Prehistory of the Southern California Bight: Models for a New Millennium

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2 authors, including:

Brian F. Byrd
Far Western Anthropological Research Group

CHAPTER 14

Prehistory of the Southern Bight: Models for a New Millennium

BRIAN F. BYRD AND L. MARK RAAB

THE GEOGRAPHICAL FOCUS OF THIS CHAPTER IS California's Southern Bight, roughly the southern half of the arc extending from the Mexican border to Point Conception. As defined here, this region encompasses Orange and San Diego Counties, western Riverside County, and the offshore islands of Santa Catalina, San Clemente, and San Nicolas (the Southern Channel Islands). At the time of Spanish contact this region was occupied by native groups (Figures 14.1, 14.2) most commonly referred to as the Tongva (Gabrielino), Juaneño (Ajachemen), Luiseño, and Kumeyaay (Bean and Shipek 1978; Bean and Smith 1978; Kroeber 1925; Luomala 1978; McCawley 1996). Our objective in this chapter is to present a regional summary of research on California prehistory since the appearance of Moratto's (1984) *California Archaeology* and Chartkoff and Chartkoff's (1984) *The Archaeology of California*.

The Southern Bight is remarkably well suited to such a retrospective analysis. This region illustrates a number of important research advances that have been made since the appearance of those two volumes. Data from this area allow us to assess in considerable detail some of the ideas advanced by Moratto and the Chartkoffs. At the same time, however, these studies have generated data that provoke fundamentally different understandings of California prehistory than those in the decades leading up to publication of the two 1984 books. These advances, outlined below, seem likely to propel archaeological research in new directions in the new millennium.

Though they expressed differing perspectives, *California Archaeology* and the *Archaeology of California* were the most comprehensive and also the first statewide syntheses of California prehistory. Both appeared at a time when California archaeology was on the cusp of enormous changes. Following the 1970s, the field experienced an explosive proliferation of archaeological information under the aegis of contract archaeology, the "radiocarbon revolution," and the appearance of a large cadre of archaeologists holding diverse theoretical viewpoints. The result, signaled by the appearance of the two books, was the rise of California archaeology as an intellectual force in its own right. They not only reflected the transformation of California archaeology but also sketched pathways along which research would develop over the following two decades, posing interesting questions about the nature and timing of prehistoric culture change. Chartkoff and Chartkoff (1984), for example, emphasized broad patterns of progressive cultural development, culminating in Late Holocene cultural climaxes characterized by high degrees of adaptive success. By contrast, Moratto (1984:460–464) suggested that culture change may have been more regionally and temporally variable than previously thought, and included episodes of culture change caused by such factors as climatic stresses. One of the most prescient questions posed by Moratto (1984:104–113) was whether a Paleo-Coastal Tradition actually had existed along the California coastline during the Early Holocene, breaking sharply with traditional views of seafaring and intensive maritime adaptations as Late Holocene developments. In the discussion that follows, we point out the ways in which researchers working in the Southern Bight have made significant progress in addressing the following questions:

- Was prehistoric culture change relatively gradual and developmental or more punctuated and multidirectional?
- Did trans-Holocene culture change stem essentially from terrestrial cultural adaptations or did the coastlines play an important early role?
- Did prehistoric culture change result in Late Holocene cultural climaxes characterized by high levels of adaptive success or was change induced by resource scarcity?
- Did environmental stresses play an important role in prehistoric culture change or was change driven by essentially intracultural forces?
- Can California prehistory be explained best in terms of broad developmental stages or regional cultural variability?

Creating a coherent picture of these research advances in the study area inevitably forces certain com-

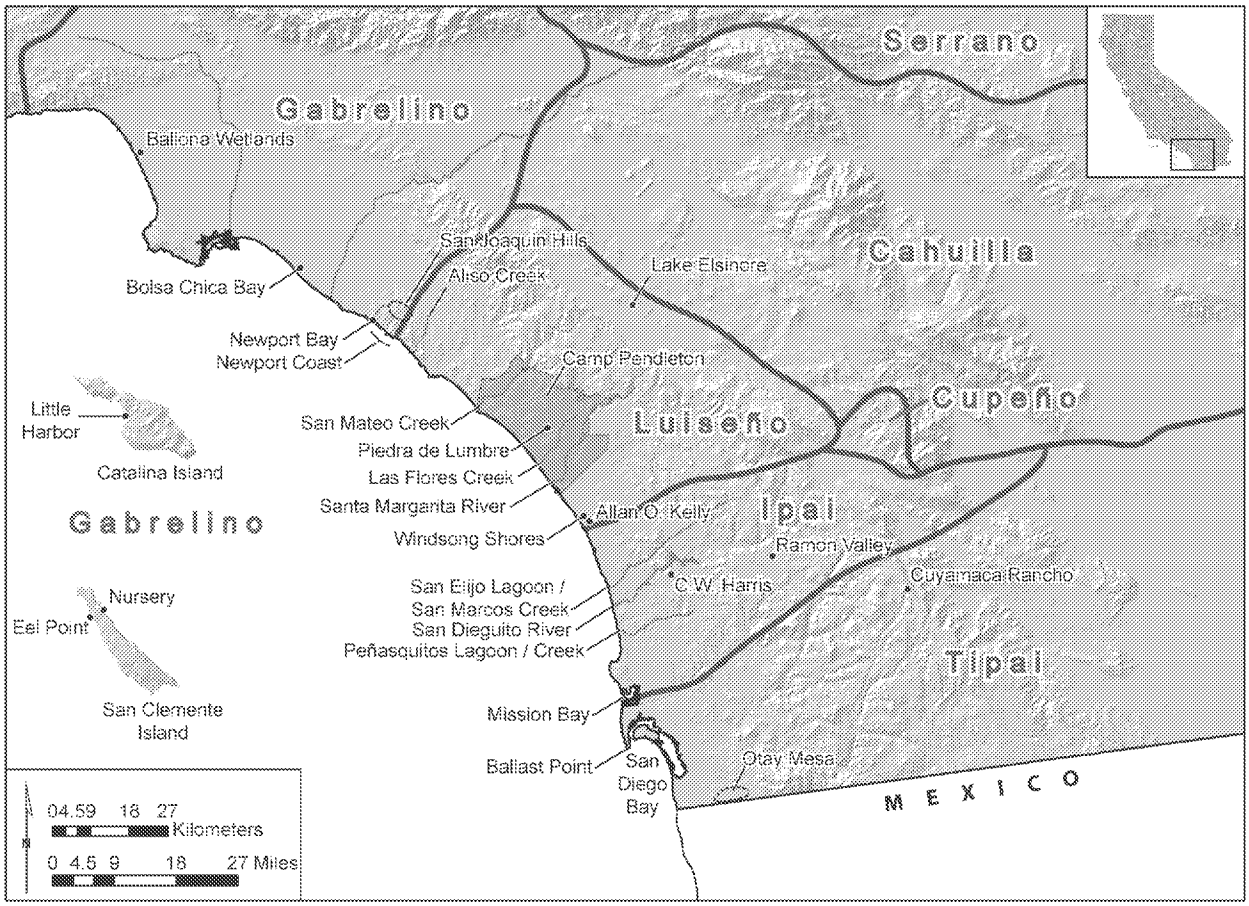

Figure 14.1. Ethnographic divisions, archaeological sites, and locations of the Southern Bight.

promises, one of which is our exclusive focus on the prehistoric era. Although historic-era archaeology has made great strides during the past two decades, space limitations do not allow us to treat this topic here. Literally thousands of reports dealing with the prehistory of the study area have appeared during the past two decades—far too many to cite let alone synthesize here. Instead, we summarize what we consider to be important advances on key research topics. This is partly a subjective decision, but it also reflects the research topics that have dominated peer-reviewed publications from the study area. These research themes largely draw on results from the mainland coastal area and the Southern Channel Islands, and to a much lesser extent on results from the more inland parts of the study area. In taking this approach, we emphasize topics that link this large and varied region together and reflect subject matter largely unexplored in the seminal 1984 books. There is no question that the perspectives presented in this chapter are heavily influenced by our own research experiences in the study region; however, we try to acknowledge divergent theoretical viewpoints and interpretations. We may also be able to bring some useful perspectives to this discussion, since both of us have had the good fortune to be involved in long-term, multifaceted research projects in the region. Moreover, this experience encompasses both mainland and insular (Southern Channel Islands) settings.

Our overall approach in this summary is to highlight selected projects and publications that best illustrate the changing research context of the Southern Bight, including the Ballona wetlands, Marine Corps Base Camp Pendleton, Lake Elsinore, Newport coast and bay projects, San Joaquin Hills projects, San Clemente Island, and San Nicolas Island (Altschul and Grenda 2002; Altschul et al. 1992; Byrd and Berryman 2006; Gamble and Russell 2002; Grenda 1997; Grenda et al. 1994; Koerper et al. 2002; Mason et al. 1997; Raab 1997; Raab et al. 2002; Reddy and Berryman 1999a,b;Vellanoweth et al. 2002) (Figure 14.1; Table 14.1).

THE RADIOCARBON REVOLUTION: HOW OLD IS THE PAST?

Modern archaeology has been aided by many technical advances but none more important than the radiocar-

Figure 14.2. Native Luiseño woman, Pi-yum'ko, Coronacion Pauvel, San Diego September 1901. (Courtesy of the Bancroft Library, University of California–Berkeley, photograph by C. Hart Merriam, cat. no. 1978.008/2300/p4 no. 1.)

bon revolution. Archaeological progress depends directly on accurately determining the age of objects and events from the past. Yet during most of the twentieth century, archaeologists were often forced to work with only a relative sense of time, usually as a result of observing changes in the style of artifacts they excavated from the layers of archaeological sites (Trigger 1989). It was not until the 1970s and 1980s that radiocarbon dating was routinely employed in California archaeology, and the increased levels of research funding afforded by cultural resources management (CRM) archaeology played a major role in this trend. During the past two decades, detailed chronologies of prehistoric cultural development have become available for the first time in many regions of California (Breschini et al. 2004). For example, Koerper et al. (2002:67) note that almost 1,300 radiocarbon dates are now available for Orange County alone. San Clemente Island is currently represented by about 400 radiocarbon dates, San Nicolas Island may rival this number, and Camp Pendleton has more than 200 radiocarbon dates (Byrd and Reddy 2002; Vellanoweth et al. 2002). This rich database is allowing us to move away from coarse-grained cultural sequences (Early, Middle, Late; Paleo-Indian, Archaic, Late Prehistoric) and really track the tempo of change, note the precise point in time for key developments, and provide a coherent approach to correlating the timing of external variables and internal social change. Much more rigorous use of radiocarbon data is needed (beyond simple comparisons of aggregate number of dates per century), along with consistent reporting, calibration, and use of the reservoir correction (Byrd et al. 2004).

CHRONOLOGY OF PREHISTORY: EARLY, MIDDLE, AND LATE HOLOCENE

California archaeologists advanced many different prehistoric cultural chronologies during the twentieth century (Moratto 1984:xxxii–xxxiii). While these chronologies were constructed to serve various research objectives, we have essentially adopted Erlandson and Colten's (1991:1–2) division of the Holocene into Early, Middle, and Late subdivisions. This approach offers an intuitive and consistent alternative to the disparate and sometimes confusing chronologies found in the archaeological literature. For our purposes we have broken the Holocene into the following three-part chronology: Early Holocene, 9600 B.C. to 5600 cal B.C.; Middle Holocene, 5600 to 1650 cal B.C.; and Late Holocene, 1650 cal B.C. to cal A.D. 1769 (Spanish colonization of California with first mission constructed at San Diego).

The Early Holocene

TRADITIONAL MODELS OF EARLY HUMAN SETTLEMENT As discussed in Chapter 4, traditional models of California prehistory postulate that the state's first inhabitants were Paleo-Indian big-game hunters who ranged across North America during the closing phases of the last Ice Age (Fagan 2003; Moratto 1984; Wallace 1978). Evidence for Paleo-Indian occupation of southern California, particularly the coastal areas, remains scanty at best (Erlandson 1991b), and there is still wide-ranging support for scenarios that derive California's first coastal populations from the interior of western North America, perhaps as a result of the impact of post-Pleistocene climate change (Erlandson 1994:269–272). As the (Wisconsin) Ice Age began to wane, warming and drying conditions between about 10,000 and 8000 cal B.C. are thought to have triggered far-reaching cultural responses in California. In the desert interior, lakes and streams that were once fed by moist Pleistocene climatic conditions began to shrink. Cultures dependent on these lacustrine environments, subsumed under the heading of a Western Pluvial Lakes Tradition (WPLT), responded by exploiting a wider range of plant and animal species, and by mi-

Table 14.1. Prominent Archaeological Sites and Projects in the Southern Bight Region

Site / Project Area	*Description*	*Recent Major Reference*
Allan O. Kelly Site (SDI-9649)	Key early La Jollan site	Koerper et al. 1991
Ballast Point Site (SDI-48)	Major Middle Holocene maritime site	Gallegos and Kyle 1998
Eel Point site (SCLI-43)	Major multicomponent (Early Holocene onward) habitation site	Raab et al. 2002
C.W. Harris Site (SDI-149)	Type site of San Dieguito, Early Holocene	Warren et al. 1998
Little Harbor (SCAI-17)	Major Middle Holocene rockshelter	Raab et al. 1995
Nursery Site (SCLI-1215)	Middle Holocene village site	Raab et al. 1994
Piedra de Lumbre Quarry (SDI-10,008)	Unique chert quarry	Pigniolo 1994
Windsong Shores (SDI-10,965)	Early Holocene La Jollan site	Gallegos 1991
Lake Elsinore site (RIV-2798)	Major trans-Holocene site	Grenda 1997
Ballona Wetlands	Major locus of trans-Holocene occupation	Altschul et al. 2005
Bolsa Chica Bay	Major Middle Holocene onward excavations	Koerper et al. 2002
Camp Pendleton	Major survey and excavations, trans-Holocene	Reddy and Berryman 1999a, 1999b; Byrd and Berryman 2006
Cuyamaca Rancho State Park	Late Holocene upland settlement system	Gamble 2004; Gross and Sampson 1990
Newport Coast Project	Major survey and excavations, trans-Holocene	Mason et al. 1997; Koerper et al. 2002
Otay Mesa	Numerous surveys and excavations, trans-Holocene	Kyle et al. 1990, Robbins-Wade 1992
Ramon Valley Project	Cluster of Late Prehistoric inland sites	Cooley and Barrie 2004
San Joaquin Hills Projects	Major survey and excavations, dominated by Late Prehistoric	Koerper et al. 2002, Strudwick 2005
San Clemente Island	Numerous surveys and excavations, trans-Holocene	Yatsko 2000
San Elijo Lagoon Project	Early - Middle Holocene shell middens	Byrd et al. 2004
San Nicolas Island	Surveys and excavations, trans-Holocene	Martz and Rosenthal 2001

grating to regions with more favorable moisture conditions, including the southern California coast.

Some archaeologists see developments of this kind at the C. W. Harris site (SDI-149) in San Diego County (Carrico et al. 1991; Warren et al. 1998). Leaf-shaped and large-stemmed projectile points, scrapers, and other stone tools from the Harris site define the San Dieguito Complex (Warren 1968), which is considered to be technologically similar to interior WPLT sites. Radiocarbon dates of only ca. 8000 to 6500 cal B.C. from the Harris site, the low number of similar sites of comparable age in the region (Pigniolo 2005; Chapter 4 in this volume), and an ongoing debate on the relationship between the Harris site and sites of similar age with different lithic technologies along the coast (e.g., the Windsong Shore and the Allan O. Kelly [SDI-9649] sites; see Table 14.1, Figure 14.1) suggest that this problem needs additional research and new data (Gallegos 1991; Koerper et al. 1991; Moratto 1984:97–99; Warren et al. 1998).

After this initial settlement, traditional models suggest, coastal groups gradually adopted marine foods such as shellfish and fish, particularly after post-Pleistocene sea level rise created estuaries and bays, the remnants of which dot the San Diego and Orange County coastlines today. In this context, the La Jolla Complex of the Archaic Period flourished along the coast (Gallegos 1992; Moratto 1984; Rogers 1966; Warren et al. 1998). These shell middens are generally characterized by flaked cobble tools, basin metates, manos, discoids, and flexed burials. Initial Archaic exploitation of the San Diego area littoral zone is generally considered to have entailed sizable semisedentary populations focused around resource-rich bays and

estuaries (Crabtree et al. 1963; Gallegos 1992; Moriarty et al. 1959; Shumway et al. 1961; Warren 1964, 1968; Warren and Pavesic 1963; Warren et al. 1961). Shellfish were interpreted as a dietary staple; plant resources (both nuts and grasses) were also an important contributors to the diet, while hunting and fishing were less important.

EARLY HUMAN SETTLEMENT: CALIFORNIA PALEOCOASTAL TRADITION Archaeological findings from the past two decades challenge these traditional scenarios. Current evidence suggests that the initial human settlement of California, including the Southern Bight, was a more complex phenomenon than envisioned in traditional models. Perhaps the most dramatic change in our understanding of this process comes from the coast. At present, the oldest reliably established coastal occupation in California—perhaps the oldest archeological site in the state—is Daisy Cave (SMI-261) on San Miguel Island, about 40 kilometers off the Santa Barbara coast (see Chapters 4, 13 this volume). The oldest cultural layer at Daisy Cave is dated to between 9600 and 9000 cal B.C., making it one of the oldest archaeological sites currently known in California (Erlandson et al. 1996). Orange and San Diego Counties and the Southern Channel Islands have not yet produced equally early dates, but radiocarbon evidence shows occupation of the coastal region between ca. 8000 and 7000 cal B.C. (Byrd 2003; Byrd et al. 2004; Gallegos 1991; Koerper et al. 1991, 2002: Figure 5.2).

EARLY SETTLEMENT OF THE SOUTHERN CHANNEL ISLANDS Some of the most detailed evidence of early maritime cultural development comes from the Southern Channel Islands, particularly San Clemente Island. During the past 20 years, San Clemente Island has emerged as a major natural laboratory for the study of coastal prehistory. Like the other Channel Islands, archaeological preservation on San Clemente is exceptional owing to many factors, including a lack of both burrowing animals and urban industrial development. Although San Clemente Island has been the scene of numerous archaeological investigations during the past twenty years by university and CRM-based researchers, the Eel Point archaeological site (SCLI-43) is the oldest and most extensively documented site on the island (Cassidy et al. 2004; Raab and Yatsko 1992; Raab et al. 2002; Yatsko 2000). With occupation beginning between 6500 and 6000 cal B.C. and ending about the time of European contact, Eel Point offers important insights about the cultural characteristics of Early Holocene coastal dwellers.

EARLY BOATS, SEA TRAVEL, AND A MARITIME ECONOMY Located about 40 kilometers from the other nearest island (Santa Catalina) and 77 kilometers from the mainland coast, San Clemente Island, even during lowered sea levels of the last Ice Age, could only be reached by water. The occupation of San Clemente and other Channel Islands during the Early Holocene affords circumstantial yet unequivocal evidence of some of the earliest sea travel in North America. However, recent discoveries at Eel Point provide intriguing evidence of early maritime technology, including stone tools capable of fabricating boats. Cassidy et al. (2004) show that this tool kit, dating to 6000 cal B.C., was technologically comparable to tools used by historic Chumash Indians to make wooden seagoing canoes (see Chapter 5 in this volume).

Early settlement of the Channel Islands is significant because these islands offered few land-based foods, resulting in obligatory maritime economies. Studies at Eel Point show that during the Early Holocene, site inhabitants enjoyed a highly productive marine economy, based to a large extent on hunting seals, sea lions, and dolphins and collecting shellfish (Garlinghouse 2000; Porcasi and Fujita 2000; Porcasi et al. 2000). Based on these data, coastal locations, including the Channel Islands, offered attractive settlement locations to early human settlers. These data help explain why paleocoastal cultural traditions appeared in southern California and vindicate Moratto's hypothesis regarding the existence of this tradition.

The Middle Holocene

Traditional models of California prehistory view the Middle Holocene as a time of cultural transition, during which Early Holocene cultural adaptations were gradually modified into forms recognizable during the Late Holocene. For example, across much of central and southern California, millingstone cultures appeared around 8000 to 7000 cal B.C. featuring an adaptation focused on collection and processing of small plant seeds and the hunting of a variety of medium and small game animals. In the Southern Bight, environmental factors are thought to have played a major role in altering these early, generalized hunting and gathering adaptations.

Traditional reconstruction of Middle Holocene occupation on the mainland has emphasized sizable, semisedentary populations focused around the resource-rich bays and estuaries of San Diego and Or-

ange Counties (Crabtree et al. 1963; Gallegos 1992; Moriarty et al. 1959; Shumway et al. 1961; Warren 1964, 1968; Warren and Pavesic 1963; Warren et al. 1961). Shellfish have been interpreted as dietary staples; plant resources (both nuts and grasses) were also an important dietary component, while hunting and fishing were thought to be less important.

This adaptive strategy, often referred to as the La Jolla Culture in the San Diego area or the Millingstone Horizon in Orange County, was viewed as remaining largely unchanged for several thousand years. According to Warren et al. (1961:25), "the La Jolla Complex reached its population and cultural climax between 7000 and 4000 years ago when there was a plentiful supply of shellfish in the lagoons along the coast." This reconstruction went on to posit major changes in human adaptations after 4,000 years ago when estuarine silting was considered to have become so extensive that it caused a decline in associated shellfish populations. This in turn was considered to have caused a major depopulation of the coastal zone, with settlements shifting inland to a river valley orientation, intensifying exploitation of terrestrial small game and plant resources, possibly including acorns (Christenson 1992; Crabtree et al. 1963; Gallegos 1985, 1987, 1992; Masters and Gallegos 1997; Rogers 1929:467; Warren 1964, 1968; Warren and Pavesic 1963; Warren et al. 1961). The coast was thought to have been abandoned or only seasonally occupied, with a possible slight increase in coastal occupation after 1,600 to 1,200 years ago.

Today Middle Holocene occupation of the mainland region is recognized as considerably more diverse than initially posited. Important Middle Holocene sites have been documented in inland settings, while considerable variability is recognized in adaptive strategies along the length of the Southern Bight littoral zone (Byrd and Reddy 2002; Mason et al. 1997; Masters and Gallegos 1997). In addition, there are many localities along the coastline where continuity in occupation from the Middle to the Late Holocene is now well documented. For example, San Diego Bay, Mission Bay, the Peñasquitos Lagoon/Sorrento Valley area, San Elijo Lagoon/Escondido Creek, the Santa Margarita River drainage, Las Flores Creek, and San Mateo Creek in the San Diego area all include settlements that were occupied from the later part of the Middle Holocene into the Late Holocene (Byrd et al. 2004; Byrd and Reddy 2002; and references therein). Thus initial impressions of uniform coastal settlement changes near the end of the Middle Holocene have not been widely verified by subsequent archaeological research.

Moreover, independent paleoenvironmental data collected recently from a series of drainages reveals that the exact timing and magnitude of coastal habitat changes varied considerably within the region (Altschul et al. 2005; Anderson and Byrd 1998; Byrd 2003; Byrd et al. 2004; Davis 1992; Pope 1997; Waters et al. 1999). Well-dated, continuous sequences of Holocene geologic deposits extending back prior to 7000 cal B.C. in the three drainage systems (Las Flores Creek, San Elijo Lagoon/ Escondido Creek, and the lower Santa Margarita River valley) reveal complex physiographic histories. Notably, the larger drainage systems were more likely than smaller systems to remain tidally flushed and maintain rich estuarine habitats during climatic downturns. Overall, new data clearly demonstrate that patterns of environmental changes and cultural response along the Southern Bight mainland were quite different and much more diverse than previously suspected.

CULTURAL INTERACTION AND MIGRATION The Middle Holocene has rarely been viewed as a time of large-scale cultural interaction by groups living across California or between California and the rest of the American West. Archaeologists have generally theorized that regional cultural interaction spheres arose during the Late Holocene, as regional trade networks sprang up as an adjunct to increasing techno-economic efficiency and the desires of social elites to acquire social power and wealth through the control of these networks (Arnold, ed. 2001; Gamble and Russell 2002). Intriguing evidence has emerged, however, of geographically expansive trade networks and spheres of culture interaction linking the Southern Bight with a vast region of the American West during the Middle Holocene.

Based initially on excavations on Santa Catalina and San Clemente Islands, Howard and Raab (1993), Raab and Howard (2000), and Raab et al. (1994) proposed that *Olivella* grooved rectangle (OGR) beads, a rare type manufactured from the marine purple olive shell *(Olivella biplicata),* may mark a 5,000-year-old OGR corridor—a trade network extending from the Southern Channel Islands across southern California through the Mojave Desert, along the western fringes of the Great Basin to Oregon. Additional OGR beads were identified on San Nicolas Island, placing these beads on each of the three largest Southern Channel Islands. Yet despite more than a century of archaeological investigations, including considerable attention to

marine shell beads, no examples of the OGR type are reported from the Northern Channel Islands. Based on this evidence, Howard and Raab (1993) proposed that OGR beads might mark a discrete Middle Holocene sphere of trade and interaction that included the Southern Channel Islands and portions of the adjacent mainland; a sphere that, remarkably, excluded the Northern Channel Islands, only 80 kilometers distant.

Vellanoweth (1995) subsequently recovered OGR beads on San Nicolas Island from a stratigraphic context dated ca. 3500–2900 cal B.C.; one OGR specimen produced a direct date of 3500–3300 cal B.C. (Vellanoweth 1995:17). Jenkins and Erlandson (1996) also demonstrated the existence of OGR beads at the DJ Ranch site in the Fort Rock Valley of central Oregon. These specimens, the most distant from the southern California coast recorded to date, are close to the younger end of the age spectrum for California OGR beads; they were recovered from context dated ca. 2900–1500 cal B.C. (Jenkins and Erlandson 1996). This discovery added a dramatically greater spatial dimension to the OGR distributional pattern:

> As suggested by Howard and Raab (1993) and others, the distribution of OGR beads along the southern California coast and their presence in Middle Holocene sites in the western and northern Great Basin may support the existence of an early cultural interaction sphere, possibly linking Uto-Aztecan peoples of the southern California coast and the western Great Basin. Remarkably, more OGR beads have now been found at the DJ Ranch site in central Oregon, up to 1,200 km from their probable point of origin on the southern Channel Islands, than have been found in the heavily studied Santa Barbara Channel region immediately to the north of the proposed cultural interaction sphere. (Jenkins and Erlandson 1996:301)

This evidence opened up another intriguing possibility. Based on linguistic evidence, California anthropologists have long hypothesized that, at some time or times during prehistory, speakers of Uto-Aztecan languages migrated from the Great Basin across southern California, and eventually colonized the Southern Channel Islands. The movement of these peoples across southern California is thought to have displaced resident groups, creating a distinctive "Shoshonean wedge" of speakers of Uto-Aztecan languages across southern California (Kroeber 1925; Moratto 1984; see also Chapters 6, 19 this volume). Noting that the distribution of ORG beads closely corresponds to this Shoshonean wedge, some researchers have suggested that they may mark an ancient migration route or alignment of linguistically linked population about 5,000 years ago (Raab and Howard 2000; Vellanoweth 1995). Other researchers point to Middle Holocene human skeletal evidence from the Southern Channel Islands as possible evidence of such a migration, arguing that genetically distinct group of islanders appears in the islands in a time frame that is compatible for Middle Holocene migrations of new populations into California and the Southern Channel Islands, including San Clemente and San Nicolas (Kerr and Hawley 2002; Titus 1987).

MARITIME SEDENTISM Traditionally, Middle Holocene groups have been viewed as Archaicstyle hunter-gatherers, with seasonally mobile settlement patterns. According to these scenarios, groups such as Millingstone folk moved their camps with the changing seasons in order to better obtain various food resources. Dynamics of this kind were thought to have provided little incentive to invest large amounts of labor in substantial houses or permanently occupied villages. Recent evidence shows, however, that small maritime villages consisting of substantial house structures appeared on San Clemente Island at least as early as the Middle Holocene.

Some of the most detailed information about house construction on prehistoric San Clemente Island comes from the Nursery site (SCLI-1215) and the Eel Point archaeological site (SCLI-43). At the Nursery site, named after a nearby native plant nursery, UCLA investigators initially discovered saucer-shaped house floors about 0.5 meter deep and 4.0 to 5.0 meters in diameter, with evidence of collapsed whale bone roof structures (Rigby 1985). A charcoal sample from one these structures yielded a radiocarbon date of ca. 1800 cal B.C. (Rigby 1985). Subsequent work at the site exposed a complete house structure (House Pit 2), described by Salls et al. (1993). Like the UCLA discovery, this house was constructed in a circular pit 4.5 meters in diameter and about 0.5 meter deep. This work showed that whale bone roof members had once been set in holes between 10 and 30 centimeters in diameter at the floor perimeter. The stub of a whale rib was still in place in one of these holes. Large quantities of whale bone were found on the house floor, including masses of whale bone at the east and west periphery of the floor (Salls et al. 1993:186–188). This house yielded a date of ca. 2800 cal B.C. (Raab et al. 1994; Figure 14.3). Research at the site suggests that these houses were part of a Middle Holocene village containing at least

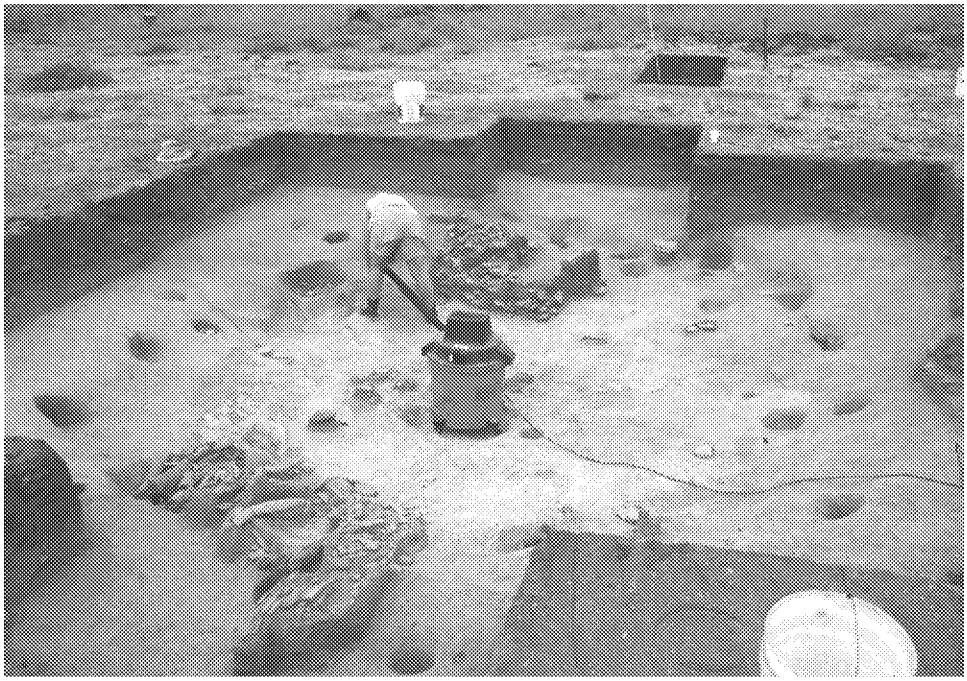

Figure 14.3. House structure at the Nursery site, San Clemente Island.

18 dwellings (Raab et al. 1994). The Nursery site is not alone in producing evidence of early house construction. Fiore (1998) described Middle Holocene house features at SCLI-43, the Eel Point site that produced radiocarbon dates comparable to the oldest house remains from Nursery (Fiore 1998:31).

These data may point to some of the earliest residential structures in coastal California, if not the state. Salls et al. (1993) argue that structures of this kind indicate a substantial degree of residential permanence, and that these structures were part of communities occupied for more than one season each year, if not on a year-round basis. Currently the seasons during which sites such as Nursery and Eel Point were occupied are not known in detail, making it difficult to determine the longevity of annual occupation of the domestic structures. However, middens adjacent to the San Clemente Island houses rival deposits associated with mainland sites that were occupied for multiple seasons during the latter portion of the Late Holocene (Byrd 1998; Byrd and Reddy 2002). In the study region, house structures have been only infrequently encountered in mainland settings (Grenda et al. 1998; Winterbourne 1967), in large part due to more extensive bioturbation and modern development. The presence of daub on some mainland sites does indicate that structures were present (Strudwick 2005). Based on this evidence, the appearance of sedentary communities appears to reflect a more temporally and spatially complex pattern than traditional models of cultural development suggest. It might also be noted that two of the Middle Holocene houses at the Nursery site produced OGR beads from their floors, linking this community to the OGR bead pattern (Howard and Raab 1993; Raab et al. 1994).

The Late Holocene

According to traditional models, the Late Holocene was the time period during which cultural patterns and tribal groups observable by early Euro-American explorers and settlers emerged. Sometime after cal A.D. 500, the bow and arrow appeared, with ceramics adopted after cal A.D. 1000 at the start of (or during) the Late Prehistoric Period (Meighan 1954; Rogers 1945; True 1966; Warren 1964, 1968). Many also supposed that this was a time when migrations created the historic linguistic landscape and new forms of social expression, including mortuary practices with cremations, replaced inhumations. This period was typically characterized as resource rich, and climatic instability not discussed. Surpluses of food, especially acorns, were thought to have sustained the social arrangements documented by anthropologists in the twentieth century. These ideas were in accord with the notions of Kroeber (1925) and other early authorities, who characterized aboriginal California, particularly coastal areas, in terms of virtually assured natural food supplies and some of the world's most benign

climatic regimes. Subsequent theorizing and synthetic accounts of coastal adaptations have often elaborated on this perspective, emphasizing highly successful cultural adaptations and high levels of social complexity. The utopian character of these theories has been characterized as benign environmental determinism by some observers (Raab and Jones 2004).

In contrast, an extensive body of research during the past two decades has revealed more complex and dynamic regional and local patterns of change. The empirical patterns that have emerged from these studies stand in marked contrast to the scenarios described above. The timing of the adoption of new technologies (such as the bow and arrow and ceramics) and social expressions (particularly cremations) vary greatly within the region, typically earlier in the east than the west and occurring very late and minimally in some coastal and insular contexts (Byrd 2003; Christenson 1990; Gallegos 2002; Gamble and Russell 2002; Griset 1996; Koerper et al. 1996, 2002; McDonald and Eighmey 1998). Dynamic patterns of intergroup trade and interaction, as well as intragroup dynamics, played major roles in these trends.

These studies also suggest that culture change was sometimes rapid rather than gradual; stressful times were not limited to postcontact times but occurred periodically during the prehistoric era; littoral and marine resources remained extremely important; and major shifts took place in subsistence practices, settlement patterns, and the organization of labor (Byrd and Reddy 2002; Gallegos 2002; Koerper et al. 2002; Raab et al. 2002; Vellanoweth et al. 2002). In particular, recent research has explored the impact of resource intensification dynamics and paleoenvironmental fluctuations on culture change (Jones et al. 1999).

SUBSISTENCE CHANGE Contrary to the glowing assessments offered by traditional models of Late Holocene coastal adaptation, the long-term trajectory of many California foraging adaptations appears to be marked by overexploitation of high-ranked food items, leading to resource depression and shifts to more costly resources. Dynamics of this kind have been identified for many of the food resources used by the region's prehistoric coastal populations, including shellfish, fish, sea mammals, terrestrial mammals, and plant remains (Byrd 1996; Byrd and Reddy 2002; Koerper et al. 2002; Raab 1992; Raab and Yatsko 1992; Raab et al. 2002; Salls 1988; Vellanoweth et al. 2002). Thus during the Late Holocene, hunter-gatherers throughout the Southern Bight region increasingly focused on smaller resources that generally occurred in greater amounts.

For example, on San Clemente Island, where trans-Holocene maritime hunting-fishing-gathering practices have been studied in detail at the Eel Point and other archaeological sites, the hunting of large sea mammals and relatively productive shellfish gave way during the Late Holocene to enormously intensified fishing, small sea mammal hunting, and collecting of the smallest species of shellfish. These trends appear to reflect a marked decrease in foraging efficiency over time (Broughton and O'Connell 1999; Garlinghouse 2000; Glassow 1996a:36–39; Hildebrandt and Jones 1992; Kelly 1995; Porcasi et al. 2000). Although resource intensification of this kind is currently viewed in various ways, Broughton (1997: 846) defines it as "a process by which the total productivity or yield per areal unit of land is increased at the expense of declines in overall caloric return rates or foraging efficiency." Thus resource intensification is the result of consuming increasing quantities of lower-ranked, less-productive food species.

Turning to a mainland example, an extensive body of data from Camp Pendleton has demonstrated that Late Holocene subsistence practices emphasized the most abundant nearby resources, notably smaller, labor-intensive shellfish, fish, small terrestrial mammals, and small-seeded plants (Byrd 1996; Byrd and Reddy 1999, 2002). Smaller shellfish, most notably *Donax gouldii* but also *Tegula*, became key elements of this subsistence strategy (Byrd 1996; Reddy 1996a, 1999a). The dietary importance of large mammals declined during the Late Holocene, while small terrestrial mammals increasingly dominated the terrestrial meat diet. Fish resources were focused primarily on smaller, nearshore schooling species, and entailed a decrease in diversity (Wake 1999). Similar trends have been noted along the Newport coast and the San Joaquin Hills (Koerper et al. 2002:70–72).

At the same time, a wide range of local plant resources (over four dozen genera) were exploited along the northern San Diego coast during the Late Holocene (Klug and Popper 1995; Martin and Popper 1998, 1999; Reddy 1996b, 1997a,b, 1999a,b, 2001, 2003). Plant resource exploitation was focused on species requiring higher handling costs, particularly grasses (Poaceae) (Reddy 1999b). Grass seeds belonging to *Bromus/Stipa* spp., *Hordeum* sp., *Phalaris* sp., and *Sporobulus* sp. occurred in the highest frequencies. Direct macrobotanical evidence of acorn exploitation is minimal, a trend also noted at more inland Late Holocene sites (Reddy

1997b, 2004). It remains uncertain whether this pattern reflects dietary emphasis, acorn processing methods, or both. "Fire followers" (plants that thrive in open areas created by regular fires) are represented to varying degrees at Late Holocene coastal sites. These include *Callandria, Lotus, Marah,* corms/bulbs from wild flowers, *Hordeum, Trifolium, Chenopodium,* and *Poaceae.* These patterns may indicate that intentional burning took place to varying degrees along the coast (Blackburn and Anderson 1993).

Bean and Lawton's (1976) publication on protoagriculture (drawing on ethnohistoric and ethnographic observations) argued that when the Spanish first entered the San Diego region, grasses were intensively manipulated, seasonal burning was an important aspect of this process, and in all probability it entailed cultivation in a variety of coastal settings (Shipek 1989). Recently this topic has been explicitly addressed by research examining morphological changes in wild barley in coastal Orange County (Klug and Koerper 1991) and the modeling of crop processing stages and the documentation of intensive exploitation of small-seeded plants near the end of the Holocene on coastal Camp Pendleton (Reddy 1999a, 2001, 2003).

These important studies show the tremendous potential for such research but also highlight how we lag behind our colleagues elsewhere in the United States. For example, systematic and intensive paleoethnobotanical investigations in eastern North America (where literally thousands of liters of sediment have been floated and studied) have revolutionized perspectives on early agriculture and revealed an indigenous pristine hearth for agriculture that entailed small seed resources such as *Chenopodium* (Smith 2001). Only by conducting intensive archaeological research and investing substantial research funds on this topic will researchers in California make comparable advances. Until that time, the alluring possibility of indigenous cultivation in the Southern Bight will remain in the murky realm of conjecture.

SETTLEMENT PATTERN RECONFIGURATION Both mainland and Channel Island locations witnessed the emergence of similarly structured settlement patterns during the Late Holocene (Byrd and Reddy 1999, 2002; Koerper et al. 2002; Raab et al. 2002), suggesting that the study area may reflect robust, widespread shifts in regional land use. Regional settlement organization was powerfully conditioned by techno-economic adaptations and provides another line of evidence to examine intensification dynamics. Late Holocene coastal southern California was dramatically affected by several correlates of resource intensification. A key aspect was the emergence of a distinctive type of Late Holocene settlement pattern characterized by comparatively large residential camps linked to numerous ephemeral satellite sites. The smaller sites were nonrandomly distributed, short-term encampments, some of which were dedicated to relatively specialized subsistence tasks. Such patterns are now documented on San Clemente Island (Raab et al. 2002) and on the mainland coast in the San Joaquin Hills and on Camp Pendleton (Brewster et al. 2003; Byrd and Reddy 1999, 2002; Koerper et al. 2002). Site types in each area include major residential bases, short-term residential camps, and limited activity sites (Rosenthal et al. 2001).

These trends are undoubtedly tied to changes in subsistence practices. As subsistence strategies increasingly focused on smaller resources that required more time and effort to procure and process, their exploitation entailed more complex settlement configurations that included both targeting and encounter strategies. These trends accelerated during the Late Holocene, particularly after about cal A.D. 1300.

RELATED CHANGES IN HUNTER-GATHERER SOCIETIES These changes in settlement and subsistence strategies were undoubtedly tied to broader changes in social interaction. Associated changes in social discourse may have included increasing community size, greater lengths of stay at major residences, and shifts in intracommunity organization. The latter may have entailed major social reorganization (with political and economic leaders emerging), more need for structured decision making with respect to the assignment of economic tasks, and formal mechanisms for dealing with scheduling conflicts. A particularly intriguing aspect of this issue entails whether the gender-based division of labor noted ethnohistorically emerged with the shift to intensive mass collection and harvesting of shellfish and grasses (Jones 1996; McGuire and Hildebrandt 1994).

CAUSAL FACTORS The key question arises, What were the causal factors underlying these changes in subsistence practices, settlement organization, and other related activities? Recent years have seen arguments linking critical changes in economy and settlement patterning with paleoenvironmental fluctuations, which in turn initiated productive debates over periodic overexploitation as a factor in structuring Late Holocene island adaptations based largely on fishing and the nature of mainland littoral adaptations

(Laylander and Christenson 1988; Rosenthal et al. 2001). Despite the research advances engendered by these models and related debates, a number of important questions remain unresolved. One of the most important of these involves unraveling the potential causal interrelationship between paleoenvironmental fluctuations and social factors in bringing about Late Holocene cultural patterns.

Research of the past several decades has emphasized the high population density of the region's hunter-gatherers, their intensified economies, and their relatively complex sociopolitical systems. Depending on a few ubiquitous but low-ranked, labor-intensive, and storable resources put Late Holocene people in ecological jeopardy, since few alternative foodstuffs were available in times of resource stress. While much of the Holocene archaeological record may reflect a process of intensification and population growth, it is also probable that this long-term trend toward intensification put coastal populations at increasing risk in the event of severe fluctuations in the climate. With the Late Holocene emphasis on low-ranked resources and mass harvesting, more limited options were available to increase production, and these economies may have been more vulnerable to high-intensity environmental change (Jones et al. 1999:155).

Recent evidence derived from a series of problem-oriented projects along the coast in this region reveal that the settlement and subsistence responses to paleoenvironmental changes were dynamic and locally innovative as well as nonenvironmentally deterministic, and did not entail coastal abandonment (Altschul et al. 2005; Byrd and Reddy 2002; Gallegos 2002; Gamble and Russell 2002; Koerper et al. 2002). These new results demonstrate intensification in the exploitation of littoral resources and coastal occupation. Those who championed the traditional interpretations of southern California coastal prehistory noted earlier viewed this pattern as evidence of an extraordinary degree of adaptive continuity across time. This seems simplistic at best; however, since profound differences in settlement and subsistence patterns that emerged during the Late Holocene have been revealed by recent research.

A particularly important aspect of this discussion has been the impact of unusually severe and persistent medieval-era droughts (often referred to as the Medieval Climatic Anomaly, MCA) on longer-term adaptive trends (Jones et al. 1999). An important part of this argument has been that long-term shifts in foraging efficiency prior to the MCA positioned Late Holocene hunter-gatherers for disaster (Jones et al. 1999). Studies of the MCA anomaly have been productively pursued in mainland and insular settings. For example, Yatsko's (2000) research on San Clemente Island shows that this semiarid island, acutely sensitive to changes in moisture, reflects dramatic changes in settlement patterning between about cal A.D. 1100 to 1300, shifts that appear to reflect the reorganization of settlement around areas with a greater geological potential for surface water.

We do not mean to imply that all Late Holocene adaptive changes were caused by negative environmental change, but rather that rapid external changes may have served as catalysts for internal changes within hunter-gatherer communities. Indeed it is possible that recent discussion has on occasion overemphasized negative external change as a driver of social change. At Camp Pendleton, the proliferation of more specialized sites occurs immediately after the end of the Medieval Climatic Anomaly around cal A.D. 1300, and this is the time frame after which most small sites flourish on San Clemente as well. These post-MCA changes imply that rapid improvement in the environment may have released some of the environmental pressures on population levels and their spatial distribution, and fostered an increased presence of hunter-gatherers on the landscape.

Overall, two major points have emerged from recent Late Holocene research. First, external change was rapid and often negative, and communities in the Southern Bight reacted in a variety of novel ways to these fluxes in external conditions. Second, casual relationships between shifts in social organization and external variables were extremely complex, and will require high-resolution data to fully resolve. We suspect that these trends toward greater intensification imply that potentially profound changes occurred with respect to the social institutions of these hunter-gather communities. Although new types of gear and equipment were also needed, we do not consider that these social changes required major technological breakthroughs. From our perspective, the crucial changes in intracommunity socioeconomic organization were related to the greater investment in time necessary to collect, process, and store smaller food resources, and the impact of changes in the organization of labor on settlement structure.

PREHISTORY UPSIDE DOWN

Based on recent research in the Southern Bight, prehistory turns out to be much different than once thought. Once accepted notions about prehistoric

cultural development have been turned upside down. Intensively maritime economies, seafaring, residential sedentism, and large-scale trade networks were viewed traditionally as hallmarks of a Late Holocene cultural climax in southern California, culminating millennia of incremental cultural improvements. A large body of evidence now shows that these traits were all present thousands of years earlier than once supposed, and culture change was highly variable across time and space. Substantial evidence shows that sea travel and distinctively maritime cultural adaptations were well established during the Early Holocene, if not the Terminal Pleistocene. Residential sedentism and large cultural interaction spheres, including trade, appeared at least as early as the Middle Holocene. Our understanding of the Late Holocene is also shifting. This time period was often conceptualized as a time of paramount socioeconomic elaboration, based on studies of the Chumash Indians of the Santa Barbara coastal region. This picture has given way to appreciation of much greater variation in social complexity and settlement patterns across southern California, including groups such as the Kumeyaay of southern San Diego County. Where monolithic reconstructions of cultural elaboration once held sway, we now have competing theoretical models, some of which view Late Holocene culture change as far more punctuated than once imagined and far more driven by stresses such as climate change and resource depression than adaptive optimality.

These data suggest that a fundamental rethinking is under way about California prehistory and the ways it is studied. We are learning that the prehistoric past contained complex and varied cultural patterns that do not necessarily have analogs in the ethnohistoric present and cannot be explained on the basis of traditional reconstructions of California prehistory.

MODELS FOR A NEW MILLENNIUM

Since the 1984 publication of *California Archaeology* and the *Archaeology of California*, perhaps the most profound change we have witnessed is not simply the dramatic increase in archaeological data, but rather how these data force us to model the past. Earlier we alluded to the fashion in which California archaeology was overshadowed during much of the twentieth century by an anthropological establishment focused to a large extent on ethnohistory. Particularly in an era when archaeological practitioners lacked a detailed sense of prehistoric time, ethnohistoric analogies afforded attractive analogies for reconstructing prehistoric cultural arrangements. Given that Late Holocene archaeological records were frequently the best preserved and most visible, and therefore the most intensively studied, it should come as no surprise that theorizing about culture change across the whole of prehistory frequently revealed the heavy impression of Late Holocene cultural arrangements. While many recognized in the abstract that different kinds of cultural arrangements probably existed in the past, reconstructions of prehistory often reflected a reverse engineering of the Late Holocene—theorizing about the long-term changes that would have been necessary to produce the Late Holocene/Early Historic archaeological/ethnohistoric record. Until the past two decades, this theorizing had to be undertaken with modest stocks of archaeological data, particularly from Middle and Early Holocene time periods. Given the information available to archaeologists during the first three-quarters of the twentieth century, the results are impressive. Whatever questions may now be raised about these reconstructions, these efforts did afford a logical and coherent basis for theory development and analysis of archaeological data.

We increasingly understand, however, that California's prehistoric past was complex, multidirectional, and multicausal. As the data on Early Holocene seafaring, maritime adaptations, Middle Holocene sedentism and trade, and Late Holocene climatic flux and resource scarcity suggest, we can only be misled by imagining the native cultural patterns of the early historic era as analogous to much older time periods. The rich ethnohistoric data on native Californians and ethnographic reconstructions based on early-twentieth-century interviews (rather than participant-observer data) is the envy of archaeologists working on hunter-gatherers in other areas of the world. This information is unquestionably important in understanding how historic native groups adapted to the study region. On the other hand, research of the past two decades demonstrates with increasingly clarity that this information has very real limitations. Above we noted increasing agreement that prehistoric culture change was much more variable across time and space than was once suspected. The prehistoric past contained cultural patterns that have no historic analogs. To continue to model large expanses of prehistoric time and space largely on the basis of historical ethnographic analogies is an increasingly questioned practice. However, we are not suggesting that archaeologists ought to ignore ethnohistoric information, since historical pat-

terns tell us how particular groups adapted to cultural and physical environments.

A good approach for the future is the use of modern ethnohistoric research techniques to better understand immediate precontact patterns of social interaction. For example, mission period baptismal, death, marriage, and census registers provide new insight into the size of Native American coastal villages and intervillage relationships. Recent research along these lines suggests, for example, that eight villages of at least 100 individuals existed within the area of modern-day Camp Pendleton and that there was strong patterning in village intermarriage (Johnson and Crawford 1999). These results are inconsistent with the long-held view that settlement patterning in the study region was seasonally bipolar, with only temporary or seasonal camps along the coast (Quintero 1987; Rosenthal et al. 2001; Waugh 1986). Similar techniques are also yielding new insights in the Southern Channel Islands (Johnson 1989).

In contrast to the studies above, we have seen countless reports and publications that first describe alleged native cultural patterns in the Late Prehistoric/Early Historic time frame, then go on to offer opinions about how far back in time these patterns can be recognized in the archaeological data. Many of these reports do not seem to recognize that inferring patterns of behavior from ethnohistoric accounts is as theory-laden an exercise as archaeological inferences drawn from material culture. Through assertion and repetition, popular interpretations of ethnohistory are represented as objectively established facts. We are all entitled to our own opinions, but we are not entitled to our own facts. Ethnohistoric accounts tend to depend on the theoretical assumptions they are paired with. In our view, California research could benefit from a far more open and rigorous discussion of this problem.

Whatever the fate of such a debate, research of the past twenty years confronts us with cultural patterns that cannot be accounted for by reference to historic Indian groups. This is where archaeology can make powerful new contributions. Archaeologists are in a position to understand how the past was different from the ethnohistoric present, and why. To achieve this purpose we need to expand on a couple of trends that have emerged during the past two decades. One of these is the diversification of theoretical models. An examination of the literature cited above shows the deployment of a spectrum of theoretical approaches to the study area, ranging from foraging optimization models to neo-Darwinian selectionist perspectives to culture-historical orientations. The application of a wide range of modern theories of hunter-gatherer behavior (Bettinger 1991; Kelly 1995) is a trend that should be encouraged.

A second major change forced by new data is growing debate among researchers. As theoretical models increasingly compete to explain the past, debate is not only inevitable but highly desirable, for example, questions about whether Early Holocene coastal dwellers were effective seafarers, whether Middle Holocene groups moved away from the mainland coast after bays silted in, whether climatic stress played a role in Late Holocene cultural patterning, whether Late Holocene economic patterns reflect resource depression or abundance, and others. This is a trend that should also be encouraged.

Finally, those who may have worried that archaeological progress would be hampered by the lack of formal regional research designs, the split of archaeology into "academic" and "contract" branches and other ostensible problems, can take heart. The past two decades suggest that archaeologists of all kinds continue to seek explanations of the past in more creative and productive ways. Moratto (1984) and Chartkoff and Chartkoff (1984) helped us gather our thoughts for this task. Their books distilled what many were thinking as California archaeology approached the end of the twentieth century. With these works as reference points, we can now see that California's ancient peoples achieved complex and interesting cultures earlier than we might have imagined. Just as importantly, the Moratto and Chartkoff and Chartkoff volumes signaled the rise of an increasingly sophisticated and intellectually autonomous California archaeology. As these trends continue into the new millennium, archaeology is forging new research models that will undoubtedly transform our understanding of California prehistory yet again.