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Studies in Prehistoric Sociopolitical Complexity in the Northern Channel Islands and Preliminary Findings from Prisoners Harbor

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Abstract. Since 1981, the Santa Cruz Island Archaeological Project has sought to identify the socioeconomic and political processes by which the hunting-gathering peoples of the Channel Islands became so complexly organized in later prehistory. Early stages of research focused on stone tool craft specialization; more recent work has centered on shell bead manufacturing, diet, exchange, chronology, and paleoenvironmental reconstruction on the islands. The research has included a number of archaeology field schools and National Science Foundation-supported field seasons between 1985 and 1992. Various project results have been published during the past decade; in this paper, a broad overview of research objectives and findings is combined with a discussion of recent excavations at the important Prisoners Harbor site on the island's north coast. Thus far, Late Period to early Historic Period deposits have yielded evidence for redwood post structures, bead making, microdrill manufacturing, and exchange involving exotic materials.

Keywords: Prehistory; chiefly evolution; craft specialization; bead making; architecture; Chumash; Santa Cruz Island.

Introduction

Research, underway since 1981, has centered on the development of social, political, and economic complexity among the pre-contact Chumash of the northern Channel Islands (Arnold 1985, 1987, 1990a, 1990b, 1991, 1992a). With the support of several institutions and agencies, 9 major phases of research have been completed to date, including 3 yr of National Science Foundation-supported field and laboratory investigations, 5 archaeological field schools, and several doctoral programs, M.A. theses, and Honors papers. Although the primary data are derived from archaeological testing of sites on Santa Cruz Island, project members have also relied on ethnographic, archival, biological, and historical research. The Santa Cruz Island Archaeological Project has focused on the identification of the sociopolitical processes by which the hunting-gathering Chumash peoples of the Channel Islands became so complexly organized during the last few hundred years of prehistory. Operating as a simple chiefdom with expansive trade systems and multiple economic specializations by the era of European exploration, the Chumash of the northern islands and mainland coastal region were unusual in their degree of social hierarchy and integration (Arnold 1993a). Conventional anthropological theory links chiefly organization with agricultural economies: classic cases include the Hawaiian Islanders and Mississippian cultures. The importance of this research lies in evaluating from what social, political, and environmental circumstances social complexity emerged among these hunter-gatherer peoples. This paper outlines the advances we have made in understanding the origins of complexity in this region and the theoretical significance of these new findings. This is followed by an introduction to the site of our most recent field research, the important prehistoric trade and population center at Prisoners Harbor.

Research and Theoretical Significance

The earliest part of this long-term research program focused on an intensive lithic craft specialization centered on eastern Santa Cruz Island during the last millennium of prehistory (Arnold 1983, 1985, 1987). These investigations verified with systematically recovered archaeological data that the northern islanders had developed a significant degree of labor specialization prior to contact. Subsurface testing at a chert quarry in the interior highlands (SCRI-93) and a chert microblade production village along the island's northern shore (SCRI-306) was combined with a program of survey work to complement existing surveys of the eastern portion of the island. Based on this fieldwork, it was possible to reconstruct a relatively precise chronology of changes in microblade technology, changes in control over access to chert raw materials, important alterations in exchange patterns, and overall increases in the complexity of social organization (Arnold 1985, 1987, 1990a).

During the period between 1986 and 1993, this research was expanded to include investigations of broader-scale social change, including evidence pertaining to the emergence of a shell bead manufacturing specialization, and aspects of paleoenvironment, diet, architecture, settlement patterns, status differentiation, and intra- and

inter-island exchange. Survey coverage of the island incorporated areas of the western and southwestern coastal zones not previously examined. Detailed analysis of shell midden constituents from a series of major coastal communities revealed notable changes in shell bead making and local marine environments, along with minor changes in practices of marine food procurement (Arnold 1990b, 1991, 1992a, 1992b, 1993a; Arnold and Tissot 1993; Colten 1993; Arnold and Munns 1994). Disruptions in island-wide settlement patterns were identified through chronological refinements using artifact seriations—particularly the quite sensitive microlith and shell bead assemblages—and sequences of stratigraphically controlled radiocarbon dates (Arnold 1992a).

We found that most large later Middle Period coastal communities were abandoned about A.D. 1150–1200, while the majority of Late Period villages were newly established after A.D. 1250–1300. Very few communities appear to exhibit continuous occupation through this period of settlement unrest, even those with both Middle and Late occupational strata (Arnold 1992a). However, once Late Period villages were established, most apparently remained as stable residential locales through the opening of the mission era in the 1770s (Arnold 1990b). The reasons for the earlier disruptions may be relatively complex, but they appear to be correlated with both unfavorable marine water temperatures (and lessened food availability) and extended periods of drought (Larson et al. 1989; Arnold and Tissot 1993). Populations may have retreated from more unproductive shorelines to consolidate in just a few larger communities such as Prisoners Harbor (*kaxas*) or Coches Prietos (*liyam*), but even at these important villages, it has not yet been determined if there was uninterrupted occupation through this period. The marked changes in island labor organization and sociopolitical ties that occurred during this time (Arnold 1992a, 1992b, 1993a) likely developed on the islands rather than somewhere off-island, but the demographic and economic dynamics are still poorly understood. Continued research at Prisoners Harbor may help to address important questions regarding the rapid social and economic evolution in the region at this time.

Anthropologists have only recently recognized the importance of complex hunter-gatherer societies in broader studies of human cultural evolution. As more and more theorists acknowledge that chiefly levels of sociopolitical integration were possible without agriculture, alternative explanations of the sources of social power have taken on greater importance. Various kinds of economic, ideological, political, environmental, or technological changes can stimulate new degrees of hierarchy and integration among relatively large, sedentary populations, whether they be fishers, gatherer-hunters, or farmers (Arnold 1993a). Archaeological research in the Channel Islands region, much like comparable work in Florida, the Northwest Coast, interior British Columbia, and Alaska, is contributing substantially to studies of complex hunter-gatherer social evolution in the New World (e.g., Hayden et al. 1985; Coupland 1988; Marquardt 1988; Ames 1991; Lambert and Walker 1991).

Prisoners Harbor Site

Perhaps the most important prehistoric and historic community on Santa Cruz Island, the Prisoners Harbor site (SCRI-240) is currently a focus of University of California, Los Angeles investigations (1990–1993). This village site (*kaxas*) has been the locale of substantial early research work and of an unfortunate series of engineering decisions that together have destroyed parts of its irreplaceable cultural resources. Nonetheless, parts of the site survive intact and continue to yield important scientific data. I begin with a review of the more notable events in the site's excavation and development history, to be followed by a presentation of recent excavation results.

Although early expeditions by eastern museums and looting by private collectors certainly occurred at this site prior to the turn of the 20th century, such reports are largely anecdotal and fail to specify methods, materials removed, or affected site areas. D. B. Rogers (1929) noted that Leon de Cessac (affiliated with the Musee de l'Homme, Paris), the Reverend Stephen Bowers (amateur), and Paul Schumacher (Smithsonian Institution and Peabody Museum) removed materials from the islands during the 1870s and 1880s, and a "Mr. Hebblewaite" (probably Outhwaite) "carried on extensive excavations at Prisoners Harbor" sometime prior to 1920 (Rogers 1929). The most damaging activity dating to this period, however, was the decision by the U.S. Army Corps of Engineers to reposition the mouth of the adjacent Canada del Puerto stream in the mid-1920s. The diverted stream channel destroyed a large section of the 5-m-deep midden and part of the cemetery of this site, and led directly to the subsequent destruction of the remaining eastern zone of the site, which was left unprotected from the stream's flow. Rogers (1929) could still see the eastern edge of the site when he surveyed the island in the late 1920s. This allowed him to estimate that the site was originally 400 x 150 ft (roughly 120 x 45 m, with the longer dimension extending east-west), whereas today it measures 40 x 45 m, having lost about 80 m on its east end (the eastern two-thirds). Despite this great loss, a significant section of the site remained largely unaffected and has been investigated during subsequent archaeological research.

Ronald Olson (University of California, Berkeley) conducted excavations at a number of Santa Cruz Island sites during the summers of 1927 and 1928. Olson occasionally worked in the field with D. B. Rogers (who was employed by the Santa Barbara Museum of Natural History to excavate on the island), although they were apparently bitterly at odds during much of the expedition.

Both parties set out to excavate at a large number of sites, guided by semi-scientific goals and a heavy emphasis on locating burials and grave goods. They were hampered from obtaining high-quality results (by today's standards) by the use of untrained laborers and the rapid pace of excavation characteristic of the late 1920s.

Olson excavated at the Prisoners Harbor site for a very short time, probably just a few days, exhuming 1,038 ft^3 of soil from a 50- x 3-ft trench, the position of which we can roughly reconstruct from a small sketch map (Hoover 1971). Trench depth ranged from 2–17 feet. Olson recorded great quantities of chert-manufacturing byproducts and no burials. Table 1 summarizes artifact totals of the major data classes reported by Olson and published by Hoover (1971). Undoubtedly, with Olson's crude excavation techniques, very low percentages of small artifact types such as beads, small bone tools, and chert microdrills that were actually present in this large trench were found . There is no evidence to suggest that Olson used screens regularly; thus, he would have failed to recover the vast majority of small artifacts. Rogers did not excavate at Prisoners Harbor at that time, although he excavated a few burials and a small number of associated artifacts there on 5 December 1936 (J. Johnson 1993, pers. comm.).

Coleman and Wise (this volume) report that Arthur Woodward (Natural History Museum of Los Angeles County) carried out brief excavations at Prisoners Harbor in 1939. Part of a museum team surveying the Channel Islands, Woodward exhumed 6 burials at the site over a several-day period in August of that year. Notes indicate that these burials were situated along the creekbed and that Woodward reinterred the remains, collecting only a small assemblage of artifacts such as beads, shell pendants, chert flakes and cores, and a stone bowl.

In about 1947 (and apparently again in 1950), Phil Orr (Santa Barbara Museum of Natural History) tested SCRI-240 during a day visit with a school group. Orr excavated into the cemetery, which apparently was still exposed along the streambed, identifying some 27 burials. Most of these were secondary or disturbed, and it seems likely that Orr's group dug through the area where Woodward had excavated a few years earlier. Associated with these burials, unearthed in a 5- x 5- x 6-ft deep pit, were artifacts of both native and European origin. Fragmentary field notes do not make clear whether collections of any sort were made, but a sketch map shows the rough location of the pit. Again, there is no evidence for the use of screens, and the rapid disturbance of this number of burials suggests crude techniques and poor recovery of smaller artifacts. The Santa Barbara Museum of Natural History has a small assemblage that represents a partial collection from this work and/or Rogers' 1936 expedition (J. Johnson 1993, pers. comm.).

More sensitive archaeological techniques began to be used at SCRI-240 in 1974, when Albert Spaulding (University of California, Santa Barbara) directed the excavation of 2 large trenches (14 x 2.5 m) through part of the remaining westerly portion of the site. Controlled excavation of the central blocks of these trenches (roughly 14 x 1 m) recovered the bulk of the artifacts and exposed the site's very complex stratigraphic sequences. Site depth, formation processes, and chronology were clearly revealed during these investigations (Spaulding n.d.). However, the large screen-mesh size (1/2-in. mesh in most contexts; 1/4-in. or 1/8-in. mesh in some) selected by student field crew chiefs significantly diminished the utility of the recovered data for interpretations of the smaller constituents. As will be shown below, these methodological choices markedly affected the recovery of beads, microliths, and many dietary indicators. At present, the excavation notes and catalogs from these excavations have not been formally compiled, nor have the data been published (materials are curated at the Department of Anthropology, UCSB). In addition to several burials, thousands of items were recovered and retained, but the collection will require further work before we can meaningfully interpret artifact totals and link them with volumes excavated and techniques employed. Included in the items recovered were microblades, microblade cores, beads, borers (macrodrills), projectile points, grinding tools, digging-stick weights, bone tools, fishing gear, and larger faunal remains.

Table 1. Frequencies and densities of artifacts recovered by Olson from 1,038 cubic ft of excavation (approximately 29.39 m^3) at Prisoners Harbor. Compiled from Hoover (1971) and Olson's field notes, Hearst Museum, Berkeley, California. Density figures were calculated using 29 m^3; densities are per cubic m.

Artifact type	Frequency	Density
Projectile points	52	1.8
Microblades/drills	3,018	104.1
Macrodrills	74	2.6
Scrapers	79	2.7
Steatite beads	3	0.1
Mortars	12	0.4
Pestles	8	0.3
Grinding slabs	25	0.9
Abraders	7	0.2
Doughnut stones	6	0.2
Hammerstones	29	1.0
Cooking pebbles	33	1.1
Tarring pebbles	417	14.4
Olivella beads	45	1.6
Tivela beads	3	0.1
Mytilus beads	11	0.4
Megathura beads	2	0.1
Conus beads	5	0.2
Conch bead	1	0.1
Haliotis ornaments	2	0.1
Haliotis containers	14	0.5
Other worked shell	42	1.5
Bone beads	12	0.4
Bone awls	48	1.7
Bone fishing gear	40	1.4
Other worked bone	26	0.9

In order to provide an idea of the results obtained in the UCSB project, I can, however, present densities of several artifact types from the most fully documented part of the excavations. I have calculated the volume represented by the stratigraphic levels C1 to C14 from the Central Block of Trench 2 (Spaulding n.d.), and Phillip Walker (UCSB) has provided data on the frequencies of several artifact types from the catalogs. Central Trench 2, roughly 22 m^3, appears to be the most precisely excavated and reported area from the more than 100 m^3 removed during the project. Walker compiled artifact data from the upper levels of this sector, representing roughly 16 m^3. Artifact frequencies and densities from these deposits are shown in Table 2. Because 5 of these artifact types are small (beads, bead blanks, microblades, Olivella shells, and projectile points), densities for these classes are very low; there is no question that a notable percentage of such items was lost through the screens. Borers and microblade cores are among the types with more representative approximations of densities.

Table 2. Frequencies and densities of selected artifact types from the 1974 excavations at SCRI-240. The totals are from the upper 14 levels of the Central Block of Trench 2, representing roughly 16 m^3; densities are per cubic m.

Artifact type	Frequency	Density
Beads	11	0.7
Bead blanks	8	0.5
Olivella shells	3	0.2
Microblades	107	6.7
Microblade cores	997	62.3
Macrodrills (borers)	389	24.3
Projectile points	22	1.4

Beginning in 1990, the UCLA summer field program in archaeology, directed by the author, undertook small-scale testing at an area near the western margin of the Prisoners Harbor site where it appeared that undisturbed deposits might be located. The research was designed to complement the previously recovered data sets that entailed recovery biased towards large artifact types. In order to understand some of the site's most important functions in prehistory, including microblade and shell bead manufacturing, recovery techniques that permitted systematic recovery of small bead production by-products were essential. Equally important was the recovery of more complete dietary and paleoenvironmental information, including plant, fish, small mammal, and bird remains ignored or discarded during most previous excavations.

As noted above, SCRI-240 was 1 of the island's most important communities for centuries. Specifically, during the historic era, very high-status individuals resided there, and the village as a whole had multiple marriage and exchange ties to other communities throughout the Santa Barbara Channel area (Johnson 1982). Perhaps the key village among all those on the northern islands, Prisoners Harbor was a major center for canoe travel and exchanges of island-made beads for mainland goods, and thus it was important to learn more of the site's later history.

During the summers of 1990–1992, crews from UCLA tested the upper strata of SCRI-240. These levels date to the historic and later prehistoric periods. Testing methods were consistent through the 3 field seasons. Manual excavation of 5-cm-deep levels within 1-x 1-m units provided horizontal and vertical control. We expanded an original 3- x 1-m trench to create a T-shaped trench consisting of 5 contiguous units. Fortunately, this locus is undisturbed by earlier depredations. All materials were screened over 1/8-in. mesh and column samples and soil samples for ethnobotanical analysis were collected. All of the rarer classes of diagnostic artifacts identified *in situ* were recorded with 3-dimensional coordinates. Intensive inspection of *in situ* deposits and dense screen residues during field sorting operations resulted in the collection of thousands of diagnostic artifacts, including beads, bead blanks, beads-in-production, fishhooks, microliths, projectile points, bone tools, ornaments, glass beads, and more.

All screen residues have been retained and are being processed at UCLA's Channel Islands Archaeological Laboratory. Tests have shown that the intensive field sorting procedure recovers a variable, but relatively predictable, percentage of these classes of artifacts; thus, preliminary (field-screened) results are a rough indicator of final totals and will be used until we can complete lab work. Complete lab sorting of each level (0.05 m^3) is labor intensive, consuming from 50 to 90 person-hours of skilled labor because the midden is filled with a very wide range of well-preserved organic and inorganic remains and tools. Unfortunately, the use of less rigorous procedures would at this point constitute willful destruction of a dwindling archaeological record at this exceptional site.

Excavation Results

Space is inadequate to report the many data sets newly available from Prisoners Harbor, but the 2 most notable are (1) sets of redwood (*Sequoia sempervirons*) posts preserved upright in a linear or semicircular arrangement, marking the outline of 1 or more late prehistoric structures well below ground surface; and (2) abundant microlith and bead manufacturing byproducts evident in all levels, providing accurate data for the first time on both the relative and absolute quantities of these items at the site. We have also recovered useful dietary data (more than 20 major taxa) and exchange data (imported objects and materials from the southern islands and the mainland), but space is insufficient to discuss these here.

The redwood posts discovered in 1991 and encountered again in the 1992 expansion of the excavation area represent an exceptional find for the Chumash region.

Never before has very valuable drift redwood (carried by the California current from north-central California) been reported as a structural member in Chumash structures (Arnold 1993b). We have now identified a total of 20 posts in 4 of the 5 units excavated. Figure 1 illustrates the configuration of those posts identified to date. They are limbs rather than portions of trunks of the giant redwood, a species that grows no farther south than southern Monterey County, roughly 300 km north of Santa Cruz Island.

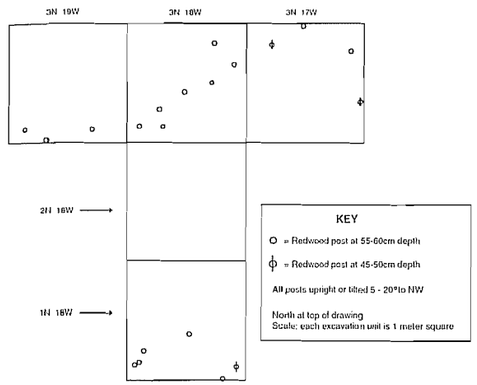

Figure 1. Plan view of positions of redwood structural posts at SCRI-240.

A highly prized material such as redwood was generally reserved for plank canoe manufacture or for tools, boxes, or other special goods (Arnold 1993b). Although its superb preservation qualities make it ideal for house posts—redwood lasts far longer in the ground than any locally available wood such as oak, sycamore, or willow—it has not been recorded either archaeologically or ethnographically in this context (Hudson and Blackburn 1983; Gamble 1991).

In a discussion of Formative-period elite residences in Mexico, Blake (1991) suggested that both the houses of chiefs and public structures in chiefdoms may exhibit elaboration in style, ornamentation, and construction materials in order to distinguish them from ordinary houses or unimportant structures. For a region such as southern California, where structures were made of simple pole and thatch, structure diameter and the materials used for the posts were likely the sole or primary means to express and validate social differences. A working hypothesis is that the posts shown in Figure 1 are not part of a common structure or structures. If this is not an ordinary structure or structures, the area may represent the remains of an elite residence and/or some other kind of important communal structure. Associated artifacts and dietary remains (analysis in progress at this writing) may permit us to identify differences between ordinary and elite houses as well as distinctions between residences and public areas such as dance floors or sweatlodges. Continued work on this site area represents a significant opportunity to study status distinctions in one of the most important late prehistoric Channel Islands communities.

Table 3 lists the artifacts recovered from 2.55 m^3 of the 1990–1992 excavations, and Table 4 shows artifact totals and densities. Many aspects of analysis must await completion of the lab sorting, but at this point we can document some important patterns based on the data recovered during field screening. All 3 projects (Olson's, Spaulding's, and the UCLA project) recovered several classes of artifacts of particular interest: Olivella beads, the microblades and microdrills used in making the beads, and projectile points. We can use these artifacts to gauge the relative effectiveness of coarse and more meticulous excavation techniques. More than 2,000 Olivella shell beads were found during our field screening alone—a little more than 800/m^3—whereas Olson's and Spaulding's excavations generated fewer than 2/m^3. Olson found quite a few microblades and microdrills (n = 3,018; 104/m^3) and Spaulding's crews found 107 (nearly 7/m^3), but the density of this artifact type recovered using fine screening was much higher (774/m^3).

Finally, both Olson and the UCSB project collected a few dozen projectile points, suggesting a mean density of about 1.6/m^3, but the recent excavations recovered 24 points in 2.55 m^3, a density nearly 6 times greater. Indeed, several of the small- to medium-size artifact classes such as points, bone tools, and microblade cores suggest that actual densities may be 3 to 10 times higher than previously recorded, though intrasite variations in densities may partially explain these differences.

What is obvious is that previous work has resulted in significant underestimates of the smallest constituents such as beads and bead blanks, glass beads, small points, and microdrills. Most notable is the fact that more refined techniques resulted in the recovery of at least 500 to 1,100 times more finished beads than did large-mesh screening or no screening. Even more importantly, however, the numbers of bead blanks and beads-in-production at this site provide conclusive evidence that substantial bead making as well as bead use was taking place at this community. Also, substantial microblade manufacturing occurred at the site. Furthermore, concentrations of glass beads and points in the immediate vicinity of the well-defined row of redwood posts in the northerly units suggests that patterns of use of that space may differ from nearby areas and the structure or structures were probably standing in late prehistoric to early historic times (ca. A. D. 1770–1800).

Table 3. Preliminary data (selected artifact types) based on field screening, SCRI-240, 1990–1992 field seasons (2.55 m³). Note: These figures represent totals which will be substantially augmented following full laboratory processing.

Unit/ Depth	GB	BB	BIP	FB	BB	BIP	FB	MB	MD	MC	PP	BT	GS	OE
		Olivella			Other									
1N, 18W														
15–20	6	66	25	67	3	3	4	26	9	16	—	—	2	—
20–25	3	34	20	52	—	3	1	17	6	10	—	1	—	—
25–30	—	8	18	25	—	—	3	23	11	11	—	1	1	1
30–35	—	6	8	45	—	1	3	42	17	10	—	1	—	2
35–40	—	5	2	15	—	1	2	15	21	8	—	—	1	—
40–45	—	14	8	26	1	—	3	77	19	22	1	1	3	1
45–50	—	9	7	27	—	1	—	106	25	40	—	—	3	—
50–55	—	13	4	25	1	—	3	88	21	63	*1	2	1	1
55–60	—	7	8	20	1	1	1	51	18	22	—	1	—	—
Subtotal	9	162	100	302	6	10	20	445	147	202	2	7	11	6
2N, 18W														
15–20	2	22	3	61	—	—	3	29	7	8	—	—	—	—
20–25	1	90	15	79	3	3	1	25	4	5	—	2	—	2
25–30	1	28	9	72	1	1	2	10	5	5	—	—	—	1
30–35	—	19	7	51	—	—	2	19	8	7	*1	—	2	2
35–40	—	2	3	4	—	—	—	2	2	1	—	2	—	—
40–45	—	14	16	29	1	—	—	28	22	7	1	1	1	1
45–50	1	7	10	28	—	1	2	46	20	7	*1	—	3	—
50–55	1	11	14	40	—	—	—	80	23	9	1	—	—	—
55–60	—	11	14	38	1	1	3	84	28	18	1	—	1	—
Subtotal	6	204	91	402	6	6	13	323	119	67	5	5	7	6
3N, 18W														
15–20	1	13	3	23	—	—	—	20	6	10	—	—	2	1
20–25	—	3	1	35	—	—	—	9	—	7	—	2	—	1
25–30	2	58	13	85	—	—	4	12	2	3	—	—	1	—
30–35	4	20	15	91	—	—	3	4	4	5	—	—	—	—
35–40	3	3	9	46	—	2	2	7	1	6	—	1	2	2
40–45	1	6	29	51	1	—	4	27	12	9	—	—	1	—
45–50	2	10	18	45	1	1	4	52	20	7	*2	—	1	—
50–55	—	10	20	34	1	—	4	55	20	7	*3	—	1	—
55–60	—	19	15	49	—	—	3	52	26	4	—	1	2	—
60–65	—	11	13	46	3	—	2	38	22	6	—	3	—	—
65–70	—	4	12	22	3	—	1	31	11	6	—	2	—	—
Subtotal	13	157	148	527	9	3	27	307	124	70	5	9	10	4
3N, 17W														
15–20	1	1	15	18	—	1	2	9	3	10	1	1	—	—
20–25	—	1	21	43	2	2	1	6	1	14	—	1	2	—
25–30	1	4	15	59	—	—	2	5	2	5	*1	2	1	—
30–35	—	1	12	50	—	—	—	11	2	3	—	—	1	—
35–40	1	1	6	29	1	—	—	7	7	5	—	2	—	—
40–45	—	2	17	39	—	1	3	11	15	3	—	1	—	—
45–50	—	6	14	31	1	—	2	25	11	8	*1	2	—	1
50–55	—	2	12	36	1	1	3	16	14	5	—	1	—	—
55–60	—	13	14	41	—	—	1	15	3	5	*1	—	1	—
60–65	—	1	11	31	—	—	2	27	7	5	—	—	—	—
65–70	—	5	4	28	—	—	1	49	11	11	—	—	—	—
Subtotal	3	37	141	405	5	5	17	181	76	74	4	10	5	1
3N, 19W														
15–20	3	1	9	11	—	—	1	9	1	1	—	—	1	—
20–25	1	—	15	12	—	—	—	5	3	6	*2	—	—	—
25–30	5	4	28	47	1	—	1	6	1	4	1	—	—	—
30–35	8	3	39	58	—	—	2	2	—	3	*2	3	—	—
35–40	4	5	35	79	—	2	1	9	—	3	—	1	1	—
40–45	4	6	23	57	—	—	2	9	8	3	—	—	—	—
45–50	—	1	17	30	—	—	—	10	2	4	—	—	—	—
50–55	—	2	10	36	—	—	3	20	8	3	1	—	—	—
55–60	1	4	8	48	—	1	8	28	2	3	1	—	—	—
60–65	—	9	5	19	—	—	2	38	6	5	—	3	2	2
65–70	—	4	5	26	—	2	5	70	15	7	1	1	—	1
Subtotal	26	39	194	423	1	5	25	206	46	42	8	8	4	3
Total	57	599	674	2,059	27	29	102	1,462	512	455	24	39	37	20

Key:
GB = Glass beads
BB = Bead blanks
BIP = Beads-in-production
FB = Finished beads
MB = Microblades
MD = Microdrills
MC = Microblade cores
PP = Projectile points
BT = Bone tools/modified bone
GS = Ground stone
OE = Other exotics (including steatite, Franciscan chert, other exotic cherts, etc.)

* 1 or more are exotic material.

Table 4. Grand totals and artifact densities (selected artifact types, from field screening) based on data from Table 3 (SCRI-240, 1990–1992 field seasons); densities are per cubic meter. Note: These figures represent totals which will be substantially augmented following full laboratory processing.

Artifact type	Frequency	Density
Glass beads	57	22.4
Olivella bead blanks	599	234.9
Olivella beads-in-production	674	264.3
Olivella finished beads	2,059	807.5
Other bead blanks	27	10.6
Other beads-in-production	29	11.4
Other finished beads	102	40.0
Microblades	1,462	573.3
Microdrills	512	200.8
Microblade cores	455	178.4
Projectile points	24	9.4
Bone tools/modified bone	39	15.3
Ground stone	37	14.5
Other exotics	20	7.8

Summary

The Prisoners Harbor village holds great importance in terms of the history and prehistory of the northern Channel Islands, and, indeed, for all of southern California. We are beginning to integrate archaeological data from this community into a research program more broadly concerned with the origins of hunter-gatherer complexity and general patterns of social evolution. This paper has presented findings from recent field research pertaining to status indicators and manufacturing activities that clarify aspects of the functions of Prisoners Harbor during the last 500 yr. Well-intentioned previous research at this site has regrettably resulted in under-recovery of small but significant artifacts and other remains. Meticulous data-recovery techniques can correct this error, enabling us to learn a great deal more from the study of a full range of sizes of artifacts and organic remains from this exceptional cultural resource.

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Prehistoric Animal Exploitation, Environmental Change, and Emergent Complexity on Santa Cruz Island, California

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Abstract. The prehistoric Native American inhabitants of Santa Cruz Island had unusually complex economic and political organization, and environmental change has been postulated as a stimulus for this complexity. Analysis of animal remains from 4 prehistoric middens on Santa Cruz Island yields information on economy and palaeoenvironment, and demonstrates a marine-oriented economy that included mollusks, fish, marine mammals, birds, and terrestrial mammals. Although the overall composition of the assemblage changed over time, fish and shellfish remains are the most abundant fauna in these archaeological sites. The abundance of marine mammals decreased through time, and terrestrial mammals were a minor component of the faunal assemblage. Analysis of fish taxa identified from otoliths yields information about habitats exploited and local marine ecosystems.

Keywords: Chumash Indians; midden; chiefdom; otolith; El Niño-Southern Oscillation.

Introduction

The Chumash Indians of southern California were one of the most complex hunting and gathering groups in North America, exhibiting a variety of characteristics typical of simple chiefdoms, including regional religious and economic integration, craft specialization, high population density, hereditary chiefs, and capital villages (Landberg 1965; King 1976; Johnson 1988). The nature and timing of emergent complexity in the Santa Barbara region is a topic of some controversy. King (1981, 1990) suggested that political differentiation occurred at the end of the Early Period (before 1400 B.C.) and that further economic changes occurred in the Late Period, after A.D. 1100. Most researchers believe the development of complexity occurred after A.D. 1100 (King 1982; Martz 1984; Arnold 1992). Arnold's (1987, 1992) research on Santa Cruz Island suggests that chiefdom-level economic organization developed approximately A.D. 1150–1200 as part of a complex set of economic responses to environmental changes that occurring at that time. The conditions of emergent complexity included high regional population density, reliance on marine resources, and environmental change. This research is an analysis of faunal remains from archaeological sites from the appropriate time periods. If changes in economic organization and climate took place at that time, faunal remains should show evidence of these changes.

Although most researchers believe that simple chiefdom-level complexity is a late prehistoric phenomenon, the *conditions* of emergent complexity developed over a long period of time. Archaeological data suggest increasing population size and density over time (Glassow et al.1988; Lambert and Walker 1991), but few good estimates of population parameters exist. Certainly the Chumash had high population density at European contact (Brown 1967; Johnson 1988). Brown (1967), using historic and mission register data, estimated the contact-period population for the Chumash area to be approximately 15,000. Much of this population was concentrated along the mainland coast, although fairly large villages existed on the Channel Island coasts and in the Santa Ynez Valley (King 1975) as well. Keeley (1988) noted that estimates of population density for the coastal region at historic contact were considerably higher than other complex hunter-gatherer groups, approaching 22 persons per sq mi.

Around A.D. 1150–1300, significant environmental changes in southern California included a prolonged period of increased sea surface temperature (Pisias 1978, 1979; Arnold and Tissot 1993) and some significant droughts (Larson et al. 1989). These climatic changes probably had severe impacts on marine ecology and the availability of resources consumed by Native Americans. Physical anthropology provides evidence of nutritional stress and interpersonal violence just prior to the Transitional period, the time of prolonged warm water (Lambert and Walker 1991). The health of people in the region generally declined prior to this period. Periosteal lesions, which are indicators of trauma, pathogens, or nutritional deficiencies, became more common. *Cribra orbitalia*, which indicates childhood anemia, was also common.