated cluster analysis methods to the data set inherited from the CED and from the Human Relations Area Files (Jorgensen 1980:311-313). *Western Indians* is an encyclopedic work, including distributional maps for 260 of the 430 cultural variables that he used. The work includes a two-dimensional scattergram that illustrates the clinal distribution of cultural relationships among most western North American cultures. Figure 11 shows that scattergram, with the tribal plots encircled within seven cultural areas (Jorgensen 1980:89).

Neither the Costanoans nor the richly documented Chumash were included in the analysis that produced Jorgensen's scattergram. The Miwokan, Yokutsan, and Salinan groups that we would expect to have been most like the Costanoans are encircled on the scattergram with the Patwin, Pomoan, and Maiduan groups in a "Northern and Central California" cluster. Yet he reported a cluster analysis tree that suggests a different clustering pattern, one that placed the Miwokan, Yokutsan, and Salinan groups in a "Southern California" cluster together with the west-southern California Shoshonean and Yuman groups, while assigning the Patwin, Pomoan, and Maiduan groups together with the Achomawi, Shasta, and Northwest California groups (Jorgensen 1980:94). The differences between the scattergram and cluster tree suggest that the enclosed areas on the scattergram reflect Jorgensen's intuitive division of the clinally related California linguistic/cultural groups.

Jorgensen explained why he did not include the Costanoan language family area within his study population:

> Because Spanish policies and European-carried diseases ravaged tribes along the California Coast, some tribes, such as the Gabrieliño and Salinan of coastal California, are poorly reported; nevertheless these two are included in the sample. The Chumash from the coastal region near Santa Barbara, and the Costanoans from the coastal region between San Francisco Bay and Monterey Bay were, however, less well reported than either the Salinan or the Gabrieliño and have been excluded (Jorgensen 1980:2).[23]

Jorgensen's rejection of Costanoan data for his ethnographic study supports our conclusion that there is little comparative value in Harrington's 1942 CED material for the Costanoans.

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[22] Driver and Coffin (1975) referenced Jorgensen (1969) for a full description of the type of cluster analysis or numerical taxonomy program that they used to generate their tree diagrams. Statisticians are now aware that very different results may be generated in cluster analysis, depending upon whether "nearest-neighbor, furthest-neighbor, or average neighbor" linkage decisions are used at each cluster level. We did not consult Jorgensen (1969), and thus, cannot report the linkage criteria they used.

[23] The absence of Chumash data from Jorgensen's study is understandable. J. P. Harrington's extensive detailed notes pertaining to Chumash material culture and social organization would, it seems, have provided the necessary basis for their inclusion. However, those notes had not been published when Jorgensen (1980) prepared Western Indians in the 1970s.

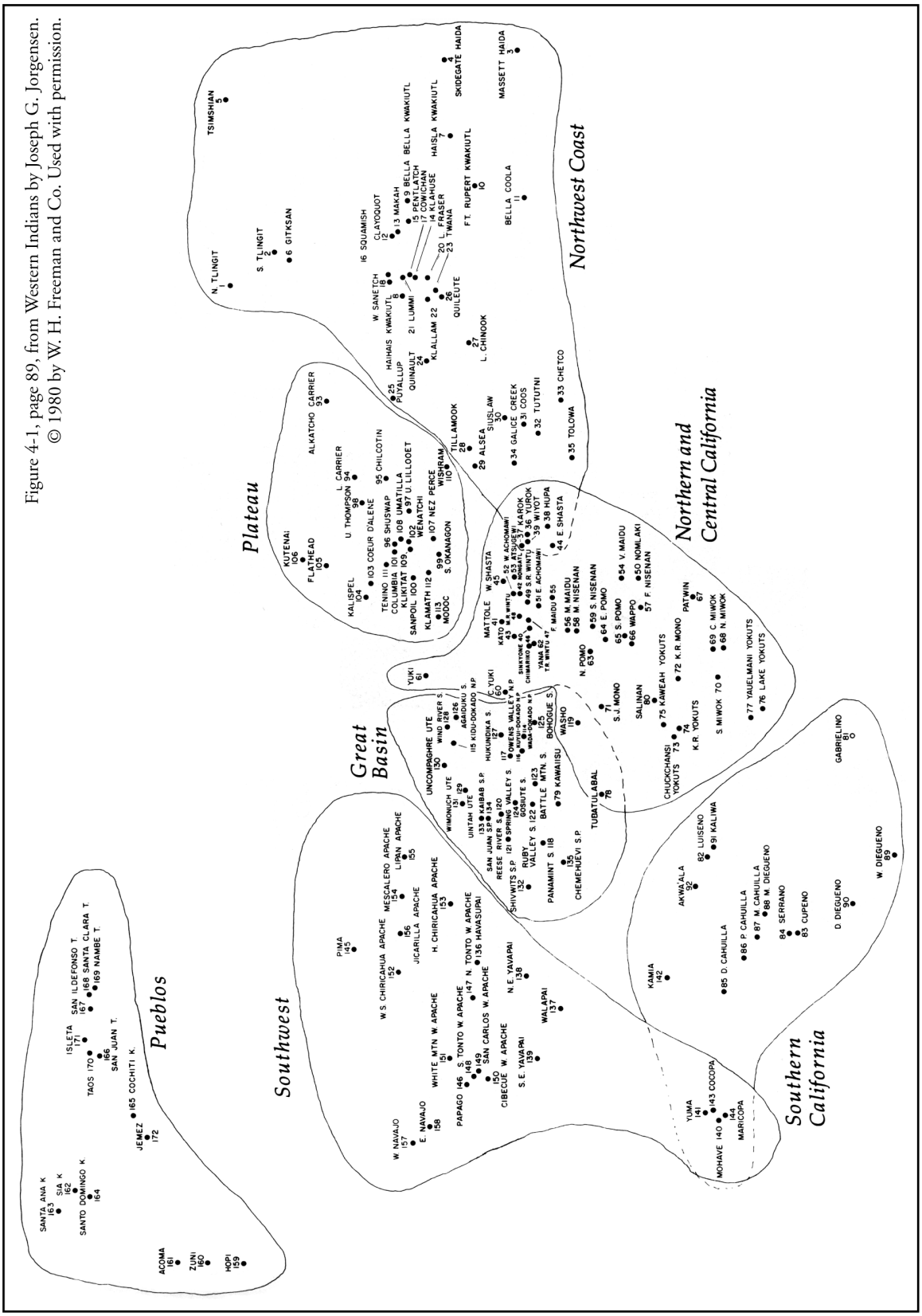

Figure 11. Jorgensen's 1981 Scattergram Showing Cultural Relationships among 172 Western North American Language Groups.

ETHNOGRAPHIC VARIATION IN WEST-CENTRAL CALIFORNIA

In this section we examine the degree to which cultural differences did or did not co-vary with language and language area in west-central California. This is a difficult topic because our data are so limited. The first systematic attempt to collect and publish a broad range of ethnographic information in central California was undertaken in the 1850s by Alexander Taylor, a post-Gold Rush immigrant. Taylor gathered information of uneven quality from Indians themselves, Mexican settler descendants, and interested Anglo settlers. He published the information in a series of articles in *The California Farmer and Journal of Useful Sciences* newspaper between 1860 and 1863. In the 1870s, Hubert Howe Bancroft published material regarding California Indian ethnography, also of uneven quality, in *The Native Races of the Pacific States of North America*. Linguist/anthropologists Alphonse Pinart and Jeremiah Curtin gathered small scraps of information in the 1870s and 1880s within Ohlone/Costanoan territory.

The only detailed interview with an Ohlone/Costanoan Indian published in the nineteenth century took place during the late 1880s, when E. L. Williams (1890) interviewed Awaswas Costanoan descendant Lorenzo Asisara of Mission Santa Cruz. The Asisara interviews contain information about Mission Period history. They do not address questions of pre-contact material culture, social culture, ceremonials, or myths. Field anthropologists began working in California in 1902 with the arrivals of A. L. Kroeber and C. Hart Merriam. Both men spent a small amount of time interacting with Ohlone/Costanoan descendants. Kroeber's "Costanoan" chapter in his 1925 *Handbook of the Indians of California* contains very little information. Merriam (1967:371-403) collected some important information about basketry, food and medicine, and general vocabulary from southern Ohlone/Costanoans in the San Juan Bautista area between 1902 and 1906. Also before 1920, E. W. Gifford of the University of California visited northern Ohlone/Costanoan people in the Pleasanton area and wrote a few notes. Most importantly, J. P. Harrington began working with Ohlone/Costanoans in 1921 and continued to do so into the early 1930s (Mills 1985). Although he was primarily a linguist, Harrington took voluminous notes that included ethnogeography, ethnobotany, family histories, and oral mythic narratives.

Detailed evidence about ethnographic cultural practices in the Costanoan language family area is so sparse that J. P. Harrington (1942) had to lump all of the Ohlone/Costanoans into just two groups, Northern (San Francisco Bay) and Southern (Monterey Bay), in order to get enough material for his quantitative comparison of native cultures from Los Angeles to San Francisco Bay. Jorgensen (1980) had to leave the Costanoan language family out of his comparative study of the tribal groups of western North America, for want of an adequate sample of cultural traits. Furthermore, detailed information is also sparse for the southernmost Coast Miwok, southern Wappo, southern Patwin, Delta Yokuts, and Bay Miwok, all of which were left out of the CED studies and Jorgensen's (1980) *Western Indians*.

The subsections below deal with subsistance economy and material culture to political organization, then to population density, residential flexibility, and intermarriage patterns, and finally to evidence about ceremonialism and mythology. Our main sources are the early diaries and reports of Spanish explorers, missionaries, and government officials.[24] Ethnogeographic, marriage pattern,

[24] The most important early sources, aside from the mission registers, are by Costanso ([1769] in Boneu-Companys 1983); Crespi ([1769] in Brown 2001); Portola ([1769] in Stanger and Brown 1969); Fages ([1772] in Bolton 1930); Crespi ([1772] in Bolton 1926); Rivera ([1774] in Stanger and Brown 1969); Santa Maria ([1775] in Galvan 1971); Anza ([1776] in Bolton 1930a); and Font ([1776] in Bolton 1930b). The initial explorers' diaries provide little information on socio-political and religious organization, but do provide base-line data regarding

and personal name pattern information derives from the Franciscan mission ecclesiastical registers. Some information about material culture, mythology, and kinship terminology derives from the work of early twentieth-century field ethnographers, most particularly J. P. Harrington.

Subsistance and Material Culture

All of the contact-period people of west-central California made their living primarily by harvesting the plant and animal resources of their local environments. They augmented local produce with foods and tool-making resources received in trade from their neighbors. A sexual division of labor existed. Women harvested plant foods, involving an astounding variety of seeds, nuts, fruits, and roots (including corms and bulbs), while men augmented the food supply by fishing and hunting for large and small game. No detailed studies were ever carried out on specific subsistance patterns in any Costanoan language family area because the early Spanish explorers and settlers who witnessed those practices made no more than passing comments about them.

We presume that geographic and ecological factors shaped some material cultural discontinuities in lands where Costanoan languages were spoken. Local tribes that controlled Pacific Coast lands probably used different fishing technologies than groups along the bayshore sloughs or along creeks in the inland Livermore Valley or southern Santa Clara Valley. Groups near redwood trees constructed some shelters of redwood planks, while those along marsh edges used tule bundles to thatch their semi-circular family houses, and those in interior valleys used grass bundles. Such differences are well documented between coastal, Russian river, and Clear Lake Pomo people to the north of the Bay Area (see Kniffen 1939).

Archaeological evidence illustrates important differences in technological traditions between the San Francisco and Monterey Bay Areas during the period immediately prior to Spanish entry. Archaeological evidence suggests, for instance, that the bow-and-arrow came to the San Francisco Bay and to the Monterey Bay Areas along different paths, causing acceptance of distinct arrow point types in the two areas. The distinctive Stockton Serrate point was the first arrow point to appear around San Francisco Bay. It rapidly spread from the Sacramento-San Joaquin Delta to the East Bay, the Marin Peninsula, San Francisco Peninsula, and Santa Clara Valley with the emergence of the Augustine Pattern at approximately AD 1200 (Bennyhoff 1994a, Hylkema 2002 [date modified after Groza 2002]). The first arrow point accepted in the Monterey Bay Area, on the other hand, was the Desert Side-notched (DSN) form. The bow-and-arrow, with DSN point, seems to have arrived in the Monterey Bay Area from the southern San Joaquin Valley. It may not have supplanted the dart in the Monterey bay area until after AD 1500 (Gary Breschini, personal communication to Randall Milliken, 2005).

Baskets were the ubiquitous utensils of California cultures. California basketry construction traditions can be separated into two major groups—coiling traditions and twining traditions. Basketry scholar Ralph Shanks, a student of twentieth-century California basketry expert Lawrence Dawson, points out in his new book, *Indian Baskets of Central California* (2006), that Ohlone/Costanoan utilitarian baskets (boiling, eating, winnowing, storage, and burden) were described to field anthropologists as having been made using twining techniques. The only surviving Ohlone/ Costanoan utilitarian baskets (winnowers) were manufactured with twined techniques nearly identical to the few documented Esselen twined baskets.

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village sizes and material culture. The earliest source on political organization is Pedro Fages' 1775 overview of coastal California ethnography north to Monterey Bay, *A Historical, Political, and Natural Description of California* (Priestley 1937). The final important early Spanish sources are the responses of missionaries in Ohlone/Costanoan territory to the Spanish governments *Interrogatorio* of 1812 (Geiger and Meighan 1976).

> For all Ohlone groups, twining was the most important basketry technique. All or nearly all Ohlone baskets made for every day utilitarian purposes were twined. This Ohlone-Esselen twining was not only culturally important, it was also one of the oldest basketry techniques in all California (Dawson pers. Comm.. in Shanks 2006:32).

The few surviving contact-period Ohlone/Costanoan utility baskets, all twined, come from the Monterey Bay Area. One twined archaeological fragment comes from southwestern Alameda County. Contact-period San Francisco Bay Costanoan utility baskets were also twined, reported one of J. P. Harrington's Chochenyo consultants (Harrington 1942:21-23). Esselen and Ohlone/Costanoan twining featured two of the four important twining techniques found in western North America—plain twining and diagonal twining. Plain twining is common from Alaska to California, while diagonal twining is most commonly found from west-central California south and east into the Great Basin. Shanks (2006:24) suggests that diagonal twining was developed thousands of years ago by proto-Pomoans and proto-Esselens in west-central California, then learned by Utian speakers who later displaced them in the area.

Ohlone/Costanoan coiled baskets were limited to bead-decorated and/or feather-decorated fancy baskets manufactured for gifting. Some of them have been saved in museums in California and Europe. San Francisco Bay groups practiced coiling, but evidence is conflicting regarding whether or not Monterey Bay groups practiced it. According to Broadbent (1972) and Merriam (1967), they did not. Yet four coiled baskets attributed to Santa Cruz and further south have been preserved in museums (Yamane 2002a:130). According to Shanks:

> Not all Ohlone groups made coiled baskets. Surviving coiled baskets came from the San Francisco Bay Area and perhaps as far south as San Juan Bautista. Ohlone coiling apparently became less important the farther south you went in Ohlone country. The Rumsen, a southern Ohlone group, only made twined baskets (Shanks 2006:32).

Of three coiled basketry traditions in central California—Maidu-Patwin-Pomo, Sierra Miwok-Washoe, and Yokuts-Southwestern California—Ohlone/Costanoan coiling is closest to that of the Maidu-Patwin-Pomo group.

> The technical features of Ohlone coiling show that there are clear ties to the cultures to their north and northeast. Ohlone coiled basketry is most closely related to Coast Miwok, Patwin, Wappo and Pomo coiling, in that order. It also shows some relationship to Plains Miwok coiling (Shanks 2006:28).

However some Ohlone/Costanoan coiled basketry elements show a Yokuts influence not present on other north-central California coil work. "Several Ohlone coiled baskets use trimmed weft fag ends, which suggests a relationship to Yokuts work," writes Shanks (2006:28). That led him to suggest:

> The variations in handling weft fag ends and moving ends probably indicate difference in the histories of the eight Ohlone (Costanoan) language groups. Some of the branches of the culture may have arrived in the San Francisco-Monterey Bay Area at different times or have had contact with different cultures (Shanks 2006:28).

Overall, it is clear that there were differences in Ohlone/Costanoan basketry from north to south. However, a full and rigorous comparison of northern and southern Ohlone/Costanoan basketry is impossible because of the paucity of evidence about utilitarian baskets of the San Francisco Bay Area.

Local Tribe Organization

At the time of Spanish entry, the native people of the San Francisco Peninsula did not know themselves as Costanoans or Ohlones. What mattered was local tribe and extended family membership. A. L. Kroeber relied upon late nineteenth-century evidence from the North Coast ranges, Sierra Nevadas, and southern San Joaquin Valley to argue that regional communities were

the ubiquitous form of political organization in central California. He called the units tribelets. Using Pomo and Patwin examples, Kroeber described tribelets in the following manner:

> Each of these seemed to possess a small territory usually definable in terms of drainage; a principal town or settlement, often with a chief recognized by the whole group; normally, minor settlements which might or might not be occupied permanently; and sometimes a specific name, but more often none other than the designation of the principal town. Each group acted as a homogeneous unit in matters of land ownership, trespass, war, major ceremonies, and the entertainment entailed by them (Kroeber 1932:257).

The multi-village groups that Kroeber called tribelets, and which we call "local tribes" were ubiquitous in central California. Most early Franciscan missionaries called the local tribes rancherias (a word they also applied to individual villages), but one scribe at Mission Dolores called the multi-village local tribes of the San Francisco Peninsula "nations." (See Appendix B for details about specific local tribes of the San Francisco Peninsula and see the Mission Registers section in Chapter 1 for background and sources on ethnogeographic reconstruction of central California local tribe territories.) Multi-village local tribes were also documented by Franciscan missionaries in Rumsen and Mutsun Costanoan-speaking areas to the south of San Francisco Bay (see Milliken 1981, 1993, 1994, 2002a).

No early diarists clearly described the intricacies of political organization and group decision-making among San Francisco Bay and Monerey Bay multi-village groups. Early Spanish explorers and missionaries occasionally identified male village or local tribe leaders, and bestowed upon them the title of *capitán* (captain). The Yelamu group had only one captain named by the missionaries. He was Guimas of the village Chutchui (SFR-B 365). The Lamchin of the present Redwood City area, on the other hand, had three contemporary named captains, including Atale (SFR-B 1173), Yunenis (SFR-B 1180), and Gimas (SFR-B 1233). The Lamchin are the only known Bay Area example of a local tribe with multiple-captaincy. Evidence is unclear regarding the nature of the power of these tribal headmen. Captains seem to have been responsible for community coordination and dispute settlement, but their decisions were probably constrained by a myriad of unwritten cultural rules.

Population Density and Distribution

Population was very light in west-central California by today's standards, although it was relatively dense for a nonagricultural society. A. L. Kroeber (1925:882-883) inferred that there had been approximately 7,000 Costanoan speakers at contact, on the basis of village size estimates by travelers and settlers and summary statistics from mission registers. Kroeber (1939:154) proposed a population density of 45-70 people per 100 square kilometers (1.2-1.8 per square mile) throughout Costanoan and Miwok-speaking regions. Soon thereafter Sherburne Cook (1943a:183-186) used Franciscan mission register tallies to reconstruct average contact period tribal population densities on San Francisco Bay in the 1.8-2.2 per square mile range, 3.75 people per square mile in the Santa Cruz area, and 1.8 people per square mile in the Soledad area. Martin Baumhoff (1963:223-224) compared Cook's 1943 figures against his model of rainfall and vegetation, and came up with an upward revision to 3-5 people per square mile in the South Coast ranges as a whole. Subsequently, Cook (1976:37) revised his own estimate upward for the South Coast ranges, including the southern portion of the San Francisco Bay Area, from his 1943 average of 2.0 to 2.4 people per square mile.

The most recent South Coast Range population density study was conducted by the senior author of this report. Milliken (2006) used mission register baptismal evidence to model population densities for all Costanoan and Bay Miwok-speaking local regions from the San Benito River watershed and Big Sur north to the Carquinez Strait (Table 4). Population density varied in 34 Costanoan language family study regions from a high of 6.3 persons per square mile to a low of 1.1 persons per square mile. Highlights are as follows:

Table 4. Community Distribution Model Population Density Results for South Coast Range Regions (from Milliken 2006).

ZONE / REGION	BAPTIZED ADULTS	PRE-MISSION MORTALITY FACTOR [a]	ADJUSTED TOTAL POPULATION	POPULATION PER SQUARE MILE	LANGUAGE	COMMUNITIES (WITH HOME MISSION CODE)
SAN FRANCISCO PENINSULA						
North Peninsula	68	0.99	137	2.61	SF Bay Costanoan	Yelamu (FR)
Half Moon Bay	77	0.95	162	1.35	SF Bay Costanoan	Pruristac (FR), Chiguan (FR), Cotegen (FR)
West Bayshore	235	0.91	516	3.90	SF Bay Costanoan	Urebure (FR), Ssalson (FR), Lamchin (FR)
Point Año Nuevo	198	0.90	440	2.89	SF Bay Costanoan	Oljon (FR), Quiroste (FR/CL/CR)
Portola Valley	117	0.89	263	4.27	SF Bay Costanoan	Olpen (FR/CL)
EAST BAY AREA						
East Bayshore - North	327	0.84	779	5.21	SF Bay Costanoan	Huchiun (FR), Huchiun-Aguasto (FR)
East Bayshore - South	524	0.83	1,263	5.61	SF Bay Costanoan/Miwok	Tuibun (CL/JO), Irgin (JO), Jalquin (FR)
Diablo Valley	309	0.75	824	4.18	Bay Miwok	Saclan (FR), Tatcan (FR/JO), Chupcan (FR/JO)
Livermore Valley	304	0.75	811	3.73	SF Bay Costanoan	Causen (CL/JO), Seunen (JO), Souyen (JO)
Brushy Peak	78	0.72	217	1.73	SF Bay Costanoan	Ssaoan (JO)
Marsh Creek	77	0.69	223	1.99	Bay Miwok	Volvon (FR/JO)
Carquinez Strait	99	0.59	336	5.97	Karkin Costanoan	Carquin (FR)
INTERIOR SANTA CLARA VICINITY						
Santa Clara Valley	779	0.89	1,751	6.28	SF Bay Costanoan	Tamien (CL), Alson (CL), Puichon (CL/FR)
Saratoga Gap	76	0.87	175	2.11	SF Bay Costanoan	Partacsi (CL/CR), Lamaytu (CL)
New Almaden	188	0.87	432	2.82	SF Bay Costanoan	Ritocsi (CL/CR), Matalan (CL)
Hall's Valley	122	0.84	290	2.52	SF Bay Costanoan	*Paleños* (CL)
Upper Alameda Creek	190	0.81	469	1.92	SF Bay Costanoan	Taunan (JO), Asirin (CL, JO)
Morgan Hill	158	0.81	390	2.75	SF Bay Costanoan	Somontac (CL/CR)
San Antonio Valley	107	0.69	310	1.93	SF Bay Costanoan	Aloc (CL), Murcuig (CL)
Corral Hollow	83	0.65	255	1.59	SF Bay Costanoan	Luecha (CL, JO)
Orestimba Creek	204	0.65	628	1.64	SF Bay Costanoan	Tayssen (CL)
Del Puerto Creek	102	0.59	346	1.64	SF Bay Costanoan	Juñas (CL)
SOUTH OF SAN FRANCISCO BAY AREA						
Santa Cruz Mountains	276	0.88	627	1.82	Awaswas Costanoan	Uypi, Cotoni, Sayantac, Chaloctac, Aptos (all CR)
Gilroy	164	0.83	395	2.81	Awaswas or Mutsun	Chitac (CR), Pitac (CR), Uñijaima (JB)
Burra Burra Mountain	62	0.72	172	1.42	Awaswas or Mutsun	Auxentac (CR)
Los Banos Creek	186	0.69	539	1.78	Mutsun Costanoan	Tamarron (JB), Tomoi (CR)
San Juan Bautista	133	0.84	317	2.12	Mutsun Costanoan	Mutsun (JB/CA)
Tres Pinos/Panoche Creeks	207	0.81	511	1.38	Mutsun Costanoan	Pagsin (JB)
Hollister	144	0.78	369	2.09	Mutsun Costanoan	Ausaima (JB), Chipuctac (CR)
Little Panoche Creek	139	0.72	386	1.40	Mutsun Costanoan	Orestac (JB)
Monterey Bay	248	0.84	590	2.33	Rumsen/Mutsun	Calendaruc (CA/JB), Guachirron de la Playa (JB)
Carmel Valley	221	1.02	433	2.47	Rumsen Costanoan	Rumsen (CA)
Big Sur Coast	85	0.94	181	1.41	Rumsen Costanoan	Sargentaruc (CA)
Upper San Benito River	378	0.78	969	1.49	Chalon Costanoan	Chalon (SO), Escoyzama (SO/AN), Zula (AN)
Silver Creek	133	0.72	369	1.11	Chalon Costanoan	Ochentac (JB), Milanistac (JB), Chapana (SO, JB)

Notes: **Mission codes are like those for mission register citations, as shown in Table 1, but with the lead "S" removed.** [a] "Pre-Mission Factor" adjusts baptized adult population upward to generate inferred "pre-mission" population (Milliken 2006:21-22).

- The highest population density in Costanoan language family lands was 6.3 people per square mile in the northern Santa Clara Valley (Los Altos-San Jose) area. Other high population areas (5.0-6.0 persons per square mile) were along the east shore of San Francisco Bay and on Carquinez Strait. (Coast Miwok populations around San Pablo Bay to the north were higher yet, perhaps reaching 12 persons per square mile on the lower Petaluma River.)
- Population densities that can be called moderately high (3.7-4.3 persons per square mile) were along the bay shore portion of the San Francisco Peninsula, in the Portola Valley area west of present Palo Alto, and in the Livermore Valley to the east of San Francisco Bay. Bay Miwok groups in the Diablo Valley, adjacent to the San Francisco Bay Costanoans, had similar population densities.
- Mid-range population densities (2.0-3.0 persons per square mile) occurred in Yelamu lands at the north end of the San Francisco Peninsula, in the Point Año Nuevo vicinity along the San Mateo coast, the southern Santa Clara Valley from Morgan Hill to Hollister, along the central Monterey Bay coast, and in the Carmel Valley.
- Low population densities (1.0-2.0 persons per square mile) occurred in two kinds of marginal habitats, the dry interior and the most heavily forested of the coastal areas. The coastal low population areas were the Half Moon Bay-Purisima Creek areas of the San Mateo coast, the Santa Cruz Mountains-San Lorenzo River area, and the Big Sur region south of the Monterey Peninsula. The inland low population areas included the entire inner Coast Ranges from the San Antonio Valley area east of San Jose south to the upper San Benito River and Panoche Creek areas east of the Salinas Valley.
- The lowest population density in any Costanoan language area was 1.1 people per square mile in the dry Silver Creek region, overlooking the San Joaquin Valley east of Mission Soledad.

The total population of the various Costanoan language speakers, prior to the Spanish settlement, was probably around 17,000.

Populations of specific local tribes typically ranged between 200 and 300 people thoughout the lands of Costanoan speakers. Exceptionally large local tribes, such as the Huchiuns of the Richmond area in the East Bay and the Rumsens of the Carmel Valley, had populations of over 400 people. Some small independent bands of the sparsely populated areas included less than 50 people.

All but the smallest local tribes were divided for most of the year into three to five village groups. Specific village residence was flexible. In fact, village populations were ephemeral, subject to change on a seasonal and yearly basis. Residential flexibility is documented through family reconstitution studies of the earliest, most-detailed, mission records, those of missions Carmel and Dolores. The records show that Yelamu couples at Mission Dolores and Rumsen couples at Mission Carmel often had offspring born at two or three different villages of the group (Milliken 1983). Additionally, one Mission Dolores baptismal entry describes the seasonal movement of a Ssalson family from the San Mateo vicinity:

> I baptized…a girl of about six months age… Her father…and mother…are native of the village of Olestura, who, like all the aforesaid [baptized on this day], live without partiality, now along the tributaries of the San Mateo River, again at the aforesaid village, as well as at Sycca, and they come as far as Guriguri and San Bruno (SFR-B 178 in 1778).

Documentation for residential flexibility is also found in Spanish explorer diaries. One of the small villages that the first Spanish explorers of the Portola party visited was Pruristac (Aramai group) in San Pedro Valley, adjacent to the Mori Point GGNRA parcel. On October 31, 1769 as the explorers

approached the valley from the south over the Montara Mountain grade, they were greeted by 25 native people (Portola [1769] in Stanger and Brown 1969:94). Reaching the valley floor, they received food that the local people brought to them from their village (Crespi ([1769] in Brown 2001:593); the village was almost certainly Pruristac. Two weeks later, on their return south through the San Pedro Valley, the Spaniards noted that the native people were gone (Crespi [1769] in Brown 2001:617).

The San Andreas rift valley (the present location of Crystal Springs Reservoir) was reported to be uninhabited in November of 1769 by the Portola party. Yet on the last day of November in 1774, the Rivera-Palou expedition reported five "large" villages in that valley, west of San Mateo and Redwood City. Wrote diarist Francisco Palou:

> The first expedition that passed here did not give it a name on account of not finding any villages, while now, in the short stretch that we have traveled, we have found five large ones. From this it is inferred that the country is well populated and that the inhabitants move their villages readily from place to place (Palóu [1774] in Bolton 1926:3:272).

Villages that were in use tended to vary in population size from 40 to 200. Villages of about one hundred inhabitants were considered to be of "good size" (Anza [1776] in Bolton 1930a:133, 134), while villages with populations of around forty inhabitants were "not large" (Palóu [1773-1783] in Bolton 1926:3:290). Farther south, the Carmel Valley Rumsens, baptized prior to the spread of endemic diseases, had five villages with baptized populations of 37, 68, 74, 85, and 144 (Milliken 1987:52-56), which suggests that village sizes in the Monterey Bay Area were equivalent to those of the San Francisco Bay Area.

"Large" villages of 200 and 250 inhabitants were visited by explorers at Whitehouse Creek on the coast at Point Año Nuevo and at San Francisquito Creek on the bay shore, respectively (Crespí [1769] in Stanger and Brown 1969:87; Font [1776] in Bolton 1930b:326, 366). The largest Bay Area village reported by Spanish explorers was said to have contained 400 people. It was across the bay from the San Francisco Peninsula, in Huchiun or Huchiun-Aguasto territory in the present Contra Costa County area. Its large population was reported in the summer of 1775 (Cañizares [1775] in Galvin 1971:96) and again in the spring of 1775 (Anza [1776] in Bolton 1930a:125). No other reports suggest villages of more than 200 people. It is hard to understand how a village of 400 could have been maintained over time by the people of present western Contra Costa County, given the small size of Rodeo and Pinole Creeks, the two creeks in the area where the village was reported. Perhaps the village was a site of temporary regional trade fairs or ceremonial activities, and was twice visited by explorers when a festival was taking place.

Social Interaction Spheres

Members of local tribes in west-central California participated in intensive spheres of direct social interaction with their immediate neighbors, and spheres of maximum social interaction with more distant groups up to 26 miles away. The spheres of direct social interaction are reflected in patterns of exogamy (group outmarriage to neighbors). Mission registers provide evidence for the patterns of exogamous marriage for many local tribes in Costanoan language family territory.

Mission baptismal and marriage records explicitly document many couples who renewed their marriages at the mission and originally came from two different local tribes. The intermarriage data suggest that small groups of 40-50 people, such as Urebure and Pruristac on the San Francisco Peninsula, were as much as 80% exogamous, that is to say, that in eight out of ten marriages, one of the spouses derived from a surrounding group. In groups with larger populations of 200-300 people, such as the Ssalsons and Lamchins of the Peninsula, about half the couples had spouses from

neighboring groups, making them 50% exogamous (Milliken 1983:122-124). The exogamy pattern for the largest Peninsula group, the Puichons of the Los Altos/Palo Alto area (who may have had 420 members), is masked because half of them moved to Mission Santa Clara, where the people from lands east, south, and west of Los Altos/Palo Alto were not identified by their local tribe affiliation in the mission records. The Puichon exogamous marriages that can be documented are with Oljons, Olpens, Lamchins, and Ssalsons, with enough examples to suggest that even they were at least 20% exogamous to neighboring groups.

The marriage networks of the small local tribes overlapped like shingles on a roof.[25] Most exogamous marriages involved spouses from contiguous local tribes, people who had grown up within eight to 14 miles of one another. That exogamy pattern brought all groups into marriage pools of at least 500 people. The pattern makes sense in the light of studies that have shown that small-scale human populations around the world, prior to the introduction of modern transportation, participated in marriage pools of at least 500 people, whether their normal daily face-to-face communities were only 20 people or 400 people (Adams and Kasakoff 1976). Small groups needed to find mates for their young people among neighbors in societies where half the members were under 15 years old and where taboos precluded sibling marriages and some cousin marriage.

Once the San Francisco Peninisula people reached out to a pool of 500 people for marriages, there seems to have been little incentive to reach out farther. However occasional longer-distance marriage links are documented in the mission registers. For instance, a marriage between a coastal Oljon man (SFR-B 588) and a bayshore Ssalson woman (SFR-B 1202) is documented in their child's baptism record (SFR-B 808); the heartlands of those two groups was about 18 miles apart. The longest distance of documented San Francisco Peninsula marriages involved spouses from places 26 miles apart. A woman from the Yelamu village of Chuchui and a man from the Cotegens on the Pacific Coast, 26 miles to the south, were already married when they were baptized in 1786 (SFR-B 534, 535). Another Yelamu woman, this time said to be from Sitlintac, had been living with her husband Caronon among the Chupcans in the Concord region, 26 miles to the east in the Diablo Valley, prior to the baptism of their child at Mission Dolores in 1779 (SFR-B 119, 401).

Exogamous marriage patterns in the Monterey Bay Area were similar to those around San Francisco Bay (King 1994; Milliken 1987:74). Throughout central California people were tied together in a fabric of social and genetic relationships through intertribal marriages, despite their political divisions. Marriage pool distances probably reflected direct social interaction spheres for trade and ceremonial interaction, but no direct evidence is available to support that inference.

Boundary Maintenance and Conflict

The same local tribes that inter-married with one another occasionally fought to defend boundaries against one another. Territorial disputes and wife-stealing were the most commonly documented reasons for inter-group hostility in central California, according to Pedro Fages in 1775 :

> The land also provides them with an abundance of seeds and fruits...although the harvesting of them and their enjoyment is disputed with bow and arrow among these natives and their neighbors, who live almost constantly at war with each other (Fages [1775] in Priestley 1937:70).

[25] Marriage networks were not impeded by language borders. For example, the Huchiuns of Oakland-Richmond (San Francisco Bay Ohlone/Costanoan speakers) intermarried with the Coast Miwok-speaking Huimens, the Karkin Ohlone/Costanoan-speaking Carquins, and the Bay Miwok-speaking Saclans.

Diarists of the Anza-Font expedition documented an example of territorial defense and conflict between intermarried neighboring groups on the San Francisco Peninsula in 1776. Expedition Chaplain Pedro Font reported the following at a Lamchin village in the present Redwood City vicinity:

> One of them was wounded in the leg by an arrow, and another stood with his bow and arrows making signs and gestures as if he were fighting, and pointing out the wound. From this we inferred that he was telling us how they were at war with other villages ahead, and was trying to persuade us not to go there because they were very warlike (Font [1776] in Bolton 1930b:328).

Font's "villages ahead" belonged to the Ssalson local tribe of San Mateo. The Lamchin-Ssalson boundary was somewhere between present Redwood City and San Mateo. After exploring the north end of the San Francisco Peninsula a few days later, Juan Bautista de Anza wrote:

> In the district which I have examined today and from which I returned at five o'clock in the afternoon, I have also encountered numerous and docile heathen, who have accompanied me with great pleasure but without going a step outside of their respective territories, because of the enmity which is common among them (Anza [1776] in Bolton 1930a:129).

Most hostile encounters were individual ambushes or ritualized small group face-offs, but archaeological evidence of group graves indicates that larger-scale conflicts occassionally erupted.

Kinship Terminology

Kinship terminology suggests that Ohlone/Costanoan kinship organization was like that of the more southerly Salinan, Chumash, Takic Shoshonean, and Numic Shoshonean language groups, and markedly different than that of the neighboring Miwokan, Wintuan, and Yokutsans, according to Levy (1978a:488). Levy found enough information to characterize the kinship systems of the Chochenyo (San Francisco Bay), Awaswas, Mutsun, Rumsen, and Chalon language speakers. Levy culled information from the field notes of J. P. Harrington to show differences in terminology between each Costanoan language area. Similarities and contrasts between language groups vary, depending upon the kinship term in question.

In identifying offspring, all Chalon men and women used the same words for sons and daughters, as Americans do. Mutsun and Rumsen men differentiated "son" and "daughter" terms, but Mutsun and Rumsen women lumped together offspring with a term equivalent to "child." Awaswas and San Francisco Bay (Chochenyo) speakers had a four-part system, specific terms used for "son" and "daughter" by men and two other specific terms used for "son" or "daughter" by women.

In reference to both grandparents and grandchildren, the San Francisco Bay speakers (Chochenyo) and Rumsen were like each other and like most Miwokan groups, while the Mutsun and Awaswas were like each other, but in ways that were similar to the Salinan and Yuman groups to the south. Terms for father's brother and mother's brother were equated in both San Francisco Bay (Chochenyo) and Rumsen, a system that is like the American system, but unlike the system of any other core California group. San Francisco Bay (Chochenyo) niece and nephew terminology contrasts with that of the Awaswas, Mutsun, Rumsen, and Chalon.

Levy reached the interesting conclusion that the kinship terminologies of the Rumsen in the south and the Chochenyo dialect of San Francisco Bay Costanoan in the north were most similar to one another, and to the underlying proto-Costanoan kinship terminology. Mutsun, Awaswas, and Chalon kinship terminologies differed from each other in many ways, but all seem to have been influenced by Salinan kinship terminology (Levy 1978a:488). In kinship terminology, at least, there is no dichotomous split between Monterey Bay and San Francisco Bay Ohlone/Costanoan culture.

Ritual and Mythic Narrative

Ritual activities and mythic narratives form integrated systems in today's dominant religions, including Buddhism, Christianity, Hinduism, and Islam. The mythic narratives explain the nature of the world and of the supernatural beings with whom humans interact, while individual and community rituals involve contemplation of, or supplication to, the supernatural beings of the mythic narrative. Such may have been the case in native central California, but anthropological documentation, including documentation of metaphor and figurative allusion, is so superficial in the area that the connection between myth and ritual is not recognizable.

Throughout west-central California oral narratives about creation and the nature of the universe shared common over-arching themes (Barrett 1933:466-482; Gayton 1935:588-591). They documented how present events and places in nature were determined by the actions of a prehuman race of supernatural beings during a former mythological age, but they also suggested the on-going activity of those supernatural beings in the contemporary world of the story teller. The specific narratives of each group were linked to the local landscape, and served as a charter that established the group's origins and rights of ownership to a particular territory. Most of the Central California narratives that have been recorded emphasize male skills and dependence upon knowledgeable older male mentors. Some stories describe the occurrence of floods or wild fires as a consequence of avarice or rule-breaking. Many narratives stress the dangers of interacting with neighboring peoples holding contrary allegiances (Barrett 1933; Gayton 1935; Gifford 1917; Kelly 1978; Merriam 1910; Radin 1924).

It is impossible to know the degree to which oral narrative themes varied among all of the Ohlone/Costanoan groups, because no Ohlone/Costanoan myths have been handed down from the Awaswas or Mutsun speaking local tribes, from the Ramaytush or Tamyen dialect areas of the San Francisco Bay-speaking tribes, or from the Karkin. However a separation of northern and southern oral traditions is indicated from the two bodies of Ohlone/Costanoan traditional stories that are available. The northern stories come from J. P. Harrington's Chochenyo (Mission San Jose dialect of San Francisco Bay Costanoan) consultants, while the southern stories come from a number of Rumsen sources in the Monterey-Carmel vicinity (Ortiz 1994). Chochenyo creation myths feature Coyote and his grandson *kaknu*, the falcon; similar stories are told among the Wappo and all of the Miwok-speaking peoples. Rumsen myths come out of a different tradition. They feature Eagle, Coyote, and Hummingbird, a group of individuals who commonly appear in Yokuts and Salinan oral narrative (Gayton 1935:595; Ortiz 1994).

Kroeber (1925:855-859) recognized four traditions of public ritual activity in native California, and no subsequent scholars have disagreed. A ceremonial system centered around "Dances of Wealth Display" existed in Northwest California. The "Secret Society and Kuksu Dances" ceremonial system was practiced in north-central California south to Salinan language territory. Most of south-central and southern California was within the "Jimson Weed Initiation" area, with a special "Chinigchinich with Sand Painting" form in Takic Shoshonean-speaking areas of Southern California. The "Desert System of Dream Singing" ceremonial system held sway along the Colorado River and in present Imperial County (Kroeber 1925:Plate 74).

The label "Kuksu Cult" covers a number of fairly well-described ceremonial dance systems, including those of the Pomoans, Patwin, Nisenan, Coast Miwok, Plains Miwok, and Sierra Miwok. Many of the groups classified as members of the cult had neither dances nor dance personages called Kuksu. They did have in common the secret dance society, initiation into the society by novices, and control of dance performances by elders who served as directors. According to Kroeber:

> The Kuksu cult was the only one in California which directly impersonated spirits and had developed a fair wealth of distinctive paraphernalia and disguises for several mythic characters. This is a feature which probably grew up on the spot. It cannot well

> have reached central California from either the Southwestern or North Pacific coast areas (Kroeber 1922:305).

Among the well-documented Pomoan groups membership in the Kuksu society was selective, and Kuksu leaders tended to be professional specialists in other areas, such as headmen, shamans, bead makers (Bean and Theodoratus 1978:294).

Northern Ohlone/Costanoan (Mission San Jose) ritual was documented by J. P. Harrington, who learned that the Hiwey, Lole, and Kuksu dances, associated with the cult to the north, were practiced at Mission San Jose. Since so many northern groups moved to Mission San Jose during the historic period, it is uncertain if those dances were practiced in the East Bay prior to the Mission Period. Good evidence for spirit-impersonation dances among San Francisco Bay Costanoan-speakers in the earliest days at Mission San Jose is found in Langsdorff's painting of partially outfitted dancers in typical central California regalia at that mission in 1806 (plate in Langsdorff 1814, see also Milliken 1995, title page, [original at The Bancroft Library]).

Merriam recorded the names of dances among the Rumsen of Carmel Valley that translate as medicine man's dance, devil's dance, bear dance, coyote dance, dove dance, and puberty dance (in Broadbent 1972:79). These names are unlike the names of specific dances within the north-central California dance cycles, and seem to represent a separate tradition.

Finally, Harrington (1942:37, 45) received vague information to the effect that boys ingested jimson weed to augment vision quests among both northern and southern Ohlone/Costanoans. That practice is generally recognized as a Southern California trait. It may have been brought to the historic mission communities by Yokuts-speaking people.

ARCHAEOLOGY, PHYSICAL ANTHROPOLOGY, AND LINGUISTIC PREHISTORY

Ethnographic evidence suggests some separation between the cultures of Costanoan language family speakers of the San Francisco Bay and Monterey Bay Areas, as we have seen in evidence presented above. In this section we look at evidence for the emergence of these differing Ohlone/ Costanoan cultures in prehistory. We examine the archaeological records of both areas as far back as they reach. We also examine evidence from physical anthropology, new mtDNA evidence, and evidence suggested by reconstructed proto-languages.

Archaeological Sequences in Ohlone/Costanoan Territories

Native west-central Californians were hunters and gatherers from the time they arrived, at least 14,000 years ago, until they joined the missions. Initially they concentrated on big game hunting, possibly contributing to the demise of Pleistocene fauna in western North America. Later people developed a generalized mixed-resource gathering lifestyle that has been called the Archaic lifestyle (Willey and Phillips 1958), similar to the Epipaleolithic of the Middle East (Byrd 2005) and the Mesolithic of Europe (Jochim 1998). Archaeologists have developed names for the cultural "phases" or "facies" of California's past, in order to highlight periods of change and continuity. In this section, we follow the classificatory systems for the prehistoric cultures of the San Francisco and Monterey Bay Areas that are documented in the new volume entitled *California Prehistory: Colonization, Culture, and Complexity* (Jones and Klar 2007).

Little is known about the cultures of either the Monterey Bay or San Francisco Bay Area during the 11,500-3500 BC period. But much is known about times since 3500 BC. The cultural records for the two areas are so distinct that they have been separated into two different chapters in *California Prehistory*. San Francisco Bay Area prehistory is described in the chapter entitled "Punctuated Culture Change in the San Francisco Bay Area" (Milliken et. al. 2007), while Monterey Bay Area prehistory is documented in the chapter entitled "The Central Coast: A Midlatitude

Milieu" (Jones et. al. 2007). Below we compare San Francisco Bay and Monterey Bay cultural patterns and phases over five major periods of the past 13,500 years.

11,500-10,000 BC – Clovis Pattern Big Game Hunter Pattern

The earliest definite culture in western North America was that of the specialized big game hunter groups that manufactured large Clovis spear blades. It is inferred that the small groups of mobile foragers of this time period relied upon mammoth and bison herds for their primary food sources. Evidence for their presence in the 11,500-10,000 BC period, the terminal Pleistocene, occurs all across North America. But no such evidence has yet been found in the San Francisco or Monterey Bay Areas. It is generally believed that they lived in the two areas, but all evidence has either been washed away by stream action, buried under Holocene alluvium, or submerged on the continental shelf (Rosenthal and Meyer 2004:1).

10,000-3500 BC – Early/Middle Holocene (Lower Archaic) Millingstone Pattern

A generalized mobile foraging lifestyle prevailed throughout California during the Early Holocene and the first half of the middle Holocene. It was characterized by the milling slab and handstone, used to process hard seeds into edible meal, and by a variety of large wide-stemmed and leaf-shaped projectile points. Millingstone components have been documented in buried sites around the edges of the San Francisco Bay Area, including sites CCC-637 and CCC-696 at Los Vaqueros reservoir in the hills east of Mt. Diablo (Meyer and Rosenthal 1997), SCL-178 at Metcalf Creek in the Santa Clara Valley-Hollister corridor (Hildebrandt 1983; Fitzgerald and Porcasi 2003), and at SCL-65 at Saratoga in the western Santa Clara Valley (Fitzgerald 1993). Millingstone pattern components have also been documented in the Monterey Bay Area at MNT-228 (Breschini and Haversat 1991), MNT-229 (Jones and Jones 1992), and MNT-234 (Milliken et al. 1999), all in the Elkhorn Slough-Moss Landing vicinity. During this period there is no evidence of any important cultural differences between Monterey Bay and San Francisco Bay people.

3500-500 BC – Early Period (Middle Archaic) Split Sequence
Lower Berkeley Pattern on San Francisco Bay, Hunting Culture Pattern on Monterey Bay

At the beginning of the Early Period, about 3500 BC, mortars and pestles appeared in many locations in west-central California. Mortar and pestle technology is believed to be associated with intensive acorn harvesting and processing, concomitant with increased population and the beginnings of sedentary village life. On San Francisco Bay, a specialized incipient sedentary collector pattern emerged at approximately 3000 BC. This pattern, in which stone bowl mortars and pestles are abundant while millingslabs and handstones are absent, is the Stege Phase expression of Fredrickson's (1973) Berkeley Pattern. It is marked by a variety of bone punches, gouges, flakers, and serrated scapulae saws, as well as large numbers of grooved stone net sinkers (see Elsasser 1978, Gerow 1968). Rectangular beads cut from the wall of the olivella and abalone shell appear for the first time and mark the Early Period throughout California and western Nevada. The earliest known cut-and-shaped shell beads in a San Francisco Bay Area burial were recovered at SCL-832 in Sunnyvale and date to 3590 BC; the grave also contained red ocher and exhibited pre-interment burning (Cartier 2002). Emergence of a sedentary lifeway is suggested by rich midden at the West Berkeley mound (Wallace and Lathrop 1975). The large oval house floor of a sedentary village in Walnut Creek has recently been dated to 1500 BC (Price et al. 2006).

During the Early Period on Monterey Bay, mortars and pestles first appeared as a minor part of a groundstone assemblage dominated by milling slabs and handstones. The local expression of this mixed use pattern, labeled the Saunders Phase, also includes various notched, square-stemmed, and long-stemmed dart point forms (Jones 1998). Occasional burials on the Monterey Peninsula from this

period contain rectangular olivella shell beads (Breschini and Haversat 2002:57, Cartier et al. 1993). A similar cultural assemblage is found along the Santa Cruz-San Mateo coast during this time (Hylkema 1991). Jones and Ferneau (2002:213) associate this mixed groundstone, mixed projectile point assemblage with the "Hunting Culture" of the same time period on the Santa Barbara Channel. The predominance of millingslabs and the nature of other site materials indicate that the Monterey Bay people were continuing a mobile foraging lifestyle in the Early Period.

500 BC-AD 1050 – Middle Period (Upper Archaic) Split Sequence: Upper Berkeley Pattern in the San Francisco Bay Area, Hunting Culture Pattern in the South

The beginning of the Middle Period was marked by new shell bead forms, the most common being the olivella shell Saucer, replacing the Early Period bead forms throughout California. Cobble mortars continued to be the sole grinding tool in the central bay, although mixed mortars and millingslabs continued to be used at the inland peripheries. New leaf-shaped projectile points and new bone artifact types appeared. New site locations were occupied, many of them bay shore midden sites that would grow to become mounds and be inhabited off-and-on until the Spanish arrival. These midden mounds seem to have been stable villages with mortuaries. Flexed burial, with occasional cremation, continued as the main interment custom of the first half of the Middle Period. Diversity of grave goods increased from earlier times, but remained limited to a small portion of the Middle Period burials. The presence of mortars and flexed burials led Fredrickson (1973) to call this Middle Period phase a continuation of the Berkeley Pattern. Yet it is very different from the Lower Berkeley Pattern of the Early Period, with its new site locations, new tools, increase in burial wealth, and evidence of increased sedentism. This increasingly complex incipient collector Upper Berkeley Pattern is labeled the Ellis Landing Phase on San Francisco Bay, following Beardsley (1954).

About half way through the Middle Period, a different cultural expression replaced the Ellis Landing Phase culture in part of the San Francisco Bay Area. The Meganos Pattern pushed from the east into the interior valleys of the East Bay at about AD 450. It rapidly spread onto the Fremont Plain and down into the Alviso area of the Santa Clara Valley, where it lasted for another 200 or 300 years, until about AD 800. Its primary distinction from Ellis Landing was its off-village cemeteries and nearly ephemeral village sites, suggesting a more frequent seasonal shift of villages. Meganos burial practice, involving extended burials, was also distinct from the Ellis Landing Phase. Bennyhoff (1994b) considered Meganos a derivative of the Early Period Windmiller Pattern of the Sacramento-San Joaquin Delta. Even at the height of Meganos presence in the East Bay interior and Fremont, the Ellis Landing Phase of the Berkeley Pattern continued in place in most of the south part of the San Francisco Bay shore, on the west side of San Francisco Bay, and along the East Bay shore in the Oakland-Richmond area. Both Ellis Landing people and Meganos people participated in the Upper Middle Period trade network marked by distictive olivella shell Saddle beads. However, the central California Saddle beads never replaced olivella saucer beads in southern California and the Monterey Bay Area.

On Monterey Bay, the Middle Period may have been preceded by a period of cultural collapse. Breschini and Haversat (2002) report that the number of inhabited sites seems to have dropped precipitously during an 800 year period from 900-200 BC, essentially the Early/Middle Transition. Site occupation then returned to the pre-gap levels. The cultural pattern seems to have continued much as it had during the Early Period, according to Jones (1998). Bowl mortars and milling equipment both continued in use, as did the contracting-stem and side-notched projectile points that had characterized the previous Saunders Phase. Olivella Saucer beads replaced the earlier rectangles, as elsewhere; few beads or other items are found with burials, and many of the saucer beads are poorly rounded, suggesting casual local manufacture. Jones et al.(2007:137) call this Middle Period culture on Monterey Bay the Vierra Phase, and consider it a continuation of the Hunting

Culture, with its reliance on a mixture of portable millingslabs and heavy mortar stones for vegetal processing. Breschini (personal communication, 2006), on the other hand, emphasizes the increase in proportion of mortars to millingslabs during the Middle Period and argues that at least some of the sites indicate incipient collector land use like that of San Francisco Bay's Berkeley Pattern. Also, Breschini and Haversat (2002:31) present evidence for a shift in settlement pattern on the Monterey Peninsula at AD 660, at which time many Middle Period sites were abandoned and new sites were occupied that continued to be utilized through the Late Period.

AD 1000-1770 – Late Period Split Sequence: Augustine Complex Collectors on San Francisco Bay, Rancho San Carlos Incipient Collectors on Monterey Bay

In the San Francisco Bay Area, a major cultural shift began at AD 1000, the start of the . Middle Period/Late Period Transition or MLT (Groza 2002). Most bone tools and ornament types of the Middle Period disappeared. A new fish spear appeared. New olivella shell bead types proliferated, including nicely finished sequin rectangle and poorly finished split-drilled and split-punched half shell olivella beads. Although the MLT was coincident with the Medieval Climatic Anomoly (a dry period in the Sierras and parts of southern California [Jones and Kennett 1999]), site density around San Francisco Bay did not drop.

By AD 1250 the transition to a new culture on San Francisco Bay was complete. Called the Augustine Pattern by Fredrickson (1973), it also took hold in the northern San Joaquin Valley, the Sacramento Valley, and the North Coast ranges as far north as Round Valley in Mendocino County. Shell beads of the Augustine Pattern were well-shaped olivella shell sequin rectangles and the difficult-to-make olivella shell cups. Other costly cultural markers included shaped stone "flower-pot" mortars, flanged steatite pipes, carefully carved bone whistles, and "banjo" effigy ornament that may have marked development of the "Kuksu" secret society. The bow-and-arrow was finally accepted into the San Francisco Bay Area at this time, marked by the distinctive Stockton serrated projectile point forms invented in the adjacent Central Valley (Bennyhoff 1994b:54, Hylkema 2002:49, Justice 2002:352). Mortuary behavior evidenced social stratification. Partial cremation appeared, often associated with the wealthiest grave offerings. While some items were traded over long distances, bay shell decreased at sites in the interior valleys, suggesting that territories were becoming more restricted and controlled.

We call the Augustine Pattern a complex collector pattern because specialized craft, political, and secret society roles seem to have become much more important at this time than in any earlier central California pattern. Fredrickson (1973) argued that this was an Emergent culture, by his definition equivalent to initial agricultural village life elsewhere, rather than a typical hunter-gatherer Archaic culture.

The first sub-phase of the Augustine Pattern faded around San Francisco Bay soon after AD 1500. Its signature olivella sequin and cup beads disappeared as mortuary offerings, banjo abalone pendants became less common, and a new set of olivella lipped beads and pentagonal abalone ornaments appeared (Bennyhoff 1994a:68-71). Clam shell disk beads spread across the North Bay and out into the Sacramento Valley after AD 1500, but did not reach the southern part of San Francisco Bay until as late as AD 1700. Clam shell disk beads never were traded south of the Coyote Narrows, just south of San Jose (King 1978b:60). It is not clear if, after AD 1500, the overall Augustine Pattern population crashed or just went into a more modest expressive mode. Some have suggested that European-introduced epidemics spread across the continent following Spanish explorations in Mexico and the southeastern United States, causing population crashes and cultural disturbances (Erlandson and Bartoy 1995, Preston 1996).

The Late Period Monterey Bay people did not participate in the Augustine Pattern. While the area has a few rich midden habitation mounds, it never incorporated flanged steatite pipes, flared

"flower-pot" mortars, or graves rich with beads into its material culture. Etched bird bone whistles and "banjo" abalone pendants have been recovered at only one site south of the San Francisco Bay Area, SCR-44 at Watsonville (Jones and Ferneau 2002:232). Sequin rectangle beads are rare, and clam shell disk beads never did reach Monterey Bay. Jones et. al. (2007) label the local Late Period culture the San Carlos Ranch Phase. It is best characterized as an incipient collector pattern. Breschini and Haversat (2002) argue that the pattern emerged at AD 660, during the latter portion of the bead horizon-defined Middle Period. Jones argues that the previous Vierra Phase culture crashed, along with other central Coast cultures, before and during the MLT and Medieval Climatic Anomoly, and that the Rancho San Carlos Phase did not develop strongly until well into the Late Period, as late as AD 1400. "There is very little evidence for continuity in settlement between ca. A.D. 800 and 1500" (Jones 1998:86). Perhaps related to this, no Stockton serrate points are found south of the Coyote narrows, which separates the Upper Santa Clara Valley from the southern Santa Clara Valley. Instead, the first projectile point on Monterey Bay associated with the bow-and-arrow was the Desert side-notched point, which spread to the area from the south and east some time after AD 1200, then continued to spread north, replacing the Stockton serrate point on the San Mateo coast and in the San Jose area after AD 1500. Jones and Ferneau (2002) find evidence for "de-intensification" of culture on Monterey Bay during the Late Period.

All in all, the differences between the San Carlos Ranch Phase of Monterey Bay and the Augustine Pattern of San Francisco Bay is stark. It is also surprising, given the similarities between Costanoan family languages of the two areas. In contrast, the Augustine Pattern was shared by San Francisco Bay Costanoans, Bay Miwoks, Coast Miwoks, Pomoans, Wappos, Patwins, Maiduans, Plains Miwoks, and Delta Yokuts. Just as Germans, French and Italian speakers participated in Medieval and Enlightenment European culture, so too the distinct Late Period language groups of the San Francisco Bay Area participated together in the complex collector Augustine pattern.

Physical Anthropology and Prehistoric Population Movements

The study of genetic differences among human populations is not the same endeavor as the study of cultural differences. Genetic lineages may follow a single tradition of slow cultural change over time, or they may suddenly accept the different culture of an invading lineage. In just the same way, the language of a genetic lineage may change slowly through internal innovation or relatively rapidly through acquisition. Despite the imperfect relationship between genetics, language, and culture, human history is replete with invasions that bring new genetic lineages, carrying new languages and new cultural configurations, into areas where they had not previously existed. Thus it is worth examining the evidence from physical anthropology, as an aid in understanding changing cultures in prehistoric central California, and in shedding light on cultural differences between Ohlone/Costanoans of the San Francisco and Monterey Bay Areas, in particular.

Differences in cranial form and teeth aid forensic anthropologists in distinguishing the gross genetic identity of modern individuals and populations as African, west Asian (including European), East Asian (including native North American), or Austral-Asian. But within each of those large geographic divisions of humankind, the discrimination of sub-groups has been problematic. Physical anthropologists do agree that central California physical populations of the past 4,500 years can be classed into three physical types:

> Measurements of recent California Indians and skeletal remains from archaeological sites indicate that at least three morphologically distinct groups of Indians lived in California during the late prehistoric period (Gifford 1926a, 1926b). People of the Yuki physical type were confined to the Mendocino County area of northern California. These Indians are short in stature, with narrow heads, broad noses, and low faces. A second widely distributed "California" physical type consists of people

> with high faces and broad heads. Areas occupied by Indians with this cranial morphology include the northern Channel Islands and the adjacent mainland coast [as well as all of central and northern California outside of the restricted Yuki and Western Mono areas-ed.]. A third narrow-headed, broad-nosed group called the "Western Mono" physical type occupied a much more restricted area that included the Monache territory in the Sierra Nevada near the headwaters of the San Joaquin River and the territory of the Gabrielino on the southern California mainland, including the Los Angeles basin and southern Channel Islands (all of the "Western Mono" type occupied territory inhabited by Shoshonean speakers in historic times) [Titus and Walker 2000:80-81].

Brooks (published in 1975, but written in the 1950s) verified that the San Francisco Bay Area people during all three late Holocene time periods fit the "general" native California crania type. In contrast to Titus and Walker above, Brooks (1975) characterized the general type as having "medium-high faces and medium-width heads." Brooks compared measurements of Early Period skeletons from ALA-307 (West Berkeley mound) with Middle Period skeletons from ALA-309 (Emeryville mound) and Late Period skeletons from ALA-309, then compared that series with skeletal measurements of the general California type published earlier for other parts of California:

> The picture presented by the cranial measurements is that of a group on the narrow side of mesocephaly [between narrow and long headed-ed.], with a mesoprosopic face [between wide and narrow face-ed.] bordering on broad, and with a nose on the broad side of mesorrhiny…
>
> All three, Hrdlicka's, Gifford's and the Ala 307-309 series, appear to correlate closely. Grouping all three together furthers the possibility that the description, presented here and by Gifford, of a population medium in nearly all measurements and observations, is valid (Brooks 1975:112-113).

Brooks (1975:113) also noted that Early Period Delta Windmiller Pattern skeletons were significantly larger in both cranial and post-cranial (stature) measurements than the San Francisco Bay and general California populations.

Gerow (1968:96-98) also emphasized that the Early Period Windmiller people were larger and more robust than the Early Period San Francisco Bay people. He showed that the size differences between Bay and Delta populations decreased over time. Gerow also argued for significant differences in cranial form between Windmiller and the general California population, calling the general population "low-vaulted" and the Windmiller population "high-vaulted." In fact, the cranial form differences between the two populations are not great. Gerow's (1968:171) San Francisco Bay University Village population had an average vault height index of 74.1, at the high end of the "medium" range (70-75). Newman's (1957:27) comparable Early Period Delta population had an average vault height index of 76.8, at the low end of the "high" range. Gerow argued that the Windmiller people were the first Penutians in California and that they intermarried with their physically distinct Hokan-speaking neighbors as they spread out among them from the Delta after 2000 BC, leading to a convergance of physical types over time.

Recently, Ivanhoe (1995) and Ivanhoe and Chu (1996) have published cranial and post-cranial measurements on a larger sample of skeletons from the San Francisco Bay Area and the Central Valley, stratified by time. Like Brooks and Gerow before them, they found the San Francisco Bay people to be smaller than the Windmiller people in the Early Period, but they also found an overall reduction in stature in both areas through the Middle and Late periods, and they found that the Bay populations continued to be metrically smaller than their Central Valley counterparts

through those periods. Ivanhoe (1995) attributed the reduction in stature to population stress leading to nutritional stress, as reliance on protein-deficient acorns as a food source increased over time.

Breschini (1983:56-61) distinguished a Penutian (Wintuan and Miwok) cranial type from a Hokan (Shasta and Salinan) cranial type. He used discriminate analysis on small samples from geographically discrete areas to argue that Late Period Bay Area Costanoans exhibited metric cranial characteristics intermediate between Hokan and Penutian extremes, concluding that the Costanoans are a genetic mix of the two. His model complements Gerow's (1968) idea that the Windmiller people were the first Penutians, while the generalized California physical type originally represented Hokans. This conclusion is controversial in light of new linguistic evidence that languages of the Penutian phylum developed separately outside of California and never entered the state as a single population. Furthermore, the Windmiller, Shasta, Salinan, Wintuan, and Miwokan crania are so similar to one another, relative to variation across North America, that differences among them might easily be accounted for by small sample size and genetic drift (Jurmain in Cartier et al. 1993:90, Suchey 1975).

mtDNA and Prehistoric Population Movements

Mitochondrial DNA studies have determined that all living people share descent through a single woman who lived in Africa some 150,000 years ago. Mitochondria are organelles in our cells that carry out the energy-generating process. They copy themselves as needed and are passed on from mothers to children within the egg, without undergoing genetic recombination each generation. In general, accidental mutations become fixed only when they occur in limited unimportant regions of the circular mtDNA. Researchers in the 1980s began building a phylogeny of global mtDNA variation by examining the degree of differences among large samples of people from around the world. It was discovered that human mtDNAs could be classified into a relatively small number of key groups called haplogroups.

> These were usually restricted geographically: some to sub-Saharan Africans, others to Europeans, and yet others to East Asians… The identification of robust genealogical groups has allowed the development of the phylogeographic approach to demographic history, in which questions of dispersals, migrations, and colonizations are addressed by study of the geographic distribution of lineages on a gene tree, with a growing body of work exploring the colonization of the Americas, the Pacific, and Europe (Richards and Macauley 2001:1316-1317).

By 1985 it was determined that living people from pure Native American maternal lineages had mtDNA signatures (or haplotypes) that could be bundled into four clusters (or haplogroups), each derived from a woman with a distinct founding signature (Wallace et al. 1985). The four haplogroups were labeled A, B, C, and D by Antonio Torroni and colleagues (Torroni et al. 1992). It was soon clear that the least divergent founding lineages of all four exist in east and central Asia (Torroni et al. 1993, see also Kivisild et al. 2002 and Derenko et al. 2003). By 2000 a fifth rare haplogroup, X, was reported in both native North America and across north Asia; its least differentiated founding lineage occurs in northeast Asia (Reidla et al. 2003)

By 1996 it was clear that the four major mtDNA haplogroups are not evenly distributed among native American groups. "There is some correspondence between language group affiliations and the frequencies of the mtDNA haplogroups in certain tribes, while geographic proximity appears responsible for the genetic similarity among other tribes," wrote Lorenz and Smith (1996). Most clearly related to recent language group migrations are the Eskimos of the Arctic and Na-Dene (Athabascans) in both Canada and the southwest United States, both marked by specific subsets of Haplogroup A. The available mtDNA sample from living American Indians by 1996 included a small group of 17 central California descendants—Costanoans, Miwoks, and Yokuts; their haplogrop distribution of 12% A, 41% B, 6% C, and 41% D. Only the southern California Uto-Aztecans were

also strongly represented in both haplogroup B and D, among 30 other language groups reported at the time from across North America (Lorenz and Smith 1996:317). It remains to be seen whether distinctive combinations of haplogroups, including rare one-of-a-kind variants, that have been associated with specific North American language groups (not tribes) are (a) meaningful markers of distinct population history, (b) the product of stochastic variation, or (c) merely a reflection of small sample size (see Malhi et al. 2002).

The ancient mtDNA of a small number of skeletal remains from early central California populations has recently been characterized by Eshleman (2002). He reports 16 samples from the Early Period Cecil Site near Stockton, 23 samples from the lower Middle Period Cook Site near Vacaville, and 6 samples from the Middle Period Applegate Site near Lodi, all in the Central Valley to the east of the San Francisco Bay, as well as 3 samples from the Monterey Peninsula. The patterns of haplogroup representation for the Central Valley sites are so similar that we can report them as a single group of 45, 2% A, 11% B, 51% C, and 36% D. The ancient central California pattern resembles more closely that of modern southern California Shoshoneans than modern Costanoans, Miwoks, and Yokuts, at least in the small available samples of those groups. That does not, in itself, mean that the ancient central Californians were the ancestors of the modern southern California Shoshoneans. Stochastic change in haplogroup distribution of local populations is possible if a few women of one lineage have disproportionate reproductive success over two or three generations. Leading mtDNA researchers Martin Richards and Vincent Macauley warn:

> Patterns… may reveal the existence of a genetic trail leading back to the source of the dispersals. In contrast, poorly designed summary statistics that are blind to the phylogeographic patterns within different populations will often fail to reveal these relationships, and the archaeological record can rarely provide unequivocal evidence for a movement of people, as opposed to cultural diffusion (Richards and Macauley 2001).

To overcome the weakness of summary comparisons of haplogroup distributions, Eshleman (2002:98-101) looked further into the geographic distributions of common and uncommon variants among the haplogroups in the ancient and modern populations. The analysis confirmed stark differences between the lineages represented in the Early and Middle Period in the Central Valley and the lineages represented by 17 modern Costanoans, Miwoks, and Yokuts. It did not confirm strong specific lineage relationships between the ancient Central Valley people and the modern southern California Shoshoneans. In summary, Eshleman reports:

> The low frequency of haplogroup B, the most common haplogroup among most modern populations in California, among the ancient samples from California, and the lack of shared or closely related haplotypes between ancient and modern individuals in this region suggest that more recent migrations into the region have occurred. A more recent migration later in prehistory or increasing numbers of migrants in a continual stream probably introduced greater frequencies of haplogroups B and D and consequently diminished the relative frequency of haplogroup C in admixed populations in the Central Valley (Eshleman 2002:107).

Eshleman (2002:104) concludes that lack of continuity between ancient and modern Central Valley populations must have occurred after the Middle Period—[more specifically the lower Middle Period, when the Cook site was inhabited-ed.]—and that it may have occurred through migration of Penutian speakers from the Great Basin, which does have specific mtDNA lineages in common with modern California Penutians (cf. Eshleman and Smith 2007).

Not nearly enough mitochondrial DNA data sets have yet been accumulated to shed light on genetic relationships between ancient and ethnographic people of the San Francisco Bay Area and Monterey Bay Areas. However results from the first three mtDNA recoveries from ancient skeletons

on the Monterey Peninsula are interesting. Eshleman (2002:100) reports that all three examples, from sites MNT-619, MNT-1482 and MNT-1489, represent Haplogroup A, which is all but absent in the interior California skeletal populations. Two of the three Monterey samples represent the basal founding Haplogroup A lineage that occurs all across North America, but is common in California only among the modern Chumash, Salinan, and Esselen of the south-central California coast. Future testing of larger well-dated skeletal populations may determine if the predominance of Haplogroup A along the coast, and its absence in late Holocene Central Valley populations, is the fluke product of small sample size, or a telling piece of information about prehistoric population interactions in California.

Inferential Linguistic Prehistory

The long-lasting theory that Penutian speakers pushed Hokan speakers out of the central area of California at some time in the past has been touched upon in the discussions of physical anthropology and mtDNA above. Below we briefly sketch the history of the Hokan-Penutian model. Then we summarize the latest consensus view of past central California linguistic group movements, which emphasizes the interaction of Hokans with proto-Utians, rather than with the larger hypothetical Penutian stock. After that we describe the contradictory conclusions of different linguists regarding the depth of time of internal Utian family splits. Those contradictory conclusions support alternative models of San Francisco and Monterey Bay Area culture history.

The scholars that initially developed the Hokan-Penutian model assumed that proto-Penutians migrated into California as a single speech community. The model was introduced by A. L. Kroeber in 1923 and elaborated by Klimek (1935) on the basis of comparisons of key "climax" area traits. It was first tied to archaeological cultures by Walter Taylor (1961), who proposed a Penutian intrusion about 3000 BC as part of a continent-wide series of language group movements that began as early as 10,000 year ago (see also Krantz 1977). Baumhoff and Olmstead (1963:282) proposed a somewhat later sequence, with the Hokans in place on San Francisco Bay as the Early Horizon people and the Penutians coming in at the start of the Middle Period at 500 BC.

Gerow (1968:12, 98) hypothesized that all Bay Area Early Period people spoke proto-Hokan languages. Penutians entered Central California at approximately 2000 BC in the Early Period, as the carriers of the distinctive Windmiller Pattern into the Delta. "We infer the coexistence of two distinct cultures or traditions and populations in Central California between 1500 and 1000 BC. After that date Bay and Delta cultures and populations gradually converged" (Gerow 1968:12). During this convergence process, Gerow implies, Penutian languages differentiated and replaced Hokan languages in much of central California.

During the 1970s the concept of a single Penutian entry into California fell apart. Linguist Kenneth Whistler (1977, 1980) was aware that the Wintuans (postulated Penutians) arrived in California from Oregon at a later time than the Utians (also merely postulated as Penutians). He hypothesized that the San Francisco and Monterey Bay Areas were inhabited by proto-Esselen foragers (postulated Hokans) prior to 2500 BC and that they were replaced between 1000-2000 BC by proto-Costanoans who practiced an acorn-intensive semi-sedentary lifestyle. This fit Gerow's model, the key difference being that Whistler named the people who pushed into San Francisco Bay during the latter part of the Early Period as proto-Costanoans, in place of proto-Penutians.

In 1979 linguist Richard Levy proposed a detailed reconstruction of the differentian and spread of the Penutian language families of California into their specific historic languages and language locations. He inferred moments of punctuated language differentiation in the past, using the lexico-statistical method. He traced innovations and borrowings of words specific to certain environments to locate possible language group homelands He reasoned that the proto-Miwokans were in place in a Sacramento-San Joaquin Delta homeland at the beginning of the Middle Period at 500 BC, and the proto-Costanoans were in place in an inner Coast Range homeland by the same time:

> The Proto-Costanoan homeland … was located in the Inner Coast Ranges by virtue of the inclusion of coast live oak, valley oak, interior live oak, blue oak, California laurel, and digger pine in its reconstructed flora. The internal classification of the Costanoan languages and retention of some phonological traits by Karkin alone strongly suggests a homeland in the Carquinez Straits area (Levy 1979:8).

Levy correlated the restricted times of language differentiation with the times of great cultural change, as archaeologists of the 1970s understood them. His model indicates westward expansion of Miwok across the north end of San Francisco Bay into the Marin Peninsula soon after 500 BC, thus at the start of the Middle Period. He envisioned a southward expansion of Costanoan from Carquinez Strait at AD 500, at which time the Southern (Rumsen/Mutsun), Northern (San Francisco Bay), and Karkin branches began to differentiate.[26] He postulated the Rumsen-Mutsun differentiation at AD 1100, during what we now consider the Middle/Late Transition, and the beginning of dialect differentiation in the San Francisco Bay language at AD 1360. He showed similar geographic expansions and language differentiations among all of the Penutian language families in California.

Levy (1979:12-15) explained the Penutian expansions in general, and the Costanoan expansion in particular, as a function of development of the Omaha kinship system. That complex system reflected, he argued, marriage exchange systems advantageous to powerful lineages, allowing chiefs to extend their power over several settlements and form large tribelets.

> In periods where carrying capacity of a given biotic zone increased we would expect societies with Omaha systems to expand into the newly enriched area. Conversely, with diminishing carrying capacity, we would expect a decline in population density and a switch to symmetric exchange of women and the emergence of less compelx forms of societal organization (Levy 1979:14).

He correlated the most active periods of Penutian expansion and language differention with moments of environmental quality improvement following times of climatic stress at AD 500 and again at AD 1360.

Breschini (1983:64-70, 98-101) agreed with Levy that the proto-Costanoans expanded at the expense of the Hokans due to their superior social and political integration, but he postulated a much earlier Costanoan advance than Levy (1979), one more akin to that proposed by Gerow (1968).

> The change from Hokan to Peutian speakers, assumed to be a result of intermarriage and gradual absorption, appears to have taken palce along the Central California Coast only where a very specific combination of several specific factors was present. The necessary factors were, as far as can be identified at present, a combination of relatively level areas of oak grassland in reasonable proximity to either the ocean or the San Francisco Bay, and sizeable areas of marshes (Breschini 1983:70).

Breschini proposed a Penutian (inferring proto-Utian) arrival from the east at the West Berkeley site on the east side of San Francisco Bay at 1800 BC, at which time they intermarried with local Hokans and merged cultures with them, forming the mixed cultural assemblage of University Village by 1400 BC (Breschini 1983:75-80). In his interpretation, Penutian intermarriage with Hokans continued southward along a wave front, so that the proto-Costanoan language arrived in the Carmel Valley at

[26] Levy (1979:9) thought that AD 500 was the beginning of the Late Period, because he was using Heizer's (1958) dating Scheme A. We now understand AD 500 to be the period of the Meganos Intrusion into the East Bay, half way through the Middle Period (Groza 2002).

500 BC to begin such intensively utilized sites as MNT-12, the Hudson Mound (see also Breschini and Haversat 2002:31-37).

Moratto (1984:552-553) suggested that proto-Utians entered the lower Sacramento Valley at 2500 BC from the Great Basin and founded the Windmiller culture, then began to move into the San Francisco Bay Area after 2000 BC to mix with the local Hokans (he suggested proto-Esselens) to create the Lower Berkeley Pattern. He quoted Levy (1979) regarding a probable proto-Costanoan homeland in the hills of the East Bay. Similar to Breschini (1983), Moratto (1984:280, 554) posited the Utian (or proto-Costanoan) arrival at University Village at the south end of the Peninsula at 1200 BC, then on south to their full historic territory on Monterey Bay by 100 BC. Meanwhile, the proto-Miwok segment of the Utians pushed into the North Bay by 1500-1000 BC, bringing the Berkeley Pattern from the East Bay (Moratto 1984:279). At the same time, a new Penutian group, the proto-Yokutsans, pushed into the lower Sacramento Valley to mix with the proto-Utians that continued the Windmiller Pattern there, suggested Moratto (1984:554-555).

At 500 BC, according to Moratto's (1984) scenario, the proto-Miwoks, with their mortar/pestle Berkeley pattern culture, pushed back eastward into the lower Sacramento Valley from the north side of San Francisco Bay, forcing the Yokutsans with their mixed groundstone modified Windmiller culture south into the San Joaquin Valley (Moratto 1984:557). The Yokutsans initially did well, spreading all the way south to Buenavista Lake by AD 400 (Whistler cited by Moratto 1984:563). Moratto only indirectly hinted at an explanation for the Meganos "extended burial" mortuary pattern intrusion into the East Bay by quoting Whistler's idea that a climate reversal led to drought in the San Joaquin Valley at AD 400, causing most Yokuts to pull southward to Tulare and Buenavista Lakes, while others assimilated with neighboring groups (Moratto 1984:563-564). Next, according to the Moratto (1984) model, around AD 500-700 proto-Patwin speaking Wintuans came down the Sacramento Valley, absorbing a Miwokan group (thereby splitting the western and eastern Miwoks), and bringing a suite of new artifacts—bow and arrow, harpoon, flanged stone pipes, and pre-interment grave pit burning—which, when shared with Pomos, Miwokans, and northern Costanoans, triggered the beginning of the Augustine Pattern around the Delta and San Francisco Bay (Moratto 1984:562-63). The most recent movement, according to the model, was a re-expansion northward of Yokutsans from the southern San Joaquin Valley back up into the northern San Joaquin Valley, an expansion not completed until AD 1600-1700, just before the Spanish arrival (Moratto 1984:571-572).

Moratto's (1984) "multiple-entry" hypothesis, so similar to Breschini's 1983 scenario, was portrayed as the *consensus* explanation of California linguistic group prehistory in the 1996 "Languages" volume of the Handbook of North American Indians series (Foster 1996:89-90). However, alternatives are still accepted by some scholars, and new explanations for language movements in some local areas are being offered every few years. For instance, Hildebrandt and Mikkelsen (1993:179-182, 194-195) and Jones (1998:86) use archaeological evidence for continuous forager adaptations to suggest that incipient sedentary collectors did not spread south into the Monterey Bay Area until AD 1000. Since they accepted the argument that proto-Costanoans were collectors, rather than foragers, they conclude that the Costanoans themselves did not spread south to Monterey Bay until after AD 1000. Their conclusion fits well with Levy's (1979) direct linguistic approach, but contradicts the earlier scenarios predicted by Moratto (1984), Breschini (1983), and Breschini and Haversat (2002).

Bennyhoff (1994b:83) rejected the idea that the Lower Berkeley pattern was formed under Windmiller pattern influence. Instead, he argued that the Lower Berkeley pattern arose around San Francisco Bay independent of, and concurrent with, the rise of the Windmiller pattern to the east (Bennyhoff 1986:67, 1994a:66). Unlike Gerow (1968), Bennyhoff believed that University Village

and all other Lower Berkeley Pattern manifestations around San Francisco Bay represented the proto-Utians, already in place west of the Delta as the Early Period unfolded.

> I hypothesize that the entire cultural sequence from 3000 BC to historic time in the Alameda District (San Francisco peninsula and East Bay) represents a single population changing through time. The physical type does not change and numerous cultural traits persist throughout this time span (spined serrated scapulae, type A1bII awls, wedges, cobble bowl mortars, and cobble pestles, etc.) In this [Alameda] district we have the Micos Tradition persisting through the Berkeley and Augustine patterns. The Micos Tradition (from Miwok-Costanoan) represents the ancestral Utian occupation of the San Francisco Bay region, displacing and pushing to the south an earlier Esselen population. If the Berkeley Pattern was brought in by ancestral Miwok and Costanoans before they split (the Stege aspect), the Upper Berkeley Pattern (Ellis Landing aspect) represents the split of Costanoan and Miwok (Bennyhoff 1994a:66).

Bennyhoff also rejected Moratto's (1984) identification of the Windmiller pattern people as Utian with an eventual Yokuts admixture. He believed that they were proto-Yokutsan people, indicated by their ventral extension burials, that they were pushed south into the San Joaquin Valley at the outset of the Middle Period, and that they were the people who brought Meganos pattern sites into the East Bay during the latter portion of the Middle Period (Bennyhoff, undated manuscript in the Bennyhoff Collection).

Most subsequent scholars have agreed with Moratto's (1984:279) tentative assertion that the Utians divided when a proto-Miwok segment pushed into the North Bay by 1500-1000 BC, bringing the Berkeley Pattern north and leaving the East Bay people to develop into the Costanoans (Fredrickson 1989). Linguist Catherine Callaghan has suggested that the proto-Miwok homeland may have been the interior North Coast Ranges, north of the marshlands north of San Pablo Bay, but south of Clear Lake:

> The nature of plant terms reconstructed for Proto Miwok is consistent with a homeland in or close to the Central California foothills, with access to valley areas and the high mountains. The foothills of the Sierras would qualify, also an area close to Mt. St. Helena in the North Bay. In view of the archaeological evidence, the North Bay may be more probable (Callaghan 1994:10).

Note, however, that the archaeological evidence is ambiguous for language groups between San Francisco Bay and Clear Lake. White has recently written:

> Archaeological and historical linguistics evidence from the North Bay indicates that pWMi [proto-western Miwok], pSYk [proto-Wappo], and pWPo [proto-western Pomo] speakers all employed a basic Berkeley Pattern material culture, interacted extensively, and thus may be largely indistinguishable using traditional archaeological systematics (White 2002:551).

Given the inability of the archaeological record to prove that early Berkeley Pattern people in the North Coast Ranges were Miwokan, the possibility of a Sierra foothill homeland for proto-Miwok must still be entertained.

Our understanding of the relationship between linguistic prehistory and cultural change in the past might be improved if we understood what forces allowed the proto-Costanoans and proto-Miwoks to stay apart from one another long enough to form distinct language clusters, rather than a wider clinal language continuum. It is difficult to model possible explanations because the linguists do not agree about the actual time depth of the key language splits. Victor Golla currently takes a short chronology

approach, arguing for a recent split between the Costanoans and Miwokans at 1000 BC, and a Costanoan radiation as late as AD 1000:

> I would give [the Miwok-Costanoan split-ed.] 3,000 years at a maximum. Twenty five hundred years feels even better, nicely correlating with the Early/Middle Transition. The time-depth of the attested Costanoan languages is much, much shallower than even 3,000 years. It's hardly a third of that, something more on the order of English and German … This suggests that it may be the sole survivor of a more deeply differentiated group of non-Miwok Utian languages that developed elsewhere in Utian territory (Golla, personal communication to Randall Milliken, 2005).

Callaghan, on the other hand, takes a deep chronology approach. She considers the Utian language divergences to have occurred as far back as 4,500 years ago (2500 BC). She writes:

> Three thousand years is much too shallow for the Miwok-Costanoan split. The Germanic languages are 3000-3500 years apart, and one can determine cognate relationship by inspection of basic words. That is not the case for Utian … My 4,500 year estimate accords with Moratto's statements concerning a warming trend in the Nevada Great Basin area about that time which might have driven a portion of the people out and to California, presumably by a northern route (Callaghan, personal communication to Randall Milliken, 2005).

The present Costanoan languages began to diverge from one another around 0 AD/BC, Callaghan suggests:

> When it comes to families of languages, I think that most people who know what a family of languages is want a simple comparison with an approximate date attached. That is why I say that the Costanoan family has an approximate time depth of 2,000 years, like the Romance family, and that the Miwok family has an approximate time depth of 3500 years, like the Germanic family (Callaghan, personal communication to Randall Milliken, 2003).

Richard Levy's estimates for the Utian radiations lie between Golla's short chronology and Callaghan's long chronology. His lexico-statistical approach placed the Miwokan-Costanoan split at 3,200 years ago (1200 BC), an initial northern-southern-Karkin Costanoan language split at AD 500, and the Rumsen-Mutsun split at AD 1000.

With the scholarly three choices for the split between the Miwok and Costanoan populations—4,500, 3,200, and 2,700 years ago respectively—prehistorians can choose the linguistic evidence that fits their archaeological interpretations of late Holocene central California prehistory. Bennyhoff (1994a) thought Utians had been in the San Francisco Bay Area since 3000 BC, while Gerow (1968) believed they arrived at 1500-1000 BC. One researcher thinks the proto-Costanoans arrived in the Carmel Valley by 500 BC (Breschini 1983) or 200 BC (Breschini and Haversat 2002), while another believes they did not reach the Carmel Valley until AD 1350 (Jones 1998). Currently there is no way to reconcile these divergent opinions. Physical anthropology shows no really strong differences among groups of the relevent areas over time. Mitochondrial DNA evidence may track populations in the past, but only if significant comparative sample sizes are obtained for every time period. And finally, there is no assurance that archaeological pattern changes, even when well-dated and well-documented, co-occurred with language group movements (see Hughes 1992).

SUMMARY: SAN FRANCISCO BAY AND MONTEREY BAY CULTURES

In conclusion, a significant cultural split between San Francisco Bay and Monterey Bay Ohlone/Costanoans is documented in the admittedly sparse ethnographic record, as well as in the

archaeological record and in the linguistic record. While it is fairly clear that all of the San Francisco Bay Costanoan local tribes had more in common with each other than they did with the Mutsun, Chalon, and Rumsen local tribes of the Monterey Bay Area, it is also of interest to examine the extent to which the Monterey Bay and San Francisco Bay Costanoan cultures were more similar to one another than either was to the culture of some neighboring language group. In this summary overview, we run down a checklist of internally contrasting elements, and examine them in the light of neighboring cultures.

Numerous ethnographic elements unite the northern and southern Ohlone/Costanoan cultures, but those that do are elements shared by Coast Range people of many languages from San Luis Obispo to Cape Mendocino, such as presence of brush-covered and tule-covered houses, elements of everyday dress, the use of the bow-and-arrow, and division of groups into local tribes of fewer than 500 people. Both San Francisco Bay and Monterey Bay Ohlone/Costanoans intermarried in limited social interaction spheres that did not surpass a 40 mile radius for any local group, so that intermarriage between the two branches occurred only along a narrow geographic geographic band from Point Año Nuevo through the Santa Cruz Mountains and on eastward to the Orestimba Creek drainage in the interior South Coast Range. But such relative isolation is true for any subgroup of the Costanoans on two sides of any line, arbitrary, linguistic, or cultural.

The following elements point to some amount of real cultural contrast between the San Francisco Bay and Monterey Bay Costanoans:

- While both Northern and Southern Costanoan groups of the inner Coast Ranges engaged in intermarriage with San Joaquin Valley Yokuts groups, other external cultural influences were not shared equally between the two areas. Some of the northernmost San Francisco Bay Costanoans intermarried with Coast Miwoks, others with Karkin Costanoans and Patwins, still others with Bay Miwoks. On the other hand, some Southern Costanoans intermarried with Salinans, others with Esselens, and a few with both.
- Basketry traditions of San Francisco Bay seem to have been somewhat different from those of Monterey Bay, probably due to influences from different neighboring traditions. It may well be, however, that full inventories of baskets from both areas would provide evidence for a unified Costanoan tradition for at least a portion of the basketry repertoire.
- Mythological narratives from San Francisco Bay are oriented to a general north-central California pattern, while mythological narratives from the Monterey Bay Area have south-central California motifs.
- During the protohistoric period, leading up to and including Spanish contact, archaeological evidence illustrates significant differences from north to south. The San Francisco Bay people practiced the complex collector lifestyle of the Augustine cultural pattern (shared among the San Francisco Bay Costanoan, Bay Miwok, Coast Miwok, and Southern Patwin); they invested time and effort into creating flared-rim "flower-pot" stone mortars and flanged pestles, flanged steatite pipes, distinctive "banjo" abalone ornaments, delicate Stockton serrate arrow points, and engaged in the clam shell disk bead trade network believed to signify a partially monetized economy. The protohistoric Monterey Bay people, less densely populated, practiced an incipient collector lifestyle of the San Carlos Ranch Phase. They did not use the items described above for the San Francisco Bay Area people, with the exception of one "banjo" abalone ornament found in the Watsonville area. They utilized the Desert side-notched arrow point for as long as they had the bow and arrow, a point that began to appear to the north (in the southern part of the San Francisco Bay Area) only after AD 1550. They used the hopper mortar, rather than the bowl mortar, for grinding acorns.

No elements of the archaeological record provide evidence for a distinct Late Period "Costanoan Archaeological Culture Area" that mimics the historic extent of the Costanoan language family.

Significant cultural differences between the San Francisco Bay and Monterey Bay Areas began long before the protohistoric Late Period. The cultures of the two areas seem to have been very similar, even identical, in the earliest times that have been documented, between 10,000 and 3,500 BC; people in both areas were quite mobile, used milling slabs to process vegetal products, and had little ornamentation. Things began to differentiate at 3500 BC, after which time key differences between the two areas are reflected in different types of plant processing equipment, different settlement patterns, and different amounts of status differentiation:

- Millingstones, believed to signal a traveler lifestyle, were as common or more common in Monterey Bay sites at all times from 3,500 BC to AD 1000, while the mortar and pestle completely replaced the millingstone north of the Santa Clara Valley by 3,500 BC.
- Around San Francisco Bay, burials and cremations with diverse beads and ornaments, probably suggesting increasing importance of status differentiation, became quite common from 200 BC forward, but remained exceptional throughout time on Monterey Bay.

In short, Monterey Bay prehistoric culture, as much as it has been documented, seems to have been a stable local adaptation and a conservative one. San Francisco Bay culture, on the other hand, has been subjected to introductions of new artifact types, changes in settlement locations, and innovations in symbolic ornament systems over and over again since 3,500 BC.

Linguistic reconstruction also indicates a split between northern and southern Ohlone/ Costanoans. The Costanoan dialects around San Francisco Bay were nearly unified at the time of Spanish contact, with the exception of the very different Karkin speakers on Carquinez Strait. In the south, Mutsun, Rumsen, and Awaswas, while not mutually intelligible, form a language branch that has developed innovations that do not occur in the Chalon language to the east or in the San Francisco Bay Costanoan language to the north. The standard explanation of the events that shaped the distribution of the ethnographic Costanoan languages, supported by most authors cited above, is as follows:

- The San Francisco Bay Area was the proto-Costanoan homeland from the Early Period forward; toward the end of the Middle Period, a pre-existing Esselen-speaking population in the Monterey Bay Area began to emulate the cultural pattern of the more northerly Costanoans, leading to a wave of southerly progressing intermarriage and change to Costanoan language and San Carlos Ranch culture on Monterey Bay during the Late Period.

This standard explanation does not account for the great language diversity in the Monterey Bay Area (presumed by linguists to reflect great time depth of occupation), in contrast to low language diversity around San Francisco Bay south of the Karkin homeland. Given that problem, one new alternative explanation is offered for the first time here:

- There was a proto-Costanoan presence from the Early Period forward in both the San Francisco and Monterey Bay areas (albeit with cultural differences). By the Middle Period there were a number of diverse Costanoan languages in both the Monterey and San Francisco Bay areas. During the terminal Middle Period, the Santa Clara Valley became a center for innovation, provoking some of the cultural changes that would mark the Late Period. This was followed during the Middle/Late Transition period by an northward expansion of the new motifs and a single San Francisco Bay Costanoan language onto the Peninsula and into the East Bay, replacing all other Costanoan languages around the bay except Karkin.

The first model may be too simple to describe the ebb and flow of cultural development and language change that has occurred over the past few thousand years within contact-period Costanoan language family territory. The second alternative, while illustrating possible complex ebb and flow of language and cultural innovation in the past, has not been tested in the court of scholarly opinion. A satisfactory future model will have to take into consideration the evidence for change in culture in the lands of the historic Coast Miwoks, Bay Miwoks, Patwins, and Delta Yokuts as well each of the Costanoan language areas.

In conclusion, ethnographic and archaeological clues indicate that there was a generally united Augustine Pattern culture around San Francisco Bay when the Spaniards arrived, involving the Coast Miwok, Southern Pomo, southernmost Wappo, southernmost Patwin, Bay Miwok, and San Francisco Bay Costanoan (Bennyhoff 1994a). The Costanoans of Monterey Bay, on the other hand, are shown by ethnographic and archaeological clues to have been participating in a substantially different cultural pattern, the San Carlos Ranch Phase pattern, at the Spanish arrival (Jones et al. 2007).