# Investigations of Prehistoric Behavioral Ecology and Culture Change within the Bahía de los Angeles Region, Baja California

Eric W. Ritter


## Abstract

Archaeological investigations by the University of California during the 1990s in the greater Bahía de los Angeles region of Baja California included sample inventory and limited test excavations. This research resulted in the documentation of 74 sites and a better understanding of the 6000 plus years of changing regional occupation and use. It is proposed that relatively mobile, thinly scattered populations began to increase around 1000-1500 years ago. More interior-coastal interaction is suggested to have occurred during at least late prehistory concomitant with more efficient food acquisition practices and, perhaps, improved water management. Cultural events in nearby and more distant regions and possible climatic perturbations may have exerted some influence on local settlement/subsistence patterns. The conceivable marginal increases in overall cultural complexity during late prehistory were interrupted by the Spanish entrada.

## Abstracto

Las investigaciones arqueológicas por la universidad de California durante los años 90 en la mayor región de Bahía de Los Ángeles de Baja California incluyeron excavaciones del inventario de la muestra y de la prueba limitada. Esta investigación dio lugar a la documentación de 74 sitios y de una comprensión mejor de los 6000 años más de cambiar la ocupación y el uso regionales. Se propone que las poblaciones fueron móviles,y dispersadas relativamente fino, y que ellos comenzaron a aumentar hace alrededor 1000a1500 años. Una interacción más interior a la costa se sugiere a haber ocurrido durante la última prehistoria concomitante por lo menos con prácticas más eficientes de la adquisición del alimento y, quizás, la gerencia mejorada del agua. Los acontecimientos culturales adentro regiones cerca y más distantes y talvez algunas perturbaciones climáticas pudieron haber ejercido una cierta influencia en modelos locales de establecimientos y subsistencias. Los aumentos marginales y concebibles en la complejidad de la cultura total durante la última prehistoria fueron interrumpidos por la entrada española.


## Introduction

Today, as during historic and prehistoric times, Bahía de los Angeles on Baja California's Gulf coast is an attractive desert beacon for maritime oriented peoples (Fig. 1). Here, archaeological sites are many and are at risk to the vagaries of nature and modern society.

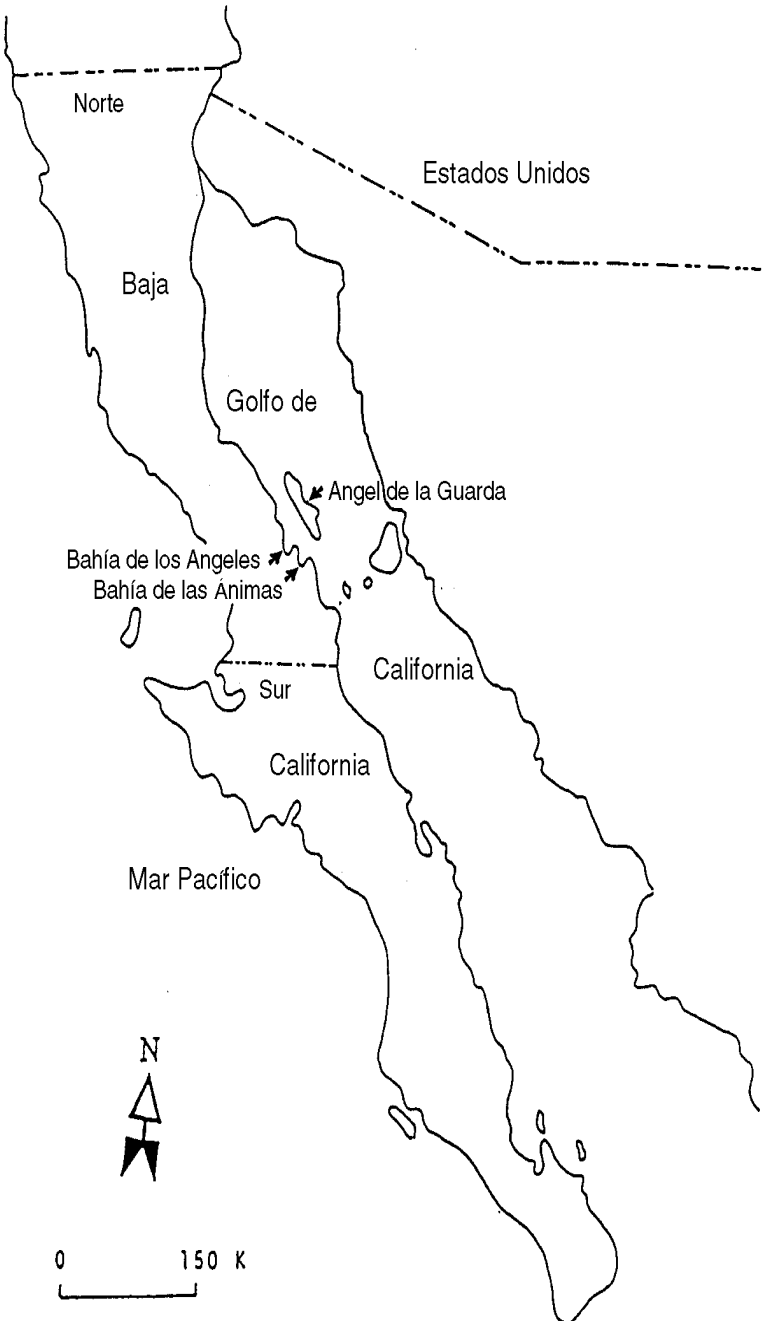



Fig. 1. Area of Study.

Archaeological remains and their natural setting in the greater Bahía de los Angeles region overall still retain high research value despite scattered losses and local environmental degradation. As a consequence of continued resource risk and information promise, and at the request of Mexican stewards, the Archaeological Research Facility at the University of California, Berkeley (UC) and the Instituto Nacional de Antropología e Historia (INAH), embarked on a four-year (1993-1997) cooperative study at the interface of this Lower Sonoran Desert life zone and resource rich Gulf of California. These archaeological undertakings can only be considered initial, yet the results are encouraging in terms of their implications regarding regional culture history, mobility strategies, subsistence, social change, ceremonialism, trade/exchange, human biology, and other issues as laid out in more detail in a series of reports (Ritter 1994, 1995a, 1997).

## Theoretical Background

Theoretically speaking, in this regional research the author attempted to merge a socio-ecological focus (cf. Kelly 1995) of the interdisciplinary work with cognitive-oriented components (Whitley 1992), especially in terms of rock art interpretation and mortuary ritual reconstructions. This rationalist, synthetic approach allows for a test—or at least an informed consideration—of hunter/gatherer/forager models (cf. Kelly 1995) with regard for past ethnoarchaeological and ethnohistoric work (cf. Aschmann 1959, Felger and Moser 1985) and an appreciation of site formation and transformation processes. The theoretical approach was well-intended in this case, but it has shortfalls in most of Baja California. In the peninsula there is still no well-established culture history, at least beyond the late components, and archaeological inquiry as yet suffers from the absence of a large quantity of data derived from adequate sampling and solid paleoenvironmental information. But, it still seems appropriate in this paper to examine some of the research techniques, findings, and beginning interpretations derived from these initial archaeological studies in the region (Ritter 1994, 1995a, 1997) following the theoretical underpinnings described above as closely as possible.

## The University of California/INAH Field Strategy

The 1993-1997 archaeological field work, as with previous regional work, was predominately coastal, with reconnaissance excursions to an inland playa, Mission San Francisco de Borja, Adac rock art complexes, and several other minor locales. The field work was broad-brushed involving systematic and purposive archaeological site survey, ecology observations, surface collecting of cultural materials, and limited test excavations at prehistoric sites. The coastal ribbon of archaeological residue, especially mollusk remains, foremost along the bay shores, is obvious and revealing. Variable resources' procurement, processing of these resources, and residential and probable ritual activities are evident along the coast, including the use during at least late prehistory of cemeteries and other presumed ceremonial/spiritual locations away from habitation locales.

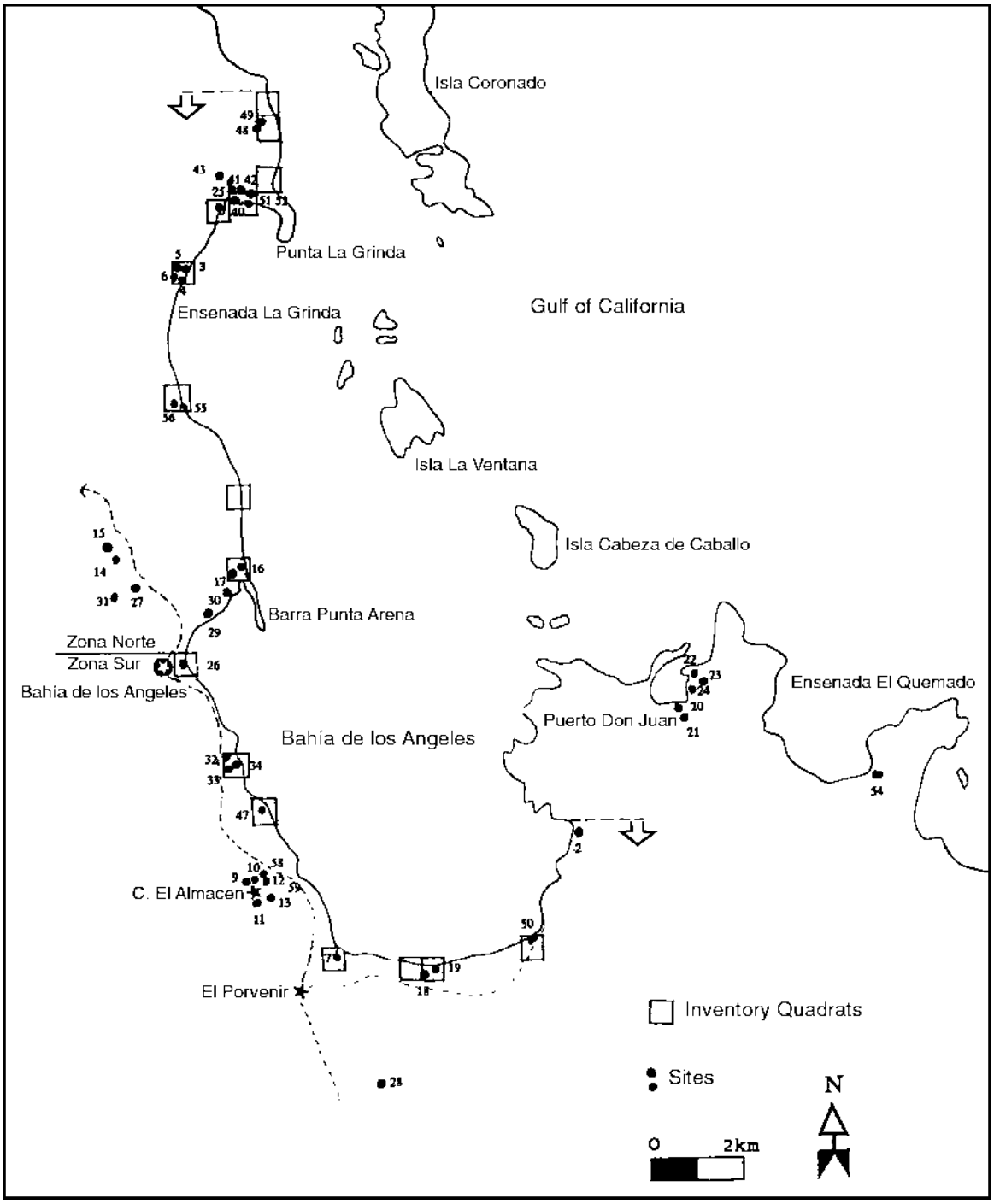



Fig. 2. A major portion of the archaeological inventory for the greater Bahía de los Angeles region.

In an attempt to understand the spatial distribution of archaeological remains within Bahía de los Angeles and neighboring bays and coastal strips, short of a total survey, a systematic site sampling strategy was employed coupled with purposive survey and local informant interviews resulting in the detailed documentation of 74 sites, of which 47 near the coast along Bahía de los Angeles are shown on the accompanying map (Fig. 2).

Bahía de los Angeles was divided into a north and south half based on environmental differences (shelter, proximity to differing vegetation zones, tidal flat presence, rocky/cobbly shoreline occurrence, etc.), and 0.5 by 0.5 kilometer (km) quadrats along the littoral strip were aligned using the Bahía de los Angeles and Campo Juárez Mexican topographic maps' UTM grid. A random selection of quadrats from each zone was then conducted. Subsequently, 16 quadrats were inventoried at 30 meter (m) transect intervals totalling 29 per cent of the bay's shoreline. The less protected north zone included 16 sites in six of nine quadrats, and the south zone included nine sites, generally larger, in all seven quadrats (Fig. 2). Survey and documentation of sites in other coastal stretches of this bay and those bays to the south, including Bahía de las Ánimas, resulted in the recording of an additional 38 sites not in survey quadrats (some of these are shown on Figure 2) (also see Ritter et al. 1994, 1995a). Inventory calculations indicate there are approximately seven sites per square kilometer along the bay shores; very few sites along inter-bay shores, and smaller sites in lower density than along bay shores within a few kilometers of the bay perimeters (Ritter et al. 1995).

Local museum director Carolina Espinoza (personal communication 1994) has indicated that a pattern of dispersed rock enclosures occurs on the major alluvial fan near the main spring (Aguaje de San Juan) in Bahía de los Angeles (Fig. 3a). Inselbergs (residual hills) surrounded by coastal fans and canyon mouths within a few kilometers of the bay shore appear to have been important locations for prehistoric activities. These landform features include both open sites of various types and rockshelter locations. Also recorded during the UC/INAH survey were eight presumed ephemeral camps and flaked stone tool workshops at adjoining Laguna Agua Amarga and Laguna Seca; a pictograph site in the interior at Montevideo (Fig. 3d); and an open midden site in the interior near Mission San Francisco de Borja Adac at San Ignacito (Site UC-BC-53). Observations were made at the mission as well as where a small geometric or abstract pictograph site was documented and ceramics were collected. In addition to survey, limited test excavations (one or two small units of variable size—0.5 to 1 m square) were conducted at four sites (a coastal shellmound, a coastal rockshelter midden apron, a near-coastal cairn complex—with negative results—and an interior pictograph rockshelter).

## Site Configurations

Based on the coastal and more limited interior inventories and observations, more than a dozen prehistoric site expressions or types are definable based on objective and subjective attributes such as size, artifact/ecofact/feature presence or absence, location, etc. (also see Davis 1968). (Many of these site types are at least late prehistoric based on obsidian hydration

a. Cerro Los Angelitos, UC-BC-32

b. El Metate (Conchero), UC-BC-30

c. La Rocosa de Buitre, UC-BC-43

d. Montevideo

Fig. 3. Archaeological sites of Bahía de los Angeles.

readings, projectile point style, artifact weathering, and landform characteristics; and most site types, perhaps all, seem to be multi-period). These types include the most frequent site occurrence, shell deposits of various sizes (Fig. 3b), sometimes with feature and artifact associations. Other site types include flaked stone artifact scatters (the second most common site); and hundreds of widely scattered rock enclosures (Fig. 4). These rock rings or rock enclosures occur on the fans, hills and shorelines, sometimes in clusters of up to 24. They are variable in size and position (Fig. 5), often found with shells and artifacts. They occasionally occur at remote locations with expansive vistas. Here, they generally have no other cultural associations. Additionally, there are rock cairns (Fig. 3c), mortuary locations, a presumed storage shelter, an enigmatic site with linear and circular clearings, trails, rock art sites (Fig. 6), an interior midden, rockshelters, and small quartz quarries.

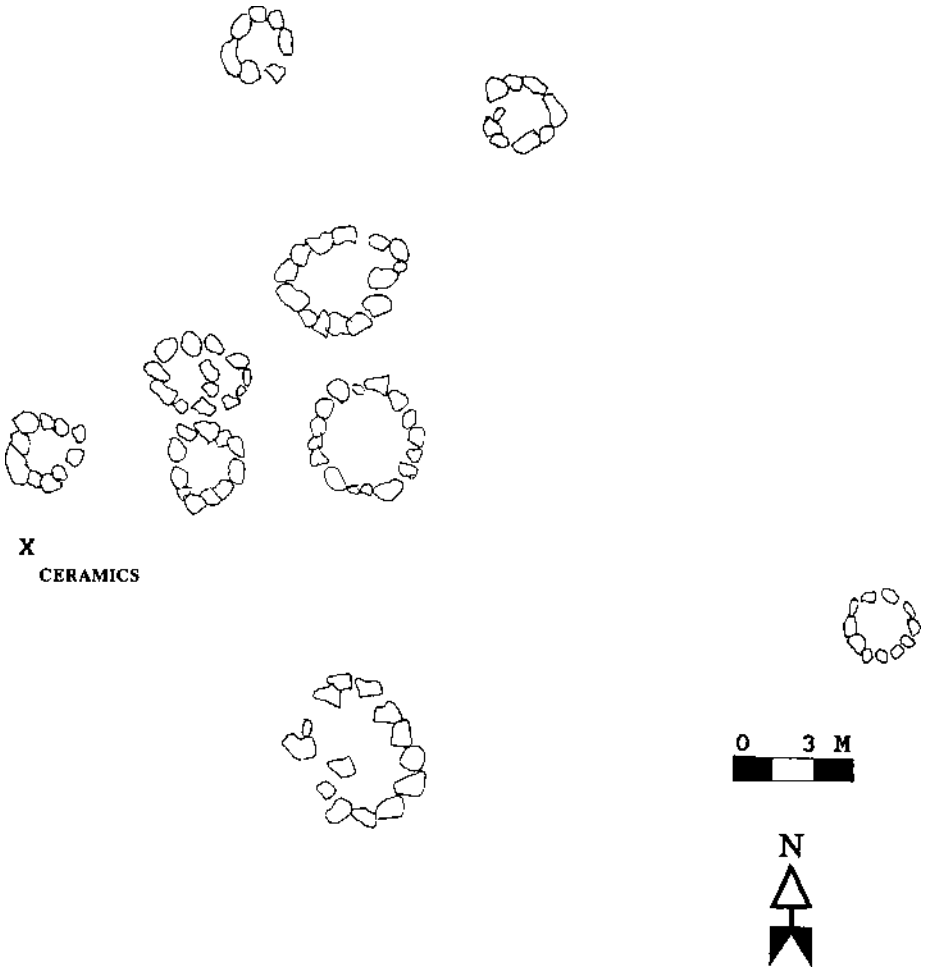



Fig. 4. Rock enclosures, El Rincon, UC-BC-2.

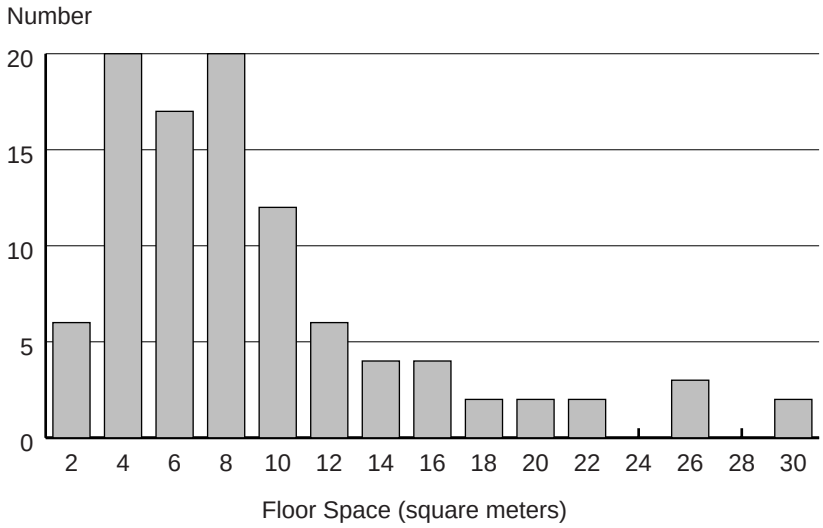



Fig. 5. Rock enclosures at Bahía de los Angeles, 1993 sample.

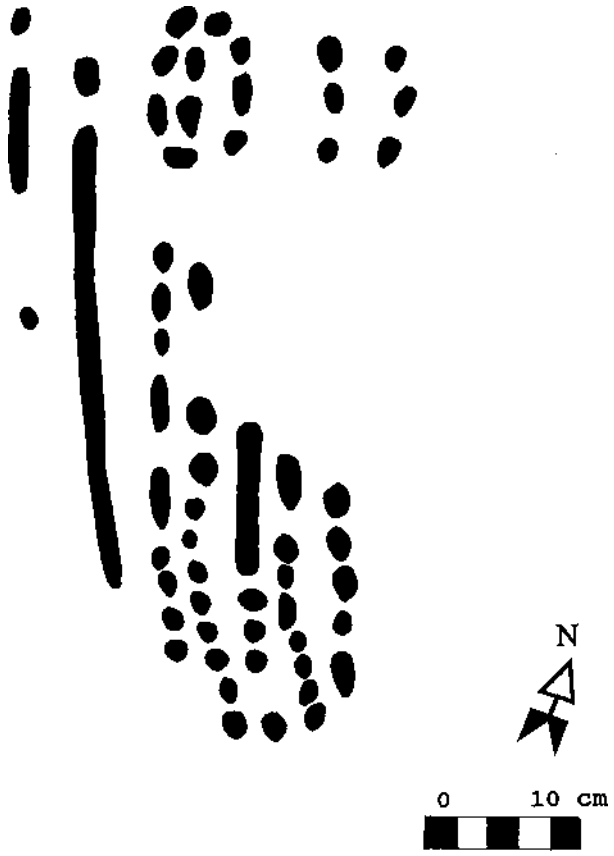



Fig. 6. Red Pictographs in shelter, Cueva Abraham, UC-BC-13.

The combination of fresh water and protected bay and estuary—not unexpectedly—includes more and larger cultural expressions than appears inland until watered canyons are reached. The oldest residential site known from the region is Aguaje de San Juan located at the present town of Bahía de los Angeles. This shellmound extends back over 6000 years (Moriarty 1968). Regionally, there are many historic site types and variations of types of prehistoric sites present, such as obsidian quarries, milling stations, oven-like features, etc. not recorded during the UC-INAH project.

## Data and Inference

While many details regarding the archaeological remains are available in previously cited reports, presentation of some of the pertinent 1993-1997 findings is appropriate in order to embrace—or at least better review—the summary discussion that follows. Tool kits were not complex, often involving a sharp basalt or quartz flake, core tool (Figs. 7-10), or flaked shell implement (Fig. 11). Projectile point/biface types (Figs. 12a, 12b, and 13) from earliest to latest range from basalt and other fine-grained volcanic and quartz side-notched and, perhaps, bipointed and stemmed points to much more frequent later small triangular and side-notched or serrated Comondú series points of obsidian and cryptocrystalline and microcrystalline stone (also see Davis 1968).

Obsidian, while rare, has been identified from sources at Isla Angel de la Guarda, Bahía San Luís Gonzaga, probably from the Sierra Ánimas, and from an unknown location. Obsidian hydration studies from the two main sources (Isla Angel de la Guarda and Unknown A) (Shackley 1997) indicate that obsidian has been used by the inhabitants for a long period of time (narrow to wide hydration bands)(Fig. 14) in biface reduction, small core reduction, and bipolar reduction.

Unshaped manos (Figs. 15a and 15b) and metates seem the norm over the millennia cross-cutting cultural periods. Ceramics, while present at a few sites, are probably derived from mission influence and include Tizón Brown Ware, Mission Series, Santo Tomás Brown Ware, and the San Felipe type. These vessels were probably both locally made (Tizón-like) and imported from northerly reaches (San Felipe) in bowl form, with larger vessels confined to the San Francisco de Borja Adac mission (1762-1827) (Fig. 16).

Faunal remains from late prehistoric deposits, and probably earlier deposits as well, demonstrate the importance of mollusks (51 species or genera identified), especially small clams, like *Protothaca* sp., *Chione* sp., and *Cardita* sp. (Figs. 17, 18). Other dietary evidence includes rays, sharks, and reef and near-shore sandy-bottomed fish; crabs, sea turtles, sea mammals, and, to a lesser extent along the coast, land mammals and birds. There seems to be a proliferation of use of shellfish and other marine resources during late prehistoric times (numerous apparent or dated late deposits). However, Aguaje de San Juan, as stated, exhibits a thick profile of shells from periodic harvesting practices lasting nearly 6000 years. Land

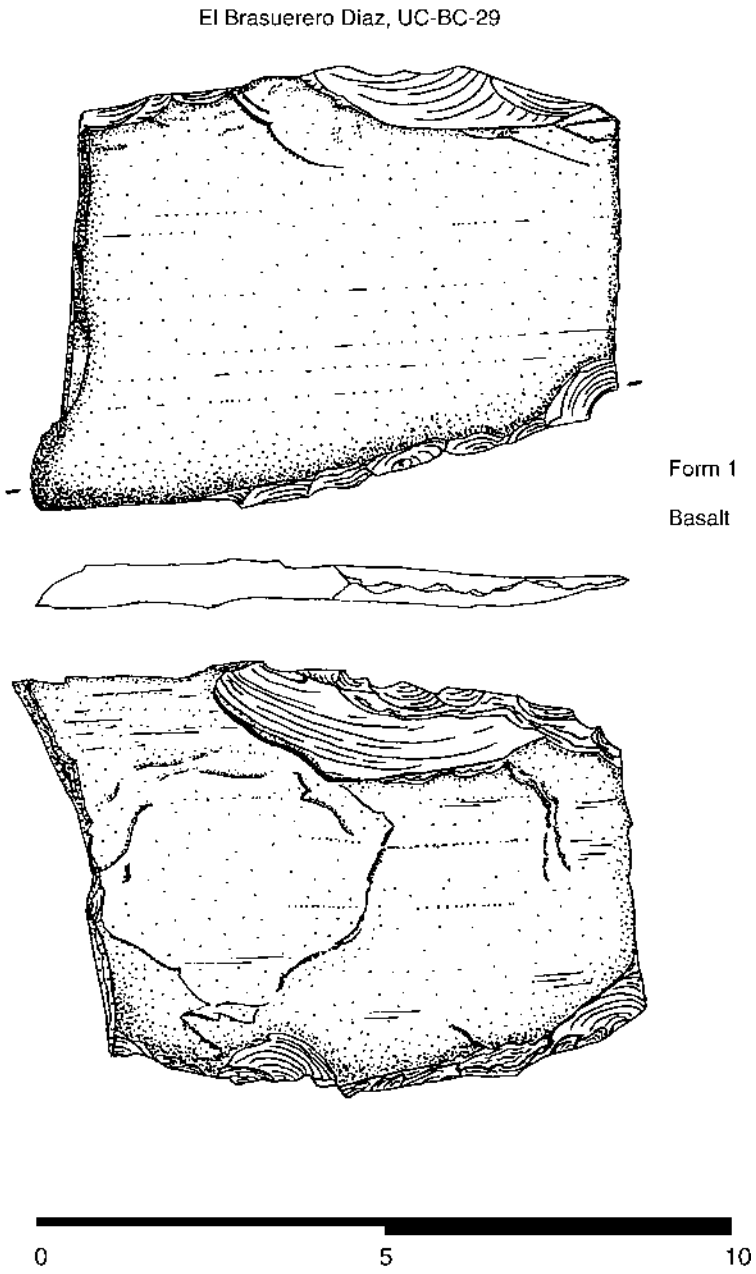



Fig. 7. Flaked stone tool (centimeter scale).

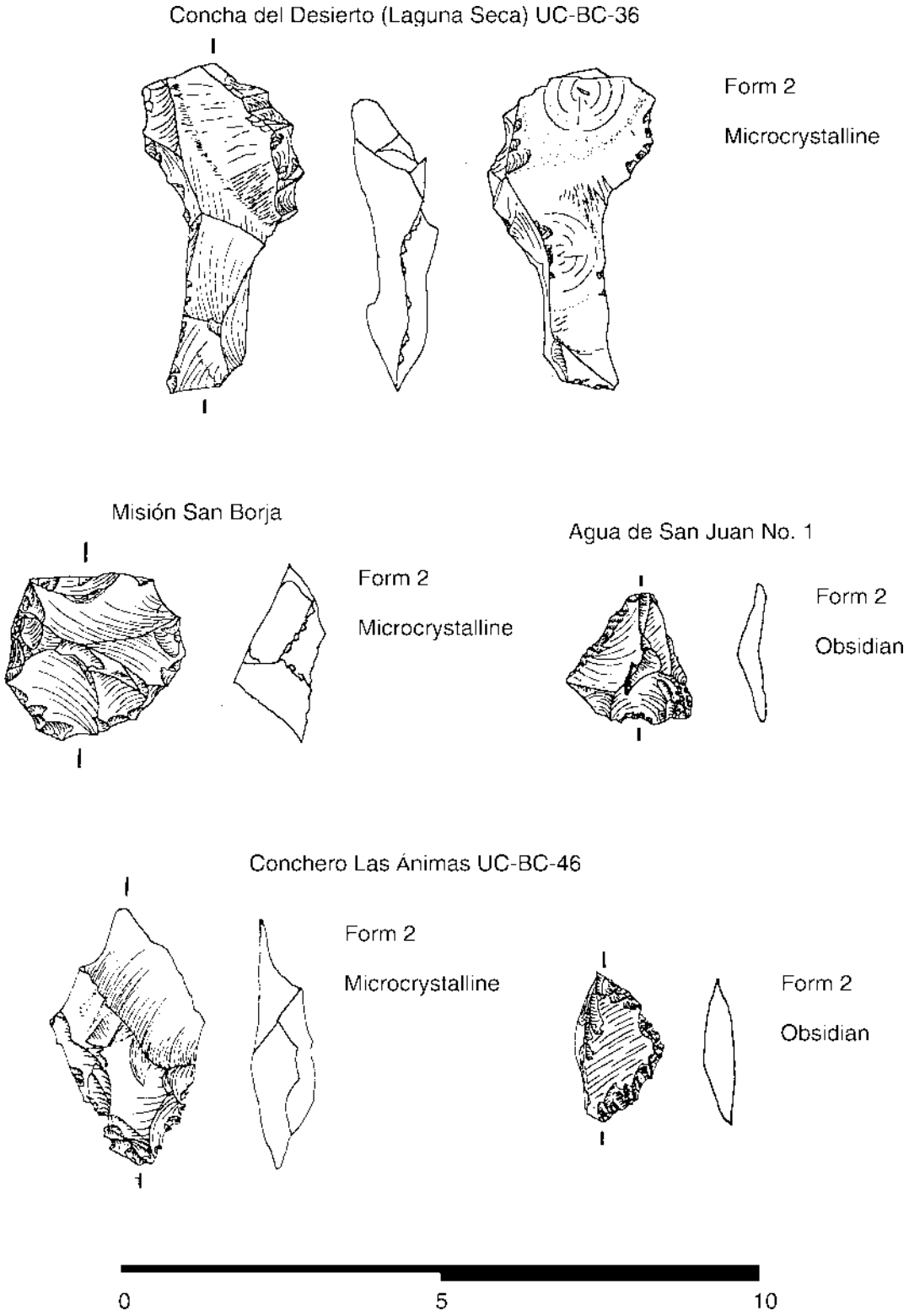



Fig. 8. Flaked stone tools (centimeter scale).

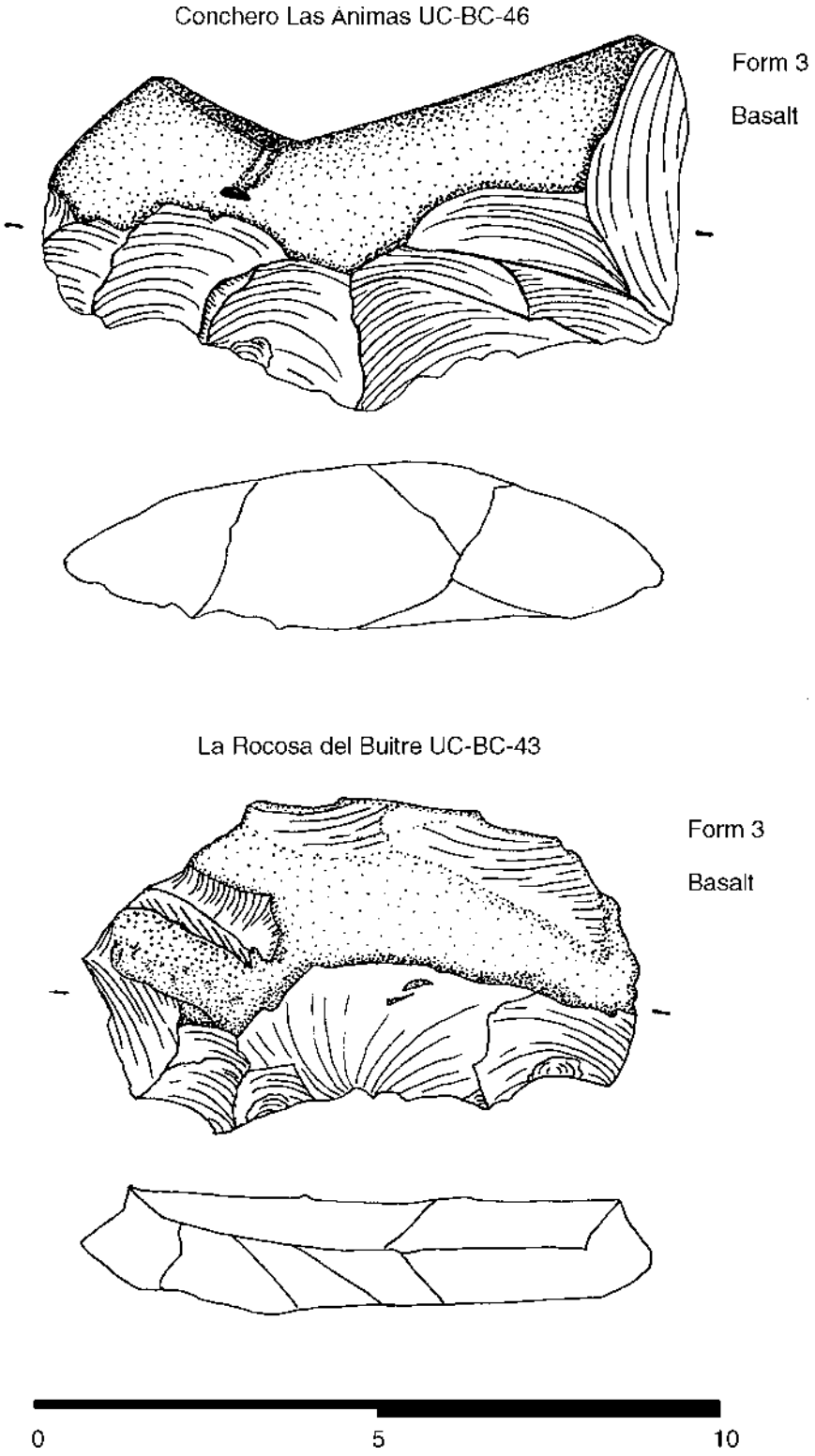



Fig. 9. Flaked stone tools (centimeter scale).

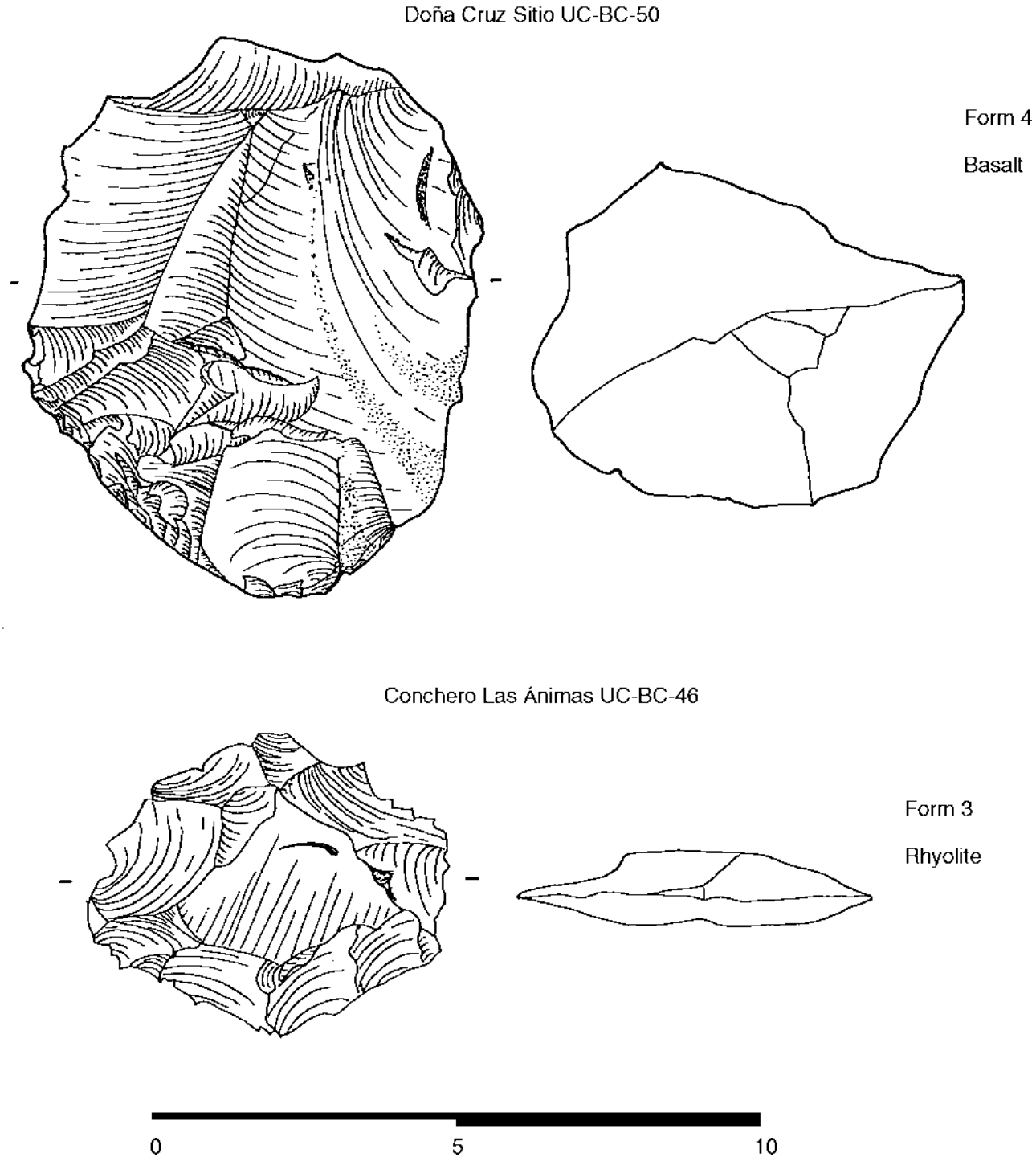



Fig. 10. Flaked stone tools (centimeter scale).

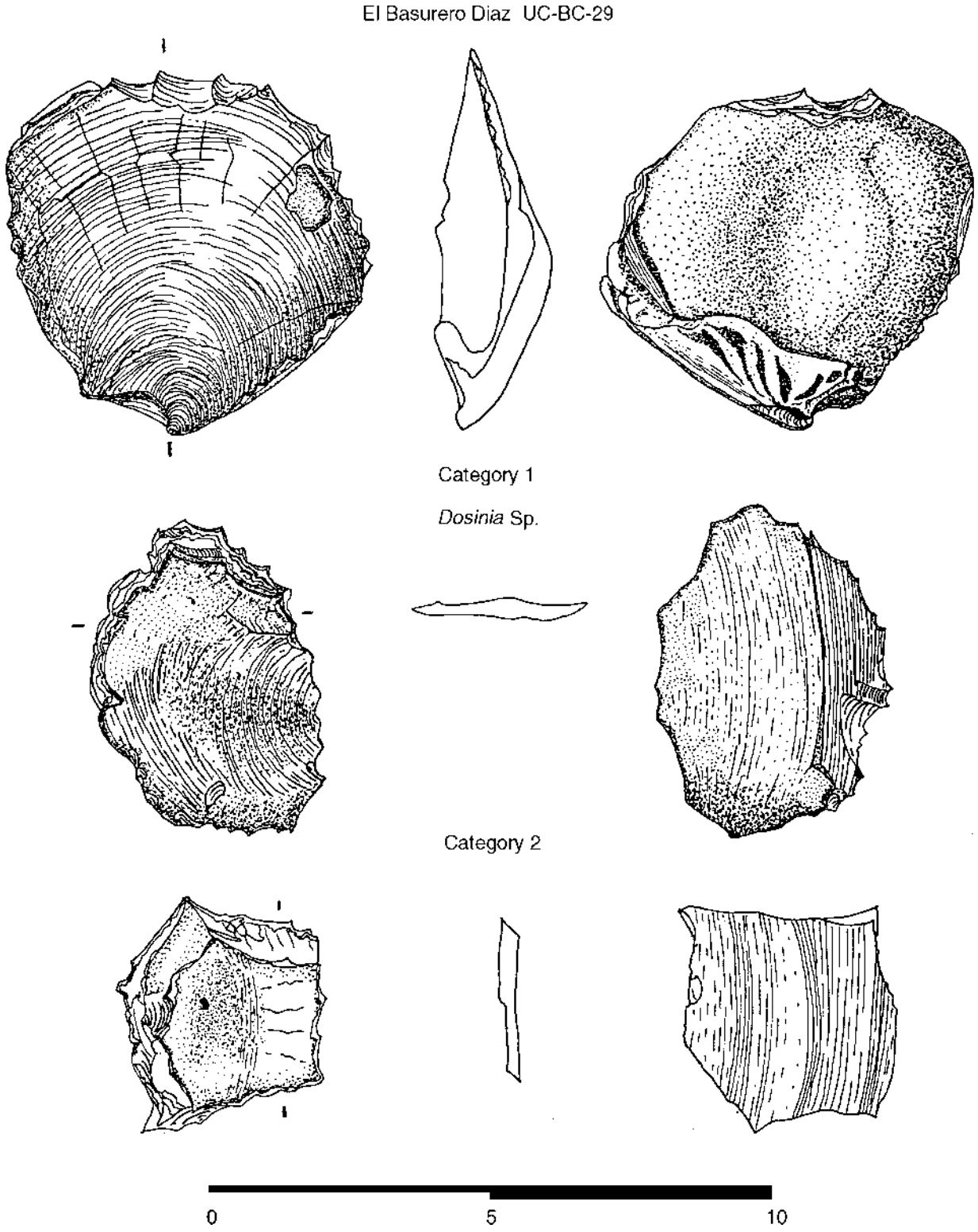



Fig. 11. Flaked shell tools (centimeter scale).

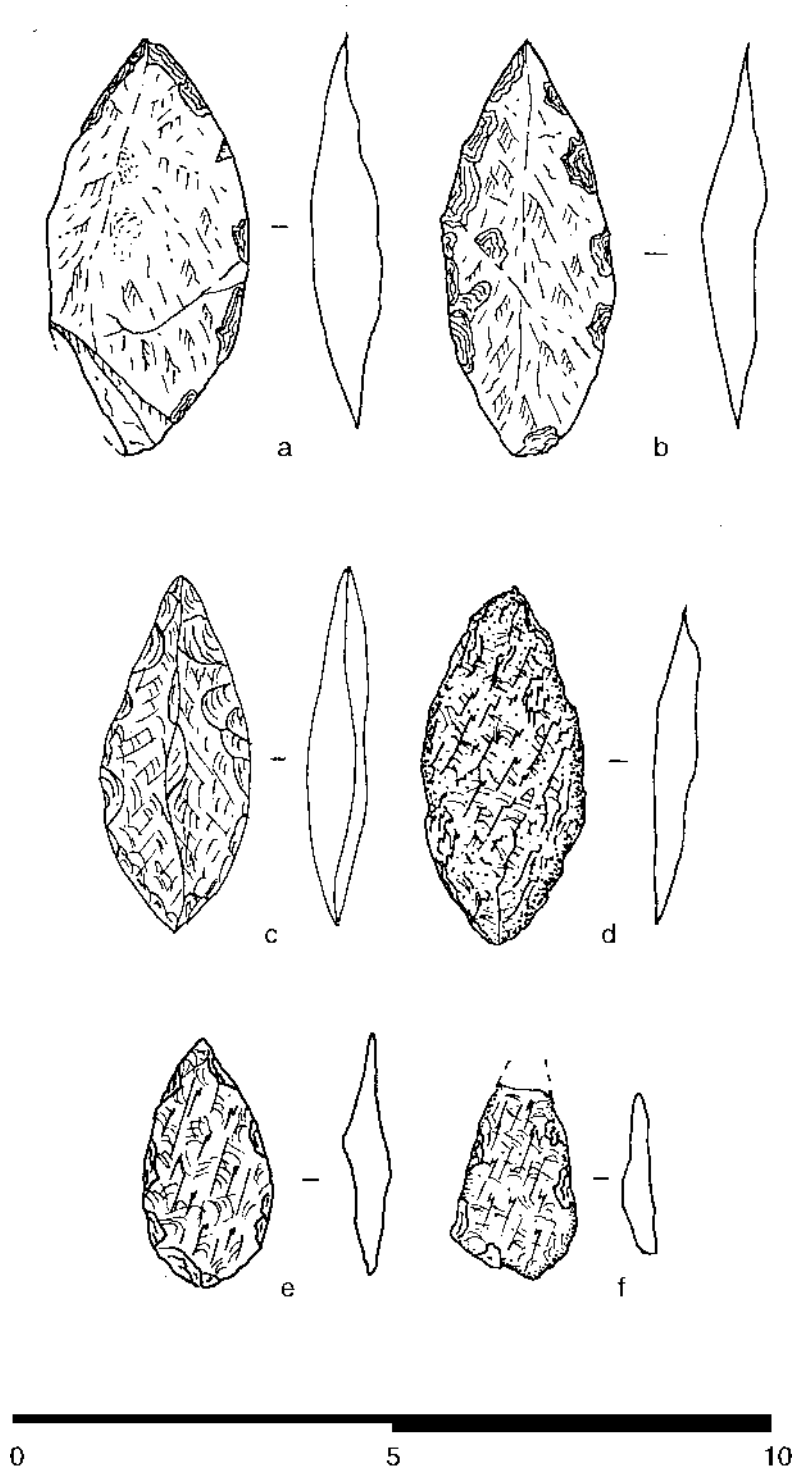



Fig. 12a. Bifaces/Projectile points (centimeter scale).

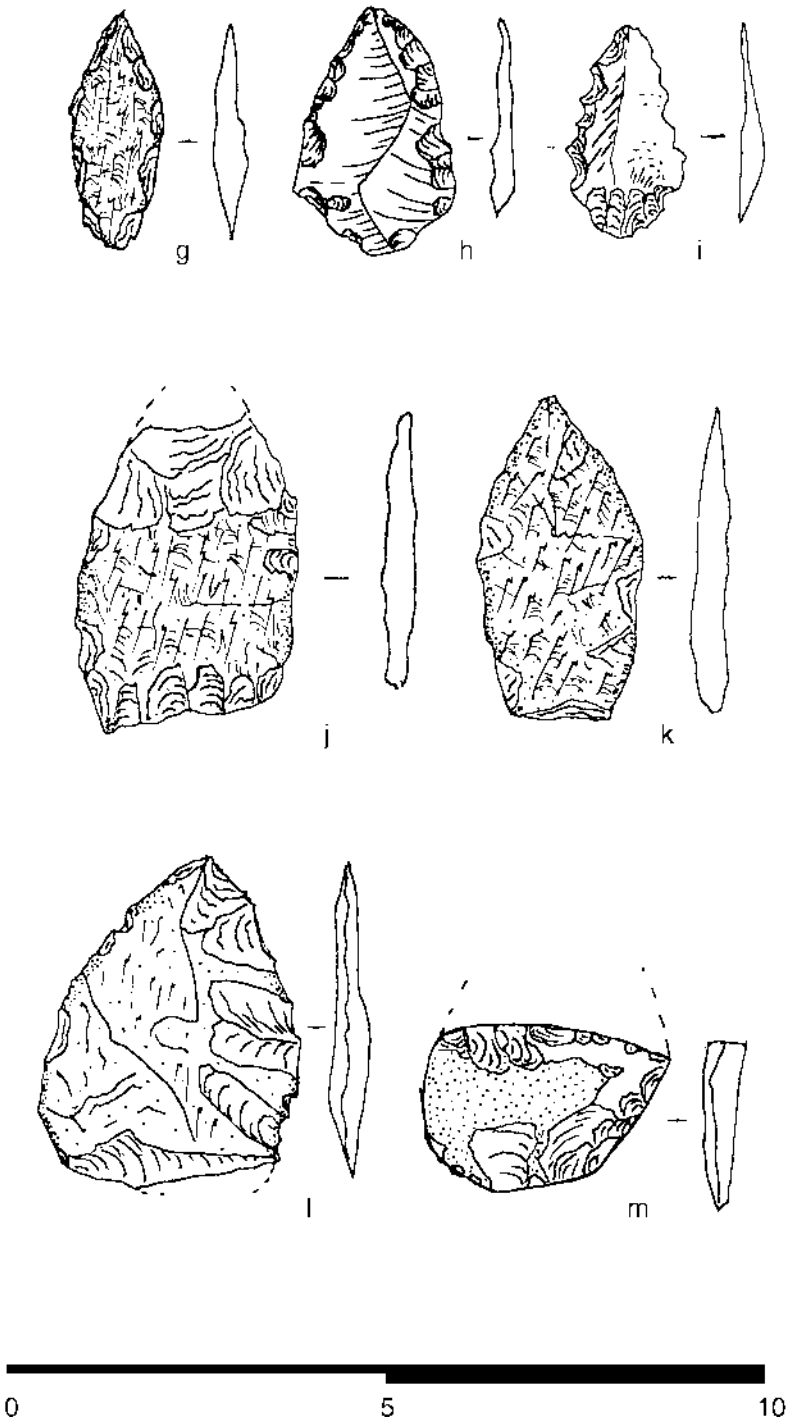



Fig. 12b. Bifaces/Projectile points (centimeter scale).

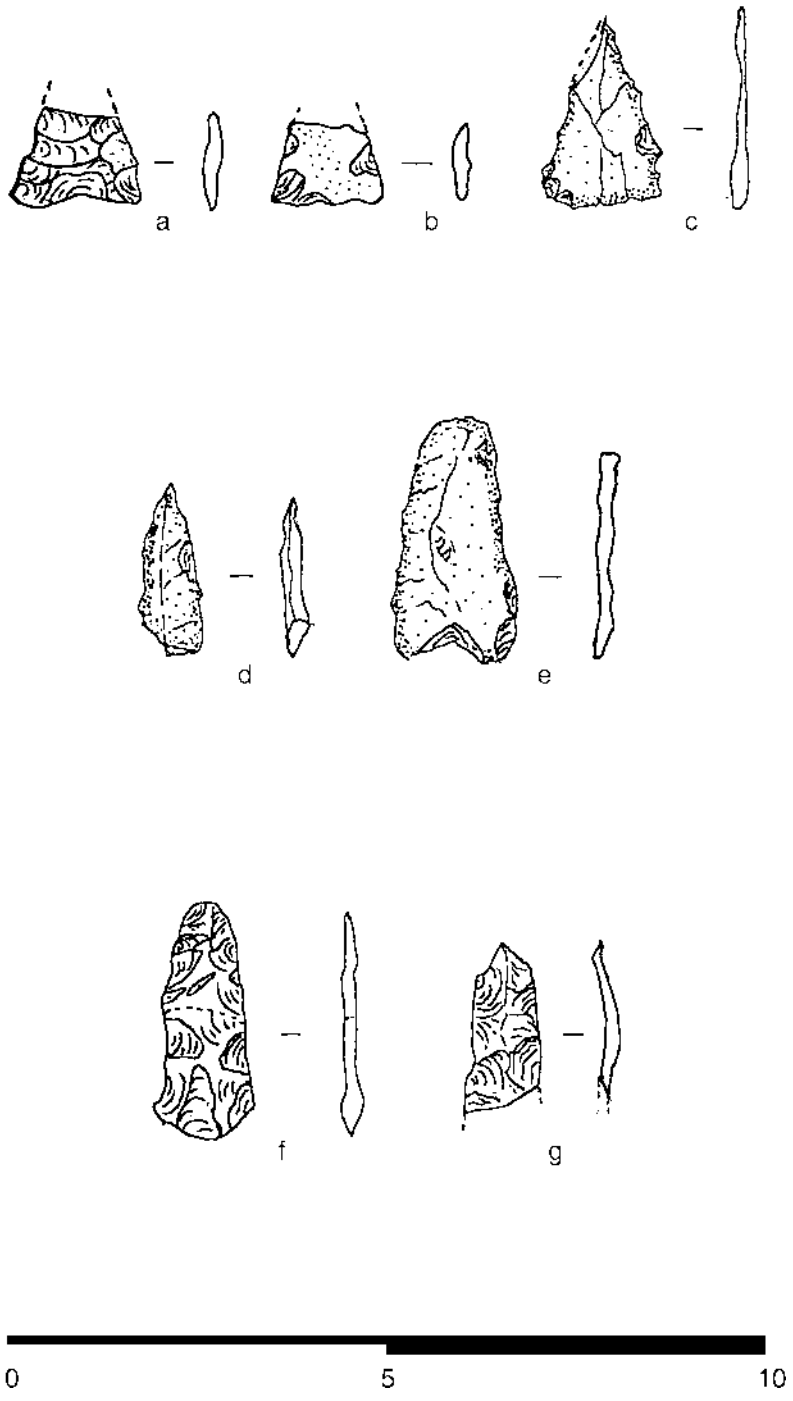



Fig. 13a. Projectile points (centimeter scale).

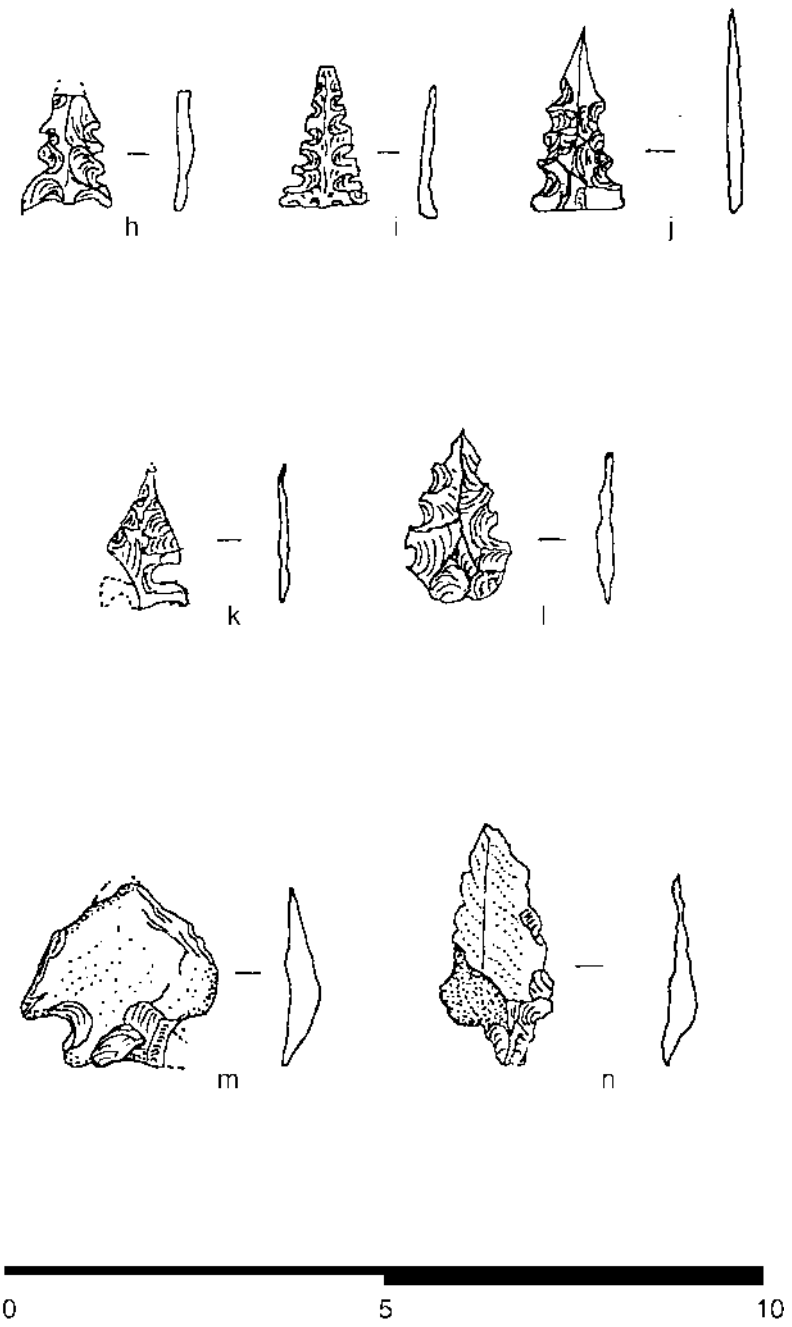



Fig. 13b. Projectile points (centimeter scale).

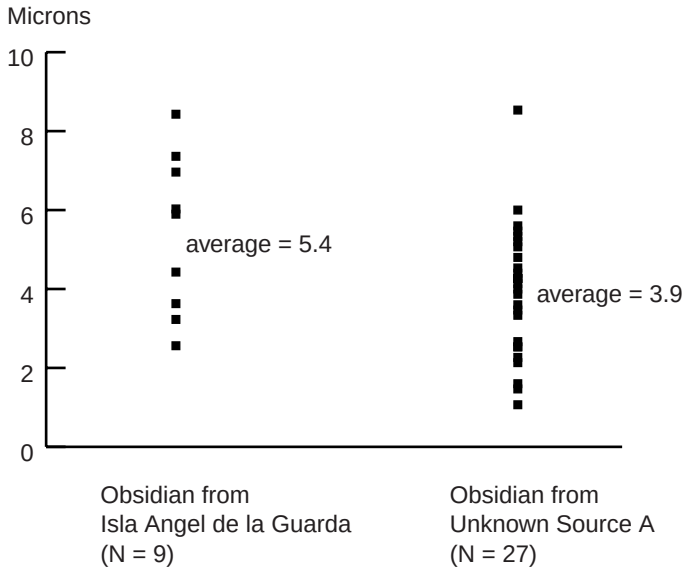



Fig. 14. Obsidian hydration, Bahía de los Angeles.

based hunting, at least during the late prehistoric Comondú period (Massey 1966) in coastal settings, seems less important than marine-related resource procurement, and this is reflected in both the faunal remains and the relatively low frequency of projectile point recovery. The infrequent projectile point recovery may be a product of recent collectors and, in part, an outcome of survey mainly along the coast. The bow and arrow were introduced during the last millennium or two and most likely would have had some effect on large game hunting practices and take. While milling tools are common in coastal and interior zones, rigorous recovery of botanical remains from deposits and tools has yet to be undertaken and one can only surmise that a wide array of plant foods was important based on ethnographic observations and milling tool presence.

There is a regional, variable pattern of burial that seemingly reflects social, political, and/or economic divisions confined, likely, to the Comondú period (King 1997). Children and infants are not represented in the 30 burials investigated, although Massey and Osborne (1961:341) report them in a tomb with one or more presumed shamans.

Burial is apparently limited to separate cemeteries or locations within rocky hillsides or small rockshelters away from residential locations. No human remains were seen at open sites such as shell/artifact clusters. Multiple burial tombs are common with ten or so known in addition to more than a half dozen individual tombs. In some cases, the type of tomb is difficult to distinguish due to looting. Burial accompaniments are quite variable, ranging from apparent food and raw material offerings [some are exotic like leatherback turtle (*Dermochelys* sp.) remains and pufferfish (*Spheroides annulatus*)] to oyster shell ornaments (Fig. 19) and pos-

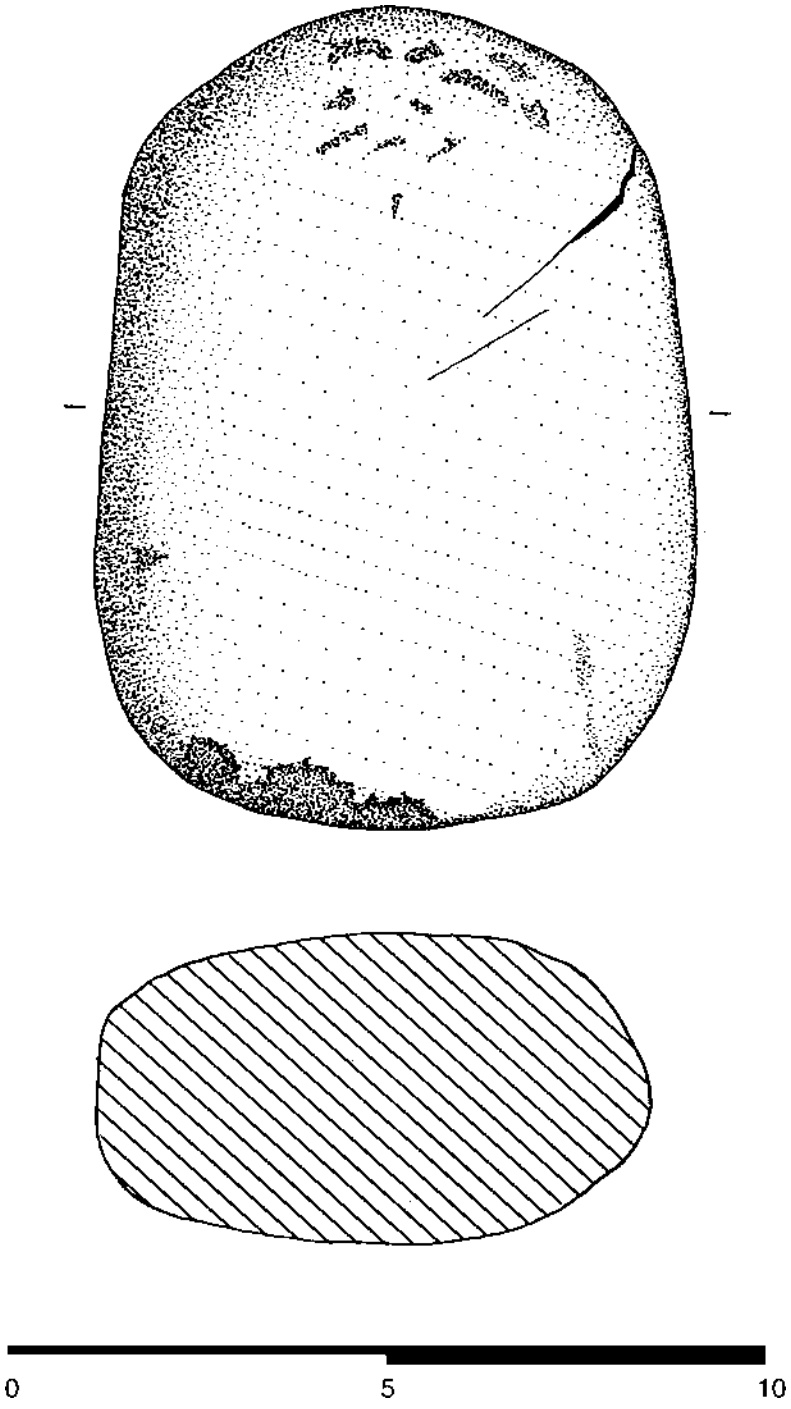



Fig. 15a. Manos (centimeter scale).

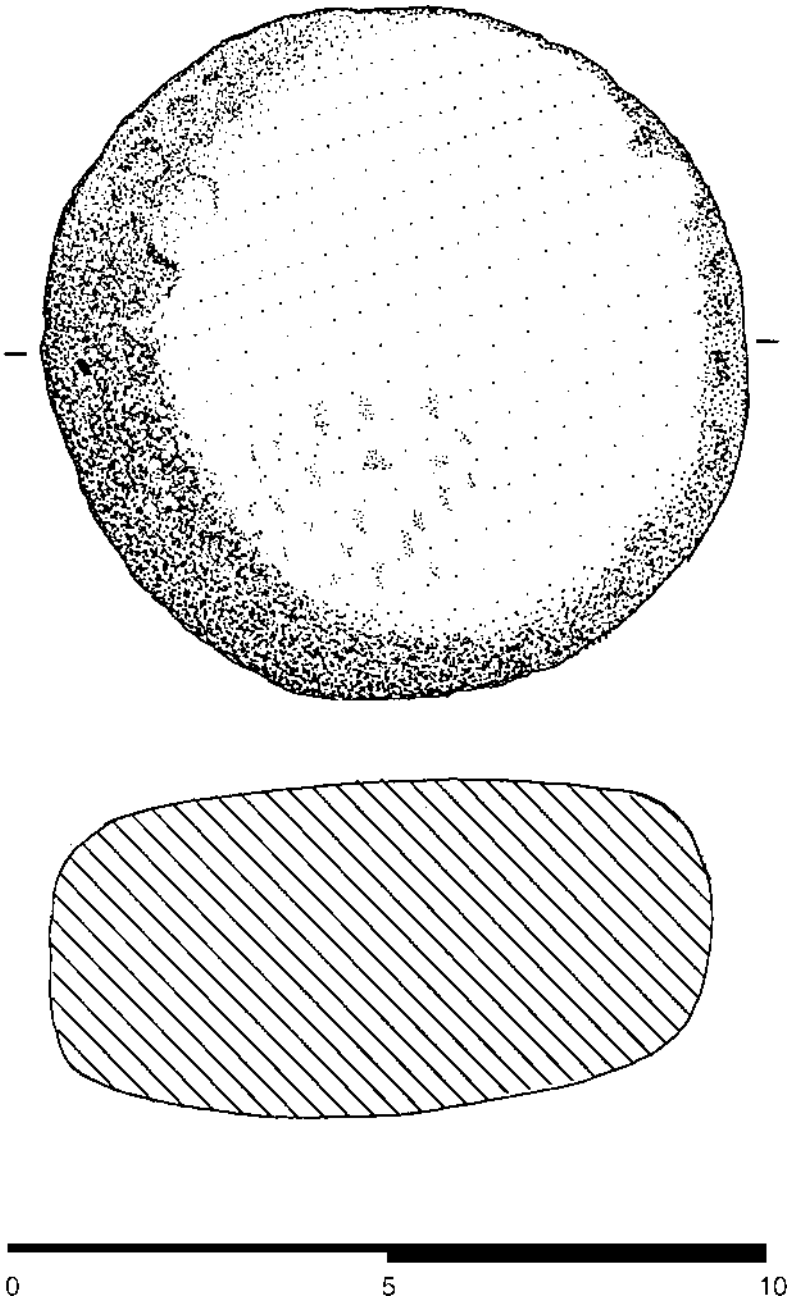
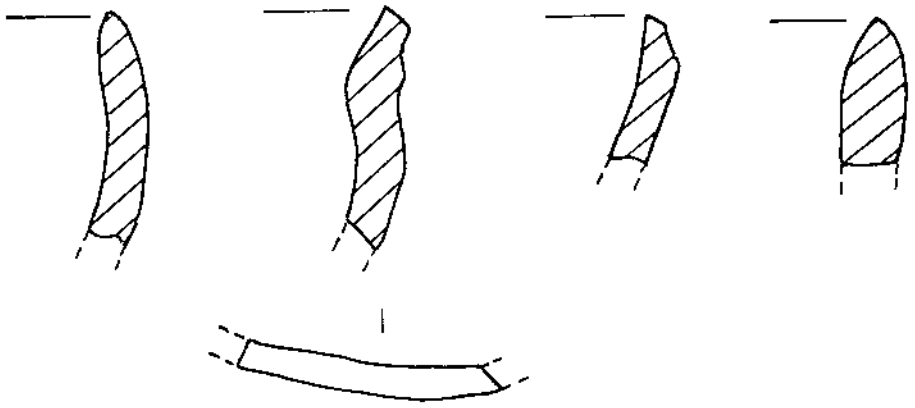
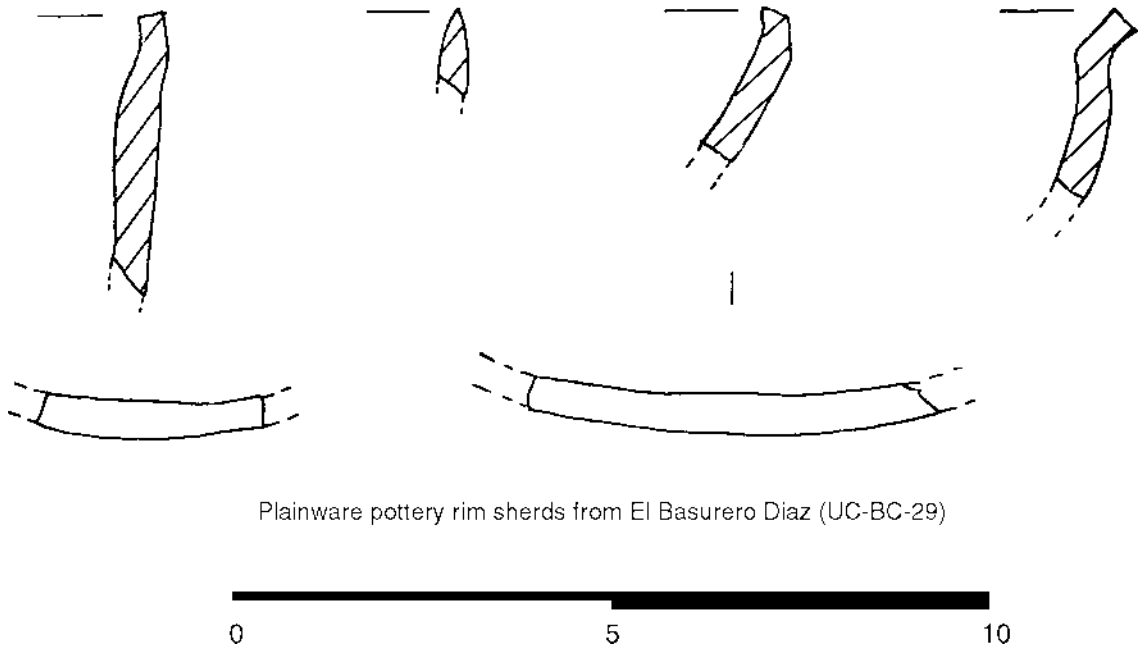



Fig. 15b. Manos (centimeter scale).



Plainware pottery rim sherds from Mission San Francisco Borja




Plainware pottery rim sherds from El Basurero Diaz (UC-BC-29)

Fig. 16. Plainware pottery rim sherds (centimeter scale).

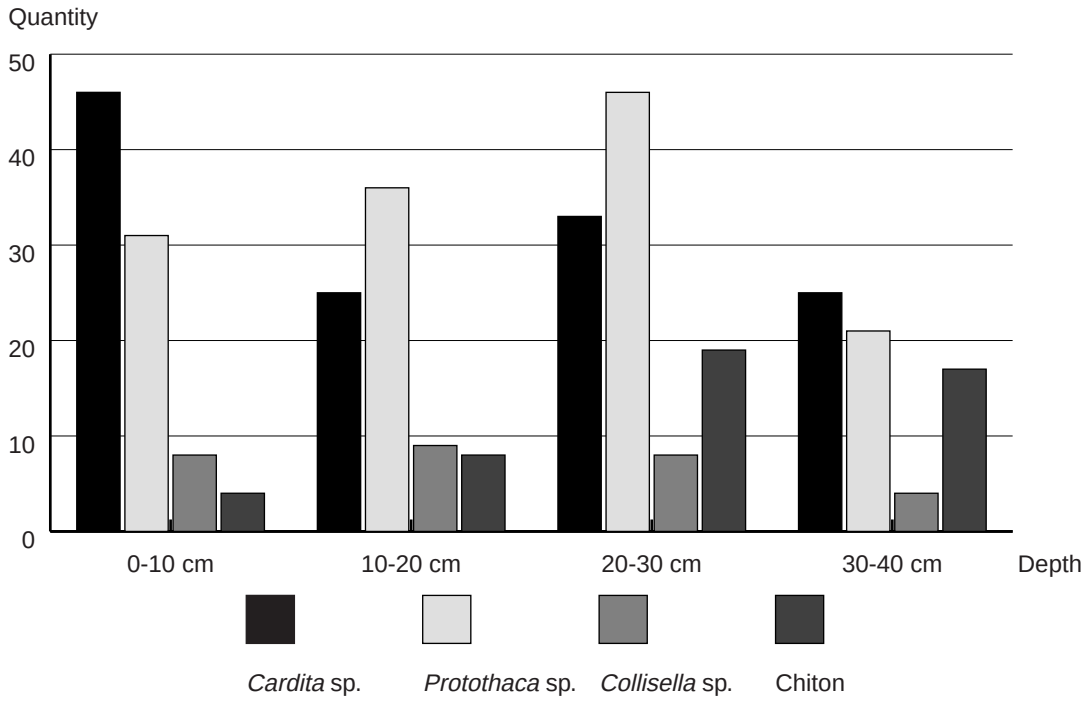



Fig. 17. Cuevas Abraham, UC-BC-13, Most frequent shellfish remains.

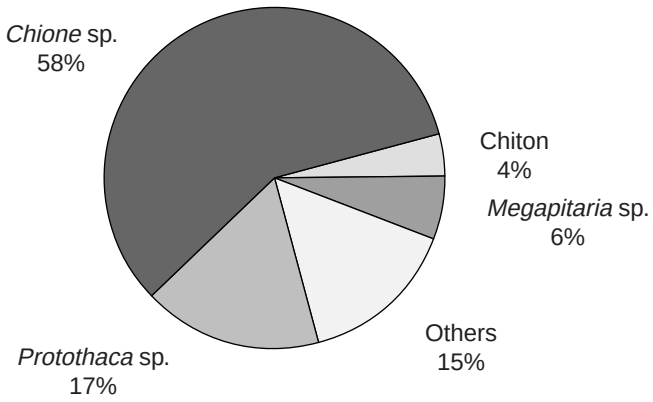
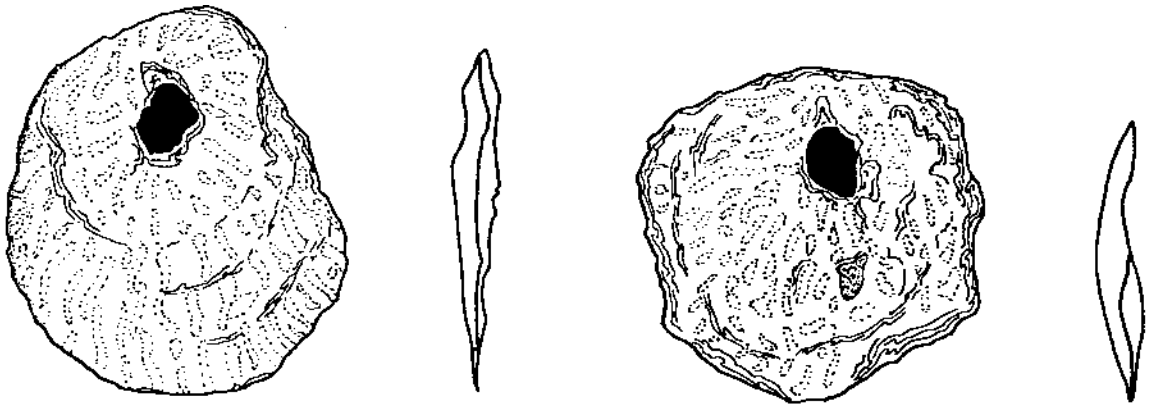
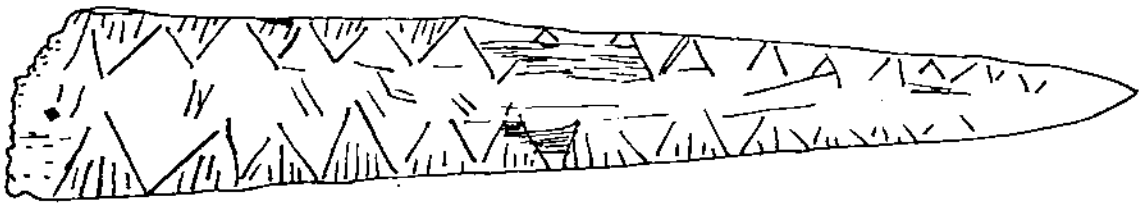



Fig. 18. El Metate, UC-BC-30, Unit A, 0-10 cm, Most frequent shellfish species.



Shell ornaments, *Ostrea sp.*



Incised bone pin

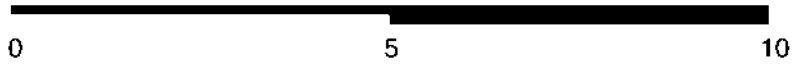



Fig. 19. Bone and shell ornaments, Cañon de los Muertos, UC-BC-27 (centimeter scale).

sible ritual-related (scatophagic?) receptacles like "killed"—umbo perforated— *Laevicardium elatum* shells, and bone awls and pins (Fig. 19). In one instance there was a wealth of perishables as discovered in the late 1800s by naturalist Edward Palmer (see Massey and Osborne 1961). (Gender associations of the burial goods are unclear due to disturbances.)

Differential burial patterns, perhaps even a reflection of ascribed or achieved status such as associated with a shaman, band leader, or outstanding craftsman/artist/hunter and conceivably his or her extended family (beyond age and sex grading), include primary flexed interments (Fig. 20), cremation and/or post-interment burning, extended burials, and secondary burial. All appear to be late prehistoric patterns and the relative proportions of different treatment is uncertain due to disturbances. However, cremation/post interment burning and extended burial patterns seem the rarest.

There is strong evidence for burial-related ritual at Cerro El Almacén and Bahía de las Ánimas. Cleared circles or polygons (Fig. 21), polished knobs on boulders, special pathways, scratched boulders, and spaced cairns are found. Burial chambers sometimes exhibit special attention and effort in construction, and burial locations were well-hidden with interments sealed with local rocks (Fig. 22).

## Hypotheses, a Model, and Explanations

Early to mid-Holocene archaeological evidence in the region, in the form of previously recognized diagnostic artifacts at least, is quite elusive, although marine-oriented peoples appear to have been relatively well-established in Bahía de los Angeles by about 6000 years ago (Moriarty 1968:20-21; Bendímez et al. 1993). Climatic change and its effects on food and water resources probably had an influence directly or indirectly here in the Bahía de los Angeles region if southern Alta California evidence can be applied (cf. Smith 1979, Enzel et al. 1989; Stine 1990, 1994). Any behavioral response to major climatic perturbations (and its archaeological manifestations) is an avenue for further study.

The mid-Holocene time interval is not well-represented archaeologically except by a handful of "Archaic" projectile points (Davis 1968, Ritter 1994), a limited sample of obsidian hydration readings (perhaps readings over 4-5 microns) (Fig. 14), and a single uncorrected shell C-14 date of 2500 years ago (Moriarty 1968:20-21) from Aguaje de San Juan. (Comondú remains seem much more prevalent, sampling problems and few C-14 dates aside).

Possibly following mid-Holocene times when current climatic conditions more or less became established (Van Devender et al. 1984; but also see Enzel et al. 1989, Ingram 1998, Smith 1979, and Stine 1990, 1994) around 4000-5000 years ago, there could have been an adaptive change in procurement scheduling and harvest efficiency. If this happened, it may have occurred due to changes in resource availability perhaps necessitating, among other responses, the implementation or improvement in the use of food preservation techniques (drying, second

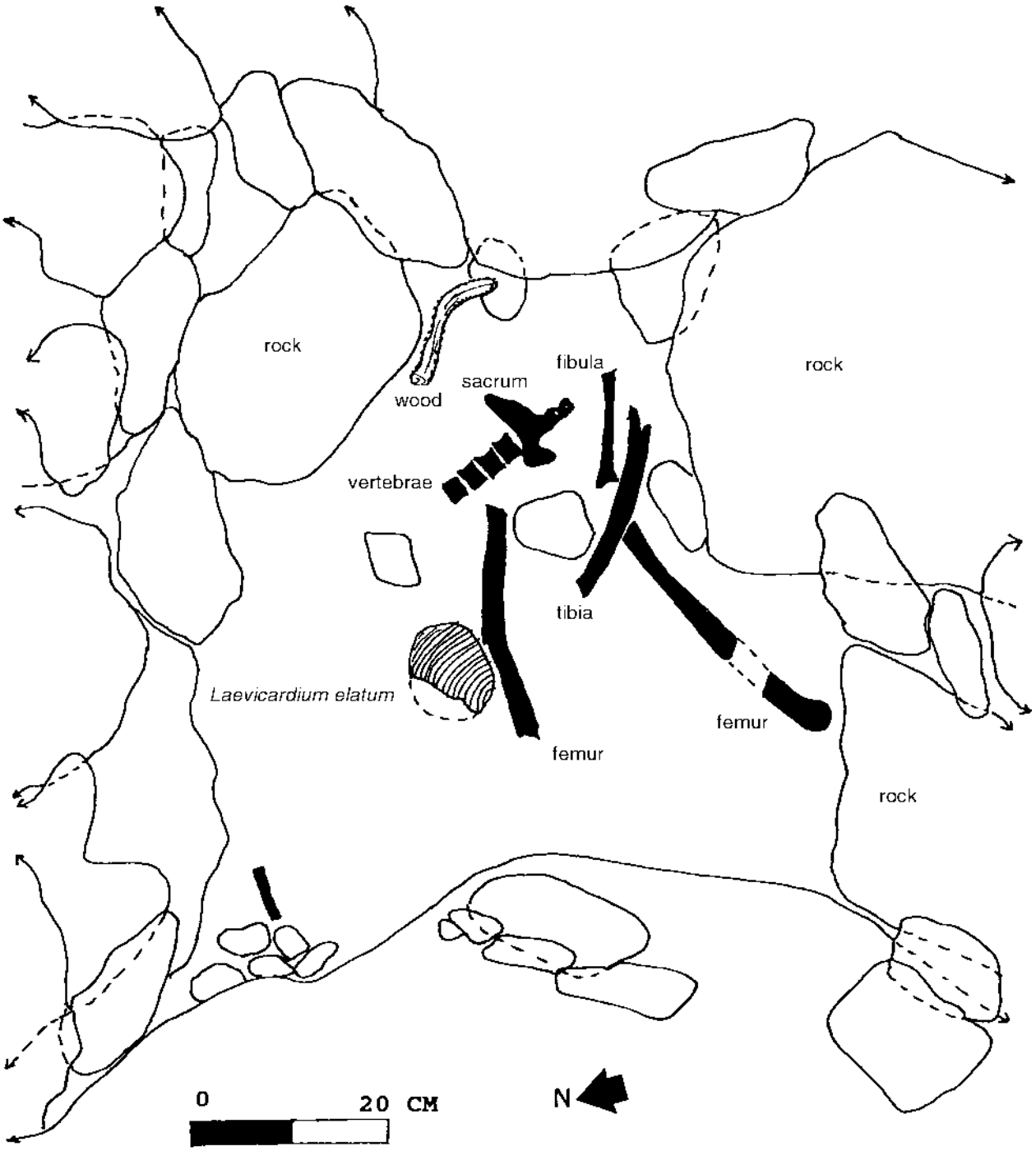



Fig. 20. Burial Tomb, Cerro de las Calaveras, UC-BC-44, Feature 14, Burial 15.

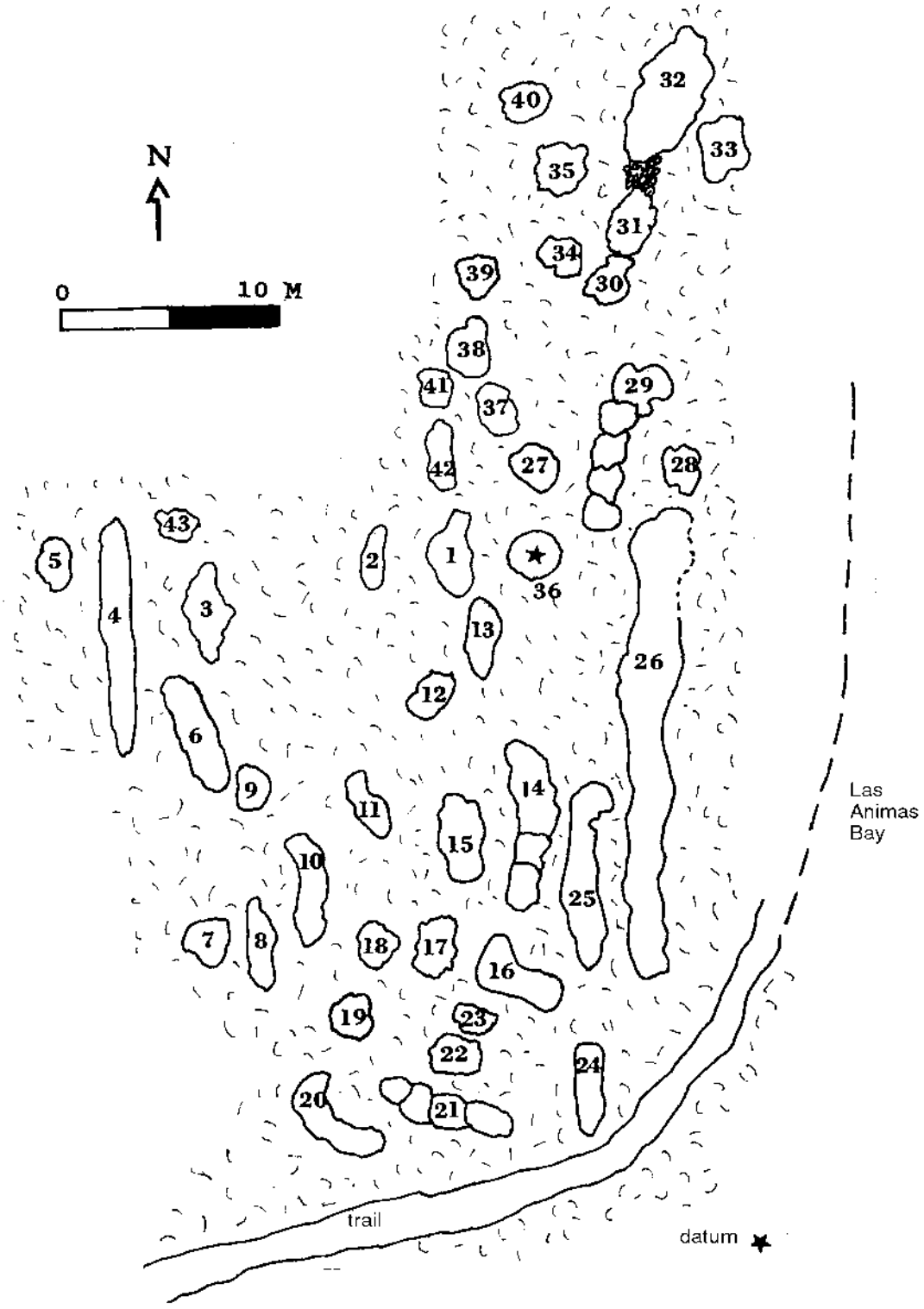



Fig. 21. Cleared areas on rocky hillside bench, Cerro de las Calaveras, UC-BC-44.

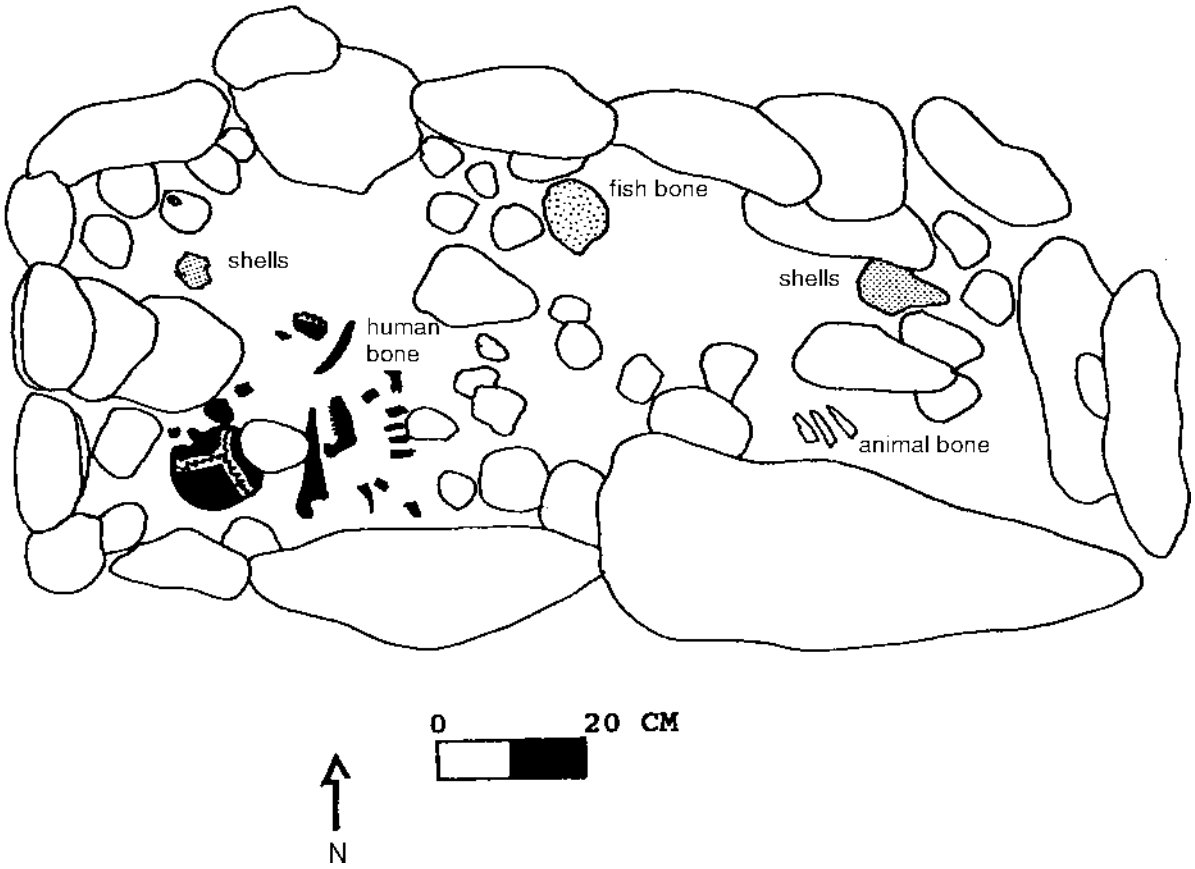



Fig. 22. Burial Tomb, Cerro de las Calaveras, UC-BC-44, Locus 2.

harvest, storage?). The impoverished archaeological record for this time period, site losses aside—and if real— may be in part due to less dispersed activities and, conceivably, fewer people, some of whom may have moved to the interior, the Pacific side, or elsewhere, or concentrated themselves at the larger camps near water.

By at least Comondú period times (after around 1000-1500 years ago), there was likely the development of regularized, culturally influential interactions with interior groups and their exchangeable resources (for example, interior groups may have provided roasted agaves and nets and fish line of agave fiber—Wagner 1929). Populations may have increased due to increased food access (e.g. through trade) and procurement efficiency, an expanded marriage partner base, less stress and conflict, etc. There appears to be a proliferation in numbers, kinds and complexity of sites in general during this time. Furthermore, it is proposed that this procurement efficiency was due to one of the following: (1) intensification of use of certain food products (possibly leguminous seeds and/or agaves); (2) an increase in societal choices toward use of a broader spectrum of foods perhaps in part precipitated by overuse and/or too

much dependency on such major foods as cacti fruits (cardon, pitahaya, etc.), clam beds, and agave; (3) late Holocene climatic fluctuations with changeable effects on plant production, animal behavior, and fresh water availability and management; or (4) some combination of factors. There may also have been some level of indirect or direct influence from northern or even cross-Gulf events, such as agricultural developments in the Colorado River Delta, Numic expansion in the Great Basin, River Yuman warfare, Yuman expansion (or retreat) southward (Laylander 1993), Hakataya/Yuman influence (see Schroeder 1979:100), or Casas Grandes and Hohokam intrusions into the Pimería, Gran Chichimeca social turmoil (Gumerman and Haury 1979:98), etc.

The model developed, then, for the Comondú period (where there is the most evidence from the archaeological work in the region) has single and limited multiple family units dispersing and congregating over the greater Bahía de los Angeles region depending on food resource trends and availability, although major water centers/villages may have been used year-round by a portion of the population.

Fragmentation into extended or multi-family groups may have occurred during the winter/spring when the generally year-round available coastal marine foods and small land animals could complement the diet dominated by ripening seeds from annuals. (The widespread distribution of presumably generally late coastal sites seems supportive of this interpretation.) Potable water management and availability in tinajas—and less water consumptive needs in cooler months—would have allowed a broader range of residency and foraging.

During the late spring and summer there may have been more aggregation at key water sources and interior areas, such as at Aguaje de San Juan, Bahía de las Ánimas, and Adac (San Francisco de Borja Adac). From these locations, either coastal or interior as applies, it would be possible to take advantage variously of cacti fruits, seeds of legumes, rabbits, sea turtles (as at feeding beds at El Rincón [UC-BC-2] in the southeast end of Bahía de Los Angeles), fledgling sea birds, agave, zaya (*Cnidoscolus palmeri*), and other foods—a general time of plenty (see Aschmann 1959:127-128). Late summer rains, if any, would allow short periods of population dispersal as ephemeral water sources became available.

Spring or late summer was probably a particularly active season of interaction and movement of population segments between interior and coastal zones with the periodic high caloric array of simultaneously available/differentially located and complementary resources such as marine foods (spring-summer), seeds from annuals (spring), cacti fruits (summer-fall), leguminous seeds (summer), and zaya root (spring-summer) (Aschmann 1959:127-128). Foraging could involve distant travel. Linck (in Burrus 1966:70-71), in his 1766 expedition journal concerning territory to the north of Bahía de los Angeles, relates that several Indians in his group from Mission San Francisco de Borja Adac (Adac) travelled over alluvial fan and hilly terrain in excess of 65 km in about 18 hours.

With the unpredictable ripening of cacti fruits and legumes, especially in low rainfall years or periods of time, there may have been more circumscribed population movement as better strategies (timing, method, equipment choices, and task group size) were developed for other more predictable, localized, higher ranked foods such as certain marine animals, like the sea turtle (see Price and Brown 1985:8). Spring or late summer appears to have been the time of increased interchange of foods and goods between coastal and inland populations (each with differing high ranked foods, e.g. agave for fish/turtle), available at differing times. Such exchanges probably limited some food shortages and may have served to decrease group conflicts. Better storage methods and resource banking objectives (such as management of shellfish beds) could also have played a role in limiting food shortages and lessening stresses.

While not demonstrated at this juncture, it may be that a variable pattern combining elements of diversification and intensification dependent on the season emerged—or was emerging by contact times—with increased use of certain high ranking and reliable food resources like fisheries, shellfish beds, and sea turtle haunts. Hypothetically, this was perhaps a period of better food acquisition scheduling, a more efficient use of seasonally variable annuals in coastal and interior settings, increased exchange—coastal to interior as apparently evident in obsidian movement; better management of food reserves such as dried fish, ground bone, hard seeds, and dried roots (see Aschmann 1959); and development of broader and "efficient" distribution and exchange mechanisms to kinsmen and partners.

By Comondú times, feasting, ritual and exchange (see Aschmann 1959:127-130), perhaps including multi-group gatherings, and group ceremonies at key centers such as Cerro El Almacen in Bahía de los Angeles (with all its enigmatic ground features, burial shelters, and rock art); and locations like the Montevideo and Yubay rock art complexes (see Ewing 1988) may have facilitated inceptive cultural complexity (see Lourandos 1988:150). This would have been facilitated through broadened social and economic interaction, especially between interior and coastal groups.

The archaeological signatures that might reflect increases in cultural complexity (exchange/trade/group interaction increases, ritual elaborations as in rock art, embellished or enhanced role of leaders, etc.) introduction of cultural indications from elsewhere, internal differentiation in the social systems, and specialization are difficult to determine. Price and Brown (1985:439) have noted that two major variables can suggest a rise in cultural complexity. These are internal social differentiation and inequality incorporating the scale of organization and the degree of integration. Burial pattern differentiation and shamanic involvement (see Massey and Osborne 1961; Ritter 1994, 1997), as perhaps in rock art production and construction of possible ritual-related features such as cleared pathways and rock enclosures lacking residential debris (UC-BC-44; UC-BC-58)(Fig. 21), are uncertain possibilities (see Burch and Ellanna 1994:5).

Comondú assemblages, while variable, imply a widespread sphere of similar crafts and devices and regionally-specific (coastal-interior) (see Ritter 1979, 1997) lifeways, perhaps based on neighbor-to-neighbor-to-neighbor interactions over hundreds of years within the Central Desert of the peninsula. However, the north-south change in ecology between Bahía de los Angeles-Sierra San Borja and those reaches more northward toward the Sierra San Pedro Mártir is reflected in certain lifeway variations most evident in (1) the rock art (Ritter 1995b); (2) major foods consumed and processed ethnographically [e.g. cactus fruits-deer vs rabbit-hare-agave, etc. (see Burrus 1966:56)]; and (3) probably varying mobility strategies.

## Summary

It is proposed that initial occupation occurred around 6000 years ago in the Bahía de los Angeles region. Subsequently, climatic changes and possibly other factors may have led to a more mobile, less dense population for three or more millennia, or populations became more tethered to major water sources/camps. Eventually, populations may have expanded around 1000-1500 years ago. At this time it is hypothesized that there was a late prehistoric increase in cultural complexity probable in the interior-coastal interaction area. This change may have occurred because of increased food acquisition skills, efficient water management, and regional interactions concomitant with some level of indirect or direct influence from external events and possible responses to climatic disruptions as chronicled in Alta California during late prehistory. However, it is likely that, if true, this rise in cultural complexity was limited, perhaps incipient. This increase in cultural complexity overall, if present during late prehistory, was terminated by the Spanish *entrada*.

The author hopes what must still be seen as a series of initial archaeological and ecological explorations and testing will stimulate further research, education and judicious management. There is a moderate corpus of empirical information that has been gathered (cf. Massey and Osborne 1961; Davis 1968; Moriarty 1968; Foster 1984; Bendímez et al. 1993; Ritter 1994, 1995a, 1995b, 1997; Ritter et al. 1994, 1995; etc.) that has been parlayed into a very preliminary series of testable hypotheses and a workable model of prehistoric human occupation and behavior over the millennia. This is a foundation for improvement in recognizing the social history, cultural changes, and achievements of these past peoples with the added intent of attaining public empathy for their demise.

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