RESULTS OF LIMITED TESTING AT SLO-977

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ABSTRACT

Several scholars have indicated that the Morro Bay estuarine system suffers from a lack of investigation and hence is poorly known archaeologically (Jones 1991:428). Artifacts were eroding from the sand dunes at archaeological site SLO-977 in Montaña de Oro State Park. It was necessary to salvage an asphaltum feature that was exposed due to active wind erosion and to pedestrian traffic and casual artifact collecting. At the same time we test sampled the site. My ultimate goal was to protect the site by means of arresting the dune erosion. After reporting on the preliminary findings of our testing, I will outline the process that we employed to arrest the dune erosion as a long-term protection method for archaeological sites.

INTRODUCTION

The site SLO-977 is located west of the city of Morro Bay, which is located 12 miles north of San Luis Obispo and 32 miles south of San Simeon. The site is situated on a sand spit between Morro Bay and the Pacific Ocean. This is an active dune system, and artifacts and sites frequently become buried and exposed due to sand deposition and wind erosion respectively. There are numerous recorded sites on the sand spit. Little is known about these sites with regard to time of occupation or the subsistence-settlement patterns they reflect. It has long been assumed that many of these sites are merely shellfish processing stations. Many of these sites were recorded as such. Our goals were to test the most eroded portion of the site to determine, if possible, the age of the site and the types of activities that occurred there.

METHODS

We excavated several units in the area of the severest erosion. We placed a 3 x 3 m block (unit 1) over the asphaltum feature. A 1 x 2 m unit (#2) was placed in an eroding shell mound. A third (1 x 1 m) unit was placed southeast of unit 1 over an area of lithic artifacts. A fourth (1 x 1 m) unit was added on the last field day even farther east of unit 3. Units 1 and 2 were screened through 1/8 inch mesh and units 3 and 4 through 1/16 inch mesh.

After the archaeological testing, we installed 6 rolls of snow fencing in the areas most damaged by wind erosion. The snow fencing was installed perpendicular to the existing dunes and upwind of the cultural material. Six-foot steel "T" posts were placed every 10 ft (or about 3 m). The 50-foot rolls of 4-foot high snow fencing were unrolled and then attached to the steel "T" posts by means of disposable plastic ties. The steel "T" posts were driven about 1-2 ft into the sand by a steel post driver. After a couple of months, we returned to the site and "planted" handfuls of straw vertically in the newly-deposited sand on the site. This acted as a buffer to prevent the newly deposited sand from blowing away. The wind hit the straw and is deflected, thereby preventing the wind from eroding the sand.

RESULTS

What did we find? Our results indicated that these sites were not just "shellfish processing" locations. The variety and density

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of artifacts surprised me. Several styles of projectile points were found as illustrated in the accompanying drawings (see Appendix A). A couple of these are similar to types found at SLO-2 at Diablo Canyon as reported by Greenwood (1972). Three points were covered with asphaltum. There were numerous pebbles and cobbles coated with asphaltum (Figure 1). We also recovered lumps and globs of asphaltum and a few cobble-sized, flat rocks covered with asphaltum, which seem to be asphaltum spreaders similar to ones found at Vandenberg (Michael Glassow, personnel communication, 1991).

There have been several objects whose function is difficult to classify. These might need to be sent for special analyses in the future. One object recovered by ranger Jon Muench is an abalone shell fragment with wood attached to the edge of the shell with an asphaltum binder or glue. This could be an abalone shovel which was used by different Indian groups to carry hot rocks (Broadbent 1972:54-81). Several of the large projectile points appeared to be hafted knives or blades (Figures 2-3). A few may be dart or spear points (Figures 4-5). There are no small leaf-shaped or side-notched points characteristic of the late prehistoric period at this site in the area examined. Most of the similar contracting stem points appear to predate A.D. 500 (Glassow 1984:7-4/7-8). The most common style is the contracting stem type (cf. Figures 2-3). [Some other site artifacts are illustrated in Figures 6-8.]

Unit 2 in the shell mound yielded a good shell sample to indicate preference of shellfish species (Table 1). Pacific Littleneck Clam (Protothaca staminea) dominated the shell fraction as shown in Figures 9-13. This species consisted of at least 50% of the identified sample by weight. It proved to be about 71% at its maximum. The next abundant shell was Bent-nose Clam (Macoma nasuta), which yielded between 15 and 25% of the sample by weight. The balance of the shell was made up of a variety of species including Dog Whelk (Nassarius fossatus), Moon Snail (Polinices sp.), Cockle (Clinocardium nuttalli), and Washington Clam (Saxidomus nuttalli). It seems clear that shellfish were being exploited from nearby sandy beaches (which all of the dominant species inhabit).

Table 1. Fraction of shell sample by weight (g), and species.

Taxon	Level (cm)					Total
	0-10	10-20	20-30	30-40	40-50	
Protothaca	5486	997	1451	814	72	8820
Tressus	1342	35	77	68	1	1523
Macoma	925	306	227	136	17	1611
Siligua	.2	.7	5	0	0	6
Sanguinalaria	21	2	48	39	3	113
Saxidomus	113	235	136	28	5	517
Clinocardium	216	31	26	14	0	287
Polinices	198	90	107	41	3	439
Nassarius	5	58	38	9	0	110
Mytilus	1	3	0	0	0	4
Tivela	0	0	34	8	0	42
Unidentified	2484	780	877	308	26	4475
Total	10791	2538	3026	1465	127	17947

Other faunal material recovered included bones of fish, bird, ray, land mammal, and sea otter. Our bone identification is not complete at this time, and our sample was rather small.

THEORETICAL CONSIDERATIONS

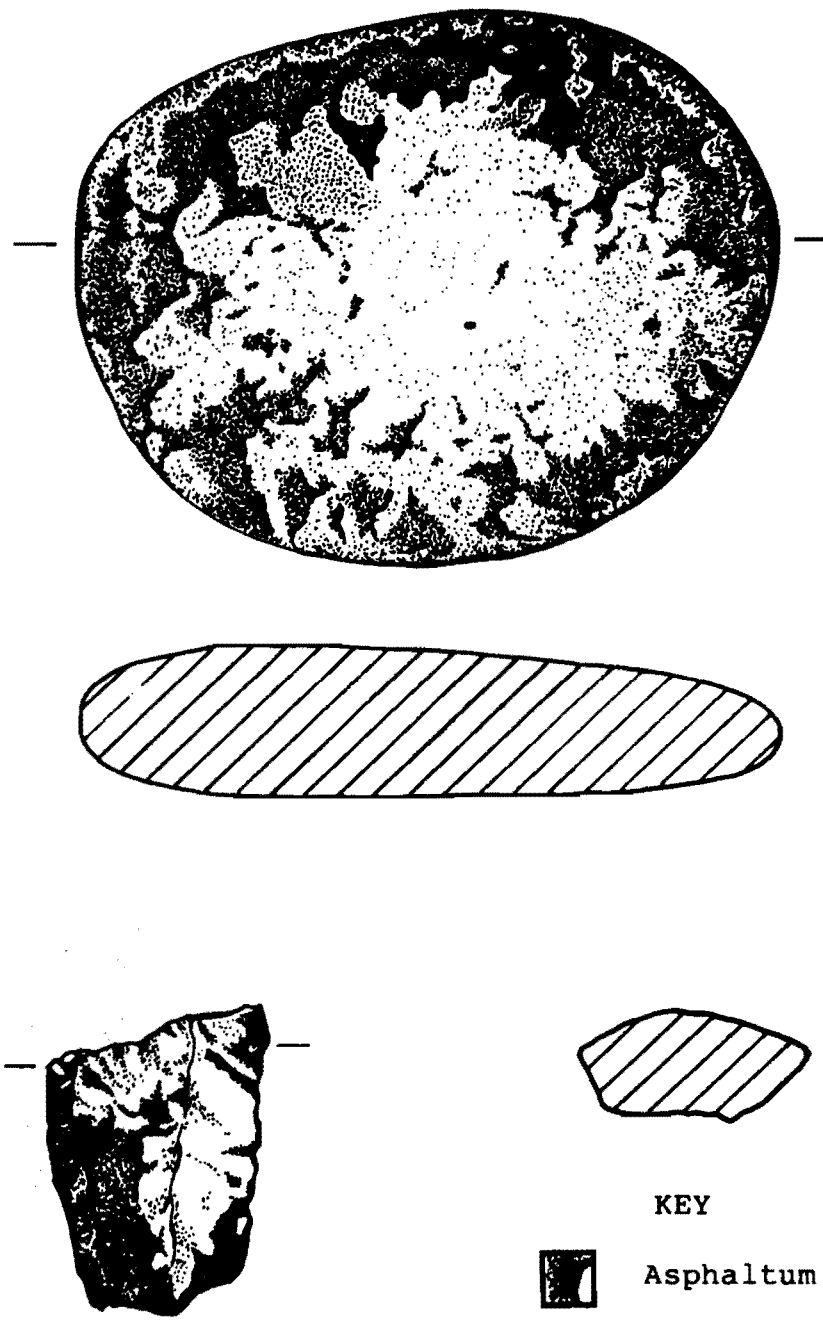
Since very little information was available in the literature on the Chumash in this area, I limited my research questions to basic subsistence-settlement issues.

Site Activities and Settlement Characteristics

(1) What kinds of cultural material does the site contain?
(2) What kinds of activities are indicated by the different kinds of cultural materials? Specifically, is the asphaltum feature related to shellfish processing?
(3) What kind of settlement (or settlements) does the site represent? That is, how did it relate to other contemporaneous sites in a settlement system (or systems)? Was it simply a shellfish processing site?

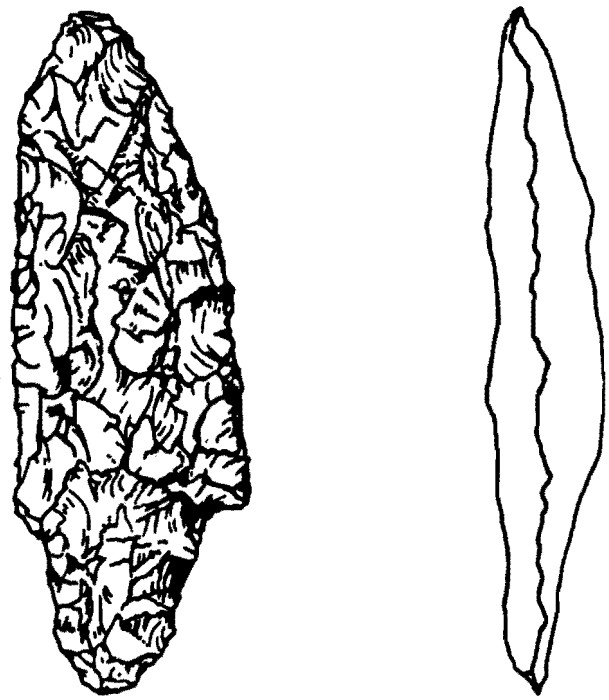
Chronology

(1) When was the site occupied? Are there multiple periods of occupation (i.e., more than 1 component)?
(2) Are there any other sites in the region

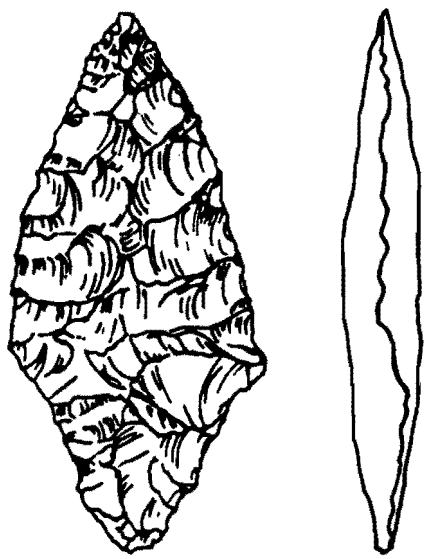


Scale 1:1

Figure 1. Stone Tools with asphaltum.



a.



b.

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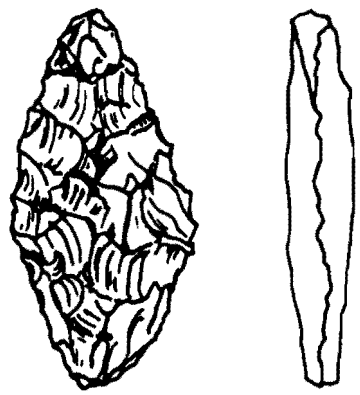

c.

a. - Biface, (P927-2-17)

b. - Contracting Stem, Projectile Point (P927-1-1)

c: - Leaf Shaped Point - (P927-1-2)

Figure 2. Large Bifacial Tools from SLO-977.

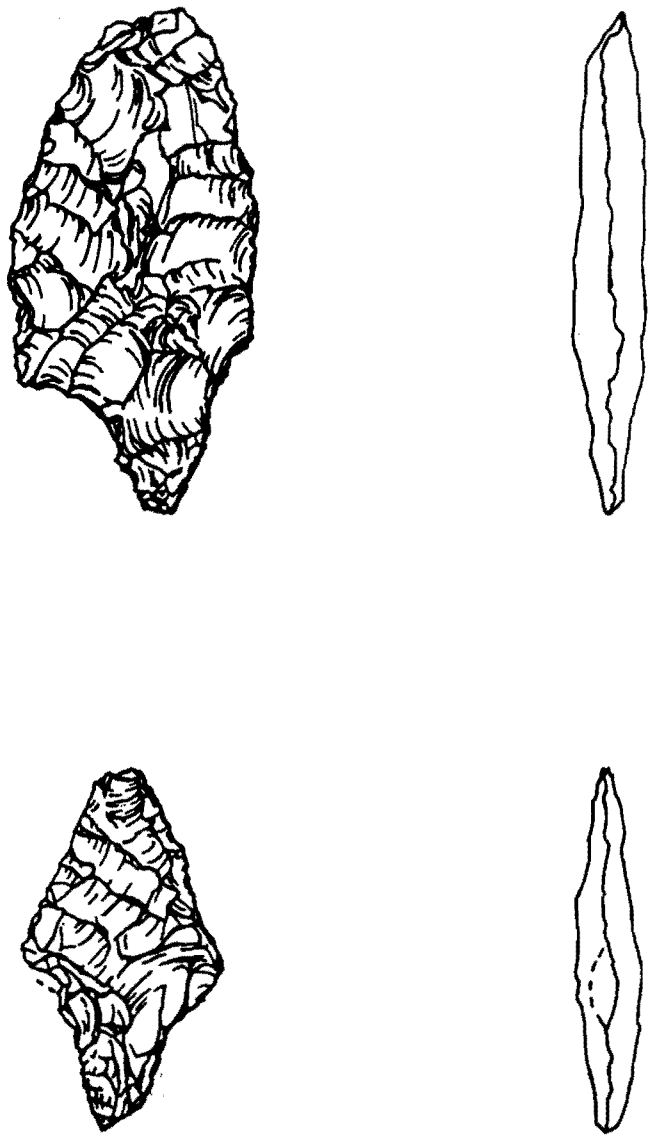

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Figure 3. Contracting Stem Points from SLO-977.

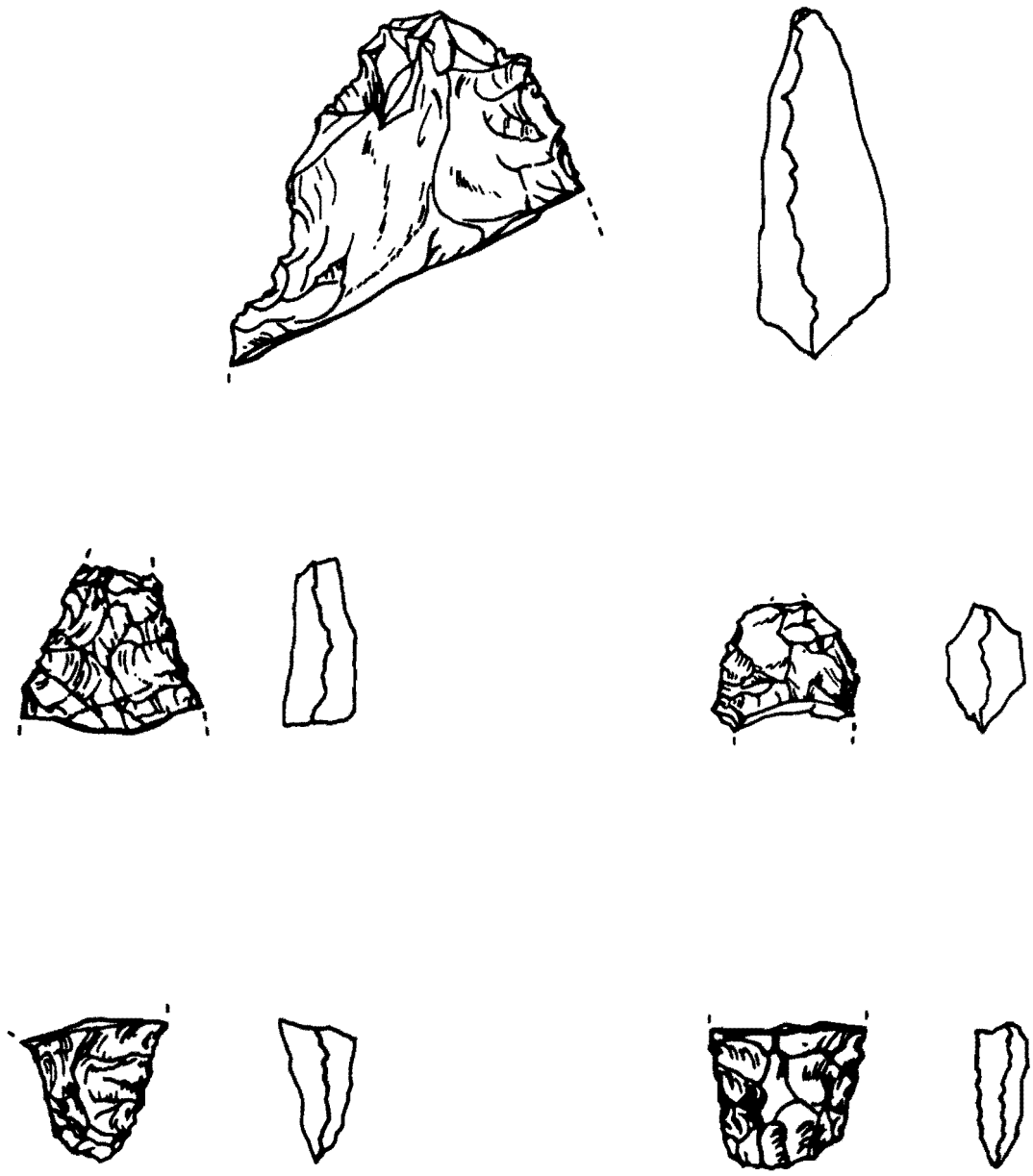

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Figure 4. Tool Fragments.

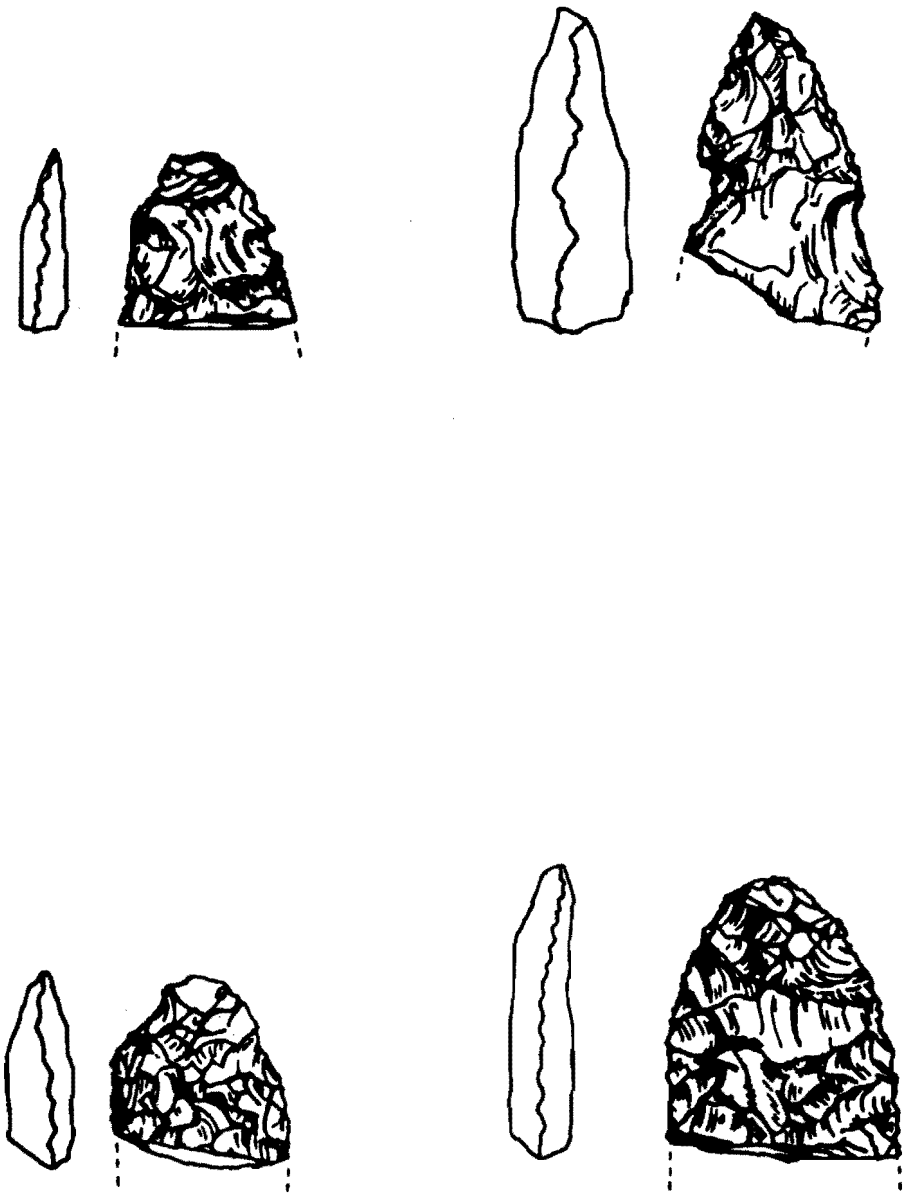

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Figure 5. Blade Fragments.

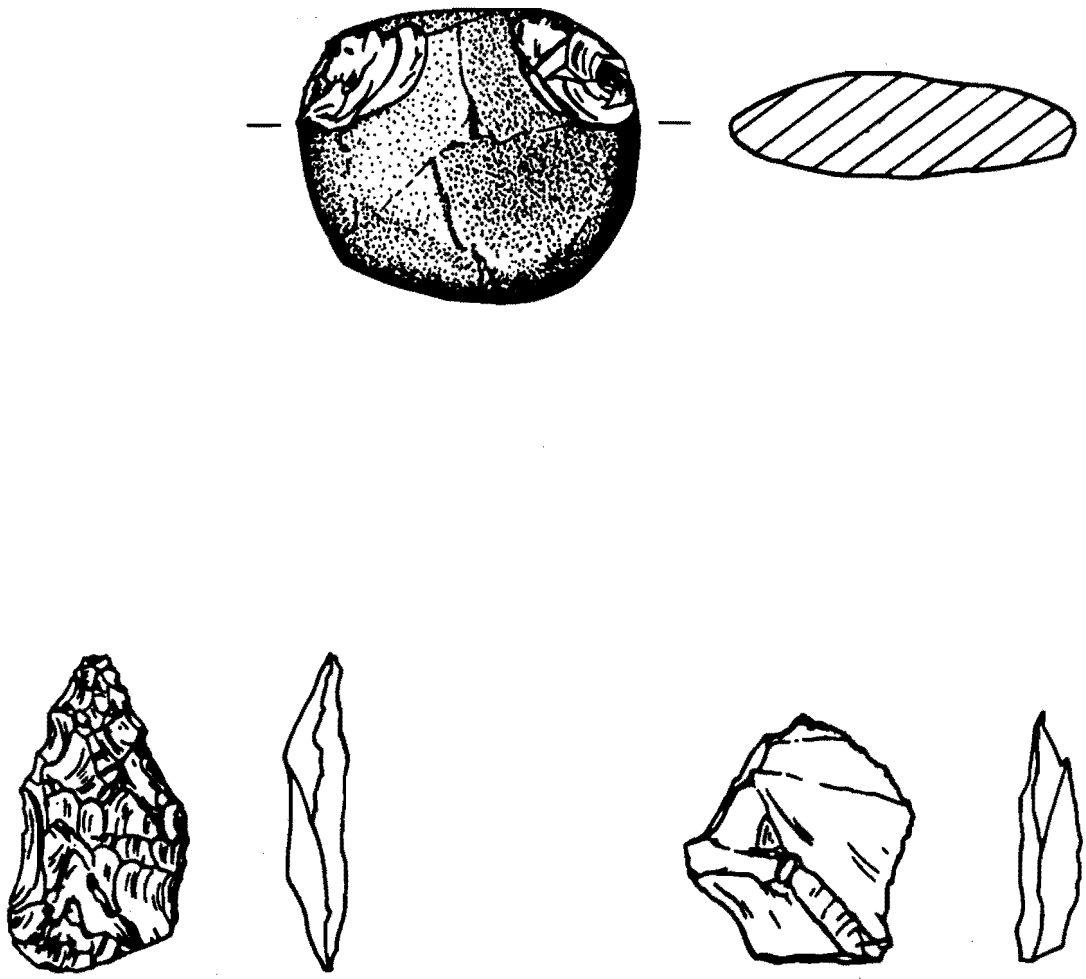

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Figure 6. Miscellaneous Tools from SLO-977.

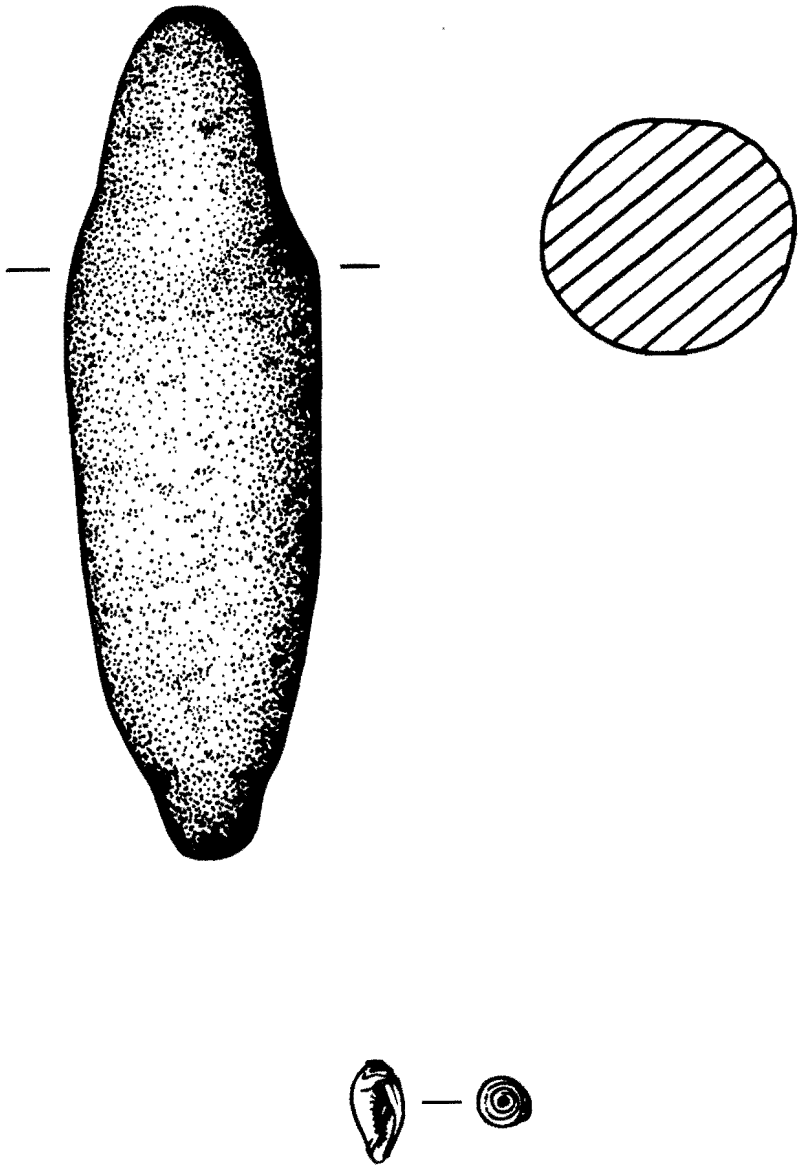

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Figure 7. Charmstone.

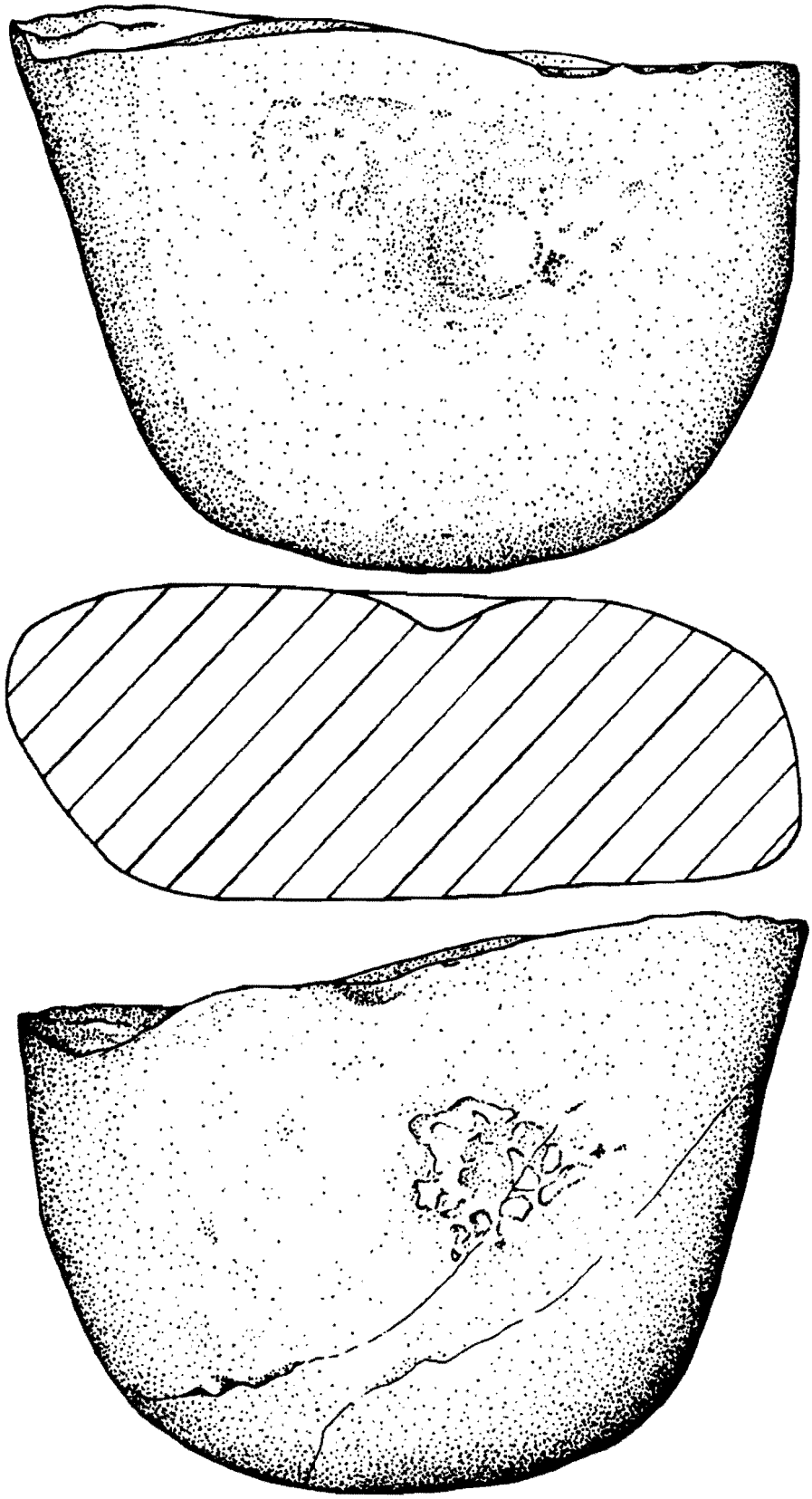

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Figure 8. Anvil Stone Tool.

Shell Sample by Weight
UNIT 2, CA-SLO-977, 0-10cm Level

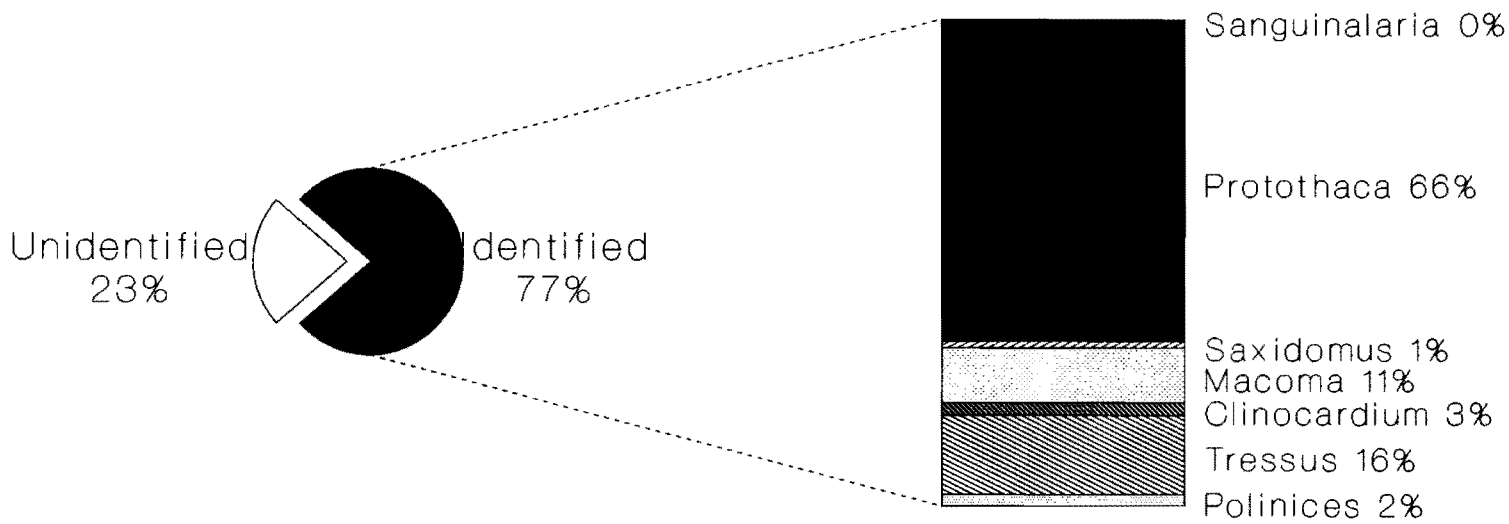

Figure 9. Shell sample fraction.

SHELL SAMPLE BY WEIGHT
UNIT 2, CA-SLO-977, 10-20cm Level

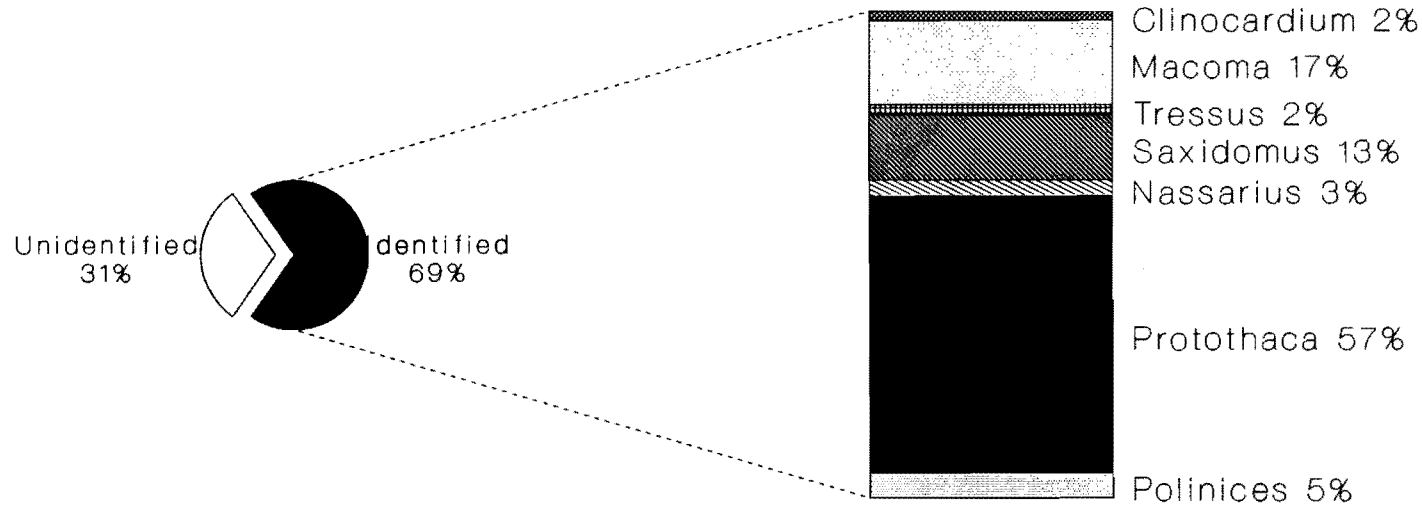

Figure 10. Shell sample fraction.

SHELL SAMPLE BY WEIGHT
UNIT 2, CA-SLO-977, 20-30cm Level

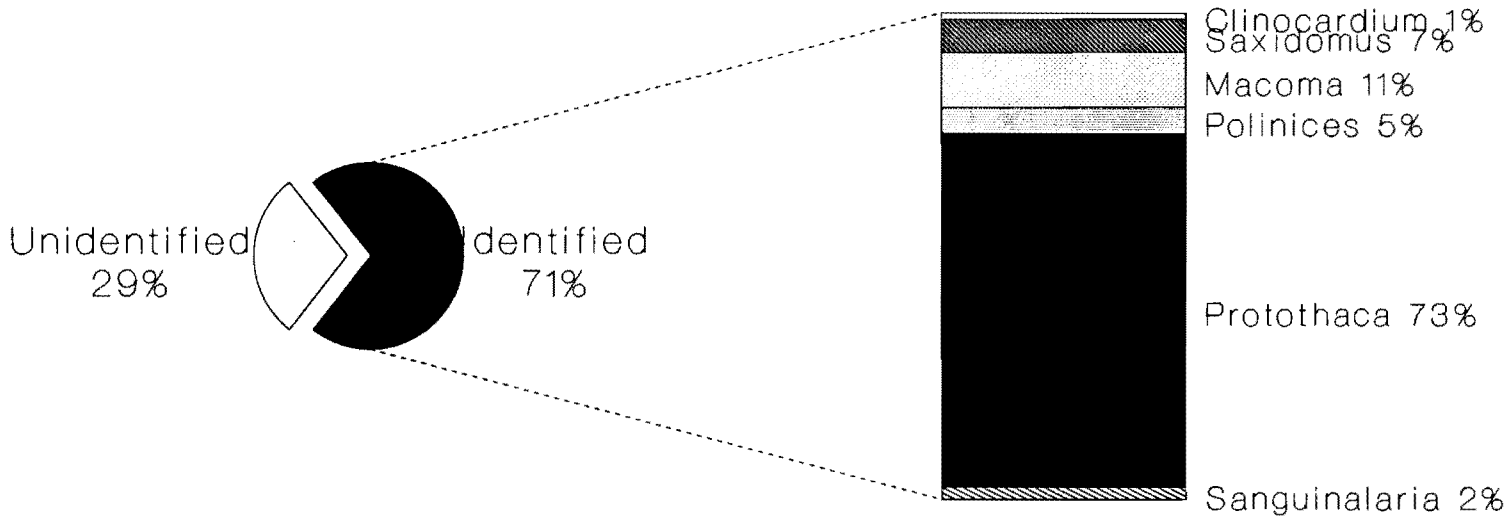

Figure 11. Shell sample fraction.

SHELL SAMPLE BY WEIGHT
UNIT 2, CA-SLO-977, 30-40cm Level

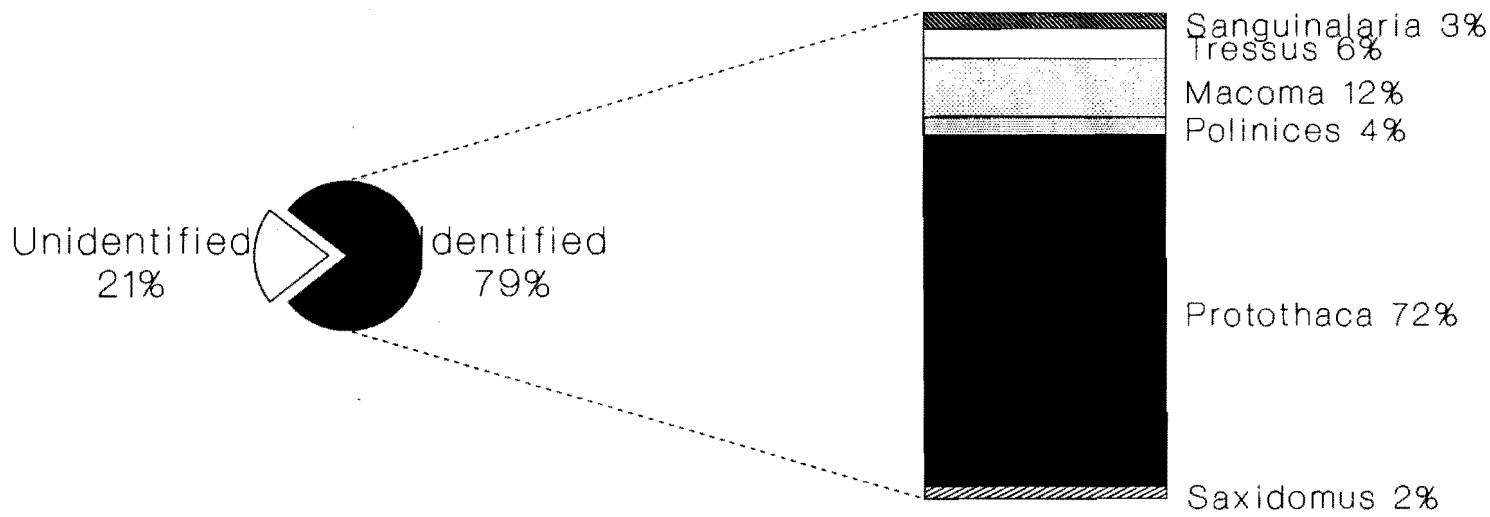

Figure 12. Shell sample fraction.

SHELL SAMPLE BY WEIGHT
UNIT 2, CA-SLO-977, 40-50cm Level

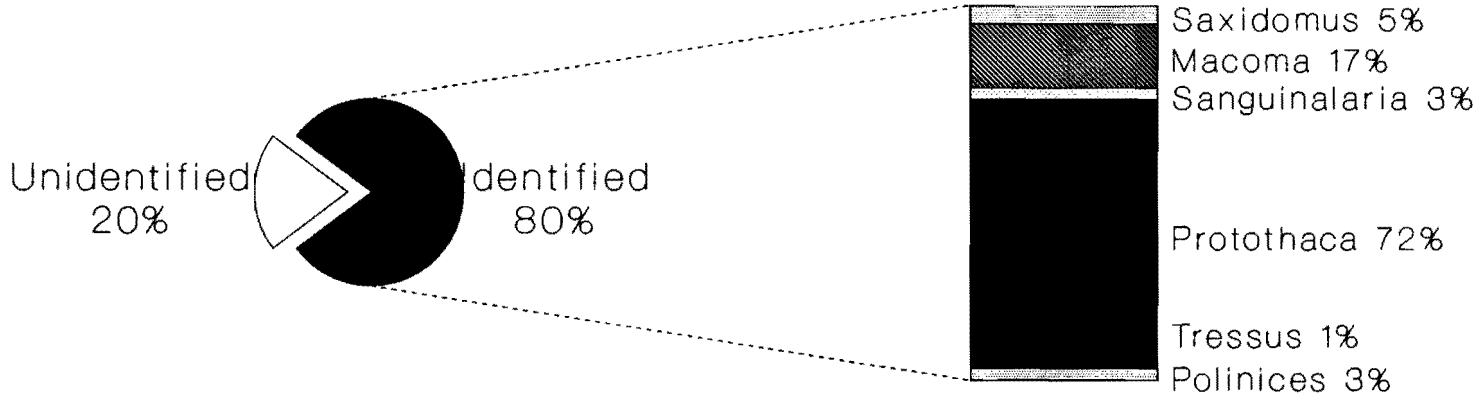

Figure 13. Shell sample fraction.

CARBON-14 RESULTS

CA-SLO-977

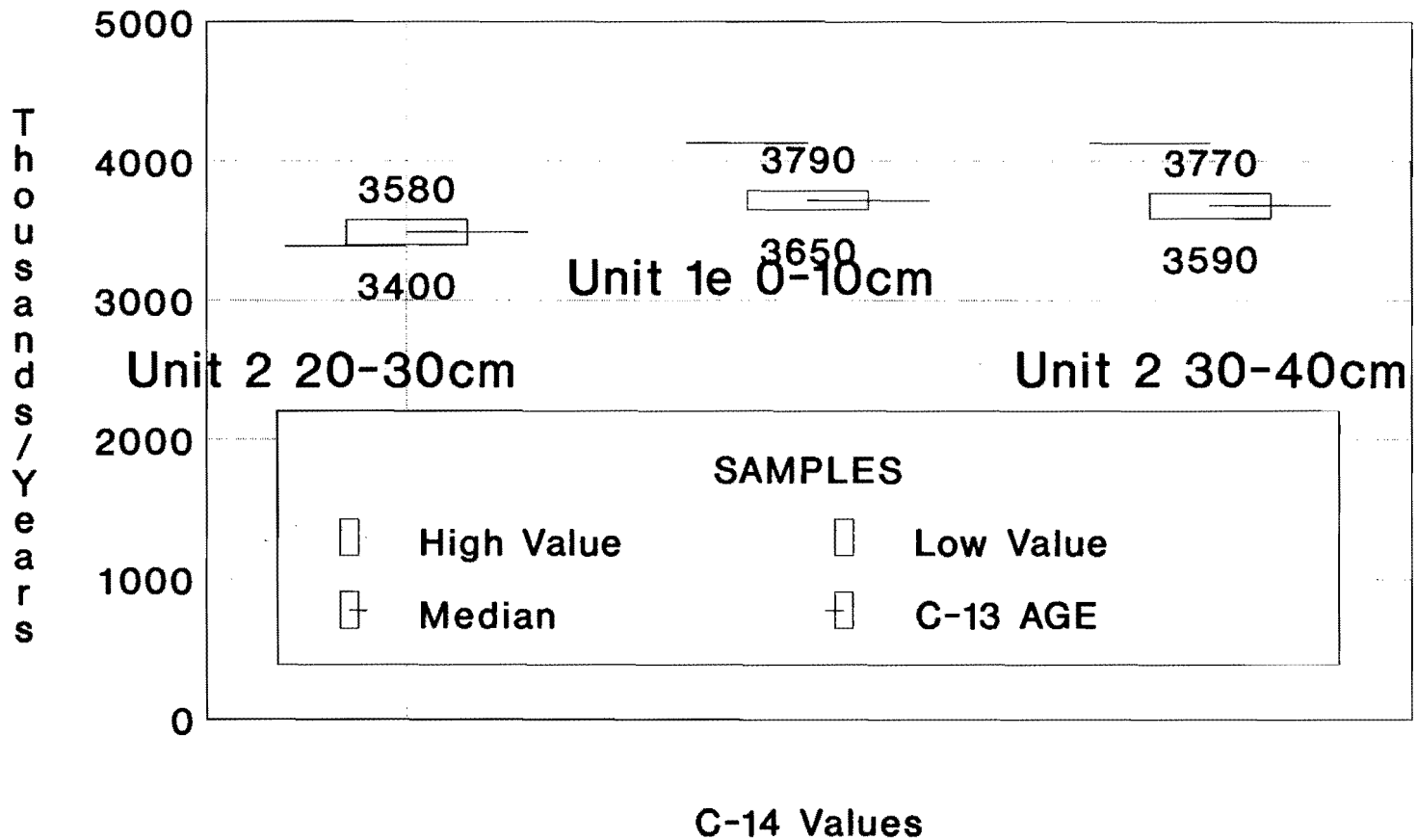

Figure 14. Carbon-14 Results

contemporaneous with this one?

One could argue that some of my research questions are too broad and others too specific. I would counter with the rationale that it is much more useful to ask questions that one can hope to answer. The only question above that is probably beyond the scope of this study is #3. However, as Bettinger has said about middle range theory:

> In the last analysis it would seem that the current confusion surrounding de-finition of "middle-range archaeological theory" reflects basic flaws in the concept itself. If it is worth anything at all, a scientific theory must at least pretend to address a specific body of fact--either those in hand or potentially obtainable...If we limit ourselves to scientific enterprises, middle-range theory is a misnomer: Anything lesser in scale ceases to be theory at all. [Bettinger 1991:80]

The new archaeology misled many scholars and students into thinking that translating artifacts or assemblages into human behavior is a simple task (Schiffer 1987:4-5). Nothing could be further from the truth. The cultural forms of the past--subsistence, settlement patterns, social organization, religion, or technology--were clearly left in patterns, as part of the archaeological record. Yet this is not easily translated into human behavior.

Schiffer (1987:8) has pointed out how we must be aware of the formation processes that form and alter the archaeological context. Proponents of this "transformation" school of thought (Schiffer and Rathje) believe that regardless of how evidence survives one cannot read (directly?) behavior and organization from patterns discovered in the archaeological record (Schiffer 1987:10). Stated simply, formation processes transform items formally, spatially, quantitatively, and relationally. They can create artifact patterns due to non-cultural processes and exhibit regularities than can be expressed as laws. That is a scary concept to archaeologists.

This is a study of both cultural and non-cultural formation processes. That is the challenge that SLO-977 presents. This site was being occupied at the onset of the formation of the present and older dune systems on the sand spit. The question is whether dune formation has altered the patterns of artifacts and features left for the archaeologist to sort.

Another intriguing topic for examination is the Collector/Forager Model introduced by Binford (1980). Binford, in his forager model used definitions of 2 settlement types: residential bases and locations. As mobility increases so does the contextual relationship between activities, features, and general archaeological residues (Bettinger 1991:67-70). Although storage is a response by collectors which solves temporal incongruities in the distribution of resources, it can create spatial incongruities. Hence, a reliance upon storage costs the group its flexibility to procure resources within their settlement system. Although there are similarities between foragers and collectors, testing this model has important considerations in answering subsistence/settlement questions.

If we are to study how man adapts to his environment, some information about that environment would be useful. If we utilize a new method (Effective Temperature or ET) which measures plant productivity and seasonality of the site, some interesting possibilities are uncovered. A rough calculation of ET gives a value of 14 for the area of SLO-977. This would indicate a collector based economy (Bettinger 1991:64-70). When the value is low it, reflects temporal incongruities in the resources relative to the population causing a cultural response. It might be that there is a minimum population figure necessary before this becomes a cultural priority. If so, that baseline has not yet been established. Certain researchers (Glassow, personal communication, 1991; Jones 1991) believe that early inhabitants were foragers in this general region. How did we figure that the ET indicates a collector based economy?

Where ET is high (21 to 25), resources should be more abundant and available throughout the year. In this situation a

hunting and gathering pattern would be more like that of foragers, such as the classic !Kung San of the Kalahari (Bettinger 1991:66). If the value is low, such as at Montaña de Oro State Park, this means that plants are not abundant and a cultural response is necessary: food storage. This would lead to settlement freezes at optimum resource locations, such as the classic Great Basin groups tethered to local piñon groves (Steward 1938). This could lead to over-exploitation of resources within a specific zone, which could have had a significant negative impact on the local culture and could be indicated in the settlement pattern by periods of abandonment, because of a need to move to new resource zones.

Regardless of its direct applicability in this case, I believe ET is a concept worth further assessment. What is unclear at Montaña de Oro is whether the archaeological record reflects both types of occupation. Craft specialization is evident, with asphaltum processing and tool manufacturing. In summary, a low ET value may reflect a collector-based economy. However, if the population was small, and it probably was at this time, it could reflect a mobile forager camp. The variety of the tool kit at this site is diverse, which further complicates a simple interpretation in terms of the Collector/ Forager model.

ETHNOHISTORY

The area of this project is in the ethnographic area of the Obispeño subdivision of the Chumash language family. They were 1 of 2 subgroups living along the outer shore from about Point Conception to Morro Bay. One of the first European contacts was probably Pedro de Unamuno, who entered Morro Bay in 1587. Sebastian Cermeno visited San Luis Obispo Bay in 1595. The expedition of Gaspar de Portola traversed the area in 1769, leaving the coast north of Pismo and traveling to Morro Bay (Greenwood 1978:520-524). There is virtually no mention of any large villages. The Europeans assumed the natives were nomads because they found no remains of house structures (even though house remains have been found archaeologically). This observation, however, could have been due to the season of the visits. There is some general disagreement whether the Native American population was in decline at the time of contact. Greenwood compared population estimates from the mission records, and early explorers' estimates and suggested that population already was in decline. Other scholars feel that the mission data indicate that assimilation into the mission system brought on the decline. We may never be able to answer that question. Regardless, most scholars agree that with the Mission Period the traditional Native American lifestyle underwent fundamental changes (Deetz 1963:30-47).

CHRONOLOGICAL CONSIDERATIONS

Three samples of shell were submitted for C-14 analysis. They were all single pieces of shell. Two were Protothaca staminea and 1 was Polinices sp. Unit 2 at the 20-30 cm level yielded a date of 3490 ± 90 or a C-13/C-12 adjusted age of 3391 ± 90. Unit 2 at 30-40 cm level yielded a date of 3680 ± 90 or a C-13/C-12 adjusted age of 4130 ± 90. Unit 1e, next to the asphaltum feature, yielded a date of 3720 ± 70 or a C-13/C-12 adjusted age of 4130 ± 70 years (Figure 14).

Numerous scholars and archaeologists have pointed out problems associated with C-14 dates (Taylor 1987; Erlandson 1988; Breschini and Haversat 1989). Taylor indicated that the C-13/C-12 fractionation correction of shell dates entails adding about 400 years to the raw C-14 date. "The marine shell carbonates should exhibit a C-14 age approximately 400 years younger than the typical wood" (Taylor 1987:121). In contrast, the reservoir correction entails subtracting about 630 years for the central California Coast (Taylor 1987:126-132). However, lately Breschini and others have indicated that the blanket 630-year correction factor may not be applicable everywhere. It does not seem to apply in the Monterey or Santa Cruz areas (Gary Breschini, personal communication, 1991). If this is the case it might not apply in Morro Bay either. I used the raw C-14 dates given as a general guideline and also gave credence to the corrected

dates by means of C-13/C-12 adjustment, which seems to be more in the 500-year range.

The geology of the dune system itself provided us with some valuable clues. It appeared that the older parabolic dunes, from which the cultural material from SLO-977 was recovered, date from 3080 to 4160 years B.P. (Orme 1990:334). Also, a 20 cm deep test unit at a neighboring site, SLO-978, was C-14 dated at 3430 ± 100 years (Gibson 1981). That could indicate that as the dunes were being formed on the Morro Bay sand spit, Indian camps were being covered soon after they were being occupied. This would explain the large number of sites or "camps" found along the sand spit at rather close intervals. It could also mean that all of the sites on the sand spit reflect a continual occupation of the area throughout the prehistoric period. It could also reflect that the sand spit functioned as a resource catchment for the Chumash in the area. Considerable more testing is necessary.

No evidence found so far would question the antiquity of SLO-977 as suggested by the C-14 dates. Most of the points recovered were large; many were contracting stem points. Sites with similar point styles can be found from the Santa Barbara Channel to Diablo Canyon. All of these styles predate the introduction of the bow and arrow into California at about A.D. 500.

Other contemporaneous sites include components from SLO-2, SLO-497, SLO-585, and SLO-978. SLO-497 yielded dates of 3140 B.P. (25-30 cm) and 3500 B.P. (90-105 cm); both dates derived from shell. SLO-497 would be slightly younger than SLO-977 based on the C-14 results. SLO-497 was originally part of SLO-1 or SLO-10 (Barter 1988). Recent dates from SLO-10 indicate that SLO-497 probably was not part of SLO-10, or if it was, SLO-497 is an earlier component or occupation period. SLO-585 yielded a date of 5100 ± 110 that indicates occupation could have been roughly contemporaneous with SLO-977 (Greenwood 1972:56-73). The lack of dated sites and completed reports for the area hinders any detailed analysis here. A detailed synthesis of the region is beyond the scope of this paper. The reader is encouraged to consult Breschini and Haversat (1988).

The projected time period for occupation of SLO-977 would be the late Early Period or near the transition period between Millingstone and Middle horizon or around Ez or Ey following King's (1981) chronology.

The site appears to have been a multi-activity site. Activities that occurred include hunting, fishing, collecting, tool manufacturing, asphaltum processing, and food processing. Both men's and women's traditional activities occurred here at SLO-977. It also appears that asphaltum was being applied to larger tools whose functions are not known at this time. It could be that they may have just been baskets, but that is hypothetical at this point and warrants future study.

NOTES

I would like to thank Christina Savitski for her fine execution of the illustrations accompanying this paper. I must also thank ranger Jon Muench for his tireless contributions excavating, monitoring, and protecting this site. To the memory of Juanita Centeno whose contribution was just a brief page in a long life, my special thanks. To Jose Castillo and Matt Baldzikowski go my thanks for their help in the fieldwork. Also to Mary Doane for her efforts on the initial shell sort analysis, I offer my gratitude. Finally, my thanks to Dick McKillop for his help in creating some of the computer aided graphics.

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