

EXCHANGE SYSTEMS IN THE ARCHAIC OF COASTAL SOUTHERN CALIFORNIA

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ABSTRACT

Exchange systems became elaborate in late California prehistory and are understood to have been essential in the evolution of socio-cultural complexity. As yet there has been relatively little attention to the origins of exchange in earlier stages of prehistory. This paper analyzes published data for exchange from Archaic sites in southern California's coastal region. It shows that systematic exchange existed at least by the beginning of the Middle Archaic, and argues for the functional and social significance of small-scale exchange in the context of Archaic cultures. It also argues for the benefit of increased research into the local availability of raw materials whose local sources have often been assumed without adequate verification.

INTRODUCTION

Recent years have seen a growing appreciation for the degree of cultural complexity achieved by prehistoric California peoples (e.g., Moratto 1984:118). This realization has involved a concomitant growth in the understanding of the central role played by exchange in the development of socio-cultural elaboration (e.g., Earle 1985). Theoretical models have been developed to account for this relationship (e.g., Chartkoff and Chartkoff 1984:231-242; Ericson 1982:129-146).

The analysis of prehistoric exchange in California thus far has focused almost entirely on its fluorescent manifestations in late prehistory. Relatively little attention has been paid to the origins and development of exchange in earlier phases of prehistory. A proper understanding of the evolution of exchange and its relationship to the growth of complexity in other aspects of culture requires a fuller examination of aspects of the early development of exchange in California prehistory.

Because exchange reached its maximum development in the late phases of California prehistory, its roots should be sought in earlier periods. This study takes as its temporal focus the Archaic Period, particularly the Middle Archaic (6000-4000 B.C.) and Late Archaic (4000-2000 B.C.) as defined elsewhere (Chartkoff and Chartkoff 1984:105-130). This timespan is roughly coeval with what Chester King has defined as the Early Period in the Santa Barbara area (King 1981) and with the Millingstone Horizon in the Los Angeles area (Moratto 1984:160-162), or what Warren (1968:6-12) has called the Encinitas Tradition.

For its geographical focus the study takes the coastal region of southern California. This choice was made for three reasons. The first reason concerns the amount of research done on Archaic sites around the state. The southern California coast, at this time, is one of the best-studied parts of the state for Archaic sites. The second reason concerns quality of evidence in a different sense. Because of the marked ecological contrast between the coast and the interior, the ability to recognize exotic raw materials is enhanced. The third reason is purely pragmatic. This study has been made in a midwestern state where the available library resources are richer for the southern California coast than for most other parts of the state.

The study has involved a review of reports of excavations at some 70 Archaic sites in the region. Evidence for possible or definite exchange was identified at only 21 of these sites. Even this limited body of data, however, allows some interesting inferences to be drawn.

UNDERSTANDINGS OF EXCHANGE IN ARCHAIC PERIOD ARCHAEOLOGY

Concepts of exchange in California prehistory are derived from ethnographic analyses. The literature on exchange in cultural anthropology is extensive, and descends from such pioneering works as Malinowski's (1922) interpretations of the Kula system in the Trobriands. Within this literature, exchange is generally understood to refer to a broad category of transactions which achieve the transfer or distribution of goods within and between communities. Market economies and money systems constitute certain aspects of exchange. The forms of exchange more germane for such studies as this one, however, involve transactions along lines of social relationship which embody patterns of reciprocity. In these patterns, the presentation of gifts, in Mauss' (1925) terms, creates obligations of response at some future time, and not necessarily of the same kind. Such transactions achieve the transfer of goods, but in doing so they also serve social values such as the maintenance of relationships, the recognition of status changes, the fostering of political support, or the resolution of conflicts. In this sense exchange is fundamentally a social institution which also has economic significance, and cannot be understood as an essentially economic phenomenon as could a market system.

Archaeologists base their understandings of the nature and function of exchange systems on ethnographic models, but they cannot study exchange in the same way that ethnographers can. Ethnographers can observe exchange behavior and can discuss the behavior with its performers. Archaeologists can study exchange only through its material consequences or by-products. The usual means of recognizing exchange archaeologically lies in the identification of material remains whose origins lie outside the putative territorial boundaries of the possessing group. The identification of artifact materials as territorially exotic or foreign makes them candidates for exchange-good status.

This conceptualization poses certain problems. The identification of such exotic goods is inexact overall, although some techniques, such as obsidian sourcing, have been very productive. Many potentially exotic goods have undoubtedly gone unrecognized because the sources of many raw materials found in assemblages often are not determined. Poor preservation has undoubtedly destroyed many other kinds of evidence for exchange. The archaeological record for exchange, therefore, is very probably biased by under-reporting.

On the other hand, the recognition that a material is exotic to a site does not necessarily mean that exchange was the means by which it was acquired. Other possible means of acquiring exotic goods, such as by expedition, may have been operating in any particular situation. Currently archaeologists have little ability to distinguish between alternate means by which past California cultures acquired exotic raw materials. In the literature, therefore, the term "exchange" really is a synonym for the acquisition of exotic goods by any means.

One other caveat should be noted concerning the age of reported exotic artifacts. Much of the published literature on the southern California Archaic was written 20-30 years ago or more, when excavation standards were less exacting as regards the recognition of internal site variability. A case in point is the Glen Annie Site, SBa-142. Recent reanalysis shows that this site had two separate components within what excavators thought was a one-component Millingstone occupation, and these two components have been shown to be more than 2000 years apart in age (Colton 1987:69-72). The position of specific artifacts within these components thus needs to be understood before it can be concluded that they do or do not reflect Archaic exchange, and the original site reports do not always provide that information. The identification of an artifact as exotic may be correct, but the exotic piece may not date to the Archaic. Michael Glassow has pointed out that a number of the Millingstone Horizon sites in coastal southern California may well have multiple components within what had been regarded as a single Millingstone Horizon component (personal communication, Redding, 1988).

The position taken here is that the description of exotic goods as having been acquired by exchange is not necessarily correct, but that the predictable under-reporting of truly exotic raw materials more than compensates for whatever raw materials may have been acquired by means other than exchange. The term "exchange", therefore, will be used in its normal sense. The problem of the age of exotic goods is somewhat more difficult. It is suspected not to affect very many of the sites described below, but future reanalysis may well change this inference.

EVIDENCE FOR EXCHANGE IN SOUTHERN CALIFORNIA COASTAL ARCHAIC SITES

The Archaic Period of coastal southern California as it has been defined by Chartkoff and Chartkoff (1984:76-130) spans the period from roughly 9000 to 2000 B.C. The Early Archaic (9000-6000 B.C.) reflects the first post-Pleistocene readaptations in California, such as the Lake Mohave cultural traditions of the southern California deserts and the San Dieguito tradition near the coast. The beginnings of maritime exploitation appear toward the end of the period.

The subsequent Middle Archaic (6000-4000 B.C.) saw the emergence of the first regional cultural traditions along the coast, such as what Rogers (1929) called the Oak Grove in the Santa Barbara County area, the Millingstone Horizon in Los Angeles and Ventura Counties, and the La Jolla sequence in San Diego and Orange Counties. This period saw the completed colonization of the Channel Islands and the development of both hard seed exploitation and littoral exploitation. Increasing localization and sophistication of adaptations continued to develop during the subsequent Late Archaic, between 4000 and 2000 B.C. (Chartkoff and Chartkoff 1984:82-104).

Sites of the period along or near the coast developed assemblages rich in milling tools, core tools, hammerstones and large scrapers. Both ornaments and fine-scale retouched flake tools were comparatively uncommon. A number of these sites have yielded extensive burial components, most typically with burials overlain by massive cairns of milling slabs or cobbles. These burials typically have yielded few other grave goods. In most of these sites the yield of shell and bone is modest while botanical remains are even more poorly represented. As a result, the surviving recognizable evidence for exchange at most of these Archaic sites consists mainly or wholly of lithics.

To be associated with possible exchange, these materials must be recognizable as exotic to the site and its surrounding area. Some raw materials currently can be so recognized, but in most cases analysts have simply assumed raw materials are local, often without specific demonstration, or have not considered the question at all. The following discussion examines categories of known or suspected exotic raw materials and their occurrences in Archaic sites along the southern California coast (see Table 1 and Figure 1).

Obsidian

This volcanic glass is one of the most distinctive and probably the most easily proven example of exotic raw materials found in the region's sites. There are no known sources of obsidian along the southern California coast, so all occurrences of the material in sites must reflect importation. The nearest known source is the Obsidian Butte locality at the south end of the Salton Sea. This source is located some 150 km east of San Diego and 275 km southeast of downtown Los Angeles (Banks 1971: 25). Although the source was created quite long ago, the filling

of the Salton Sink drowned the source and prevented it from being used until a regression about 1000 years ago exposed the deposit. It is suspected, but not yet known with precision, that earlier downdrops made the source available at various times in earlier prehistory. In any event, this source was the most common one for sites in coastal San Diego and Orange Counties. In spite of the availability of the source, obsidian never amounted to more than 1% of the chipped stone raw material in any coastal site in the region, even in late prehistory (Koerper et al. 1986:53-58).

The next nearest source was the Coso Hot Springs deposit, located in the Mohave Desert nearly 300 km east of Los Angeles. Ericson and Meighan (1984) were of the opinion that Coso obsidian did not start reaching the coast until about 2000 years ago. More recent discoveries in Orange County (Koerper et al. 1986) and Santa Barbara County (Erlandson 1988) show that Coso obsidian was reaching the coast 5000 years earlier, during the early Millingstone Horizon. A few obsidian pieces from the Archaic have sources even farther away, coming from sources lying east of the Sierra Nevada, at distances of 300-700 km or more. The Coso and Obsidian Butte sources were clearly the most important ones for the Archaic of the southern California coast, however.

As Table 1 shows, obsidian has been reported at 15 of the 21 coastal Middle and Late Archaic sites listed. These sites extend from San Luis Obispo County to San Diego County and also include a site on San Nicolas Island. This latter site is important because of its implications for regular ocean travel at this early date.

The sorts of artifacts made of obsidian also are of interest. At some of the sites chipping waste is found, but at eight of the sites only finished artifacts were found. This suggests that in many cases it may have been the finished artifacts rather than bulk raw materials which were exchanged to the coast. If so, the situation contrasts nicely with that of later prehistory, when a good deal of bulk raw material or preforms was brought to the coast for later reduction.

Steatite

Steatite or soapstone occurs in a number of places in California. For example, there are at least four known sources in inland San Diego County, of which at least two produce artifact-quality raw material (Polk 1972:7-8). The most important source by far, however, was Santa Catalina Island. Catalina quarries supplied most of the steatite used in coastal southern California throughout prehistory. Unfortunately, none of the steatite reported in the literature surveyed in this study has been chemically analyzed to demonstrate its source, so the positive identification of steatite as being from Catalina is often not possible. So far, however, there are no known local sources for good quality steatite in the coastal parts of

San Luis Obispo, Santa Barbara, Ventura, Los Angeles or Orange Counties, or on the other Channel Islands. When steatite is found in sites in those areas, the assumption of exchange is, therefore, reasonable at this time, even if the source cannot be positively linked to Catalina.

Table 1 shows that steatite has been reported at 10 of the coastal Archaic sites listed in addition to SNI-40 on San Nicolas Island. The quantity of steatite represented is rather similar to that of obsidian. The pattern of artifact manufacturing also reflects the pattern seen in obsidian, in that at most of the sites in question there is no evidence of the working of the raw material at the site. Instead, in several cases it may be presumed that artifacts manufactured elsewhere were being imported to the coast in finished form. These artifacts include a wide variety of forms: a pendant, a gorget, three beads, a charmstone, two tubes or pipes, two doughnut stones, six comals or comal fragments, two whole bowls, eight bowl rimsherds, 31 bowl bodysherds, four worked chunks, four miscellaneous objects, and "many" hammerstones.

Fused Shale

Within the great variation among shales, some varieties of fused shale offer stone comparable in chipping qualities to obsidian and chert. Grimes Canyon, near Santa Paula, yields a medium gray fused shale sometimes mistaken for milky gray obsidian. This source has long been recognized as a major supplier of fused shale for sites along the southern California coast, particularly in the Los Angeles and Ventura Counties region. A recent discovery of a fused shale source in the Santa Ynez Valley area in Santa Barbara County means that that source, rather than Grimes Canyon, is a more probable supplier of fused shale for sites along the Santa Barbara coast (Erlandson 1988: 30). Trace element analysis should be able to distinguish materials from the two sources.

Fused shale has been found in five of the 21 coastal Archaic sites listed in Table 1. Only in two Santa Barbara County sites is there any chipping waste reported of this material. At the other three sites only completed artifacts are listed. This difference may be the result of sampling or identification differences, or it could reflect real distinctions in exchange patterns. The abundance of fused shale chipping waste at SBA-75 and SBA-143 indicates that this material was not as exotic as steatite or obsidian, so that some manufacturing from the material took place at the community of the recipient. In the case of the Santa Ynez source, it is not known whether the source could have lain within the traditional territory of a coastal group. If so, that group, at least, would not have required exchange as a means to obtain the fused shale. For at least four of the five sites, however, fused shale, whether from Grimes Canyon or not, would have been an imported raw material, while at three of the sites it would appear that finished artifacts were acquired.

Gabbro

One ground stone bowl of gabbro was found at the Aerophysics Site, SBa-53, a Late Oak Grove site dating about 2900 B.C. The excavator reported that the nearest source for this metamorphic rock occurred more than 80 km away, along the coast north of Point Concepcion. The bowl therefore possibly represents exchanged material. Since there is no evidence for the working of gabbro reported at SBa-53, it may be that the bowl was manufactured at its source and acquired as a finished artifact (Harrison and Harrison 1966:84).

Granites

Granite occurs somewhat frequently in coastal Archaic sites in the form of milling stones, although varieties of sandstone are much more commonly used. Most researchers who describe granite artifacts assume that the material is locally available. This may or may not be the case in any particular situation, since no systematic analyses of local resources are described. A distinctive form of granite is said to occur on Santa Cruz, and one excavator reported finding several milling slabs made of this material at SBa-53, the Aerophysics Site, at Goleta on the mainland (Harrison and Harrison 1966:83). If so, it would imply an impressive ability to move raw materials in bulk across 40 km of open water at a very early age (5000 B.P.).

Cherts, Jaspers and Chalcedories

These colloidal or cryptocrystalline silicates constitute the most common raw materials for finely-flaked chipped stone artifacts found in coastal southern California Archaic sites. These materials as a group are highly varied in color, pattern and surface quality, more so than obsidian or fused shale, although there are recognizable clusters of traits that characterize the materials from many specific sources. It is not uncommon to find 10, 20 or more variations among all the silicates and silicate relatives found in a large assemblage.

Almost without exception, researchers have assumed or explicitly stated that all colloidal silicates in their assemblages were available locally. It is true that many varieties of silicates and their allies can be found locally, sometimes at quarry sources and more often in the ubiquitous conglomerates that constitute much of the coastal underlayment. Consequently, these materials also are commonly found as cobbles in stream gravels or along beaches. Real inventories of local silicates are rarely if ever made, however. It, therefore, remains a real possibility that out of 10-20 variations of silicates found in an assemblage, one or more might be exotic even though the vast majority are local.

At this time there is no way to identify most exotic silicates from published sources. An example of the difficulty can be seen at SBa-143 (Colton 1987). There, up to 6.8% of the debitage consists of Monterey chert. There are known quarry

sources for this material on Vandenberg Air Force Base, 30-50 km west of the site and, therefore, probably in a different territory and subject to exchange. However, the excavator reports that some Monterey chert, usually of inferior quality, can be found in stream gravels near the site. It is not yet possible to distinguish from the literature whether any particular artifact came from a local cobble or from material imported from Vandenberg. Similar difficulties surround other cases. Peck (1955:45), for example, reports a projectile point from Zuma Creek, LAN-174, made of a brown chert which he says is not local but for which no further information is provided.

Other Materials

Reports indicate a smattering of other possibly or definitely exotic artifacts of different materials. Sometimes shell can be identified as possibly exotic. For example, at the Glen Annie Site, SBa-142, 19 beads of Dentalium were reported. Three different species of Dentalium were represented among the beads. Some species of Dentalium have been reported along some parts of the present-day California coast, but it is not clear whether any or all of these species existed at Goleta 7000 years ago when the site was occupied (Owen, Curtis and Miller 1964:452).

A somewhat different problem is represented at the Scripps Estate I Site, SDi-525, in San Diego County. There, the Archaic deposit yielded some Laevicardium shells. According to the excavators, these shells occur today no closer than Baja California, at least 50-75 km to the south (Moriarty, Shumway and Warren 1959:198). According to McLean (1978:76), however, Laevicardium, or egg cockle, is still common along the southern California coast from Point Mugu well into Baja California, in which case it would not be an exotic species. The identification of a material as exotic, then, depends on the accuracy of the information source used, and excavation reports do not always make clear their sources. Conflicts between sources must be weighed as well. Furthermore, ecological sources usually refer to today's distribution of species. The distribution of Laevicardium 5000 years ago might have been considerably different.

Unusual lithic materials can be suspected of being evidence for exchange since they are rare in sites and so far have not been tied to any local sources. At the Little Sycamore Site, Ven-1, for example, Wallace (1962:15) found a charmstone made of a black rock he says is not local. Although the charmstone comes from one of the deeper parts of the site, its dating to the Archaic is not entirely certain. At the Encino Site, LAN-111, Rozaire (1960:317-318) reports a charmstone made of meteoric iron, which certainly could not be from a quarry source. Both these artifacts are ritually or ideologically significant, which adds to the possibility that exotic raw materials were used to make them.

It is useful to note the occurrence of contemporary exotic goods found at inland Archaic sites. Harrington (1957:21), for example, reports two Olivella shells found at the Stahl Site on Little Lake in San Bernardino County. Obsidian artifacts are reported at Ker-322 on Rogers Lake (Sutton 1988) and at Ker-302, the Sweetser Site (Glennan 1971), both in the western Mohave Desert. The Stahl Site may be seen to reflect exchange reciprocity: since inland goods were moving to the coast, coastal materials must have moved inland in somewhat corresponding amounts. The two Kern County sites show that exchange operated along multidirectional networks, not just in simple coast-inland pathways.

DISCUSSION

The occurrence of long-distance and regional exchange in coastal southern California Archaic cultures can be reasonably inferred from even the limited data presented in Table 1. Understanding the sociocultural implications of this exchange is somewhat more difficult. Obviously the magnitude of the exchange is dwarfed by that of later prehistory. The important thing, however, may be the fact that this level of exchange persisted at this modest scale for several thousand years.

It can be argued that the apparent level of Archaic exchange is deceptive because the evidence is underrepresented in the archaeological record. Quite probably a number of kinds of raw materials not now recognized as such may be exotic, and this possibility has not yet been systematically examined. In addition, it is quite probable that some goods exchanged in Archaic times were perishable and therefore remain unknown. Even so, there is no reason at this time to suspect that Archaic exchange occurred at vastly greater magnitudes. There also is no basis to argue that this exchange was technologically necessary. Essentially nothing made out of exchanged raw materials might not have been made out of locally available raw materials, with the possible exception of some artifact types made of steatite. That local materials existed in adequate amounts is clearly indicated by the fact that they overwhelmingly dominate all the Archaic assemblages and can still be found in abundance in local deposits.

If Archaic exchange is not explainable in technoeconomic terms, it must be explainable in other terms. It can be suggested that the motivation for this exchange lay in the social arena. Its purpose may have been the development and maintenance of long-distance social relationships through the periodic exchange of gifts, in Mauss' sense, through dyadic relationships (Mauss 1925). Lauriston Sharp's analysis of the stone axe trade in aboriginal Australia suggests a model, although in the case of his Yir Yorant the material exchanged was a vital import (Sharp 1952). As Malinowski long ago showed, however, symbolically important exchange items can function as powerful bonding agents even though they have no essential technoeconomic

significance as materials (Malinowski 1922).

The Archaic population of California is not clearly known, but may have been on the order of 5000-20,000 people, organized into a few hundred small, largely isolated groups of perhaps 10-30 individuals each, in territories of up to a few thousand square km each. Such groups must have been largely or wholly exogamous, at least for genetic reasons. Because groups were so small and so widely spread, mate exchange would have created thin but far-flung kinship networks. The need to maintain those relationships and to keep open options for future relationships and support would have promoted reciprocity between groups. The sort of exchange discussed in this study would have been an appropriate manifestation of such a system.

In such a system, the presentation of gifts of artifacts and raw materials can be understood in an interesting light. Exotic goods would have been valued, not for their technological utility in and of itself, since (generally speaking) the same tools could have been easily made from locally available raw materials. Rather, such gifts would have been valued for their social significance as gifts from distant but valued relations.

Such gifts also could have been valued for their status as demonstrably exotic materials. Let us assume that in a site where 20 variations of silicates are available locally, a variety not available locally is introduced. To the archaeologist it is simply one among 21 varieties of silicates. To the local tool-maker, however, who knows every local material, a foreign silicate is as obvious as a Rolls Royce automobile in a laundromat parking lot. The introduced raw material is special because it is exotic, and is known to be exotic by all knowledgeable people in the community. Goods regarded as valuable in these senses do not need to occur in great quantities to demonstrate their social significance (Earle and Ericson 1977).

CONCLUSIONS

Three points can be made in conclusion. The first is that there is a real need for archaeologists to make fuller determinations about what raw materials in their assemblages are locally available and which ones are exotic. Means to do so are available, such as geological sampling of catchment areas and expanded use of trace element analysis. Even in areas where much of the archaeological record has been destroyed, it is still possible to study the environments around the locations of former sites to assess their resource potential more fully than has been done. The Los Angeles area is a case in point. With better information about what raw materials are locally available in an area and which ones are truly exotic, it will be fruitful to reanalyze museum collections, especially ones from now-destroyed sites, to reassess the evidence for exchange. If, as is argued here, the magnitude of Archaic exchange is underrepresented in the literature, probably the magnitude of later exchange also is underrepresented.

The second point is that there seems to be evidence for the occurrence of exchange on small but persistent levels among tiny, largely isolated communities of Archaic peoples in coastal southern California. If so, similar patterns should be found elsewhere in the state (and beyond). An important question about this pattern concerns why these people did what they did on the small scale they did for so many millennia and over such considerable distances when the economic and calorically adaptive value was so limited. Whether or not the answer suggested in the previous section is the correct one, the question is anthropologically significant and should be pursued (Hughes 1978:53-55).

The third point is that an appreciation of Archaic exchange behavior is important for a better understanding of later prehistory. In the Pacific Period (2000 B.C. - A.D. 1769: Chartkoff and Chartkoff 1984:160-205), exchange moved much more toward truly economic rationales as well as toward much higher levels of volume. Colton (1987) independently noted the existence of trade routes in the Santa Barbara County Archaic and has described them as constituting an "interaction sphere". Considering the amount and variety of goods involved, this may be overemphasizing the nature of the system compared to its state in later prehistory. Nevertheless, the social institutions on which those later developments grew seem to have had their roots in Archaic exchange systems. A fuller understanding of the role that exchange played in the development of late prehistoric sociocultural complexity should begin with an appreciation of the foundations of exchange in the Archaic (Ericson and Earle 1982).

NOTES

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TABLE 1

EVIDENCE FOR EXCHANGE IN SELECTED SOUTHERN CALIFORNIA ARCHAIC SITES

Site	Age	Material	Reference
Arroyo Grande Watershed (AGW-6)	Millingstone Horizon (5500-2000 B.C.)	Obsidian: 1 point, 1 knife blade	Wallace 1962: 30-31
Aerophysics Site (SBa-53)	Late Oak Grove (2900 B.C.)	Obsidian: 2 points, 4 scrapers, 8 utilized flakes, 8 waste flakes Fused shale: 4 points, 7 utilized flakes, 5 waste flakes Steatite: 1 pendant, 4 worked chunks Gabbro: 1 bowl Granite: "some" milling slabs	Harrison and Harrison 1966: 16, 79-84
Corona del Mar Site (SBa-54)	Extranos Phase, Hunting culture (2500-2000 B.C.)	Steatite: 1 charmstone	Harrison and Harrison 1966: 46
Goleta Site (SBa-60)	Millingstone Horizon (6000-5000 B.C.)	Fused shale: 1 point Steatite: 8 rim sherds, 29 body sherds, 4 comals, 3 shaft straighteners, 1 tube or pipe (2 varieties of steatite present: blue and micaceous)	Kowta 1961: 367, 389
Tecolote Canyon Site (SBa-75)	Early Period Ey (3500-2400 B.C.)	Obsidian: 1 point Fused shale: 2 flakes Chert: "some" flakes from Temblor Range, Kern Co., 10% of chipped stone of Monterey chert from Vandenberg	Erlandson 1988: 12-14, 30

Glen Annie Site (SBa-142)	Oak Grove (7220-6380 B.C.)	Obsidian: 1 point, 1 disc scraper Fused shale: 1 disc scraper <u>Dentalium</u> : 19 beads (3 species)	Owen, Curtis and Miller 1964: 441-443, 452
Glen Annie Canyon Site (SBa-143)	Early Period Ex, Eyb (5500-2400 B.C.)	Obsidian: chipped stone 0.36% Fused shale: up to 6.8% Monterey chert: up to 10%	Colton 1987: 5, 56-57
Little Sycamore Site (Ven-1)	Millingstone Horizon (5000 B.C.)	Obsidian: 1 point, 1 drill Steatite (2 varieties): 1 black bead, 1 green tube bead Black stone (not local): 1 charmstone	Wallace et al. 1956:15-19
Encino Site (LAn-111)	Millingstone Horizon (5000-3000 B.C.)	Obsidian: 1 point fragment Meteoric iron: 1 charmstone	Rozaire 1960: 314-318
Big Tujunga Site (LAn-167)	Millingstone Horizon (3000-2000 B.C.)	Obsidian: 6 points, 1 scraper Steatite: 1 gorget, 1 bowl, 1 pipe fragment	Walker 1951: Plates 42,43, 45, Fig. 19; Wallace et al. 1956:18
Zuma Creek Site (LAn-174)	Millingstone Horizon (2950 B.C.)	Obsidian: 1 leaf-shaped biface Fused shale: 1 point Brown chert (not local): 1 point	Peck 1955: 45-48
Parker Mesa Site (LAn-215)	Late Millingstone Horizon (2500-1500 B.C.)	Steatite: 1 vessel body sherd	King 1962:
Sweetwater Mesa Site (LAn-267)	Millingstone Horizon (4920-4360 B.C.)	Obsidian: "a few flakes"	King 1967:56
Malaga Cove Site, Level 2	Millingstone Horizon (5000-3000 B.C.)	Steatite: 2 arrowshaft straighteners, 1 comal, 1 bowl sherd, "many" hammerstones	Walker 1951: 60

Chatsworth Site	Millingstone Horizon (5000-2000 B.C.)	Steatite: 1 gorget or large pendant, "many" beads	Walker 1951: Plates 37, 39 Wallace et al. 1956:13
Ora-64	Early Millingstone Horizon (4200-2500 B.C.)	Obsidian: 13 pieces	Koerper et al. 1986:40
Ora-119-A	Millingstone Horizon (4000-2000 B.C.)	Obsidian: 9 pieces	Koerper et al. 1986:40-41
Christ College Site (Ora-378) below 30 cm.	Millingstone Horizon (4000-2000 B.C.)	Obsidian: 4 pieces	Koerper et al. 1986:41-42
Scripps Estate I Site (SDi-525)	La Jolla II (5000-3000 B.C.)	Obsidian: 1 flake Steatite: 1 large bead Jasper (not local): 2 flakes <u>Laevicardium</u> : 1 shell (poss. local)	Moriarty et al. 1959:198-205
Valley Center Sites, San Diego County	La Jolla I (6000-5000 B.C.)	Steatite: 2 doughnut stones (1 from Catalina) Slate (exotic): 2 pendants	Warren et al. 1961:16
San Nicolas Island (SNiI-40)	2000 B.C.	Obsidian: 1 knife Steatite: 4 "objects"	Reinman and Townsend 1960: 15-16
Sweetser Site (Ker-302)	Pinto (3000-1000 B.C.)	Obsidian: 1 Pinto point	Glennan 1971: 30
Rogers Lake Site (Ker-322)	Lake Mohave (9000-7000 B.C.)	Obsidian: 1 side scraper on a flake	Sutton 1988: 30-32
Stahl Site, Little Lake, San Bernardino County	Pinto (3000-1000 B.C.)	<u>Olivella</u> : 2 shell beads	Harrington 1957:21

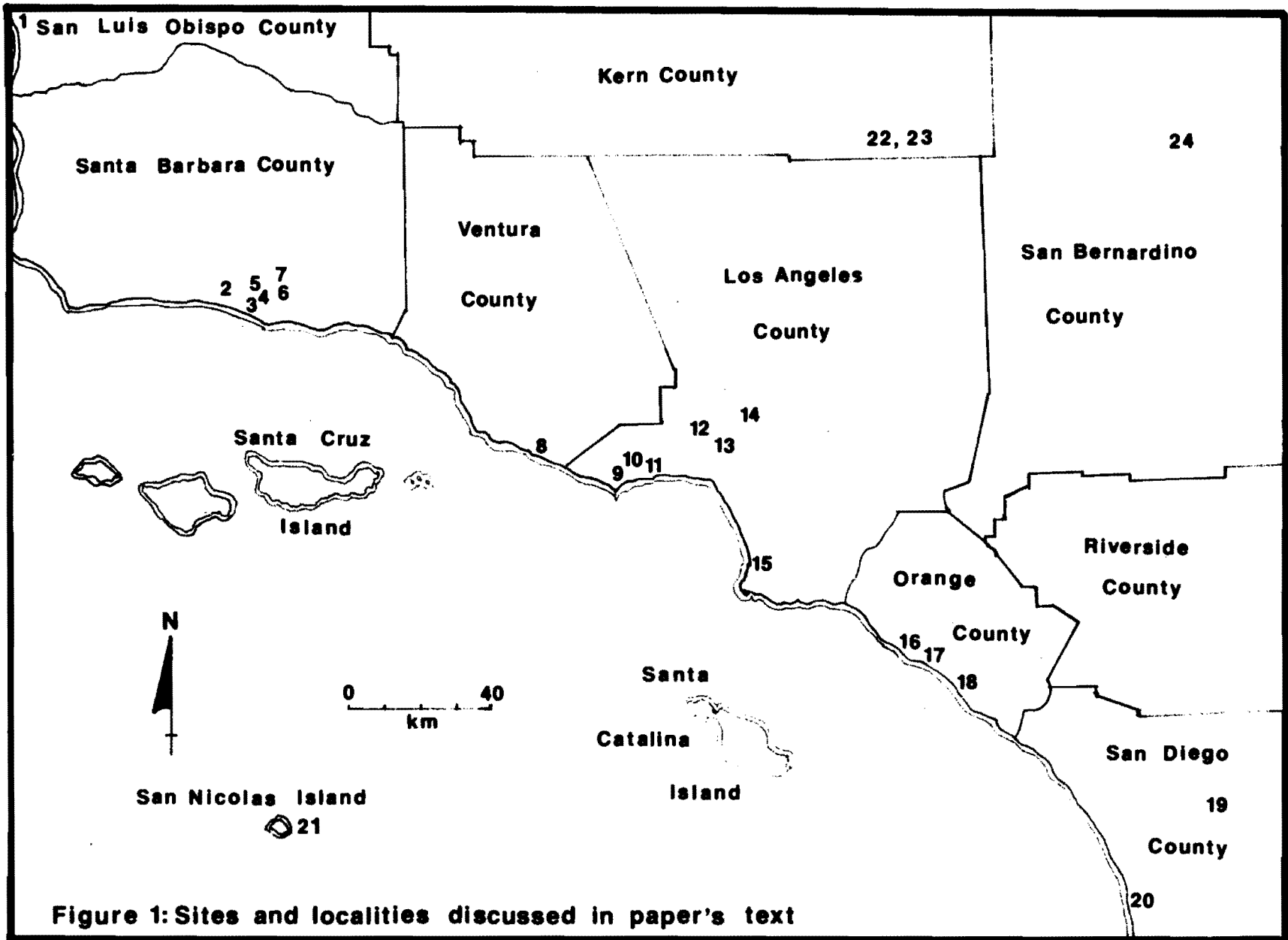


Figure 1: Sites and localities discussed in paper's text

Key to Figure 1: Site and localities discussed in paper's text.

1. Arroyo Grande Watershed Site 6
2. Tecolote Canyon Site (CA-SBa-75)
3. Aerophysics Site (CA-SBa-53)
4. Corona del Mar Site (CA-SBa-54)
5. Goleta Site (CA-SBa-60)
6. Glen Annie Site (CA-SBa-142)
7. Glen Annie Canyon Site (CA-SBa-143)
8. Little Sycamore Canyon Site (CA-Ven-1)
9. Zuma Creek Site (CA-LAn-174)
10. Parker Mesa Site (CA-LAn-215)
11. Sweetwater Mesa Site (CA-LAn-262)
12. Chatsworth Site
13. Encino Site (CA-LAn-111)
14. Big Tujunga Canyon Site (CA-LAn-167)
15. Malaga Cove Site
16. Christ College Site (CA-Ora-378)
17. CA-Ora-64
18. CA-Ora-119-A
19. Valley Center Locality, San Diego County
20. Scripps Estate I Site (CA-SDi-525)
21. San Nicolas Island Site 40 (CA-SNiI-40)
22. Sweetser Site (CA-Ker-302)
23. Rogers Lake Site (CA-Ker-322)
24. Stahl Site, Little Lake, San Bernardino Co.