

INFORMATIVE ARCHAEOLOGICAL SIGNATURES AT BAHÍA DE LAS ÁNIMAS, BAJA CALIFORNIA

By

Eric W. Ritter, John W. Foster,
Robert I. Orlins, Louis A. Payen, and Paul D. Bouey

ABSTRACT

Bahía de las Ánimas along Baja California's central Gulf coast was a major focus of prehistoric activities. Here family groups relied on a rich and diverse marine and terrestrial food base close at hand. Numerous archaeological sites are evident including shellmounds, flaked stone tool workshops, smaller residential bases, and a mortuary center. Occupation is evident from initial Mission-era sites with brown ware ceramics to remains perhaps thousands of years old. It is hypothesized that over time the regional inhabitants may have intensified and diversified their food gathering practices with concomitant population increases and links with areas nearby including those to the interior and Bahía de los Ángeles. Stress reduction mechanisms, in addition to the regional links with other groups, may have included various ritual activities and the beginnings of social differentiation.

RESUMEN

Bahía de las Ánimas, a lo largo de la costa central del golfo de California, fue un importante sitio de actividades prehistóricas. En este sitio los grupos familiares contaron con una base alimenticia terrestre y marina muy a su alcance. Son evidentes numerosos sitios arqueológicos, incluyendo montículos de conchas, talleres de herramientas líticas pulidas, pequeños asentamientos residenciales, y un centro funerario. La ocupación es evidente a partir de sitios iniciales de la era misional, con trabajos de cerámica café, hasta restos de quizá miles de años de edad. Se propone la hipótesis de que a través del tiempo los habitantes regionales pudieron haber intensificado y diversificado sus prácticas de recolección de alimentos con los incrementos poblacionales concomitantes y con los vínculos con áreas cercanas, incluyendo las ubicadas al interior y Bahía de los Ángeles. Entre los mecanismos para la reducción de la tensión, además de los vínculos regionales con otros grupos, es posible que se hayan incluido diversas actividades rituales, así como los inicios de la diferenciación social.

INTRODUCTION

Archaeological work within Baja California is increasingly directed toward understanding socio-economic and socio-political aspects of

* Eric W. Ritter, California Department of Parks and Recreation; John W. Foster, California Department of Parks and Recreation; Robert I. Orlins, California Department of Parks and Recreation; Louis A. Payen, University of California; and Paul D. Bouey, Far Western Anthropology Research Group.

prehistoric cultures and processes that may have led to changes in these and other facets of societies over time. This is usually done within an ecological perspective, keeping in mind ideological influences. The approach allows for a testing of hunter and gatherer foraging models based on a consideration of ethnoarchaeological and ethnohistorical information, and an appreciation of site formation and transformation processes.

The littoral zone of Baja California has long been known for its marine richness and diversity, notwithstanding variability from west coast to east coast, and from beach to beach. Those often sheltered sections of coast, where a diversity of shore environments was close at hand, seem to have favored the most intense use, at least during mid-to later Holocene times (Davis, 1968; Ritter, 1979, 1994, 1995). Fresh water was somewhat of a limiting factor, despite the Native Americans' ability to dig *batequis*, or brackish water wells (Aschmann, 1959:58) or to gather water from natural rock tanks or *tinajas*, or carry it in skin bladders (Tuohy, 1970) from sources often a long distance from camp.

Estuaries, at the mouth of lagoons or arroyos, were especially favored by peoples of the past for intensive use, at least on a seasonal basis. Aschmann (1959:101) has noted that at the time of contact there were central peninsular people primarily adapted to the coast, and there were those who favored highland areas. This paper provides a set of archaeological and ecological observations on one northern Gulf of California bay where a richness of marine environments is evident: Bahía de las Ánimas, just south of the better-known and studied Bahía de los Ángeles (Arnold, 1957; Massey and Osborne, 1961; Davis, 1968; Foster, 1984; Ritter, 1994, 1995, 1997; and Bendímez, n.d.) (Figures 1 and 2).¹

Because of its near-pristine character, obvious marine richness, sheltered location, availability of potable water, fertile inland flora and fauna, and position at the mouth of a major arroyo system (Arroyo San Pedro), Bahía de las Ánimas provides an ideal locale for testing various hypotheses. For example, does coastal diversity in a localized setting lead to concentrations of populations on at least a seasonal basis, with such populations prospering well below the location's carrying capacity? Does the predictability and availability of a rich resource base make food choices and preservation/storage considerations less critical than in other areas of the coast and in the interior? How was group mobility patterned in response to resource use stability, intensification or diminishing exploitation, and

¹ This article is a revision and update of a previous article published by the authors in the *Pacific Coast Archaeological Society Quarterly* (Ritter, et al., 1994).

what roles did ecological, social, biological and cultural variables play in decisions? In addition, the bay's position across the relatively narrow and island-studded Gulf provides a situation where searches can be made for cross-Gulf contact with the Seri people (Foster, 1984).

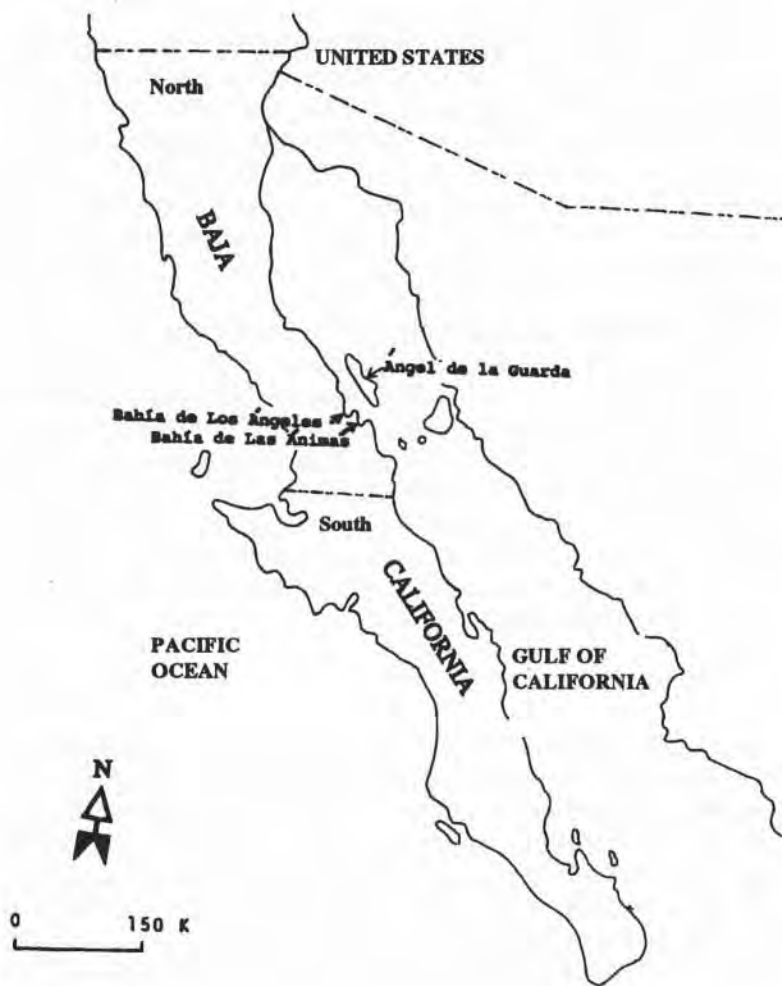
Other questions that were examined in light of the surface archaeology concerned clarification regarding the southern extent of prehistoric pottery manufacture or use in the peninsula; whether obsidian occurred locally or was imported for tools; the nature of the flaked stone reduction system(s); and local settlement-subsistence patterns and demography based on the size and extent of sites and their ages, as determined from artifactual and geoarchaeological evidence. Questions regarding mortuary practices and physical anthropology were posed subsequent to our discovery of burial sites.

Our short-term studies made during visits in 1988, 1994 and 1995 were geared primarily toward surface observations of the archaeological record. These observations can be used as a baseline for further examinations where more specific questions can be asked and tested in a rigorous fashion, as was accomplished when one relatively undisturbed burial tomb was excavated in 1995. The physical anthropology observations that resulted from the emergency recovery of numerous disturbed and partially-disturbed human remains, while still mostly in process, offer tremendous potential with regard to human genetics, epidemiology, diet, and other aspects of the osteological remains.

LOCAL ENVIRONMENT

The marine richness of Bahía de las Ánimas is due to a complexity of littoral micro-environments and a fertile off-shore fishery. There are rocky shoreline stretches around points and islands, cobble shorelines along the outer bay, and within the bay proper, extensive mud and sand flats left exposed for foragers at low tide. Hyper-saline estuaries also exist in the bay where branches of the Arroyo San Pedro reach the shoreline. One lagoonal area supports thickets of red mangrove (*Rhizophora mangle*). Salt flats and tidal flats behind portions of the coastal dune field or coastal beach ridges add to the environmental diversity.

Bordering the Valle las Ánimas at the innermost portions of Bahía de las Ánimas are the lowlands of the Sierra las Ánimas to the west, including alluvial fan ridges and possibly older terrace remnants. On the east side of the valley are the low hills of the Sierra Agua de Soda. Both of these bordering mountain ranges are composed largely of granitic and volcanic materials.



AREA OF STUDY

Figure 1. Location Map of Study Region.

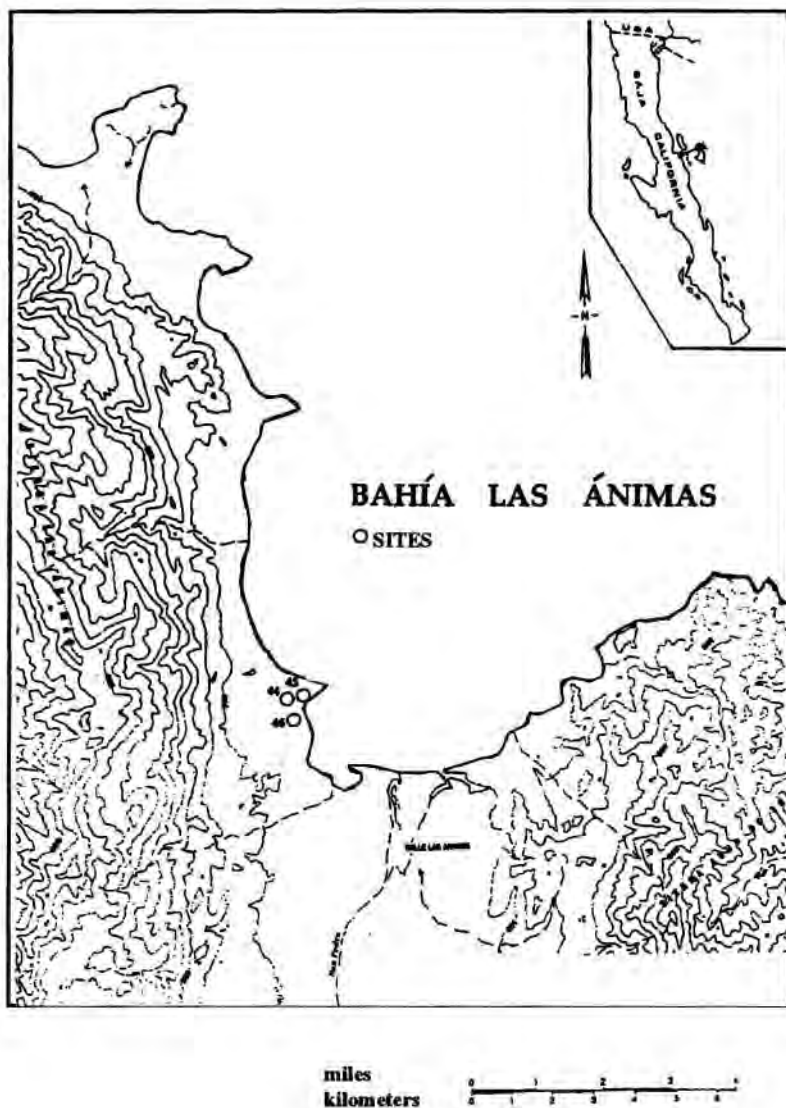


Figure 2. Map of the Bahía de las Ánimas Region.

The diversity of landform conditions is reflected in a mosaic of vegetation communities and patterns. Aside from the mangrove thickets, there are various halophytic communities growing within salt flats just behind the coastal dunes. Plants found here include saltbush (*Atriplex* sp.), pickleweed (*Salicornia pacifica*), iodine bush (*Allenrolfea occidentalis*), and *Suaeda* sp. On the alluvial soils behind the coastal dunes occurs a dense growth of mixed leguminous trees, cacti, plants of the spurge family, and other vegetation. Especially noteworthy because of their food value, are the high amounts of pitahaya agria (*Stenocereus gummosus*) and mesquite (*Prosopis* sp.). Other plants of note include *Opuntia* sp.; cardon (*Pachycereus pringlei*); other legumes, such as catclaw (*Acacia greggii*); and trees of the Senna family, lomboy (*Jatropha cineria*), and palo adan (*Fouquieria diguetii*). The year 1988 was especially good for a growth of bedstraw (*Galium* sp.). Other annuals were no doubt plentiful in times past, but have probably suffered from overgrazing.

A listing of marine specimens potentially available to the aboriginal inhabitants would be exhaustive. Reef and pelagic fish, mollusks, sea mammals (such as a nearby rookery of sea lions), crustaceans, and sea turtle were no doubt plentiful. During 1994 thousands of small sardines were exposed in tidal flats after an especially high tide. Shore, island, and near-shore birds were abundant. Land mammals, from rodents to raccoons, and including coyotes, deer, and bighorn sheep were locally available, judging from our observations. Reptiles also were relatively common.

A key factor, of course, in the occupation and use of this bay would have been the availability of fresh water. Recent inhabitants have excavated near-shore wells with brackish, palatable water less than 6 meters deep. Certainly *batequis*, or shallow, near-shore wells would have been possible. One or two small springs have been reported in the bay. *Tinajas* probably occur in the nearby hills, where water would have been naturally stored for periods following storms, predominantly during the late summer however, these could occur on occasion during the winter.

SURVEY METHODOLOGY

The archaeological reconnaissance performed at Bahía de las Ánimas was largely informal and rudimentary. Much of the bay behind the littoral strip and interior areas within the bordering valley and uplands were not examined. Attention was focused on the shore and near-shore areas of the inner portion of the bay (Figure 2).

Survey initially involved a team of five individuals spaced irregularly (ca. 25-75 m apart) from the foothills halfway to the shore, sweeping north

along the westerly and inner portion of the bay below the principal lagoon, followed by a sweep back along the shoreline, also spaced irregularly. Three individuals then made a sweep for about two kilometers along the shoreline, and back several hundred meters at a location north and west of the lagoon and along the southernmost limits of the lagoon. The original five individuals also made a search of the point on the west side of the inner bay (Figure 2). Most of the reconnaissance was within 200 meters of the shoreline, with some examinations extending inward no more than 400 to 500 meters. About eight kilometers of the bay margin (Figure 2) were examined, with a nearly-continuous ribbon of cultural remains. Neither the shoreline survey nor site identifications can be considered complete, because of the informal and limited nature of the observations.²

During the reconnaissance, notes were taken, and some field sketches made of artifacts. Limited collection was also undertaken, as was the excavation and recovery of human remains within mortuary zones.³ Photographs were also obtained. The survey was aided by use of the Dirección General de Geografía del Territorio Nacional 1:50,000 topographic maps (Punta las Ánimas [H12C53] and Bahía de los Ángeles [H12C52]) which formed the basis for Figure 2.

SITES LOCATED

During the survey we provisionally identified fifteen distinct sites, separated from each other by at least 50-75 meters of distance where very little or no cultural materials were found. (Site map locations are on file with the Instituto Nacional de Antropología e Historia in Méxicali). However, it would seem that along portions of the bay, occupation was nearly continuous, and our separations may have little cultural relevance. For example, some of the separations were the result of embayments or estuaries with extensive use on both sides. In other instances, sporadic use of shoreline segments, as on the northwest side where the beach was cobbly, may have resulted in an overlapping of many occupation and use events widely separated by age, and virtually impossible to segregate without formal study.

² Archaeological site locations are not shown on the attached map, due to the sensitivity of these resources, and on-going problems of illegal looting and collecting.

³ Fieldwork was undertaken under a permit, and according to an agreement between the Phoebe Hearst Museum of Anthropology, University of California, Berkeley and the Instituto Nacional de Antropología e Historia (INAH).

Site 1

The first site recorded during the bay survey is a large dune shellmound over 108,000 square meters in size. It is composed principally (over 95%) of *Chione* sp., as is true of almost all the sites. The *Chione* measured in the 40 to 50 mm range in length at inland locations, and between 45 and 60 mm in length closer to the shore. As at many of the sites, the *Chione* were often crushed, possibly from occupational and post-occupation trampling. Other shellfish noted albeit infrequently included *Dosinia ponderosa*, possibly *Cymatium* sp., *Strombus gracilior*, *Anadara grandis*, *Arca* sp., *Pecten* sp., *Glycymeris* sp., *Ostrea* sp., and *Natica* sp. Shellfish were quite concentrated near the center of the site, with patches towards the edges. Uncommon genera of shellfish were often found in small clusters. Pelican, burnt sea turtle, and sea mammal bone were also noted.

The greatest depth of the site is closest to the coast, estimated at around a meter in depth, with only a surface scatter as one reaches the site's edges. Some areas of the site show burning activities. The site exhibits a low density of artifacts: about one per 25 square meters. Noted were unpatinated basalt flakes; microcrystalline silicate and quartz flakes; several obsidian flakes; a basalt core with some patination; a basalt chopper-like tool; a water-worn silicified tuff core or plane; a scoria, or vesicular basalt cobble, with some light grinding; a boulder mortar by a recent well, possibly related to historic Mexican use; worked shell; and sherds of brown ware pottery, discussed in more detail in a later section. Table 1 presents a summary of the various site characteristics.

Site 2 (UC-BC-46)⁴

The second recorded site, just north of the above site, and possibly part of a larger occupational complex, is a deep appearing (over 1 m) dune shellmound concentrated around an estuary. The shellmound contains a darkened deposit from considerable burning and trash deposition, and there is a grayish-brown color to the midden. The millions of shellfish are over 99% *Chione* sp., with *Dosinia ponderosa*, *Tagelus* sp., *Atrina* sp. and other species present. Between 50 and 75 percent of the midden is shellfish. Turtle bone, along with centra from sharks, and three croaker (?)

⁴ UC is for University of California, BC is for Baja California, and 46 is the number assigned through expedition work in both Bahía de las Ánimas and Bahía de los Ángeles under the senior author's direction.

Table 1. Characteristics of Bahía Las Ánimas Archaeological Sites.

| No. Site | Site Size (m) | Sz.(m) | Dominant Shellfish | Human Remains | Animal Bone | Mano(s) | Metate(s) | Debitage | Flaked Stone Tools | Ceramics | Obsidian | Features |
|----------|---------------|---------|--------------------|---------------|-------------|---------|-----------|----------|--------------------|----------|----------|--|
| 1 | 550 x 250 | 108,000 | Chione | - | + | + | - | + | + | + | + | - |
| 2 | 750 x 150 | 88,000 | Chione | - | - | + | - | + | + | + | + | - |
| 3 | 300 x 175 | 41,000 | Chione (few) | - | - | - | - | + | + | - | - | Cleared Circles? |
| 4 | 450 x 150 | 53,000 | Chione | - | - | - | - | + | ? | - | + | - |
| 5 | 1650 x 150 | 194,000 | Chione | - | - | - | - | + | + | - | - | - |
| 6 | 825 x 150 | 97,000 | Chione | + | + | + | - | + | + | - | + | Short Rock Alignment |
| 7 | 1000 x 400 | 314,000 | Chione | - | - | + | + | + | + | - | - | - |
| 8 | 775 x 275 | 167,000 | Chione | - | - | + | + | + | + | - | + | - |
| 9 | 775 x 200 | 122,000 | Chione | - | + | - | - | + | + | - | - | Fire Hearth |
| 10** | 600 x 125± | 59,000+ | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 11 | 280 x 220 | 59,000 | Ostero | - | - | - | - | + | - | - | - | - |
| 12 | 300 x 200 | 47,000 | Ostero | + | - | - | - | + | + | - | - | Rock Wall Cleared Areas, Trail Talus Burials |
| 13 | 75 x 75 | 4,400 | Chione | + | - | - | - | + | - | - | - | Talus Burial |
| 14 | 50 x 50 | 2,000 | Chione | - | - | ? | - | + | - | - | - | - |
| 15 | 75 x 75 | 4,400 | Chione | - | - | - | - | - | - | - | - | Cleared Circle |

*Burnt

**Observed at a distance

(Sciaenidae) vertebra, was found and identified by Dr. Kenneth Gobalet of California State University, Bakersfield.

Artifacts are more numerous at this site than at the first site. The only projectile points noted occur here: small rhyolitic and obsidian triangular points that probably tipped arrows or served as harpoon insets (Figure 3 a-c). In two loci there were found a scattering of brown ware sherds, discussed in more detail in a later section (Figure 3d). Large silicified tuff, quartz, and basalt flakes were relatively numerous (over 100 total), and several obsidian flakes were found. Other artifacts noted include three large basaltic, thin, bifacial cutting tools (fish knives?) (Figures 4a, 5a,c), a form of artifact found in a number of sites in Bahía de los Ángeles as well; three silicified tuff and two basaltic unifacial scraping/cutting tools (Figure 4b,c), and a hand-sized unifacial andesite *mano*. A tool form common to many of the sites is the edge sharpened *Dosinia ponderosa* clam shell (Figure 6), or interior pieces of the shell used for various cutting/scraping activities. These specialized tool types are discussed in more detail in a later section.

Site 3

A third site lies just to the west of Site 2, slightly to the interior on a ridge top. Here there are two loci. The first contains five possible cleared circles on the order of two meters in diameter, along with a few scattered *Chione* and *Arca* shells, a basalt unifacial tool, a basalt polyhedral core, and a light scatter of basalt flakes. The lithic reduction technology suggests primary, secondary, and tertiary decortication without platform preparation, merely opportunistic flaking.

The second locus is a lithic workshop area within a boulder field of basalt (95%) and rhyolitic (5%) cobbles and boulders, with recent or fresh-appearing flake surfaces. There are about 50-75 workshop areas, ranging from split boulders to core-anvil-flake locations. Some scattered shell occurs here as well, along with scores of hammerstones of granitic and volcanic materials. The technology expressed is like that of the first locus.

Site 4

This coastal shellmound appears relatively shallow and patchy; it is comprised mostly of *Chione*, with a few scattered flakes of basalt, obsidian, and silicified tuff. This location is rather unprotected, since it is on the northwest side of the bay outside the shelter of the point to the east (Figure 2).

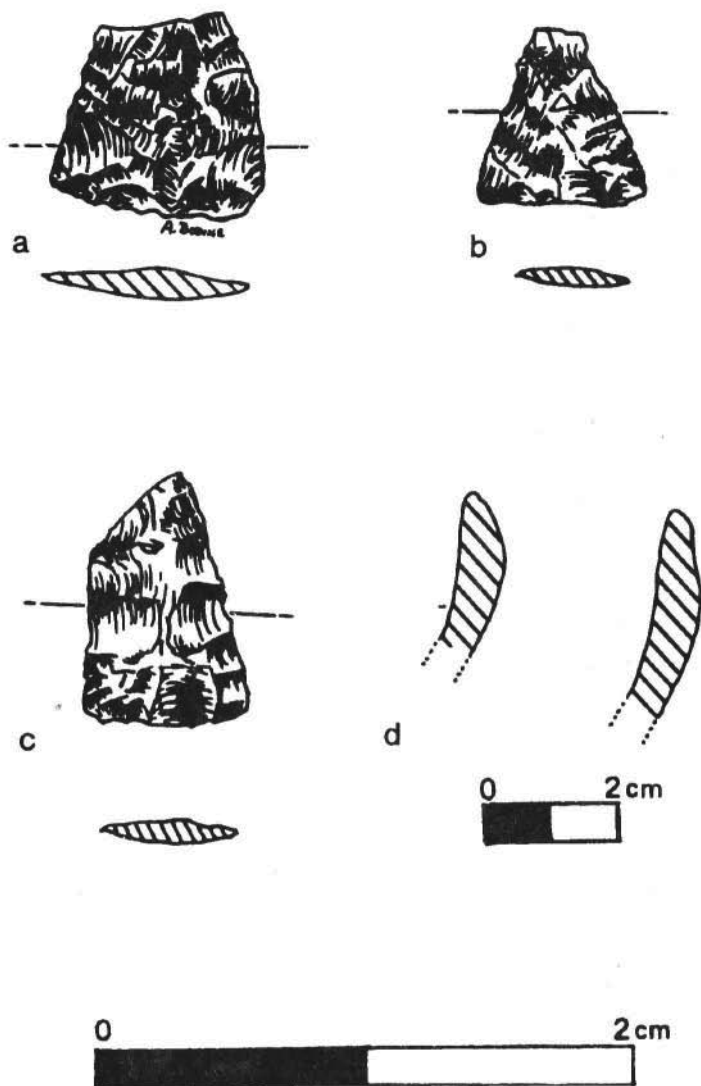


Figure 3. a. Rhyolitic projectile point from Site 2.
b. Rhyolitic projectile point from Site 2.
c. Rhyolitic projectile point from Site 2.
d. Brown ware rim sherd outlines from Site 2 (note separate scale).

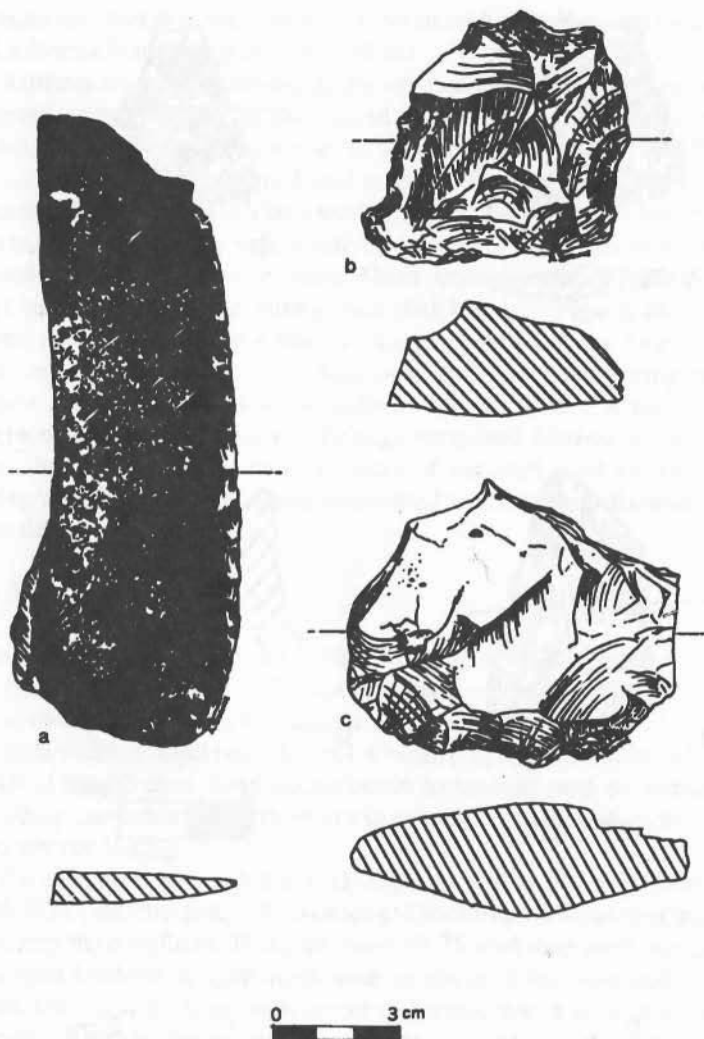


Figure 4. a. Basaltic bifacial slab from Site 2; it may have served as a cutting/splitting instrument for fish and other animals and products.

b. Basaltic steep-edged unifacial scraper-like tool from Site 2.

c. Basaltic steep-edged unifacial scraper-like tool from Site 2.

Site 5

The second largest site encountered is a narrow strip of patchy cultural debris on the northwest side of the bay, along a cobble beach fronting alluvial fans from the Sierra las Ánimas, well outside the Ánimas Valley confines. *Chione* is the dominant shellfish, but there are significant numbers of species reflecting the cobble beach environment, including *Hexaplex* sp., and *Ostrea* sp. More oyster shell also occurs near one end of this site by a mangrove lagoon. Flakes of basalt and silicified tuff occur here and there, but without obvious modification. Smaller silicified tuff flakes seem to occur closer to the mangrove area. There are also a few heavy cores or core-tools of basalt, and little or no bone.

Site 6

One of the more complex sites encountered is located at the southwest corner of the bay. This partially-looted shellmound with darkened midden, is within an area of sand sheets, and is dominated by *Chione* shellfish, with less than 5% of other genera present, including a small concentration of whelks (possibly *Cymatium* sp.) and scattered *Pecten* sp., *Dosinia ponderosa*, *Ostrea* sp., *Hexaplex* sp., *Natica* sp., and *Crepidula* sp. Other faunal remains include a large unidentified fish vertebra, and a burnt sea turtle carapace. There are scores of flakes on the surface, including basalt, rhyolite, silicified tuff, and rare obsidian. One rhyolite core was noted as measuring 8.5 cm x 6.5 cm x 6.2 cm. Basalt flakes include both large and smaller sizes, and these exhibit no cortex or rubbing/abrasion on the platform portions, suggesting the use of prepared cores. The few obsidian flakes and shatter, hint of a bipolar obsidian industry, as noted in other sites in the region (Ritter, 1995, 1997). One spent silicified tuff core was noted. Flaked tools include a silicified tuff point or drill tip, and a unifacial silicified tuff tool. Other cultural remains include numerous fire-cracked or affected cobbles, and one rhyolite *mano*.

Features noted at this site include a 1.8 m long alignment of eight boulders, oriented to the southwest, and possibly the remnants of a windbreak. Half a dozen beach cobbles were also found in a cluster. Fragments of what appears to be burnt human bone suggest cremation practices.

Site 7

The largest site discovered in the survey in terms of areal extent (Table 1) is situated at the southern extremity of the bay. Like the site above, this

location reflects considerable past activities. *Chione*, some of which are burnt, make up about 98% of the shellmound, with a possible example of *Codakin* sp., as well as *Arca* sp., *Dosinia ponderosa*, *Tagelus* sp., *Megapitaria* sp., and *Natica* sp. shells.

No site in the survey shows more evidence of apparent milling activities, and the nearby rich floral community is probably not coincidental. There are three basin *metates* made of granitic material. One measures 48 cm long x 42 cm wide x 9 cm thick, with a basin of 3 cm on one side, and limited use on the other side. The other bifacial *metates* are similar in size, with basins of 2 and 4 cm deep, respectively. More than a half-dozen unifacial andesitic *manos* were observed. A rhyolitic cobble has been pecked centrally on one face, apparently for anvil use. As at other sites on this south bay, pieces of pumice of varying sizes have washed up on shore, and occur within the middens as well. No obvious use is apparent on those few pieces examined, although worked and unworked pumice occurs in sites away from the coast in the region (see Massey and Osborne, 1961; Ritter, 1997). Flakes of basalt and silicified tuff were quite numerous, on the order of two or three per square meter of surface area as an average, but with concentrations. Flaked stone tools observed include five basaltic core/hammers, a large basalt chopper-like tool, a basalt scraping-like tool, and a rhyolitic biface (Figure 5b). Some looting is apparent at this site.

Site 8

The third largest site in the sample occurs along the south bay margin, bordering an estuary and within a large dune field (Table 1). This shellmound contains over 95% *Chione* sp. but also includes *Ostrea* sp., *Megapitaria* sp., *Pecten* sp., *Cymatium* sp.(?), *Tagelus* sp., *Laevicardium* sp., and probably others. Five *manos* were observed along with a *metate* (materials not noted). Flakes of various volcanic materials like those observed at previous sites were numerous, including one obsidian flake. A few fine-grained volcanic cores also occur. Most of the flakes were large, and may have been used without modification of the edges as at the other sample sites. A fine-grained volcanic biface was discovered, as well as burnt pumice and many cobbles without obvious use, but clearly transported into the dune area.

Site 9

This relatively large site forms an arc around an estuary and salt flat. The shellmound is predominantly *Chione* sp., in the 95-98% range, with *Ostrea*

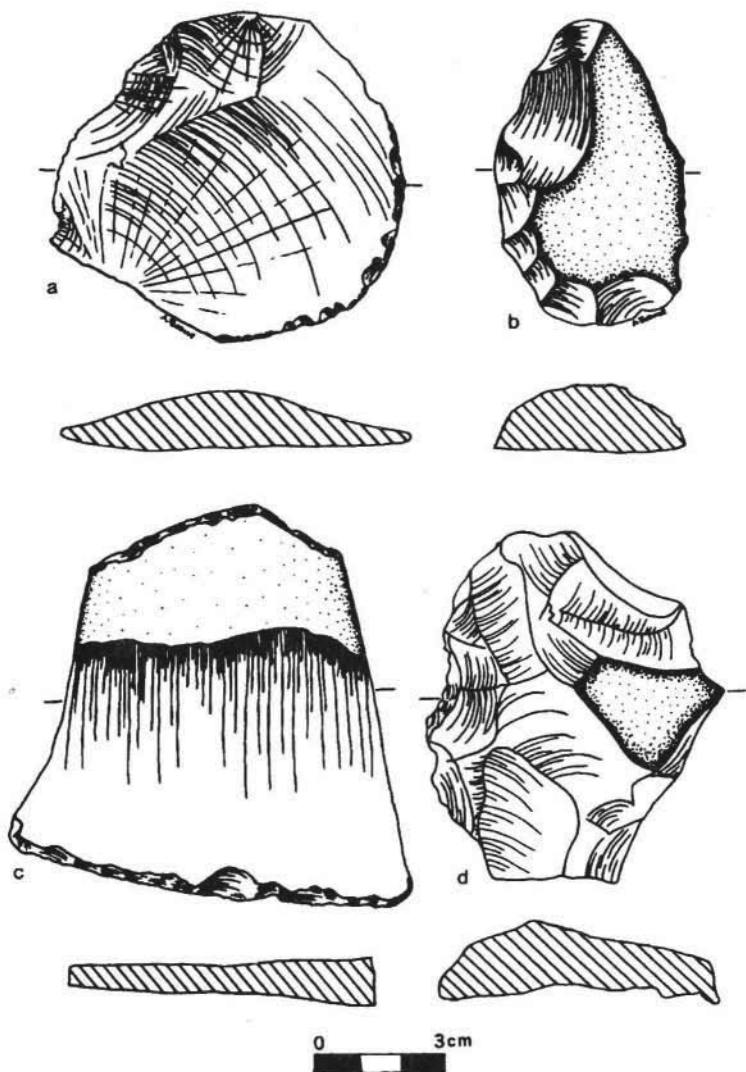


Figure 5. a. Basaltic bifacially edge-flaked large flake from Site 2, possibly used to split fish and other animals. b. Fine-grained volcanic (rhyolitic?) biface from Site 7. c. Bifacial edge-flaked thin basaltic slab, possibly a fish knife or multi-purpose cutting instrument noted at Site 2. d. Silicified rhyolite unifacial scraper-like tool from Site 9.

sp., *Arca* sp., *Cardita* sp., *Laevicardium* sp. (19 cm long), and others. Apparent sea mammal bone was present. There were no ground stone artifacts seen in the cursory survey, but three basalt flake knife-like tools were noted, along with a few flakes of basalt and silicified tuff. A fine-grained greenish volcanic core was recognized, along with a knife or scraper tool of silicified tuff or rhyolite (Figure 5d). Interestingly, there was an unnatural concentration of pebbles observed at one part of the site. Also detected was a rock fire hearth.

Site 10

A site not actually visited, but observed across an estuary from Site 8, is this shellmound. It would appear to have the same general characteristics as Site 8, although it probably is smaller in size due to landform parameters.

Site 11

On the east side of the Valle las Ánimas a small site with a thin shellfish deposit was discovered on a boulder-strewn bench at the base of the mountains, just inland from the bay about 1500 meters. It is about six or seven meters above the valley floor, an estuarine and salt pan location. Toward the front of the site are found badly broken *Chione* sp. shells. Up against the bouldery slope the shellfish deposit is almost 100% *Ostrea* sp.

The shellfish seems older and more deteriorated than at the other sites, and it is possible that this site is currently somewhat isolated from the main shellfish beds of today, further to the north. In this respect, the site may represent an occupational location from a previous environmental setting, prior to an outward migration of the sandy and muddy coastline, in which the bay has perhaps been aggraded and/or the coastline has been displaced due to tectonic activities.

Artifacts noted at the site include silicified tuff and basalt flakes. The location exhibits evidence of the removal for subsequent use of basalt spalls from convenient outcrops.

Site 12 (UC-BC-44)

One of the most unusual and enigmatic site complexes is located within and along the edge of a volcanic hill on the peninsula that forms the northwest side of the inner bay (Figure 2). This site has at least four loci, a set of linked cleared areas (Figure 7), a trail and rock wall, and a series of talus or rocky hillside burials.

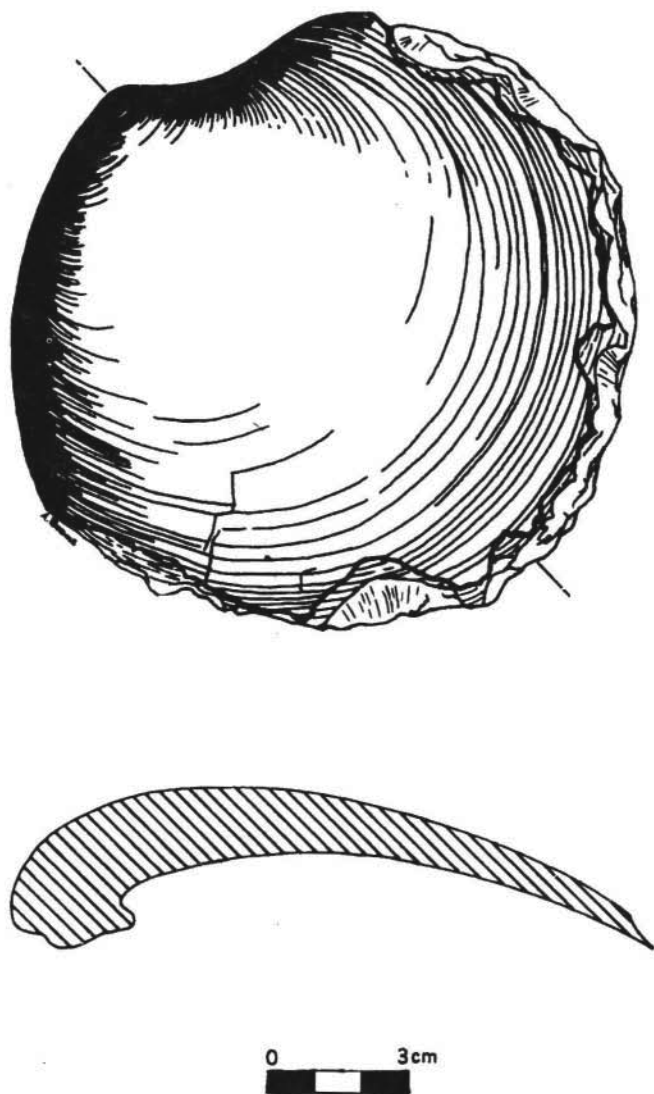


Figure 6. Edge-Flaked *Donisia Ponderosa* Shell Tool.

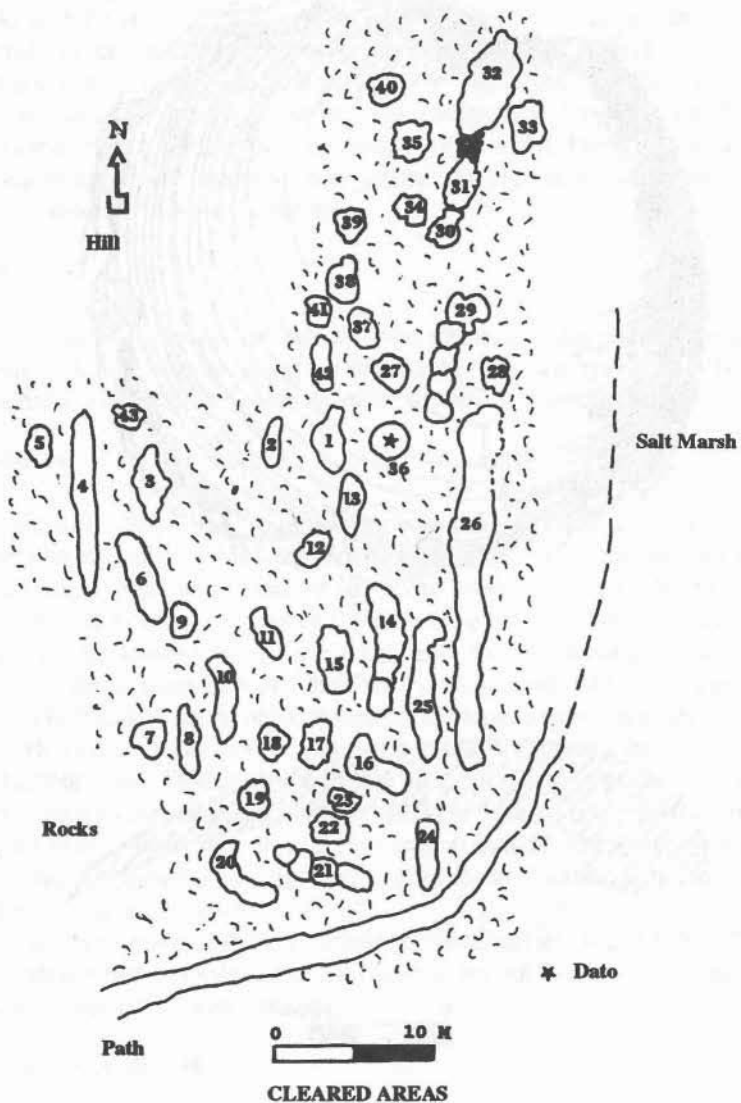


Figure 7. Plan Map of Cleared Features on the Lower Hillslope of Site 12 (UC-BC-44), Cerro de las Calaveras.

The generally-linked clearings number 44. Various types of clearings are present: circular, elongate, oval, irregular, and almost rectangular. (Figure 7). These features have walls that are one to two boulders high, about 25-40 cm, and they occur in an almost staircase fashion. Measured examples include circular features 1.7 m, 2.0 m, and 2.8 m in diameter; oblong areas 2.1 x 2.4 m, 1.6 x 1.5 m, and 5.5 x 2.4 m; and near rectangular areas 4.4 and 4.0 m on the sides, by 2.5 m on the ends. Some of these clearings are so irregular that their cultural affinity is open to question. Very few associated remains are present. A few razor and oyster shells, and one or two basalt and microcrystalline silicate flakes were noted. Several bedrock slicks, finely scratched slabs of rock, and two polished rock protuberances were found near burial locations. Many of these features are thought to have a ritual association connected to mortuary practices, including perhaps dancing, grinding of materials, rubbing and scratching of special rocks, etc.

Adjoining the cleared areas is a rock wall 17 m long, 1.5 m wide and 1 m high, composed of relatively large well-patinated boulders. A nearby trail runs adjacent to the wall, and may be an ancient trail still used by Mexican fisherman, judging by its recent surface appearance. One thick basalt flake was noted in association. Several isolated rock rings were also recorded.

The adjoining hill, including three loci, is composed of rock rubble and boulder taluses that contains at least 20 widely-scattered rocky burial tombs, most of which have been badly disturbed by looters. One of these undisturbed tombs was excavated. Measured tombs are 1.8 x 1.4 m, 0.9 x 0.6 m, 1.3 m x 1.0 m, and 1.5 m in diameter, each about 60-70 cm to over a meter deep, as measured to the undisturbed rubble and sediment floor, into which appears to have been placed one, or up to three, tightly flexed (Figure 8) and/or secondary burials, and at least one cremation or burned human remains (e.g. post-interment burning). Several of these tombs appear to have been carefully constructed with sediments brought in and placed on the floor; small rocks were used to fill in the rocky walls to make them more continuous. More concerning these burials, grave associations, dating and isotopic studies is presented later in this paper. A notable feature of at least one or two of these entombments appears to be the placement of a large tabular natural boulder "headstone" stuck into and protruding from the depression area edge.

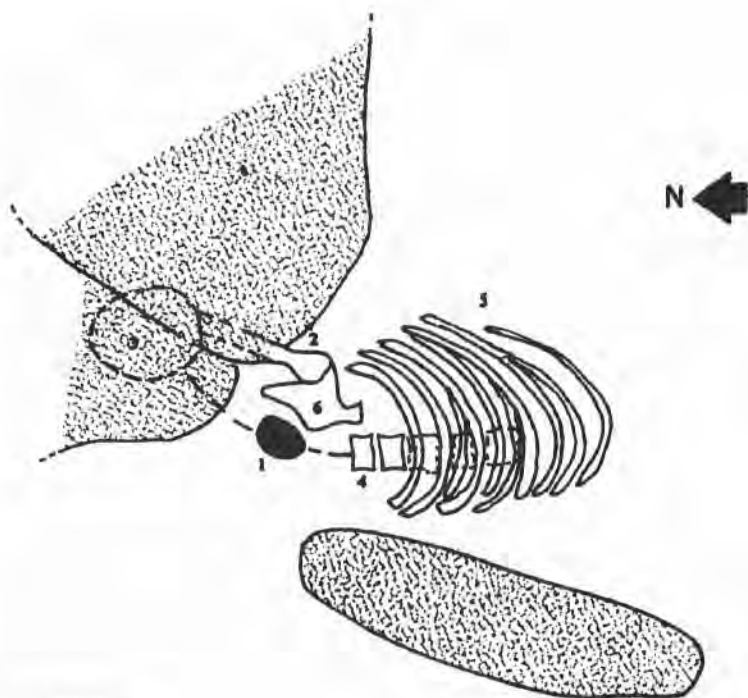
Site 13 (UC-BC-45)

On an adjoining volcanic hill to the east of the above site was found another rock-covered hill burial location, along with a residential scatter of *Chione*

BURIAL TOMB

Find 3

Burials 2-3-4



1. Granite pebble
2. Humerus
3. Cranium
4. Vertebrae
5. Ribs
6. Scapula

Not to scale

Figure 8. Burial Drawing from Multi-Burial Chamber at Site 12 (UC-BC-44), Cerro de las Calaveras.

sp. shells and a few basalt and obsidian flakes. Five disturbed burial chambers (Figure 9) were observed at this site, and notes and samples were taken regarding the remains, as discussed later.

Site 14

A small shellfish scatter of about 98% *Chione* sp. was found near a modern fish camp at a protected inlet of the point forming the northwest portion of inner Bahía de las Ánimas. Other shellfish noted include *Arca* sp., *Dosinia ponderosa*, *Atrina* sp., and *Ostrea* sp. A few basalt and rhyolite flakes, small and large, were observed, along with several imported granite cobbles and pebbles not showing obvious use.

Site 15

At the very tip of the point discussed above, near the location of a modern shrine, occurs a small amount of shell (mostly *Chione* sp. with *Atrina* sp. and *Arca* sp. shell also noted). A cleared circle in the rock is found here, it measures 2.7 x 2.0 meters, with a rock wall height of 30-40 cm.

Aside from the sites listed above, several trails of unknown affiliation were noted in the coastal area. There is a known coastal trail in this region, as well as one or more trails leading inland up the Valle las Ánimas. Within the valley, on isolated hills, there were also noted several rockshelters that may have been utilized, and a rock wall. Aside from the scratched rocks, no rock art is known from this bay, although petroglyphs and burials are reported to occur on the trail north to Bahía de los Ángeles.

SHELLFISH TOOLS

In her extensive treatment of sea shell usage in aboriginal Baja California, Williams (1975) includes an accounting of utilitarian sea shell use described from the peninsula and adjacent areas. While not as often reported as shell modified for use as pendants or beads, there is an established number of archaeological sites containing worked shell implements. Massey reports chipped scrapers or spoons from the Cabo Pulmo region, and suggests that this class of implement may have seen widespread employment across the southern peninsula in rock shelters and open habitation sites (1955:286). Southern California and northern Baja California coastal middens have also been reported to contain scattered scraping or cutting tools fashioned from marine shell (Williams, 1975:5).

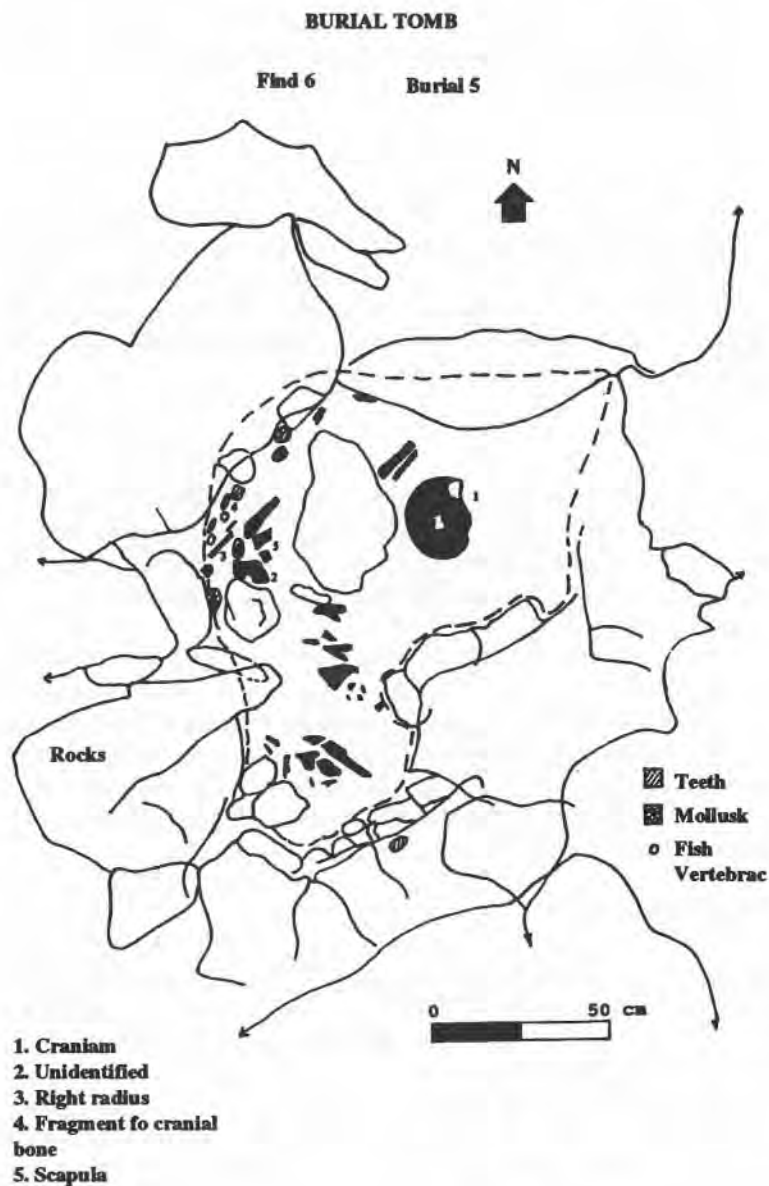


Figure 9. Drawing of Disturbed Burial Tomb at Site 13 (UC-BC-45), Cerrito de las Calaveras.

More recently, Strudwick (1985) has described in detail the process of shell fishhook manufacture. Part of the reduction sequence involved pressure flaking of shell.

Work by the senior author in this region (Ritter, 1994; 1995; 1997) has led to the identification of an extensive shellfish-tool industry; *Dosinia* sp. shells predominate, and there are rarer *Megapitaria*, along with what are probably other shell species tools. These shell tools take two basic forms: valves with marginal flaking for cutting/scraping use, and portions of the valve that form smaller cutting/scraping tools. Extensive refuse from tool making is also notable on regional coastal residential sites.

The Bahía de las Ánimas shell middens consist of 95-99% *Chione* refuse. At all deposits with significant amounts of shell, there appears a light scatter of flaked shells of the large clam *Dosinia ponderosa*, as noted above. This bivalve is found in moderately shallow water on sandy bottoms offshore to 60 m throughout the Gulf of California, where it reaches a size of 145 mm in length (Keen, 1971:178). It exhibits a large, white, rounded shell, with a coarse concentric sculpture and a heavy hinge. Many of the *Dosinia* shells noted at the large middens appear to have been purposely flaked. A series of percussion blows to the exterior margin produces a sharp, serrated edge with conchoidal fractures (Figure 6). Some evidence of flaking on the interior can be seen in some specimens. The result is a large, heavy, and extremely sharp implement, with a working edge rivaling that made from obsidian or fine-grained volcanic material. Smaller shell "flaked" tools are also evident as noted above. The removed flakes were occasionally seen with *Chione* refuse.

The existence of a percussion-flaking industry using *Dosinia* bivalves should not come as a surprise, since it has been previously reported from the Sierra Pinacate region of Sonora. Rosenthal (1977) analyzed a large collection of *Dosinia* shell tools and carried out experiments on their manufacture. She concluded that:

- 1) A diverse inventory of unifaces (scrapers), bifaces, serrates, and gouges were being manufactured;
- 2) The industry requires the use of soft-granular hammerstones and the careful preparation of a striking platform on a fresh *Dosinia* bivalve; and
- 3) The tools appear to be an adequate substitute for objects of cryptocrystalline rock where conchoidally fracturing material is difficult to obtain (1977:372-375).

It is clear that a similar industry can be identified at Bahía de las Ánimas and Bahía de los Ángeles sites. The scarcity of cryptocrystalline rock and the distance from established obsidian sources, plus the expediency of use of a relatively easily available resource may

have stimulated development of this flaked-shell industry employing *Dosinia* bivalves along with other shellfish.

OBSIDIAN ANALYSIS

Utilizing the X-ray fluorescence facilities at the University of California, Davis, eight small flakes of obsidian were initially tested for their chemical characteristics by Bouey (see Bouey, 1984; Ritter, et al., 1994). Bouey recognized three groupings of results from three unknown sources (Table 2). No match was apparent with the sources analyzed by Bouey in 1984 (Coso, Obsidian Butte, San Felipe, and Punta Mangles), nor with sources recently discovered in the Tres Vírgenes (Valle de Azufre) and Santa Rosalía areas. More recent work (Shackley, 1995) on four specimens from Site 2 (UC-BC-46) revealed that two sources were present at this site, one from Isla Ángel de la Guarda in the Gulf, and another from an as yet unknown source, possibly in the Sierra las Ánimas (based upon discussions with geologist Luis A. Delgado Argote of Ensenada, personal communication 1994). On the basis of Shackley's more recent studies at the University of California, Berkeley, it would appear that Isla Ángel de la Guarda obsidian is the most common found in Bahía de las Ánimas, and the best quality obsidian for reduction. A recent obsidian source at Bahía San Luis Gonzaga has also been found, and material from it is present in rare numbers in Bahía de los Ángeles; it might be expected in Bahía de las Ánimas as well. Thus, material from two or three sources of regional obsidian is present in small numbers.

In terms of distribution, based on Bouey's and Shackley's work within Bahía de las Ánimas: nine specimens are from the Isla Ángel de la Guarda source (Bouey's unknown group number 1), five are from Site 2, one each is from sites 1 and 4, and two are from Site 6. One specimen is from unknown group number 2, found at Site 4. Two specimens in unknown group number 3 are from Site 8 (Table 2).

CERAMICS

Bahía de las Ánimas deposits contain pottery in very sparse amounts. A total of 23 brown ware sherds was counted within a 10 m diameter area at Site 1, on a low ridge covered with *Chione* shells and lithics. These sherds appear to be the remains of a single paddle-and-anvil vessel broken into small fragments. Its original shape cannot be determined exactly, but it may have been a shallow bowl (cf. Rogers, 1973; Plate 9, No. 20). No rim sherds were noted. The exterior color ranges from dark gray (5YR 4/1

Table 2. Trace Element Analyses of Obsidian Artifacts from the Vicinity of Bahía Las Ánimas and Obsidian from Three Known Sources in Baja California, México.

| Sample | RB ppm | SR ppm | ZRppm | SUM | RB % | SR % | ZR % | Fe/Mn | Source |
|--------|--------|--------|--------|--------|-------|-------|-------|-------|--------|
| TV-1 | 105.62 | 85.12 | 157.91 | 348.65 | 30.29 | 24.41 | 45.29 | | |
| TV-2 | 112.95 | 86.07 | 154.42 | 353.44 | 31.96 | 24.35 | 43.69 | | |
| TV-3 | 97.71 | 73.68 | 135.71 | 307.10 | 31.82 | 23.99 | 44.19 | | |
| SF-1 | 98.56 | 34.22 | 140.76 | 273.54 | 36.03 | 12.51 | 51.46 | | |
| SF-2 | 92.19 | 27.46 | 131.72 | 251.37 | 36.68 | 10.92 | 52.40 | | |
| PM-1 | 79.07 | 47.22 | 99.30 | 225.59 | 35.05 | 20.93 | 44.02 | 30.8 | |
| PM-2 | 84.73 | 48.04 | 99.75 | 232.52 | 36.44 | 20.66 | 42.90 | 30.0 | |
| PM-3 | 84.41 | 49.69 | 86.80 | 220.90 | 38.21 | 22.49 | 39.29 | 31.2 | |
| BLA1 | 105.58 | 66.97 | 97.79 | 270.34 | 39.05 | 24.77 | 36.17 | 43.0 | UNK A |
| BLA2 | 93.03 | 55.76 | 79.88 | 228.94 | 40.75 | 24.36 | 34.89 | 40.5 | UNK A |
| BLA3 | 104.50 | 64.97 | 98.77 | 268.24 | 38.96 | 24.22 | 36.82 | 45.3 | UNK A |
| BLA4 | 97.31 | 153.34 | 116.13 | 366.78 | 26.53 | 41.81 | 31.66 | | UNK B |
| BLA5 | 98.76 | 59.34 | 95.76 | 253.86 | 38.90 | 23.38 | 37.72 | 44.2 | UNK A |
| BLA6 | 100.90 | 62.34 | 99.24 | 262.48 | 38.44 | 23.75 | 37.81 | 46.3 | UNK A |
| BLA7 | 52.13 | 146.82 | 279.47 | 478.42 | 10.90 | 30.69 | 58.42 | | UNK C |
| BLA8 | 59.68 | 162.33 | 307.32 | 529.33 | 11.27 | 30.67 | 58.06 | | UNK C |

Note: TV = Tres Vírgenes; SF = San Felipe; PM = Punta Mangles; BLA = Bahía Las Ánimas.

Munsell) to tan (5YR 5/2). Interior color is also varied, but generally lighter (7.5YR 6/4). The vessel has a coarse, angular sand temper, with individual grains 3 mm or larger. Evidence that organic materials were also employed in tempering shows in the many indentations left by burnt organic material. These scars are visible on interior and exterior surfaces. Vessel thickness is 8 mm. The sherds are sand blasted and highly weathered from exposure on the dunes.

A second group of eight sherds can probably be attributed to two vessels from Bahía de las Ánimas, Site 2 (UC-BC-46). A single large base fragment, measuring 78 mm across, is extremely coarse. Its core is dark black, and wall thickness measures 12 mm. It features a very dark gray interior (7.5YR 3/0), and a brown exterior (7.5YR 5/2), with deep scars from the burnt vegetal matter imbedded in the paste. Small angular sand grains (less than 1 mm in size) can be noted throughout. Vessel shape cannot be determined, but paddle marks are evident on the exterior.

A final small brown ware vessel is suggested from seven sherds noted in close proximity at Site 2. Two rim sherds conjoin and yield an estimated rim diameter of 80 mm. The lip is slightly beveled (Figure 3d). This may have been a small cooking vessel. It has a coarse, angular sand temper and dark gray (2YR 4/0) color. Burnt vegetal fibers were also included.

Ceramics from Bahía de las Ánimas middens tend not to confirm earlier observations that aboriginal pottery, as documented among the Paipai and Kiliwa, did not extend south in the Baja California peninsula below the region of El Rosario. Rogers (1945) has suggested that during his late prehistoric Yuman III times (Patayan III, post A.D. 1500) (Waters, 1982a,b,c) ceramic use spread throughout the northern peninsula, extending to an unnamed point south of Bahía de los Ángeles. As Tuohy (1970:42) has noted, there is scattered pottery below the 30th parallel, but its inspiration may be attributed to one of three sources: 1) stimulus diffusion from the brown ware tradition to the north, 2) Seri trans-Gulf contacts (Foster, 1984), or 3) Jesuit introduction (Tuohy and Strawn, 1989).

Bahía de las Ánimas sherds closely resemble those noted by Massey and Osborne (1961:343), E.L. Davis (1968:184), Ritter (1994, 1995, 1997), and Williams (1995), principally from Bahía de los Ángeles. All share the same basic characteristics, particularly the use of organic temper. Vegetal temper may be a significant chronological trait for the central and southern peninsula regions, since over most of the greater Southwest its use seems to coincide with European arrival. Bowen assigns the Seri use of organic temper to the post-1700 period, when Spanish contacts established the practice of tempering with horse dung (1976:59). Fontana and others (1962:57) note that Papago pottery with a black core and pitted

exterior from vegetal tempering can be assigned to the post-contact era. Williams (1995) examined the temper within sherds from both Bahía de las Ánimas (Site 2) and Bahía de los Ángeles. He found the Ánimas sherd to contain lithic fragments of basaltic composition, with lesser amounts of chalcedony. He places these sherds in the Tizon Brown Ware, Mission Series, Santo Tomas Brown type, a late prehistoric or protohistoric ware.

BURIALS

Examination of the two burial sites, designated Cerro de las Calaveras (UC-BC-44) and Cerrito de las Calaveras (UC-BC-45), has yielded about 30 individuals. Perhaps significantly, no infants or children are present. Collagen extracts from Burial 3 at the first site and Burial 2 at the second site were submitted to the Center for Accelerator Mass Spectrometry at the Lawrence Livermore National Laboratory for radiocarbon measurement. The C-14 ages are 970 ± 50 and 490 ± 70 years. There is considerable potential for errors in these dates, and they should be viewed cautiously (see Ritter, 1997). They do suggest a Comondú period affiliation and a long term use of these cemeteries.

Among the observations made at these cemeteries are the presence of flexed primary burials within the rock chamber graves (Figure 8). Secondary interment is suspected, along with infrequent cremation. Single and multiple burial chambers are also present, some very carefully constructed; all were at one time sealed with boulders and rocks (Figure 9). Probable food remains in the form of fish, sea turtle bone, and shellfish are present. Flakes were found in one chamber. *Laevicardium* sp. shells, sometimes with the umbo punched out, are not uncommon in graves. Raw material for possible tool manufacture is evident, including two mountain sheep tibia in one grave, and two right bird femurs in another. Some exotic animal remains, such as puffer fish, leatherback sea turtle, and unusual shells may be burial offerings, but wood rat contamination is also a possibility. In one chamber, 15 different genera or species of shellfish were present. Isotopic analyses by King (1996) on a number of burials reflects a heavy reliance on marine foods, as compared to the results from inland skeletal materials. The physical analyses completed (Willey, 1995) show evidence of hard female labor, extensive teeth wear, and strong sexual dimorphism. Severe osteoarthritic conditions are present on at least one individual, suggesting the aged were taken care of despite incapacities. Also, the burials, their positioning and variable numbers in tombs, grave good offerings, and unusual features suggest special ritual, possibly special positions within the society for some individuals, long term residency

within the bay, and possibly separate burial locations for younger members, sampling and preservation factors aside. While grave goods do not seem particularly rich, the dead were afforded special attention in special areas of the bay. We must also note that looters have hit many of these interments, and may have removed some of the grave goods.

SUMMARY AND CONCLUSIONS

Nearly the entire inhabitable portion of the inner Bahfa de las Ánimas coast exhibits a strip of occupation or use several hundred meters wide, with pockets of activity extending back 100 to 200 meters more. A rough approximation would indicate that there are at least 1.4 million square meters of surface occupational debris within the southern bay extremity and, with little doubt, over one million cubic meters of deposit, representing untold millions of shellfish and an abundance of other cultural remains.

This was an important (in terms of population density) occupation center along the north Gulf coast, although apparently less important than the larger Bahfa de los Ángeles just to the north, and certainly less than such locations further to the south, like Bahfa el Isote de San Lucas and Bahfa de la Concepción (cf. Aschmann, 1959: Table 8; and Ritter, 1979). Aschmann (1959:179-180) relates that the Indian groups noted by the missionaries from the Mission San Borja district, of which this region is a part, were most dependent on marine resources, but had smaller populations per linear mile of shoreline than did those to whom marine resources were less significant. Aschmann (1959:Table 8) estimates that in the San Borja district as a whole, there were 14.7 people per linear mile of shoreline, although he cautions that no group ate sea foods exclusively, and such use was generally seasonal. This figure, of course, is an average and would no doubt be many times higher for short coastal segments such as that along Bahfa de las Ánimas. At the risk of oversimplifying a complex situation no doubt varying considerably over time, we would estimate that scores, perhaps even hundreds (*ranchería* size) of people used this bay at the height of use, at least during late prehistoric times. Mathes (1994) has discussed some of the early explorer and missionary observations in this bay and in Bahfa de los Ángeles. Richard Hakluyt provided information on Francisco de Ulloa's visit in 1539. Cane rafts, stored fish, abundant seals, skin water bags, and bone fish hooks were noted. Mathes (1994) also provides detailed diary accounts by Father Fernando Consag, S.J. from 1746. Consag observed many seals and birds, as well as hostile Indians with bows and arrows in Bahfa de las

Ánimas and Bahía de los Ángeles in the latter part of June, which suggests use of these bays at least during the spring and summer, if not year round at the time of European contact.

Moriarty (1968) has discussed radiocarbon dates obtained from Baja California, including one that is about 6000 years in age, obtained from archaeological contexts in the Bahía de los Ángeles area. Dating problems aside, it is clear that human use of the general area has occurred for a long period of time. Bendímez (n.d.) is undertaking further explorations of the older dated shellmound at Bahía de los Ángeles. Older materials are likewise reported in the interior (Arnold, 1957, 1984; Davis, 1968; Ritter, 1976). Davis (1968:189) also recounts that in the Bahía de los Ángeles locality, sites on the coast appear late, with two exceptions "which probably were mixtures of late and middle periods." However, she later states in the same article (1968:190) that "It is highly likely that middle and early sites also existed on the coast, but that they are either covered by sand or are under several fathoms of water."

Davis's (1968:190) description of late period coastal sites from the Bahía de los Ángeles locality is similar to the site characteristics from Bahía de las Ánimas, with some exceptions. She found late sites to be shell middens in dunes, with both artifacts and shell fresh appearing. Artifacts found include small points, frequently side notched; pottery abundant, including a type described as similar to Tizon Brown Ware; basin shaped milling slabs; both unifacial and bifacial, irregular-shape handstones or *manos*; crude core tools; and common turtle carapace. Other characteristics include rare, large knife-points, biface series almost lacking, modern commercial ceramics, and "European material fairly common."

Bahía de las Ánimas clearly lacks the modern occupational debris, except for contemporary fishermen's refuse. Furthermore, aboriginal ceramics appear rare on most sites, and bifaces are present, although no quantification can be provided. There are other characteristics for the Bahía de las Ánimas sites listed above, that clearly go beyond Davis's abbreviated list. The mortuary complex and various features are examples, and both bays contain a wealth of shell tools and utensils not identified by Davis. We would also like to point out that there was no evidence of apparent Seri use of Bahía de las Ánimas such as was reported by Foster (1984) for Bahía de los Ángeles. Seri use cannot, of course, be ruled out with such a preliminary examination.

Our rudimentary assessment of the dietary remains suggests the following: Extensive use was made of the littoral sand and mud deposits for easily obtainable clams; less use of the rocky and cobbly shorelines for

shellfish, and at least some use of the bay for fishing and sea mammal and sea turtle procurement. This is probably a fair statement for late prehistoric times, less exact for earlier use of the bay. While surface remains of sea mammals and turtles were light, and no obvious marine procurement artifacts were noted, a better assessment through formal archaeological recovery techniques, we suspect, would considerably upgrade the importance of the non-shellfish marine portion of the diet. It should also be pointed out that coyotes and other animals scavenge food refuse, and can eat even turtle carapace to get nutrition from the bones and oil. Furthermore, many bones were probably ground for food.

Use of land animals no doubt occurred, but little evidence of such exploitation was noted, either in the faunal remains or in the artifacts, such as projectile points. Mountain sheep bone and other bone with burials could indicate the hunting of these terrestrial mammals. The lithic materials present could well have been primarily for acquiring and processing marine animals, such as use of simple large flakes for cutting and skinning, or triangular points as harpoon insets.

Plant foods appear to have been at least moderately important to village inhabitants, judging from the milling equipment. If these people were comparable in their subsistence pursuits to the Seri, who lived in a similar environment (cf. Felger and Moser, 1985), then they were probably utilizing such local plant foods as the various cactus fruits and seeds (i.e., *Stenocereus* sp.), mesquite (*Prosopis* sp.) and other legumes, seeds of the Amaranth and Goosefoot families, *Zostera marina* (eelgrass), and others. It appears that milling was more important in the central portion of the bay closer to the denser and more diverse vegetation patches. However, inland locations near the bay where specialized milling stations are present must be considered.

Limited interaction with distant regions is evident from the surface observations. Imported obsidian is rare and small in size, suggesting use and maintenance of relatively small artifacts, including the bipolar reduction of obsidian nodules. The nearest known sources are at Isla Ángel de la Guarda, and perhaps in the Sierra las Ánimas. Major obsidian locations to the south about 160 km in the Tres Vírgenes area and to the north in the San Felipe area, about 225 km distant, are not present. In any case, obsidian is rare, and does not appear to have been a major procurement or exchange item. The ceramics are most likely not locally manufactured in an aboriginal context. They are possibly imported from the north, but it is much more likely that they were obtained from the Spanish near the time of mission contact, that is, after about 1700-1750 (Aschmann, 1959:31).

Most of the sites discovered during the informal reconnaissance appear, based on artifact types and radiocarbon dates, to be late prehistoric. Earlier occupation may be present along the fringes of the bay, probably a preservation factor, as at Site 11. Thus, earlier sites in the central bay coast may well have been buried during depositional events, or through eustatic changes in the sea level. It is also possible that earlier components will prove present with depth within the observed shellmounds.

A significant aspect of the bay's archaeology is the mortuary complex and the probably-related series of rock structures and features. The burial of individuals within the rocky hillsides and the likely cremation of individuals at rocky hillsides and open sites differs from rockshelter burials, as reported by Massey and Osborne (1961), and as discovered by the author in the vicinity of the community of Bahía de los Ángeles. This pattern also varies from the rockshelter burial pattern found to the south in the Bahía de la Concepción region (Ritter and Schulz, 1975). However, rocky hillside burials have been recorded and excavated in Bahía de los Ángeles (Ritter, 1997). What is most clear is that there is a probable Comondú period pattern of burial (secondary, primary flexed, and possibly cremation), largely in cemeteries separate from the residential bases often within hillside ossuaries. These ossuaries are single and multiple individual features. What is also apparent is that some of these cemetery complexes exhibit a series of features that may be associated with mortuary ritual (also see Ritter, 1995, 1997).

Bahía de las Ánimas was a regional center of prehistoric activities and settlement. The archaeological remains within this bay are seem largely to be the end products of an interrupted, changing social system terminated by the Spanish *entrada*. The senior author in his regional archaeological studies, including Bahía de las Ánimas (Ritter, 1994; 1995, 1997) has developed a proposed model of human use and behavior in the region. In this paper we can examine important parts of this model. Probably over time, perhaps in the last 3000-4000 years, there was an increased awareness of food resource availability, and scheduling increased exploitation efficiency. Resource intensification and diversification may have resulted with population increases, especially during the Comondú period. This was also a time of subsistence/ technology developments/introductions: the bow and arrow, fishing apparatuses, ceramics, etc. Socio-economic links with interior groups may have increased where other food products and goods would have been available—perhaps not as readily available in the coastal environment—, e.g. mescal fishing lines and nets, agave hearts, annual seed products, cane for rafts, deer hides, etc. Marine foods and products (dried fish, shellfish tools

and utensils, etc.) would have served as exchange items. Internal stresses probably were generated with increases in population, resource intensification, and competition. These stresses were perhaps partly ameliorated through ritual associated with multi-group gatherings, as at mortuary centers and interior rock art complexes, like Montevideo and Yubay. Such ritual also served to increase craftsmanship, group solidarity, and inter and intra-band bonding and alliance ratification (see Aschmann, 1959:125-130). It is also possible that these various circumstances led to incipient social differentiation, as is perhaps evident in the mortuary remains in both bays (also see Massey and Osborne, 1961).

Bahfa de las Ánimas has all the characteristics of a valuable research center mirroring its past importance to the prehistoric inhabitants of the region. The geologic formation of this bay resulted in a very important and plentiful food zone for the Native Americans, a virtual cornucopia. These peoples were probably not as adept at exploiting the marine environment as were the seafarers of Cedros Island across the peninsula, but they made heavy use at least of near-shore marine products where acquisition was relatively easy. Some evidence suggests these people ventured out to sea as well, and supplemented their diet with a seemingly at times abundant plant food base with land animals forming an unknown dietary component.

The losses to the archaeological resources in this bay are lamentable, clearly pointing towards the need for more studies here in the near future, and linkages in the research with other peninsular archaeological work. While we have offered much new data here, and a series of tentative hypotheses, plus a model of cultural development and interaction, future research focused on the ancient signatures is needed to confirm or deny these proposals, and to provide a fuller recognition of the achievements of these peoples of the past.

ACKNOWLEDGEMENTS

The observations and report preparation were supported by a number of family members and colleagues. Dr. James Berry of the California Department of Parks and Recreation assisted in the field coordination. Deborah Hillyard of the Anza-Borrego State Park undertook botanical inspections. Donald Tuohy provided information on the peninsula's ceramics. Field observations were aided by Patricia and Bret Ritter, Eric and Jon Fields, and various members of the University Research Expeditions Program and the Instituto Nacional de Antropología e Historia (INAH). The final artifact renditions were completed by Adam Bodine. Julia Bendfmez Patterson, Jorge Serrano González, and Diana Guerrero

González of INAH assisted in obtaining necessary permits, field work and other tasks. Dr. Kent Lightfoot and Dr. M. Steven Shackley provided important coordination and work through the University of California, Berkeley.

REFERENCES

- ARNOLD, Brigham A. 1957. "Late Pleistocene and Recent Changes in Land Forms, Climate, and Archaeology in Central Baja California". *University of California Publications in Geography* Vol. 10, pp. 201-318.
- 1984. "Early Man in Baja California-Evidence and Interpretation". *Pacific Coast Archaeological Society Quarterly*, Vol. 20, No. 1, pp. 27-36. Costa Mesa.
- ASCHMANN, Homer. 1959. *The Central Desert of Baja California: Demography and Ecology*. Ibero-Americana, Vol. 42.
- BENDÍMEZ, Julia Patterson. n.d. "Proyecto de investigación arqueológica: Estudio de un conchero en el poblado de Bahía de los Ángeles, Baja California". Manuscript under preparation.
- BOUEY, Paul D. 1984. "Obsidian Studies and their Implications for Prehistory". *Pacific Coast Archaeological Society Quarterly*, Vol. 20, No. 1, pp. 55-60. Costa Mesa.
- BOWEN, Thomas. 1976. *Seri Prehistory: The Archaeology of the Central Coast of Sonora, Mexico*. Anthropological Papers of the University of Arizona No., 27. Tucson.
- DAVIS, Emma Lou. 1968. "An Archaeological Reconnaissance in the Central Desert of Baja California". University of California, Los Angeles, *Archaeological Survey Annual Report*, Vol. 10, pp. 176-208.
- FELGER, Richard Stephen, and Mary Beck Moser. 1985. *People of the Desert and Sea, Ethnobotany of the Seri Indians*. The University of Arizona Press, Tucson.
- FONTANA, Bernard L., William J. Robinson, Charles Cormack, and Ernest E. Leavitt, Jr. 1962. *Papago Indian Pottery*. University of Washington Press, Seattle.
- FOSTER, John W. 1984. "A Late Period Seri Site from Bahía de Los Ángeles, Baja California". *Pacific Coast Archaeological Society Quarterly*, Vol. 20, No. 1, pp. 61-68. Costa Mesa.
- KEEN, A. Myra. 1971. *Sea Shells of Tropical West America*. Stanford University Press, Stanford.

- KING, Jay H. 1996. "Report of Radiocarbon and Stable Isotope Measurements on Human Bones from Bahía de las Ánimas, Baja California". Manuscript in author's possession to be submitted to the Instituto Nacional de Antropología e Historia.
- MASSEY, William C. 1955. "Culture History of the Cape Region of Baja California". Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Berkeley.
- MASSEY, William C., and Carolyn M. Osborne. 1961. "A Burial Cave in Baja California: The Palmer Collection, 1887". *University of California Anthropological Records*, Vol. 16, pp. 339-364. Berkeley.
- MATHES, W. Michael. 1994. "Observaciones etnológicas sobre los primeros contactos europeos en la región de Bahía de los Ángeles, Isla Ángel de la Guarda y Adac, Baja California: 1539-1827". Apéndice 1 en el Informe: "Investigaciones de ecología social y cambios entre culturas prehistóricas en la región de Bahía de los Ángeles, Baja California (1993)" por Eric W. Ritter. Unpublished, Instituto Nacional de Antropología e Historia, México.
- MORIARITY, James Robert, III. 1968. Climatological, Ecologic, and Temporal Inferences from Radiocarbon Dates on Archaeological Sites, Baja California, Mexico. *Pacific Coast Archaeological Society Quarterly*, Vol. 6. No. 1, pp. 3-12. Costa Mesa.
- RITTER, Eric W. 1976. "The Antiquity of Man in the Laguna Seca Chapala Basin of Baja California". *Pacific Coast Archaeological Society Quarterly*, Vol. 12, No. 1, pp. 39-46. Costa Mesa.
- 1979. "An Archaeological Study of South-Central Baja California, Mexico". Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Davis.
- 1994. "Investigaciones de ecología social y cambios entre culturas prehistóricas en la región de Bahía de los Ángeles, Baja California (1993)". Report submitted to the Instituto Nacional de Antropología e Historia, Mexico City.
- 1995. "Investigaciones de ecología social y cambios entre culturas prehistóricas en la región de Bahía de Los Ángeles, Baja California (1994)". Report submitted to the Instituto Nacional de Antropología e Historia, Mexico City.
- 1997. "Investigaciones de ecología social y cambios entre culturas prehistóricas en la región de Bahía de Los Ángeles, Baja California (1995)". Report submitted to the Instituto Nacional de Antropología e Historia, Mexico City.

- RITTER, Eric W., John W. Foster, Robert I. Orlins, Louis A. Payen, and Paul D. Bouey. 1994. "Archaeological Insights within a Marine Cornucopia: Baja California's Bahía de las Ánimas". *Pacific Coast Archaeological Society Quarterly*, Vol. 30, No.1, pp. 1-25. Costa Mesa.
- RITTER, Eric W., and Peter D. Schulz. 1975. "Mortuary Practices and Health Conditions among a Small Prehistoric Population from Baja California Sur". *Pacific Coast Archaeological Society Quarterly*, Vol. 11, No. 1, pp. 43-53. Costa Mesa.
- ROGERS, Malcolm J. 1936. *Yuman Pottery Making*. San Diego Museum Papers, No. 2, pp. 1-53. San Diego.
- 1945. "An Outline of Yuman Prehistory". *Southwestern Journal of Anthropology*, Vol. 1, pp. 167-198. Albuquerque.
- ROSENTHAL, E. Jane. 1977. "Sierra Pinacate Percussion-Flaked Shell Tool Manufacture". *Journal of Field Archaeology*, Vol. 4, No. 3, pp. 372-375. Boston.
- SHACKLEY, M. Steven. 1995. "Análisis de energía dispersiva de fluorescencia de rayos X (EDXRF) en artefactos de obsidiana de ocho sitios arqueológicos en Bahía de los Ángeles, Baja California Norte: Temporada de campo 1994. Apéndice 2 en Informe: Investigaciones de ecología social y cambios entre culturas prehistóricas en la región de Bahía de los Ángeles, Baja California (1994)". Instituto Nacional de Antropología e Historia, México.
- STRUDWICK, Ivan. 1985. "The Single-Piece Circular Fishhook: Classification and Chronology". *Pacific Coast Archaeological Society Quarterly*, Vol. 21, No. 2, pp. 32-69. Costa Mesa.
- TUOHY, Donald R. 1970. "The Aboriginal Containers of Baja California, Mexico: A Search for Origins". *Tebíwa*, Vol. 13, No.2, pp. 41-51. Pocatello.
- TUOHY, Donald R., and Mary B. Strawn. 1989. "Thin Section Analysis of Mission Period Pottery from Baja California, Mexico". *Nevada Archaeologist*, Vol. 17, No. 2, pp. 36-48. Carson City.
- WATERS, Michael R. 1982a. "The Lowland Patayan Ceramic Tradition". In *Hohokam and Patayan: Prehistory of Southwestern Arizona* (Randall H. McGuire and Michael B. Schiffer, eds.), pp. 275-297. Academic Press, New York.
- 1982b. "The Lowland Patayan Ceramic Typology". In *Hohokam and Patayan: Prehistory of Southwestern Arizona* (Randall H. McGuire and Michael B. Schiffer, eds.), pp. 537-570. Academic Press, New York.

- 1982c. "Ceramic Data from Lowland Patayan Sites". In, *Hohokam and Patayan: Prehistory of Southwestern Arizona* (Randall H. McGuire and Michael B. Schiffer, eds.), pp. 571-580. Academic Press, New York.
- WILLIAMS, Anita Alvarez de. 1975. "Sea Shell Usage in Baja California". *Pacific Coast Archaeological Society Quarterly*, Vol. 11, No. 1, pp. 1-22. Costa Mesa.
- WILLIAMS, Stephen L. 1995. "Microanálisis de tepalcates procedentes del área de Bahía de los Ángeles y Misión San Fernando Velicatá, Baja California". Apéndice 5 en informe: "Investigaciones de ecología social y cambios entre culturas prehistóricas en la región de Bahía de los Ángeles, Baja California (1994)". Manuscrito con el Instituto Nacional de Antropología e Historia, México.
- WILLEY, P. 1995. "Análisis de esqueletos humanos del Cerro de las Calaveras (UC-BC-44) y Cerrito de las Calaveras (UC-BC-45) en Baja California". Apéndice 4 en informe: "Investigaciones de ecología social y cambios entre culturas prehistóricas en la región de Bahía de los Ángeles, Baja California (1994)". Manuscrito con el Instituto Nacional de Antropología e Historia, México.