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Journal of California and Great Basin Anthropology

Title

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Permalink

<https://escholarship.org/uc/item/5784f9rc>

Journal

Journal of California and Great Basin Anthropology, 18(1)

ISSN

0191-3557

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Publication Date

1996-07-01

Peer reviewed

Debating Prehistory in Coastal Southern California: Resource Intensification Versus Political Economy

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The socioeconomic determinants of prehistoric cultural change in coastal southern California are viewed in the context of competing explanatory models. A prevailing emphasis on political economic theories in Chumash archaeology is contrasted with emerging models of resource intensification. In recent years, research debates have increasingly revolved around these competing approaches. These debates are reviewed in relation to key research issues in the prehistory of the Santa Barbara Channel region.

CALIFORNIA coastal archaeology is arguably undergoing a renaissance. Even a brief survey of the archaeological literature suggests a growing contribution from California coastal researchers during the last decade (e.g., Erlandson and Colten 1991; Jones 1991, 1992; Arnold 1992, 1995; Hildebrandt and Jones 1992; Salls et al. 1993; Broughton 1994a; Erlandson 1994; Raab et al. 1994, 1995a; Connolly et al. 1995; Jones and Hildebrandt 1995; Jones and Richman 1995; Lightfoot 1995; Glassow 1996). This trend is bringing research before national and international audiences, revitalizing interest in California maritime prehistory. Examination of the research behind this trend teaches two important lessons. First, California researchers can expect to attract broad archaeological audiences to the extent that they engage theoretical or methodological issues of general importance. Second, consideration of these conceptual issues frequently takes the form of debate by researchers representing competing explanatory models. Following from this second point, the present discussion outlines two competing models of prehistory; one based on long-standing notions of political economy and the other on emerging principles of resource intensification. It then

attempts to show how several current debates about specific aspects of prehistoric cultural evolution take their impetus from these larger conceptual structures. Debate at both levels demonstrates the important role that competing models can play in encouraging researchers to collect new data, reevaluate existing interpretations and advance more adequate explanations of prehistory. At stake in these debates is the potential to dramatically reshape our understanding of prehistoric cultural developments in coastal southern California.

DEBATING COASTAL PREHISTORY

While prehistory textbooks are not intended to chronicle the cutting edge of research, these publications are a handy barometer of established thinking. For instance, a recent volume on North American prehistory by Fagan (1995: 253) summarized prehistoric developments in the Santa Barbara Channel region:

The Chumash achieved a level of social complexity that represents about the limit of such complexity possible without adopting agriculture. Like more complex hunter-gatherer societies elsewhere in North America . . . they were able to achieve this elaboration because of unusually favorable environmental circumstances.

This theme, which links social complexity to abundance of natural food resources, was established early in California anthropology. Luminaries such as Kroeber portrayed California as a cornucopia of diverse, relatively easily exploited plant and animal foods, rendering California Indians as "perhaps the most omnivorous group of tribes on the continent" (Kroeber 1925:523-530). This pattern followed from the fact that

the food resources of California were bountiful in their variety rather than in their overwhelming abundance along special lines. If one supply failed, there were a hundred others to fall back upon [Kroeber 1925:524].

So great was this bounty in the estimation of many anthropologists that the failure of agriculture to take hold in most areas of aboriginal California could be attributed to it. In this idyllic setting, many supposed that the combined productivity of terrestrial and marine foods placed some California hunter-gatherers on a par with simple agriculturists (Bean and Lawton 1976). Nor were the proponents of this view reluctant to link social complexity to this advantage:

The abundance of plant and animal resources and the development of storage techniques and other truly skilled applications of human ingenuity allowed these people to develop beyond the normal parameters of hunting and gathering, particularly in the sociological, philosophical, and religious realms. The social structures of native communities, autonomous corporate groups called tribets by Kroeber, were characterized by extra tribal alliances and political confederations sometimes achieving the level of nationhood. Within communities, populations were administered by powerful hereditary chiefs and a bureaucratic elite whose principal function appear to have been control and management of production and redistribution [Bean and Lawton 1976:46].

This scenario, which may be described without too much exaggeration as "hunter-gatherers-in-paradise," is effectively the basis of a model of cultural evolution with a long history in California anthropology.

A number of authors has posited an increasingly elaborate and productive exploitation of the marine and terrestrial food resources of the Santa Barbara Channel regions during prehistory (e.g., Landberg 1965; King 1976, 1990; Moratto 1984:133-146; Arnold 1992). In effect, this theme not only describes a cultural evolutionary trajectory that culminates in the historic Chumash, it also speaks to the origins of the great subsistence abundance celebrated by Kroeber and many others since his time, including Fagan (1995:252), who noted that

The Chumash exploited a great variety of food resources . . . "It may be said that for them, the entire day is a continuous meal," wrote one Spanish missionary marveling at the varied food resources enjoyed by the Chumash.

Models of cultural evolution have been advanced in recent years, however, that more nearly describe "trouble in paradise." Commenting on Chumash cultural evolution, Fagan (1995:229) acknowledged the possibility that

as populations grew, the overall energy cost of providing food for everyone would also increase. More effort would have been needed to obtain food, perhaps triggering a shift to new food sources that may have required a greater time and energy investment to catch or process . . . One could argue in theoretical terms that optimal foraging strategies applied . . . but the data are still insufficient.

The dynamics described in this summary have entered archaeological thinking in recent years under the rubric of *resource intensification*. As we shall see below, they also present a direct challenge to some interpretations of Chumash cultural evolution. Models of political economy and resource intensification not only posit quite different determinants of cultural change, they also afford an important opportunity to the field of archaeology. Consideration of the differences between these models shows that studies of southern California coastal prehistory can benefit from an expanded debate about cultural evolution.

RESOURCE INTENSIFICATION VERSUS POLITICAL ECONOMY

Resource Intensification

While resource intensification is currently defined in various ways by archaeologists, most of these definitions are concerned with processes that yield more food per capita or per unit of land (Earle and Christenson 1980; Hayden 1981; Price and Brown 1985; Cohen 1989; Broughton 1994a, 1994b). At the operational level, archaeologists frequently prefer to examine these processes, particularly in terms of their cost-benefit characteristics, in relation to optimal foraging or diet-breadth models (e.g., Hildebrandt and Jones 1992; Raab 1992; Broughton 1994a, 1994b; Glassow 1996:36-39).

In diachronic perspective, one of the most widely accepted characteristics of post-Pleistocene hunter-gatherer economies was a tendency toward diet-breadth expansion. In this sense, intensification involved two related trends: (1) the addition of increasingly "marginal" food species to the diet; and (2) increasing investments in the technologies required to exploit the new food items in a cost-effective way. The first trend involved consumption of increasingly diverse and often smaller plant and animal food species. Unlike Middle and Late Pleistocene economies, in which large-bodied animals frequently were major components, "broad-spectrum" adaptations of the Holocene placed increasing reliance on fish, birds, insects, shellfish, seeds, and small game. The second aspect of intensification, technological innovation, followed from increasing use of foods that were increasingly difficult to process or that required more elaborate harvesting techniques.

Following optimal foraging principles and related theoretical constructs, the motivation to undertake such shifts likely arose from periodic stress that involved imbalances between population size and the available food supply (Earle and Christenson 1980; Hayden 1981; Winterhal-

der and Smith 1981; Yesner 1981; Hildebrandt and Jones 1992; Raab 1992). Stress of this kind may have arisen from a number of circumstances, including population growth, overexploitation of food resources, and environmental change.

In California, there is evidence of intensification in the use of animal and vegetal food resources. The efficiency of this process can be estimated by applying certain cost-benefit measures. In two study areas, for instance, Broughton (1994b:501) characterized the process of intensification as one in which "the total productivity per areal unit of land increased at the expense of overall foraging efficiency," where efficiency is gauged by the body size of prey items and the relative time/energy costs that would have been required to capture and process the species in question. Since small food items (both vegetal and animal) often involve comparatively high technological, pursuit, and processing costs, foraging patterns based on these resources could be described as less efficient in energy terms than, say, hunting large animals. Based on this type of analysis, Broughton (1994a, 1994b) argued that consumption of increasingly smaller vertebrate species in the San Francisco Bay Area and in the Sacramento Valley during the Late Holocene indicates a "loss of foraging efficiency."

It is worth noting that this notion of declining foraging efficiency is challenged by McGuire and Hildebrandt (1994), who argued for hunting patterns nearly the opposite of those posited by Broughton (1994a, 1994b). McGuire and Hildebrandt (1994:48-50) suggested that in many areas of California, small game species provided most of the meat consumed by Middle Holocene populations, while deer hunting increased in importance during the Late Holocene. While these divergent interpretations cannot be reconciled here, they form the basis of a debate with interesting implications for future research.

In an example involving plant resources, Bas-

gall (1987) argued that the widespread use of acorns in California reflects intensification dynamics. This analysis questioned a long-cherished assumption that hunter-gatherer "affluence" of quasi-agricultural proportions was anchored by acorn consumption (e.g., Kroeber 1925:523). Basgall's analysis revealed that intensive use of acorns arose in various parts of California between about 4,000 and 1,000 years ago. This time frame is crucial: If acorns are such a "rich" source of food, why did it take so long for people to exploit them?

If this question troubled early researchers, it was brushed aside with explanations based on changing food tastes, "settling in" to the environment, discovery, experiments and other inscrutable factors. A more satisfactory answer may be obtained by examining the costs and consequences associated with acorn consumption. Basgall (1987) made a convincing case that when the cost-benefit characteristics, chronology, and health correlates of intensive acorn use are all considered, this food source is much less productive than researchers have traditionally assumed. Wohlgemuth (1996) found at least partial support for Basgall's model in an analysis of floral remains and groundstone artifacts from archaeological sites in central California. As an indicator of declining foraging efficiency, patterns of acorn consumption reinforce the faunal data examined above.

Political Economy

Archaeological models based on notions of political economy have been employed for more than a century. These models have frequently been assigned the task of explaining how egalitarian social relations among hunter-gatherers could be transmuted into cultural systems characterized by hereditary social ranking. The intellectual bloodlines of these explanations can be traced to nineteenth century progressive social evolutionists, such as Morgan, Spencer, and many others (Harris 1968; Trigger 1989; Bettin-

ger 1991). Most of these theorists envisioned social complexity arising fundamentally from the economic emancipation of hunter-gatherers from the limitations of nature. As Bettinger (1991:5) noted, this line of theorizing typically attributes cultural change to innovations in which, "Cultures are portrayed as populations that collectively solve adaptive problems through novel, and often complex, social, technical, political and religious means." Put another way, invention of a rationally managed, increasingly specialized, and productive "political economy" allows hunter-gatherers to escape the imagined constraints of their "natural economy," or, in more modern terms, their ecological circumstances (Bettinger 1991). In this sense, the term political economy captures the essence of processes thought to have played a central role in prehistoric cultural evolution all over the world.

Political economic models envision a variety of causal forces. Among these, a capacity to control the production and consumption of surplus goods has long been viewed as a centrally important trait of political economies. Current discussions tend to focus on the types of social power connected to surplus production (e.g., Ames 1995), with many contemporary theorists concluding that this power usually assumes self-aggrandizing and coercive forms (Price and Feinman 1995). In the past, however, theorists frequently identified redistribution of surpluses by chiefly agents, particularly food, as a pathway to social hierarchy (e.g., Service 1975). We will return to this topic below. Here, it is sufficient to characterize this traditional view of political economy as "functionalist" in the sense that it postulated an essentially consensual process in which elites were granted social power because they were perceived by their followers as "system serving" rather than "self-serving."

Examples of this approach are not difficult to find in California anthropology. The model of Native California described above by Bean and Lawton (1976), for instance, appears squarely

within this tradition. In this scheme, the twin elements of political economy—a striving for increased economic productivity and redistribution—have their counterparts in “the development of storage techniques and other truly skilled applications of human ingenuity,” and “powerful hereditary chiefs and a bureaucratic elite whose principal function appear to have been control and management of production and redistribution” (Bean and Lawton 1976:46).

In the Santa Barbara Channel region, concepts of political economy are clearly evident in attempts to characterize Chumash cultural formations. Whitley and Clewlow (1979), for instance, argued that Chumash society, including regional settlement hierarchies, was structured by the operation of a regional economy presided over by political elites. However, this line of thinking may be best illustrated in King’s (1976, 1990) model of Chumash political economy. King suggested that at least some Chumash elites attained their power in a fashion similar to that described by Bean and Lawton (1976). The basic similarity of political economic machinery in these accounts is apparent in descriptions of a Chumash regional exchange network consisting of fiestas, gifts, mortuary ceremonies, individual trade, and a monetized economy based on shell beads:

The operation of the inter-village exchange system seems to have been essentially an expression of the profit motive on the individual level, and the operation of the law of supply and demand. Effects of the system were to produce a common resource base for a large area at the expense of much work [King 1976:296].

By randomizing the effects of environmental variability with frequent interaction, the Chumash were able to use more of their resources; the degree of their interaction was a result of the high variability in the resources of the area. Their frequent use of money allowed them to average their many resources efficiently [King 1976:317].

How do these dynamics, which refer essentially to the ethnographic present, relate to inves-

tigations of the past? Insofar as archaeological research is concerned, a major liability shared by the King and Bean and Lawton models is a lack of explicit specifications about cultural change. King (1990:79) did suggest that increasing social complexity may have resulted in greater food stores, but the time frame and social and economic mechanisms believed to be involved remain obscure. Indeed, it is difficult, based on the existing debate, to determine exactly what claims are being made regarding the utility of political economic models for Chumash archaeological studies. Despite this ambiguity, it seems clear that such models have influenced certain interpretations of archaeological data, a point considered below.

MODELING DEBATE

Harris (1968:662) offered this memorable advice to those who would serve on the jury of scientific judgment: “We do not demean a theory by its failures to explain everything, but rather by its failure to explain as much as its nearest rival.” But how do we decide that one theory performs better than another? The essential answer, of course, is that rival theories can be put forward as testable models. In the ensuing debate and research, the predictive superiority of one model over another is eventually demonstrated.

Perhaps the present discussion can assist such a process by posing some basic questions: Is the case for resource intensification as *weak* as one might imagine from Fagan’s (1995:229) suggestion that models of intensification will have to muster greater empirical support before they can replace schemes currently enshrined in the literature? Conversely, is the evidence supporting political economic models as *strong* as Fagan’s characterization implies? As the discussion below reveals, consideration of even limited sets of data can provide instructive answers to these questions.

Prevailing Interpretations

Proponents of political economic interpretations of Santa Barbara Channel prehistory offer at least three lines of evidence in support of their position, which are outlined below.

Regional Culture Historical Reconstructions. To reiterate a point made earlier, the applicability of the King (1976) and Bean and Lawton (1976) models to prehistory remains ambiguous. And yet, the King model is explicitly intended to guide archaeological inquiry. King (1976:317) offered what amounts to a set of test implications for his intervillage exchange model:

The Chumash inter-village system of exchange resulted in these regularities in the archaeological record: (1) The existence of sites or areas in sites, where certain individuals produced specialized products. (2) A uniformity of artifact types throughout the area at any given time. (3) At every site the existence of artifacts not manufactured locally. (4) The existence of sites [suites] of ecofactual materials from non-local environments. (5) Elaboration in the form of utilitarian household items. (6) The presence of different kinds of status markers and money in the form of artifacts such as beads, spangles, and pendants. (7) The presence of large quantities of goods in mortuary contexts. (8) Certain categories of items produced in the Chumash area found in non-Chumash regions. (9) Graves of high status individuals containing high-status markers and utilitarian tools.

Later research, particularly along the lines of test implications 6 and 9 above, led King (1990: xviii-xix) to conclude that nascent forms of social ranking emerged between 4,000 and 5,000 years ago. This conclusion clearly seems intended to stake out a time line for the eventual emergence of social formations described in the Chumash ethnographic literature. But in what way did these formations arise? King's model, aside from reference to the socioeconomic functions of beads and ornaments, is mute regarding processes of cultural change. Even so, this model does not lack theoretical implications. In fact, the political economic logic of the model may

encourage certain interpretations of widely recognized culture historical trends in the Santa Barbara Channel region (e.g., Landberg 1965; Moratto 1984; King 1990; Arnold 1992; Glasow 1996).

For instance, reliance on milling stones and manos in the Early Holocene gave way to bowl mortars and pestles, signalling an apparent shift to dependence on acorns after the Middle Holocene. Increasing utilization of maritime resources, marked by the appearance of circular shell fishhooks and other gear, formed an important trend after the Middle Holocene. At the same time, coastal sites appear to become more numerous and, in some locations, much larger in the millennium before contact with Europeans. These late prehistoric sites contain cultural traits clearly ancestral to the historic Chumash. One can point to many other cultural traits and temporal trends, but overall this pattern is one of a succession of technological and economic changes that, at least in the Late Holocene, gave rise to large, relatively complex social formations.

Although the authorities cited above are by no means necessarily political economic theorists (as we shall see below), there is a tendency for many observers to view regional prehistory as an evolutionary sequence leading to the "rich" state of socioeconomic affairs described by Fagan (1995), King (1976), and Bean and Lawton (1976). For those inclined toward this view, the technoeconomic and social trappings of the regional culture archaeological record could be viewed as precisely the sorts of cultural improvements that political economic theories predict.

Indicators of Status Ranking. As noted above, King (1990:xviii-xix) argued that archaeological evidence of social ranking among the ancestors of the Chumash can be detected as early as Middle Holocene times. The primary argument offered in support of this conclusion is the hypothesis that beads and ornaments func-

tioned at least in part as display devices employed to maintain elite status identities (King 1976:317). The frequency and distribution of certain bead types in mortuary contexts is said to mirror the increasing degree of status ranking and socioeconomic specialization that developed among the Chumash over the millennia (King 1990). This evidence is, of course, crucial to a political economic interpretation of cultural evolution in that it identifies precisely the chiefly agents one would expect to have orchestrated these changes.

Indicators of Increasing Community Welfare. Notions of increasing subsistence productivity are inherent to theories of political economy. In King's (1976) intervillage exchange model, the concept of "averaging" resources within a region through elite-brokered exchange and redistribution, as well as the appearance of bead money, carries the inescapable implication of improving subsistence efficiency and productivity. It is not clear in King's arguments, however, exactly how such productivity is thought to have been apportioned to the members of Chumash society. For example, if food production increased through time, were the benefits shared equally or were such resources monopolized by the elites? Although there is a lack of clear answers to these questions, activities such as elite-brokered fiestas, gift exchanges, intervillage trade, and the like (King 1976) could be viewed as just the sort of economic "leveling" mechanisms that political economic theorists envision as a prime mover in the emergence of social inequality.

Typically, scenarios of this kind view the consolidation of the social power of the elites as a process in which commoners willingly accept their growing status deprivation and loss of political and economic autonomy. The plausibility of this process rests on the assumption that it is "rational" to trade socioeconomic autonomy for improved economic abundance and security. Binford's (1989:218) description of this scenario

captured what appears to be the underlying theory of the King and Bean and Lawton models, in which he noted that "All over the world, there were identified prehistoric redistributive systems organized by central chiefly agents, nice people who passed out the goods and generally made life secure for their followers." It is this putative tendency toward economic improvement that seems to play a role in the "richness" of Chumash economic conditions described by Fagan (1995) and others.

The Evidence Reconsidered

Regional Culture Historical Reconstructions. As we saw earlier, King (1976:317) proposed that several aspects of the archaeological record might indicate the operation of the intervillage network and the social ranking connected to it. What is striking about the evidence offered in support of these test implications is the dominant role played by ethnographic accounts. Accounts of this type, rather than archaeological data, constitute the foundation of empirical support for King's model, particularly in regard to subsistence practices.

If one views the ethnographic Chumash as the end product of an uninterrupted, 5,000-year sequence of cultural evolution, it may seem logical to regard ethnographic data as the starting point for "retrodicting" this process. This view is reasonable to the extent that ethnographic information implicates testable hypotheses regarding processes of cultural change (Lightfoot 1992, 1995; Raab 1993). The way in which certain ethnographic data are presented in support of political economic interpretations could be highly misleading, however. Fagan's (1995:252) comment that Spanish missionaries marveled at the varied food resources available to the Chumash is a good example of this problem. This anecdote, which is apparently intended to give a sense of the abundance of Chumash subsistence resources, is similar to vignettes offered by King (1976) in his intervillage exchange model. One

might gain the impression that the historic Chumash diet was the happy culmination of a series of subsistence improvements spanning many millennia in a rich natural environment, a process leading to "a level of social complexity that represents about the limit of such complexity possible without adopting agriculture" (Fagan 1995: 253).

It is characterizations of this kind, however, that illustrate one of the sharpest contrasts between political economic and intensification models. Whether resource variety is equivalent to food abundance in any cost-effective sense depends on a knowledge of the cost-benefit ratios associated with particular subsistence practices. This point appears to have been ignored in portraying observations about varied foods and continuous meals (Fagan 1995:252) as evidence of subsistence abundance. Any hypothesis that such observations point to abundance should be considered in light of the fact that these same patterns could well describe the broad diet-breadth of a population subjected to a loss of foraging efficiency in ways similar to those described by Basgall (1987) and Broughton (1994a, 1994b). If the latter proves to be the case, it would hardly be surprising if, in Kroeber's (1925:523-530) words, California groups were "perhaps the most omnivorous group of tribes on the continent," though, of course, this characteristic would have the opposite implication of the one intended by Kroeber.

In the past, a paucity of detailed archaeological data on technoeconomic change undoubtedly encouraged the primacy of ethnographic information for purposes of model building. Although the availability of suitable archeological data remains a significant challenge to model building, this is no excuse to defer efforts along these lines. For example, data for evaluating models of intensification have been developed as part of recent California Channel Islands research. While caution is certainly due in generalizing the results of these studies, this research

offers some support for the role of intensification dynamics in maritime cultural change.

Consider, for instance, that on San Clemente Island circular shell fishhooks and fishing intensification postdate substantial pithouses constructed with whalebone roof structures and other architectural features requiring considerable investments of labor. While structures of this kind could be associated with varying degrees of residential permanence, their labor costs appear to signal a significant degree of sedentism. Some of these houses date close to 5,000 radiocarbon years B.P. (Salls et al. 1993; Raab et al. 1994).

The crucial point here is that fishing intensification, based at least partly on the adoption of circular hooks (ca. 3,300 radiocarbon years B.P.; Raab et al. 1995b), follows by over a millennium the appearance of relatively sedentary maritime communities. Increasing emphasis on fishing also correlates with evidence of a growing island population (Raab et al. 1995b). This sequence contradicts political economic notions about the role of invention: Island populations did not achieve residential sedentism because of a new technological advantage; rather, more in keeping with intensification processes, a growing population of sedentary hunter-fishers created the conditions under which new technological innovations could take hold.

Indicators of Status Ranking. As noted earlier, the most widely cited political economic interpretations of Santa Barbara Channel prehistory are based on the ideas of King (1976, 1990). Here, it is important to distinguish between King's efforts at regional chronology building and his attempts to model the determinants of cultural evolution. Based primarily on an analysis of grave lots of marine shell beads and ornaments, King's research (1990) yielded a cultural chronology for the Santa Barbara Channel region spanning about eight millennia. This chronology, widely adopted by coastal researchers in southern California and surrounding regions (e.g., Moratto 1984:145-146; Erlandson

1994:50-5; Fagan 1995:249-250), is a significant achievement. In contrast, however, King's model of cultural evolution has come under sharp attack in recent years.

Since criticisms of King's model are capably presented elsewhere (Arnold 1992:67; Arnold and O'Shea 1993), a lengthy review of them is unnecessary here. It must be pointed out, however, that these criticisms raise considerable doubt that the emergence of social ranking can be detected reliably by King's analytical approach. The conclusion that social ranking emerged during the Middle Holocene and then gradually evolved into more complex forms is also called into serious question. As Erlandson (1994:267) noted, most regional specialists probably agree with Arnold's (1992) position that social ranking, at least on any hereditary basis, did not appear in the Chumash area until after about 700 years B.P. (Fagan 1995:251; Glassow 1996: 22-23). In addition, there is increasing support for the idea that this development was a more punctuated episode of cultural change than King's model suggests, and that paleoenvironmental factors also played a significant role in stimulating change (Lambert and Walker 1991; Arnold 1992; Raab et al. 1994). These points are important because they weigh against typical features of political economic models, including a gradualist conception of cultural change and an exclusive focus on intrasocietal forces as significant causes of such change.

Political economic models should also be considered in light of more general trends in modeling the origins of social complexity. Once again, it is not entirely clear how models such as those of King (1976) and Bean and Lawton (1976) conceptualize the connection of elites to social ranking. However, these models seem to imply a functionalist causality that envisions commoners subordinating themselves to social elites in return for increased access to material goods. If this is an accurate characterization, these models are increasingly out of step with

current thinking. This can be seen, for example, in a recent volume by Price and Feinman (1995) devoted to the topic of modeling the origins of social complexity. Ames (1995:155-156) characterized the theoretical approaches represented in this volume as falling on a continuum that ranges from "elites-as-managers" to "elites-as-thugs," maintaining that

The elite-as-manager approach sees elites arising from the needs of complex divisions of labor for coordination of tasks, task groups, and information flow. In Service's (1975) classic formulation, emerging elites managed regional specialization in production through redistribution—leading to the formation of chiefdoms. It is clear now that chiefs may do little or no redistribution.

Elites-as-thugs models presently dominate the literature. In these models, some interest group within society gains control of production, and ultimately over labor, since labor is the ultimate limit on production in nonindustrial economies. The core idea is that elites gain control and reproduce themselves out of self-interest. They do not arise from any societal need to coordinate anything—they may do that, but that is not how they come to exist. In more succinct terms, Binford (1989:231) echoed this view:

The argument for redistribution has no obvious factual basis: At least, I know of no redistributive agents who are not operating in what are already societies based on political power and I doubt that power comes from being nice.

It would probably be a mistake to construct too strict a dichotomy between consensual and coercive forms of social power, since elites may deal in both. Just the same, past models of political economy employed in the Chumash area are open to the charge of giving too little attention to competition and conflict as determinants of cultural change.

This omission is highlighted by the current debate regarding the origins of social complexity in the Santa Barbara Channel area. Arnold's (1992) marine paleotemperature model postulates that elevated sea-surface temperature between

about 650 and 800 years B.P. devastated maritime subsistence economies of the northern Channel Islands, thus acting as a "kicker" in the rapid emergence of a Chumash chiefdom on Santa Cruz Island. Shell bead manufacture is thought to have been brought under the coercive control of chiefs in an effort to buffer these subsistence failures. As an example of the "elites-as-thugs" school, Arnold (1995) stands in clear contrast to the "elites-as-managers" approach of King and Bean and Lawton with regard to the issues of: (1) punctuated versus gradual cultural change; (2) the role of conflict versus consensus in obtaining social power; and (3) the role of environmental versus intrasocietal forces in promoting change.

With regard to all of these points, Arnold's model reveals the important role that intensification dynamics can play in theorizing about the origins of social complexity. The emphasis of intensification models on cultural change arising from stresses related to population growth, over-exploitation of resources, environmental change, environmental and social circumscription, and other factors often are viewed as important preconditions to emergent social complexity by contemporary theorists (Price and Feinman 1995).

Indicators of Increasing Community Welfare. Burials offer particularly direct and powerful testimony in any debate about the relative explanatory powers of models of cultural evolution. Those inclined to view existing culture historical frameworks as evidence of political economic mechanisms at work in Santa Barbara Channel prehistory should carefully consider this evidence. Oddly, current discussions of southern California coastal archaeology rarely incorporate the large body of information that has been published in the last decade on prehistoric Santa Barbara Channel health trends (Walker 1986, 1989a, 1989b; Walker and Lambert 1989; Lambert and Walker 1991; Lambert 1993). These data are an extraordinarily valuable source of information for archaeological model building.

Figure 1 plots changing health conditions across five cultural periods defined by Lambert (1993): Early-Early Period (6,000 to 3,500 B.C.), Late-Early Period (3,500 to 1,400 B.C.), Early-Middle Period (1,400 B.C. to A.D. 300), Late-Middle Period (A.D. 300 to 1150), and Late Period (A.D. 1150 to 1782). The trends in Figure 1 represent changes in the percentage of burials displaying various health or development characteristics reported by Walker (1989a) and Lambert (1993).

The data in Figure 1 are derived from both the northern Channel Islands and adjacent mainland locations, thus affording a regional perspective on health conditions. The frequency of some skeletal traits was necessarily based a small number of burials, this problem being more acute for the earlier time periods (Lambert 1993:513). Temporal resolution is also fairly crude owing to the difficulty of assigning an exact age to some burials. Nevertheless, a number of general health trends can be discerned on the basis of reliable biological indicators. In Figure 1, data series 1, 2, and 3 suggest that the frequency and severity of periosteal lesions increased over the length of the Holocene. Beginning with the Early Middle period, this trend appears to accelerate. As the incidence of disease increases somewhat sharply, human stature drops below the mean stature line for the Holocene as a whole ("0" line in Figure 1). Periosteal lesions peak during the Late-Middle period, while stature continues to decline (data series 4 and 5), a striking trend. Comparing the stature of Early and Late Holocene burial populations, Lambert (1993:517) pointed out that

The total loss in average femur length is 2.8 centimeters (2.6 cm for males, 3.0 cm for females). Since femur length accounts for approximately 27 percent of a person's total height . . . this roughly translates into an average reduction in stature overall of about 10 cm between the earliest and latest populations.

Interpersonal violence, as measured by compression fractures of the skull, also increases

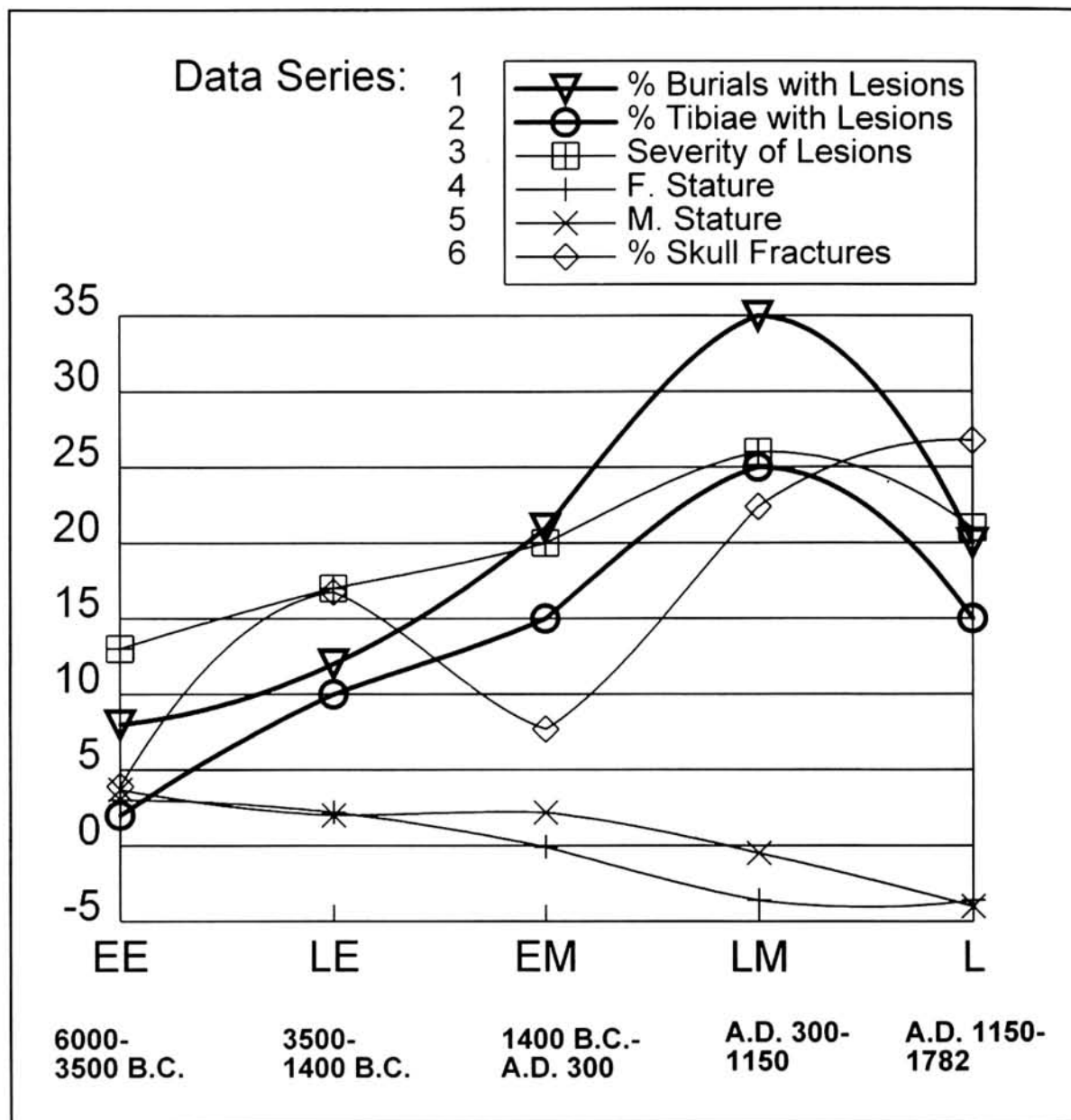


Fig. 1. Changes in frequency and severity of periosteal lesions, stature, and cranial trauma for Santa Barbara Channel populations (Walker 1989a; Lambert 1993).

over time. Violence reaches a peak during the Late-Middle and Late periods, also the time interval with the greatest incidence of disease and stature reduction.

These are compelling data in any debate about cultural evolution: If the ancestors of the

Chumash achieved increasingly productive and secure adaptations, as political economic models seem to imply, why do the osteological indicators point to long-term worsening of health conditions? How do statements about environmental richness or unusually favorable environmental

conditions relate to the osteological evidence? While political economic models could encourage an interpretation of cultural evolution that favors increasing economic productivity and social complexity, the bone data refer directly to the living conditions of the people involved.

The osteological data are provocative. During late prehistory, when one might imagine that intervillage exchange and managerial elites ushered in economic improvements, health problems reached their peak. At the very least, such improvements apparently failed to benefit the bulk of Chumash society (it remains unknown whether elites fared better), a circumstance that fell far short of the mythic "richness" or "abundance" traditionally attributed to parts of aboriginal California.

CONCLUSIONS

The foregoing discussion, despite its selective focus and brevity, suggests that the evidence supporting intensification models is not as weak as Fagan's (1995) summary may suggest, nor is the evidence bolstering political economic models as strong as some may perceive. Looking to the future, model building might consider the following points.

First, one of the greatest vulnerabilities of the California political economic models is their failure to consider seriously any determinants of cultural change except intrasocietal forces. Effectively, these models adopt a sweeping uniformitarianist stance which views biophysical conditions during most of the Holocene as essentially like those of the present. Moreover, this archetypal environment is tacitly assumed to have provided continuously high levels of subsistence productivity. Yet, viewing California as a land of unqualified environmental richness, a long-standing and widespread penchant in California anthropology perpetuated by Fagan, King, and Bean and Lawton, is demonstrably unrealistic.

A growing body of evidence points to

changes in both marine and terrestrial environments of sufficient magnitude to affect aboriginal cultural adaptations in coastal southern California (Lambert and Walker 1991; Arnold 1992; Larson et al. 1994; Raab et al. 1994, 1995b; Glassow 1996). This is an area of research that has spawned significant debates in recent years. For example, Raab et al. (1995a) have countered Arnold's (1992) marine paleotemperature model described earlier with evidence that warm water episodes involve recognizable subsistence changes, but not necessarily decreased food abundance. Raab et al. (1994) and Raab and Larson (1996) have also suggested that prehistoric drought events better correlate with archaeological patterns currently attributed to changing sea temperature, including some of Arnold's data from the Channel Islands. Whatever its outcome, this debate affords a more realistic basis for theorizing about the causes of prehistoric cultural change than prevailing political economic models.

Second, hunter-gatherers should not be viewed as environmentally or ecologically neutral actors. Evidence from a number of studies points to overexploitation of a wide range of marine food species in coastal southern California, including the Santa Barbara Channel region (Salls 1990, 1991; Hildebrandt and Jones 1992; Raab 1992; Raab and Yatsko 1992; Jones and Hildebrandt 1995; Porcasi 1995). A significant debate has recently been engaged by Lyman (1989, 1995), Hildebrandt and Jones (1992), and Jones and Hildebrandt (1995) on the issue of whether the pressures of human predation, including resource depression and extirpation of species, shaped long-term patterns of sea mammal hunting on the North American Pacific Coast. Hildebrandt and Jones (1992) argued that spatial and temporal hunting patterns can be viewed productively in relation to optimal foraging principles. On the other hand, Lyman (1989, 1995) suggested that native conservation practices, along with inadequate archaeological

data, may obviate the conclusions of Hildebrandt and Jones. Porcasi (1995) recently entered this debate on the side of Hildebrandt and Jones, based on analysis of sea mammal hunting patterns spanning about 8,000 radiocarbon years at the Eel Point site on San Clemente Island.

The examples above are by no means the only instances in which researchers have employed optimization or diet-breadth models in the Chumash area or other coastal southern California locations. Botkin (1980), for instance, documented prehistoric shellfish exploitation in the Malibu area that follows a trajectory predicted by optimization principles. Noting the relatively late intensification of marine fishing in prehistoric southern California, Glassow (1980: 89) suggested some time ago that this trend might be attributable to patterns of resource scarcity induced by population growth. The recent work on San Clemente Island discussed earlier (Raab et al. 1995b) offers support for Glassow's interpretation, demonstrating that intensification of fishing increased exponentially after the appearance of circular shell fishhooks at 3,300 radiocarbon years B.P. Glassow et al. (1988) examined long-term paleoclimatic and demographic trends in the Santa Barbara Channel, eliciting patterns of clear utility in framing intensification models. In a recent analysis, Glassow (1996:36-39) applied a diet-breadth model to a case study of prehistoric maritime economic change in the Vandenburg region of the Chumash area. These examples signal a vigorously expanding research paradigm that has already produced significant results, despite Fagan's (1995) portrayal of intensification studies for the Chumash area.

Third, does resource intensification, to the extent that it challenges long-standing political economic interpretations, reduce the Chumash and other native Californian groups to a footnote in post-Pleistocene cultural evolution? Not at all. In fact, the time may be ripe to return to the question of whether native subsistence prac-

tices of California were comparable to early food production in other parts of the world (Bean and Lawton 1976). Intensification models provide new ways of approaching this question in terms of the causes and consequences of cultural evolution, including social complexity, among groups such as the Chumash. Within such frameworks, the intense linguistic and cultural localization captured in Kroeber's (1925) notion of tribelets could be examined in relation to the socially and environmentally circumscriptive stresses implied by resource intensification. This shift in thinking would move prehistoric California from the status of a cultural evolutionary oddity, a thing to be explained only in reference to itself, to a valuable source of enlightenment about general cultural processes.

Finally, the Santa Barbara Channel health data are an extraordinarily important resource for theory building and comparative research. As Lambert and Walker (1991) pointed out, prehistoric Santa Barbara Channel populations suffered from health problems similar to those documented in many other areas. Moreover, these problems, implicitly or explicitly, are frequently linked to processes of intensification. Cohen (1989:127-128), for instance, noted that in several regions of the world, Mesolithic-style hunter-gatherers and early food-producing groups display trends toward stature reduction and generally worsening health conditions. In central California, Dickel et al. (1984) and Dickel (1985) presented evidence of declining nutrition and stature over time. In briefly examining relationships between health and intensifying acorn use, Basgall (1987:36-38) hypothesized that while storable foods may have buffered seasonal shortages of calories, the long-term trend was probably toward declines in the overall quality of the native Californian diet. Comparative studies of human health play a useful role in breaking down the mythology of a California hunter-gatherer paradise, thus opening the way to more productive lines of research.

Although the interpretations offered in this paper are exploratory, they demonstrate that existing political economic models are seriously flawed. These models are based on demonstrably unrealistic assumptions and are increasingly out of step with current empirical and theoretical studies. Alternatively, models of intensification point to productive new research directions. Equipped with these models, southern California researchers can enter global discussions about post-Pleistocene cultural change, including the origins of social complexity, sedentism, and other important cultural developments. There is every reason to suppose that southern California coastal research will be an important voice in these discussions.

ACKNOWLEDGEMENTS

The ideas expressed here were influenced by many individuals, though of course they do not necessarily agree with my conclusions. On that account, I take sole responsibility for any lapses of fact or interpretation. I acknowledge the stimulating influence of colleagues that include Matt Boxt, Ginger Bradford, Jon Erlandson, Antonio Gilman, Bill Howard, Terry Jones, Judy Porcasi, Phil Walker, and anonymous reviewers for the *Journal*. Mike Glasow's archaeological insights and editorial assistance were particularly helpful in preparing this manuscript for publication.

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