BEAD EXCHANGE
AMONG THE HISTORIC KUMEYAAY INDIANS

A THESIS SUBMITTED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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Abstract

The focus of my research is to describe, analyze, and explain the unusual spike in the number of shell and glass beads at selected Kumeyaay sites in San Diego County during the Historic Period. The reasons for this apparent increase in bead use are problematic, but one explanation is the profound impact of Spanish colonial presence on Native populations and the resultant sociocultural transformations made by indigenous groups. I demonstrate that the demographic disruption ensuing from the Spanish incursion led to a revitalization movement which dispersed from the greater Los Angeles area to the inland areas of southern California. Called the *Chingichngish* cult, the new religion melded traditional ceremonial life with a new set of rituals. This new ceremonialism was infused with the intensive use of beads, and it is likely that this created the exponential appearance of larger numbers of Class H beads at numerous inland historic sites in the region. Using archaeological and historical data, I show that the beads analyzed in the various collections were tied to various exchange networks which operated over extant trails and travel corridors and that Class H shell beads were inextricably tied to the new religion. The vastly greater number of these beads at inland Kumeyaay sites is likely the result of intensified on-site ritualism and the concomitant increase in bead exchange.

óAnthropology must take history into account because history mattersô

Michael S. Nassaney

The Development of Late Woodland Societies (2001:159)

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Contents

Figures

Tables

Chapter 1: Introduction

This study deals with the anomalous appearance during the Historic Period of *Olivella* wall disc beads at certain Kumeyaay archaeological sites located in the interior regions of San Diego County. As repeatedly exemplified by archaeological investigation in the County, beads are a rare artifact class; thus, finding large amounts of these artifacts anywhere in the County is remarkable. The focus of the present study (and embodied in the following chapters) is to discover the factors leading to this irregular occurrence.

The crucial question remains, how did this striking situation come about? Further research deriving from the historical literature and selected bead collections was warranted. Why and how did thousands of wall disc and (glass) beads suddenly appear during the Historic Period, when disruption to Native societies and economies was rampant? Bead assemblages from museums, curation facilities, and private collections throughout southern California were examined in an attempt to gain a better understanding of the historic processes behind this phenomenon. To this end, my analysis focused on collections containing beads and other material culture from sites within the study area (Figure 1-1) and dating from the protohistoric/historic period.

From this research ï in tandem with field inspections ï I was able to gain understanding of how exchange systems operated during the turbulent times of Spanish occupation, and what reasons were behind the dramatic, rapid shifts in settlement and social organization. These, and other factors such as revitalization cults, may have contributed to the anomalous increase in beads at these interior sites of eastern San Diego County.

Most of the background research and context comes from extant ethnohistoric and ethnographic literature dealing with the Kumeyaay Indians (see Chapter 2). It is understood that human societies are forever changing, and that the historic groups may have greatly differed from their prehistoric predecessors (Pauketat 2003). Nevertheless, this background will provide a starting point from which to investigate the social and economic dynamics occurring after European contact.

General theoretical approaches in archaeology are adhered to with particular emphasis on processual and postprocessual paradigms (see Trigger 1996; Pauketat 2001). In my study, I present my own particular way of doing archaeology which is hybridized from both approaches.

I have reviewed bead data deriving mainly from studies conducted in southern California over the last 90 years. This review provides important background data on bead typology, manufacture, and distribution (see Chapter 3). Also presented are various current paradigms dealing with bead exchange during the prehistoric and protohistoric (i.e. after contact and before colonization) periods. This focuses on Native bead types, how they look and in what manner they were used, and their importance to historic revitalization movements, such as the *Chingichngish* cult (see Chapter 4).

A comprehensive review is provided of the methods used in analysis of the data, theories dealing with exchange and cult activity in the study area and how these factors can elucidate the research problem identified in this study. Various other social and economic dynamics (including effects of disease, trade practices, and socio-religious movements) are also presented in support of the analysis (see chapter 5).

Bead collections from each study site are examined, dominant bead types are discussed, and distribution trends are presented. Major trade routes are identified which were likely utilized during the historic period facilitating the intensification of bead exchange relating to the spread of the newly evolved *Chingichngish* cult in the eastern part of San Diego County (see chapter 6).

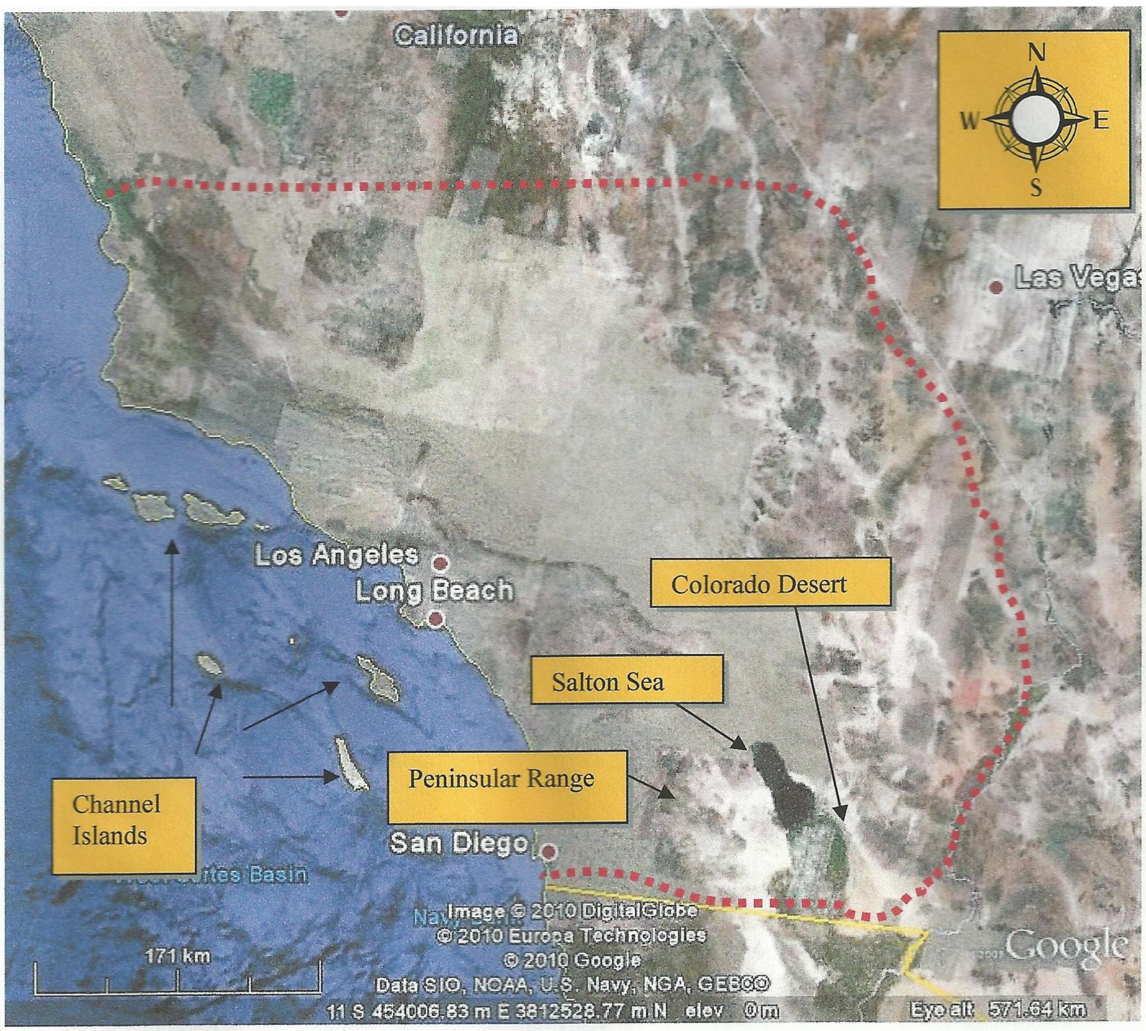

Figure 1-1: Southern California region (red dashed line – imagery courtesy of Google Earth).

Chapter 2: The Kumeyaay and their Neighbors

Introduction

What the very first European observers saw at the time of contact in the New World may have differed greatly from the later observations made by subsequent explorers and colonists (Priestly 1913; Bolton 1927). The glowing accounts of conquistadores of large, prosperous Native societies are to some degree at variance with later testimonies by Spanish colonists. While it is difficult to quantify such divergence, the fact remains that what is ethnographically known about the Kumeyaay and other southern California groups (Figure 2-1) may not accurately reflect the exact nature of prehistoric/historic populations. Any estimate of population or characterization of Native lifeways derived from ethnographic and historic sources is likely not entirely representative of earlier Native societies. Nevertheless, ethnographic and ethnohistoric records are valuable sources of information (perhaps by proxy only) for reconstructing context and assessing prehistoric/historic social change over time (Beebe and Senkewicz 2001; Hurtado 1988; Shackley 2004). The following review of prehistoric context will provide a firm basis for the understanding of later developments during historic times. For the most part, information on the prehistoric Kumeyaay and their neighbors will be drawn from Chartkoff and Chartkoff (1984) and Moratto (1984).

Prehistoric Context

Before looking at contact period peoples, it is useful to provide a brief review of the prehistoric developments that led to the ethnographically known Kumeyaay. Granted, the chronological sequence formulated for the San Diego region (Table 3-1) is somewhat sketchy and coarse-grained; it is perhaps helpful to provide what is known archaeologically of the prehistoric inhabitants of the area.

Early Man Horizon/San Dieguito Complex

The earliest prehistoric sites in San Diego are identified as the San Dieguito Complex (or Early Man Horizon ï see Table 2-1). The complex, a possible coastal analog of the Western Pluvial Lake Tradition (Moratto 1984:93-97), is seemingly hunting oriented and is characterized by leaf-shaped knives and foliate bifaces reminiscent of the Lake Mojave and Silver Lake sequence in the northern Mojave Desert. The oftentimes controversial San Dieguito Complex has been identified at various sites in San Diego County, of which the C. W. Harris site is the perhaps the most notable (Laylander 1993). To quote Moratto (1984:97), the Harris site õé is important because its strata provided the initial cultural sequence for western San Diego Countyö, i.e. stratified evidence of San Dieguito and La Jolla components.

Debate continues as to whether the San Dieguito continued to inhabit the area or vacated it sometime after 8000 YBP. As related in both scenarios, inhabitants made use of coastal and inland resources (i.e. animals, fish and shellfish) with little to no regard to seed processing; there is a distinct lack of milling tools associated with these sites, implying that seed grinding was not an important component of the economy (Kaldenberg 1982, Gallegos and Carrico 1984).

Early Horizon/ Encinitas Tradition/The La Jolla Complex

The next culturally recognized group in the area has been termed La Jolla Complex or Encinitas Tradition (see Table 2-1). Their occupation has been radiocarbon dated at

TABLE 2-1

CULTURAL AFFILIATION AND ASSOCIATED ARTIFACT CHARACTERISTICS

HORIZON (Wallace 1955)	**TRADITION (Warren 1968)**	**DATES**	**ARTIFACT CHARACTERISTICS**
Late	Shoshonean/Yuman	1300 BP to Present	Pottery; Small triangular points; Mortar and pestle as well as millingstones; artifact assemblage similar to Encinitas Tradition
Intermediate	Campbell	5000 BP to 1300 BP	Side-notched, stemmed, to lancolate or leaf-shaped points; larger knives and wide variety of scrapers; drill-like implements; basket-hoppers, mortars, stone bowls; new types of shell, bone, and stone ornaments; few millingstones
Millingstone	Encinitas	7500 BP to 5000 BP	Crude flaked stone tools; percussion flaked tools from macrocrystalline toolstone; crude chopping and scraping tools, hammertstones; projectile points rare, crudely made and large; large number of manos and millingstones; "doughnut stones", cogstones and discs; shell and bone artifacts are rare; basketry inferred from tarring pebbles
Early Man	San Dieguito	9050 BP to 7500 BP	Wide range of scraper types, percussion and side struck flakes; leaf-shaped knives, large points of all varieties; stone crescents; hammerstones and crudely flaked tools, few in number; no manos or millingstones

beginning at 7000 YPB and has been documented as persisting throughout the middle Holocene. The La Jolla Complex is archaeologically identified as having large coastal villages, shell middens, cobble-based tools, grinding tools, and flexed burials (Moratto

1984:147-151). Although large core-based tools are the hallmark of these people, a large segment of their assemblages are large utilized flakes which presumably were used to pry open shellfish (Cuero 1991:28). Artifact assemblages at coastal sites attest to a subsistence pattern based primarily on shellfish gathering and near shore fishing, suggesting a nascent maritime adaptation similar to those found in more northerly regimes at the same time period (Koerper et al 1985).

The earliest sites for this period are found in the northern region of San Diego County and are usually the same sites found associated with San Dieguito Complex. Apparently, the coastal lagoons supported large populations around 6000 years ago since many outlier sites (as based on radiocarbon dates) are associated with primary villages. The ensuing period, however, was not as environmentally favorable to large semi-sedentary populations and many sites appear to be abandoned beginning at 3000 YBP. This abandonment has been attributed to the slow rise in sea level and the consequent siltation on estuaries and lagoons, which led to the depletion of vital estuarine resources. Midden constituent analysis has shown that over a two thousand year interval dominant shellfish remains switch from deep water mollusks (*Argopectin* sp.) to tidal flat species (*Chione* sp.), suggesting a shift in resource patterns due to changing environmental conditions. Settlement patterns likely changed to facilitate this new resource emphasis.

Late Horizon/Yuman/The Late Prehistoric

Some time after AD 500, a cultural complex appeared in southern San Diego County that included the use of pottery, scrapers, drills, and small finely flaked projectile points (Warren 1968:9). The small projectiles, which likely represent arrow points, strongly suggest the use of the bow and arrow at this time period. Cremation began to supplant flexed burials at this time also. These traits were characteristic of peoples living along the Colorado River during an earlier period. Warren designates this time period as the Yuman Tradition, and states that it is ónearly synonymous with Trueôs (1966) Cuyamaca Phaseô (Warren 1968:9). The Yuman Tradition persists until the arrival of the Spanish in the 18th Century. Many features of the earlier Encinitas Tradition also persist until then.

It is an intriguing question whether the introduction of new technological items such as pottery and the bow and arrow indicates the intrusion of a new population into southwestern San Diego County or primarily the adoption of new subsistence strategies. Linguistic data suggest the latter. The Yuman language, of which variants were spoken from the coastal area that includes southern San Diego County and northern Baja California inland to the Colorado river and beyond into Arizona, is a Hokan language. Hokan languages are found in so many parts of California that it is probable that the speakers of Proto-Hokan at some point spread throughout the state at a very early time period (Shackley 2004:29). The strip of Hokan speakers whose descendants spoke Yuman languages may have occupied southern San Diego and Imperial counties from at least the early Millingstone Period (see Table 2-1). There would have been trade and ceremonial relationships between them except when travel was impossible. The Yuman technology may have been brought by traders or travelers who visited the coast from the east (Shackley 2004:26) or by coastal people visiting communities along the Colorado River. Intermarriage and a flexible kinship system may have facilitated this relationship.

It seems doubtful that there was large-scale replacement of population during this time period.

A note on the Cultural Chronology of San Diego County

As discussed above, Warren (1968) has proposed four cultural traditions for the vicinity of the study area: San Dieguito (ca 10,000 YBP); Encinitas (ca 7500 YBP); Campbell (ca 5000 YBP); and Shoshone/Yuman (ca 1300 YBP). The traditions are based upon the occurrence of differing sets of cultural manifestations seen in archaeological assemblages through time as evidenced in Santa Barbara County. Although all four traditions are clearly seen in cultural materials in Santa Barbara, only three (San Dieguito, Encinitas, and Shoshone/Yuman) have been definitively identified in San Diego area. Warren feels there are two factors that prevented the Campbell tradition from developing in the San Diego region: 1) the intrusive hunting culture evident in the Santa Barbara Channel-Ventura area during the Campbell tradition did not extend as far south as San Diego; and 2) the silting of lagoons and estuaries in the San Diego area during this time period discouraged a subsistence strategy based on a maritime economy as seen in the Campbell Tradition. Since Orange County is in a transitional zone between the Santa Barbara-Ventura and San Diego areas, it may have followed either the chronological sequence found in the San Diego area, or the sequence found further north.

The Kumeyaay: Ethnographic/Ethnohistoric Context

Protohistorically, the Kumeyaay held a large territory encompassing most of what is today San Diego, Imperial County, and the northern part of Baja California (Figures 2-1 and 2-4). Within this large tract of land the Kumeyaay practiced a hunting gathering subsistence that was dictated by seasonally available plant and animal resources. Most group movement was in an east west direction and seasonal round was molded by the verticality of the Peninsular Ranges (Figure 1-1) which separated the coastal and interior peoples (Luomala 1978:599). When the Spanish first contacted the Kumeyaay, they remarked that the population was very fluid and that boundaries between groups were not well established. It was not unusual for Kumeyaay groups to range from coast to desert throughout their range. The eastern boundary along the Colorado River was especially irregular, and often river groups migrated south and east in response to feuds with neighboring Yuman speakers (Luomala 1978:592).

In the northern region, the Kumeyaay were fronted from west to east by the Luiseño, Cupeño, and the Cahuilla (Figure 2-1). Although there may have been considerable intermingling with these groups (i.e., socioeconomically and socioideologically), it was not until the historic period that melding of these groups occurred thus leading to vague ethnic identities among all groups (Shipek 1982).

The Kumeyaay language still referred to linguistically as ôDiegueñoô (Luomala 1978:592), belong to the Yuman language family of the Hokan stock. The Hokan stock is one of the largest language groups in California and is thought to be very old by linguists (Hinton 1994:83 Shackley 2004:29). Included in the Hokan stock are the Chumash, Quechan, Mojave and Cocopa, the Pomo among others. In the Diegueño language two principal dialects are spoken with many attendant sub-dialects that appear to be widely distributed along a north-south gradient throughout the Kumeyaay territory (Figure 2-3).

Although dialects differ greatly, especially in the geographic extreme limits of the territory, mutual intelligibility appears to be high among all dialectical groups (Shackley 2004:29). The north-south distribution observed with these linguistic groups likely reflects the east-west procurement patterns of the Kumeyaay and the need to optimize resource availability for each group.

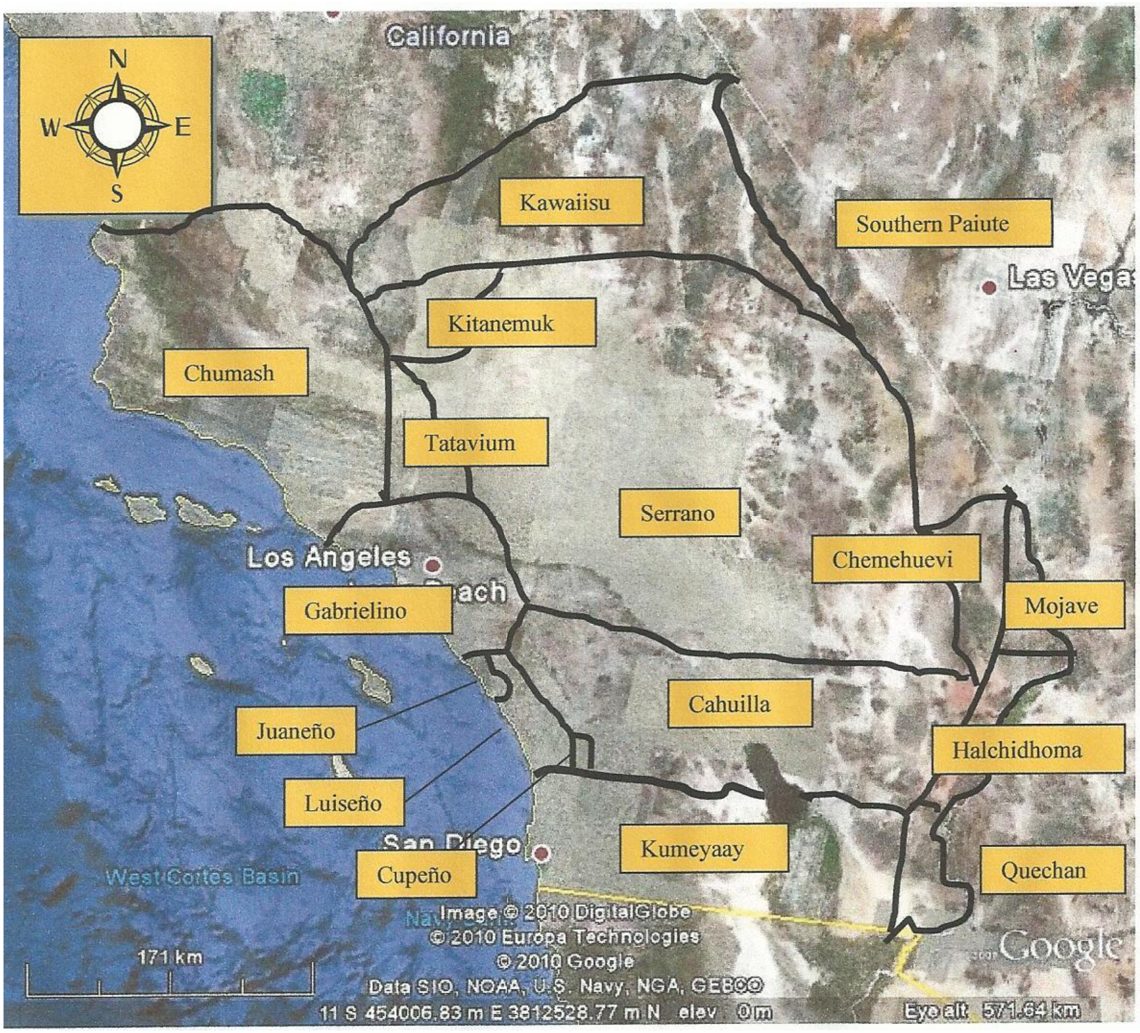

Figure 2-1: The Kumeyaay and their neighbors (Imagery courtesy of Google Earth)

Physiographically, the territory that the Kumeyaay occupied is diverse and topographically distinct. In the western section, the coast is dominated by the littoral region which is approximately 20 miles wide. Directly inland from this strip is the

Peninsular Range, an uplifted granitic fault block that harbors varied ecozones separated by ever increasing elevation. Throughout this range, east-west trending valleys bisect high peaks and rocky foothills. Beyond the mountains, to the east, is the beginning of the Great American Desert. Called the Sonoran or Colorado Desert Province (Schoenherr 1992:413-415), this region is characterized by extremely arid conditions and plant and animal life that is particularly adapted to xeric conditions. Needless to say water is scarce and animal and human populations are greatly influenced by its sporadic occurrence. Throughout prehistory, populations have been drawn to areas containing reliable water sources. The Kumeyaay and other Yuman speakers extensively occupied the zone around the Colorado river for flood plain agriculture, and Native peoples were recurrently drawn to the intermittently filled 300 mile-round Lake Cahuilla (Figure 2-2). Both these areas were oasis-like refuges from an otherwise hostile and dry environment.

Although other Yuman speakers were known for their warlike nature, the Kumeyaay were relatively pacific. Moving through their highly fluid social networks, the Kumeyaay people often lived near or with their eastern and northern neighbors. Intermarriage (as indicated by early mission records) was common between the Quechan, the Cocopa, Paipai, Luiseno, and Cahuilla (Shipek 1981:297). Infrequently they joined alliances with the more aggressive Quechan (Luomala 1978:596) and were known to have had occasional conflicts with the Cocopa (Gifford 1931:5). Aggressiveness, however, did appear to increase once the Spanish missionaries colonized San Diego. At least two organized rebellions are known to have occurred after 1769. One of these revolts involved a very large contingent of Native Americans (of possible mixed ethnicity) attacking the mission San Diego de Alcala. During the attack one of the Franciscan friars,

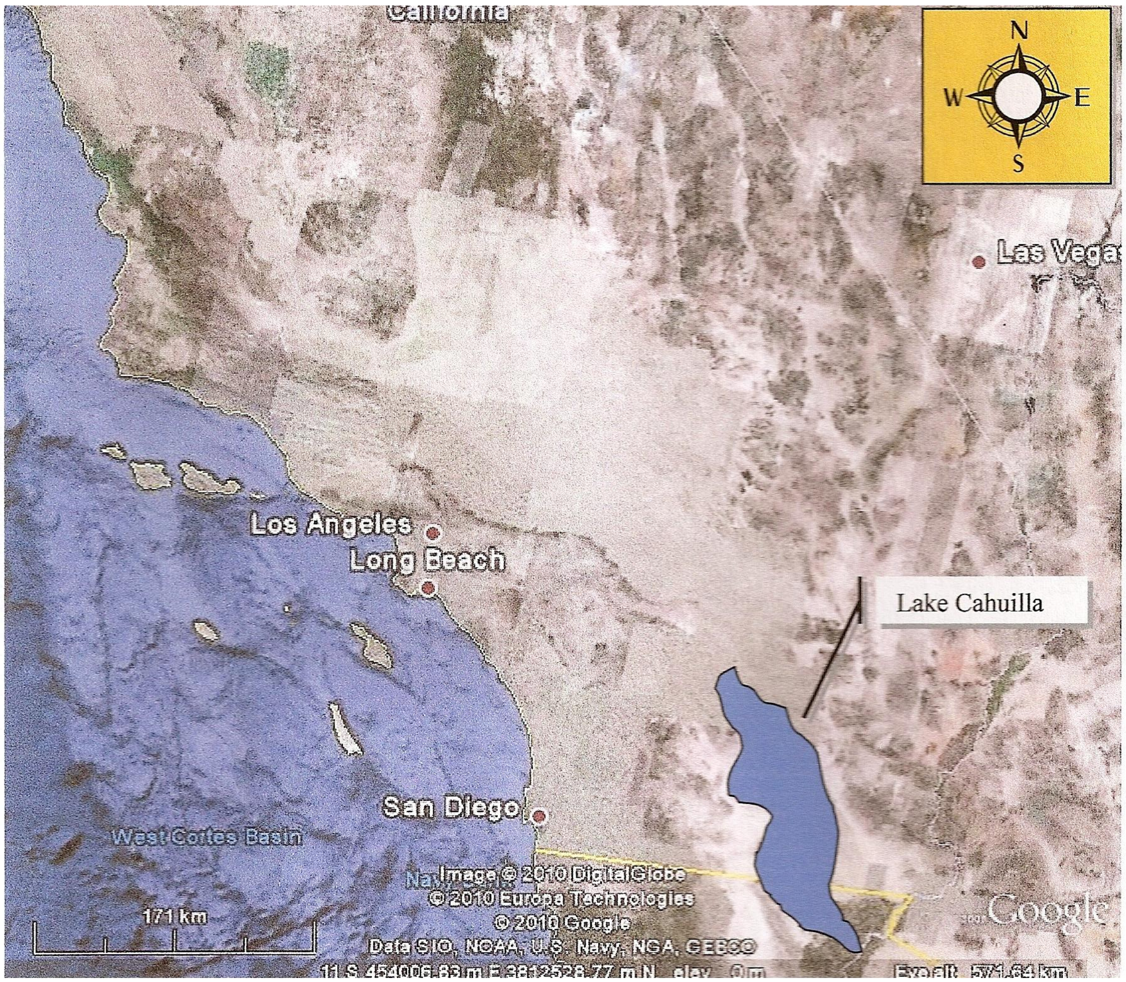

Figure 2-2: Location and extent of late prehistoric Lake Cahuilla, within the Salton Trough (Imagery courtesy of Google Earth).

Fr. Luis Jayme, was killed. Cited as the cause of this particular revolt was the interference of the Franciscans with the Kumeyaayǒs way of life (Beebee and Senkewisc 2001:186; Shipek 1981:301). Other lesser known uprisings occurred about this time throughout southern California. In 1785, a woman named Toypurina had a prophesy that the soldiers at Mission San Gabriel were dead and that the retaking of the mission would bring back the old ways (Lepowsky 2004:2-3). Reportedly a powerful shaman, and a chiefõs daughter, she was instrumental in gathering cross ethno-linguistic groups to attack the mission. Although the revolt was ultimately unsuccessful, Toypurina (who was given copious amounts of beads by adherents and warriors for her shamanistic services) was able to enlist many hundreds of Native Americans for the attack (Lepowski 2004:6). The reason for the attack may have been from the degradation, disease and dissimulation of Native lifeways (Lepowski 2004:25). Another similar incident took place in the Channel region. Like the San Gabriel event a Native woman had a vision that Chupu (a deity) appeared to her with instructions to rid the land of the Spanish and the epidemics they brought with them (Heizer 1941:128-129). It is likely that this woman, whose name remains unknown, was also a Native practitioner, who had a prophetic vision that would assist in assuaging the current miseries triggered by Spanish colonization. It is also probable that these uprisings had broader socio-political implications and may been part of an interregional movement encompassing most of southern California. This will be further discussed in the subsequent chapters.

At contact, the population of the Kumeyaay may have been as high as 10,000 people. However, population estimates vary due to spotty record keeping and the fact that mission records only account for those Native Americans living near or at the mission. Given the fact that mission San Diego was incapable of sustaining a large Native population ï due to water shortages and unavailability of arable land ï it is likely that many ógentilesö (non-missionized Indians) were unaccounted for (Lightfoot 2005:184; Luomala 1978:594-595; Shipek 1981:308). Indeed, given the uncooperative nature of the

Kumeyaay to missionization it is likely that most of the population was wild and not counted. Thus Kroeberôs (1925:712) estimate of 3000 in 1770 is without a doubt greatly underestimated since it only accounted for those individuals receiving baptism at the mission.

Settlement and Subsistence

Although no comprehensive list of villages exists for the Kumeyaay, Henshaw (1879) gives a number of less than 60. This number is surely underestimated and it is likely that many more settlements existed throughout this extensive territory. Some village names are known (Shipek 1982) and these were likely named to designate lineage or sib affiliation. As with most Kumeyaay nomenclature, placenames and group identification were geographically based. While some villages were permanently occupied, there appears to have been considerable movement through the province (Luomala 1978:597). Although fission/fusion (where different kin groups came together during the winter and then split apart in the summer) may have taken place at different times of the year to optimize the procurement of available resources (Laylander 1997), it is more probable that the Kumeyaay followed a logistical (collector) strategy (see Binford 1980) that required the establishment of permanent or semi-permanent villages that were strategically located in favored ecotonal habitats. From these base camps, special task groups could procure resources within a daily foraging radius (Laylander 1997:179). Storage would have been an important aspect of this strategy, and resources were procured on a planned óinterceptô basis. Though this pattern appears to be typical throughout the Kumeyaay region, the Eastern Kumeyaay apparently practiced a more opportunistic regime that resembled a fission/fusion strategy (Laylander 1997). In this regard, mobility not permanence was stressed between residential bases. High mobility was likely adopted due to climatic and environmental risks that were endemic to this part of county. As has been convincingly pointed out, mobility in some cases can be a prime óbuffering mechanismô for minimizing risk during times of stress (OõShea 1989:3). The Desert Kamia (Eastern Kumeyaay) was obviously required to adopt this strategy due to ever-changing conditions in their environment. Again, what seems thematic with Kumeyaay society is a flexible social organization where individuals could move freely between villages and kin groups (Shipek 1982). This allowed for maximum optimization of a varied and demanding environment.

Settlement size appears to have varied throughout the region. True (1970:57) felt that óé as many as 200 people may have lived in one locationé and 8-10 families per settlement would not be too few under some circumstancesö. Other estimates suggest a lower figure of 40 to 100 people per village (Hicks 1963:43). Still other sources refer to some villages (viz.-a-viz., the Mason Valley village, SDI-106) as containing many hundreds of people (Luomala 1978; Shipek 1982). What appears certain, however, is that settlements were organized around kin groups; that is, kin groups were localized. Although true óclansô were not observed with the Kumeyaay (Kroeber 1925, Spier 1923, Gifford 1931) it is likely that something like clans (or sibs ï called *cimul*) were present within the pre-contact population (Luomala 1978: 247-249). However, it is doubtful that the Kumeyaay ever possessed a moiety system like the Cahuilla, Luiseno, and other neighboring groups (Figure 2-1). Exogamy was practiced by clan members and only rarely did marriage occur within the same clan (Luomala 1978:602).

While kin groups were quite loosely organized, some degree of hierarchacy existed in Kumeyaay society. The village chief was an ascribed position, inherited from father to eldest son. Sub chiefs, shamans, and hunt masters also appear to be inherited positions (Luomala 1978:597). Due to the presence of primogeniture, it is likely these positions were lineage based. Chiefs were endowed with limited authority and normally directed clan and interclan ceremonies, acted as adjudicators, gave advice on subsistence activities, and appointed temporary leaders for hunting and war expeditions. The chiefôs assistant normally delivered messages and acted as an intermediary during ceremonies and important events (Gifford 1931:51).

Property or territorial rights were observed but only loosely enforced. Whether they were strictly clan based is unknown. Territories were recognized by the local group (or band) which often contained several lineages or lineage segments. Water and stored food were available to all on a reciprocal basis (Luomala 1978:597). In some cases, a large clan might claim a weaker clans eagleôs nest, which was clan property maintained by the chief and used during ceremonial occasions. In Kumeyaay society no property was inherited. At death personal belongings were burned with the deceased (Luomala 1978:604-605).

Although some villages were permanent or semi-permanent, bands moved throughout the territory to take advantage of seasonally available resources. As mentioned earlier, subsistence activities were normally oriented in an east-west direction and the greater part of resources were exploited on a vertical trajectory. From canyon or valley floor to higher mountain slopes, Kumeyaay groups harvested (mostly by women) a wide variety of seasonal plant foods (Shipek 1981). Gathering was supplemented by hunting large and small game. Deer, bighorn sheep, rabbits, rodents, reptiles, and fish were avidly sought after by men adept at trapping, hunting with the bow and arrow and fishing (Spier 1923:335-336; Gifford 1931:26). While there is some indication that large game (high ranked resources) became scarce during the Late Prehistoric Period (Hildeband and Hagstrum 1995:121), plant gathering and storage appears to be more important to Kumeyaay during the latter part of the Late Prehistoric Period. Further discussion on this shift (and possible explanations) will be covered below.

Horticulture was also practiced by the Kumeyaay near the Colorado River Basin (Luomala 1978:600). Although maize, beans, teparies and melons were planted within the flood zone of the river, the Kumeaay were never ambitious farmers, copying their neighboring Yuman neighbors in a somewhat desultory manner. However, horticulture may have become more important during postcontact times when traditional lifeways became disrupted by European intruders. It is known that by 1850, non-missionized Native Americans had peach tree orchards and cultivated maize, melon, and pumpkin. These agricultural pursuits were somewhat transitory, though, and often plots, fields and orchards were left unattended during peak gathering times (Luomala 1978:600).

Exchange Systems and Settlement Patterns

Likely as important as subsistence activities, were trade and exchange systems. The Kumeyaay, though not as fervent traders as their more northern groups, did trade with neighboring polities (Davis 1974:20; Luomala 1978:601-602; Shackley 2004:22). Facilitating their trading was an extensive network of trails that connected all parts of the

Kumeyaay territory and beyond. Everyone could use these routes and a variety of goods and materials were exchanged between participating parties. From what is known about exchange (see Luomala 1978; Shackley 1982), it is likely it was conducted through long range groups and individual trading partners (Earle 1982; Hughes and Milliken 2007; Mauss 1950; Sahlins 1972). Although down the line bartering may have taken place, it is thought to have played a secondary role (Earle and Ericson 1982:77-78). As documented by Luomala (1978:601-602), the Kumeyaay for the most part traded directly with their neighbors.

Being Hokan speakers, the northern and southern Kumeyaay (including the Kamia) likely originated from the western Arizona/northern Sonora Desert area where other Hokan groups currently reside. It is likely that the ancestral Kumeyaay were associated with the Hohokam peoples and possibly the Hakataya culture which has been identified archaeologically in the southeastern part of California (Shackley 2004). Ethnohistorically, these ancestral groups could be subsumed under Patayan Period/Tradition, which has been broken down into three phases ï Patayan I, II, and III (Waters 1982). Archaeological evidence has suggested that Patayan I (A.D. 600-1000) began with the production of ceramics near the Colorado River, the use of small projectile points, cremating the dead, and maize agriculture (Shackley 1982:12-33). Presumably, the nascent population centered on the Colorado River (Shackley 2004:17), although additional settlements have been found (Shackley 1982:21) in the eastern Lake Cahuilla (Salton Trough) region (Figure 2-2). It is during this period that the freshwater Lake Cahuilla was present within the trough.

During Patayan II phase (A.D. 1000-1500), use of ceramics became widespread and new pottery types arose, possibly reflecting changes in diet and intensive adoption of maize agriculture. It is likely that Patayan II was also associated with the various in-fillings of Lake Cahuilla located in the Salton Trough (now partly filled with the Salton Sea) in the Imperial Valley (Figures 1-1 and 2-2). This particular body of water drew populations from the surrounding area owing to the rich resource base. It is likely that population was high, especially around the shoreline (Wilke 1978:103-107).

By Patayan III times (A.D. 1500-1769) the lake had become desiccated and occupation around the lakeshore dwindled. Lake Cahuilla populations likely dispersed to the Peninsular Ranges and the Colorado River. Agriculture may have been further intensified in the Colorado River region and a highly mobile hunting and gathering strategy may have been adopted by groups occupying the desert foothills and coastal mountains. Archaeological presence is demonstrated by Patayan III ceramics types within these particular areas. Patayan III abruptly ends with the incursion of the Europeans who disrupted native lifeways and traditional practices. Continuity with ethnohistoric Yumans (Colorado River) and the Kumeyaay is documented through early accounts by Spanish explorers and the missionary fathers (Shackley 2004).

Clearly, the presence of a large freshwater lake within an extremely arid environment created a physiographic anomaly. The lake, which stretched across the Salton Trough, was a consequence of the Colorado River periodically changing course and infilling the trough which is several meters below sea level at its lowest point. Based on stratigraphic evidence and C14 dates (see Waters 1983), the first stand was around A.D 700-890 and was followed by recession that may not have led to a complete evaporation. It has been estimated that the lake took 20 years to fill and that the high water mark was somewhere near 12 meters above mean sea level (AMSL). Once the Colorado River resumed its natural course, the lake would begin to desiccate. It probably took 60 years to totally evaporate each lake stand (Hildebrand and Hagstrum 1995:94).

The second full lake stand appears to have occurred at A.D. 970-1150. This was followed by another recession, and possibly complete desiccation in the early 13th Century, which in turn was succeeded by a third complete filling in A.D 1230-1300. Another partial filling is purported to have occurred in the early 15th Century, which was followed by a full stand in A.D 1450-1500. The last stand is problematic but has been documented by excavations at the Elmore Site in Imperial Valley (Rosen 1996). This proposed lake chronology is subject to alternate interpretations due to less than accurate radiocarbon dates and stratigraphic interpolations that fail to document degree of lake levels during recessional periods and amount of salinity in lower stands (Hildebrand and Hagstrum 1995:92-93). Geologic and historic evidence suggest that there were at least six separate lake stands and that the last stand was possibly between A.D. 1625 and A.D. 1640 (Laylander et al 1993). Based on early Spanish accounts there was no water in the trough during the initial and subsequent exploration of the Colorado delta region (Wilke 1978:50-55). Certainly by the time Alta California was colonized in 1769 there were no large bodies of water in the inland regions of southern California. Once the final stand of the lake had peaked (possibly drying up within two generations) the effect on local populations must have been extreme. The lake evidently provided a lacustrine environment that contained diverse and readily accessible food resources capable of supporting large aggregate populations. Lakeshore residents likely took advantage of available waterfowl, freshwater fish and shellfish, and plant resources. Once the lake dried up, the Kumeyaay (and other lakeshore inhabitants ï e.g., Cahuilla) resettled in the foothills, mountains, and coastal areas of San Diego.

Likely too were demographic and socioeconomic changes. As documented by Phillip Wilkeõs extensive study of ancient Lake Cahuilla, population was tied to resource availability (as evidenced by settlements and fishing weirs which followed the receding shoreline) and the various lake stands (1978:118-129). Population most certainly decreased and social organization was adjusted to adapt to the reduced resource base. As indicated by site distribution during the Late Prehistoric/post-Lake Cahuilla period, the Kumeyaay adopted a highly mobile settlement pattern that took advantage of resources in differing ecozones (Luomala 1978:599-601). Social organization likely developed into flexible lineage based kin groups that were mobile as opposed to the more sedentary organization of the past (Wilke 1978:129). Flexible lineage-based groups were loosely organized around principal villages that were tied to outlier sites logistically located near vital resources (Laylander 1997:179-181).

Religion and the *Chingichngish* Cult

Religion among the Kumeyaay was less developed than with the Luiseño and Cahuilla. Shamanism was strongly developed within the society but strong cult practices as the toloache movement were not as prevalent as with their northern neighbors. It is true that the *Chingichngish* cult did spread to the Kumeyaay, but it did not reach the climactic state seen in the Tongva/Gabrielino and Luiseno. Nevertheless, this apparent órevivalist cultô was practiced throughout Kumeyaay territory (Dubois 1908). The cult, which apparently originated in the Tongva/Gabrielino territory, was closely tied to *toloache* belief systems which evidently predated the more millenarian *Chingichngish* (Boscana 1978). In fact, it is likely the *Chingichngish* was a direct result of post-contact disruption and demographic collapse due to disease (Bean and Vane 1978:669; DuBois 1908:121-122; Phillips 1996:15-17). According to myth, sometime after contact a shaman-like hero named *Chingichngish* taught the Tongva/Gabrielino a new belief system that was syncretized from earlier beliefs. Originating at *Pubunga* (near Long Beach), the movement quickly gained momentum, spreading first to the Luiseno and then to the Kumeyaay. Although it is unknown when this movement began, it is strongly suspected that its origins were in the Protohistoric Period, possibly as a result of European contact and the introduction of Christian ideas. Some researchers believe that the brief but portentous Vizcaino visit on Santa Catalina Island in 1602 was responsible for the first development of this new faith which seems to be a syncretic merging of traditional and Native beliefs. It is felt that disease was the trigger that launched this unique and far reaching revitalization movement (Phillips 1996:16-17). Certainly the *Chingichngish* movement added a certain richness to ceremonial life (especially in regard to initiation rites), and it was not totally foreign to recipient native cultures. With the Kumeyaay, *toloache* cults were likely deeply embedded in the ancient past. Songs and dances were also commonplace. Annual mourning ceremonies (carried out approximately a year after the death of a tribal member) and the *Keruk,* another memorial service, were deeply rooted and were highly ritualized. Each ceremony was orchestrated by the clan chief and sub-chief and may have had a redistribution feature where food and other goods were given freely to participants (Luomala 1978: 603).

What’s in a Name

From the time the Kumeyaay were initially contacted there has been a plethora of names applied to the people who occupy what is now San Diego and Imperial counties and Northern Baja California. Whether early explorers and ethnographers truly saw differences in the many discrete groups they encountered or whether their epithets were arbitrarily applied is unknown. What is known is that at least 15 separate tribal designations were used over the past four centuries. What then is the legitimate name for these people and how does this name relate to the socio-cultural make-up of an apparently diverse population?

Currently the descendents of the prehistoric people prefer to identify themselves as the Kumeyaay. The word *kameya’y* loosely means óthe steep ones, those from the cliffsô (Langdon 1975:68). Beginning in the early 16^{th} century many cognates arose from its alliterating modification by early Europeans. ó*Kamya, Comeya, Comaiyah, Co-mai-yah, Comedas, Comoyatz, Comoyee, Quemaya, Camillares, Comoyalis,* and *Kamia*ô have all been used to identify this group of people. The terms Ipai (i.e., northern people) and Tipai (i.e., southern people) are still occasional used by some ethnographers but the general consensus appear to prefer to the term Kumeyaay. óDiegueñoô, although used extensively during the latter half of the 19^{th} and first half of the 20^{th} centuries is somewhat out of vogue due to its connotations to the San Diego Mission (Shipek 1981:296). Linguists, however, continue to refer to the language as Diegueño. Within the Kumeyaay, or Diegueño, language ï a Yuman language family (Hokan stock) ï there appear to be four, possibly six, dialects along a north-south gradient. These dialects apparently were mutually intelligible especially along bordering groups (Shackley 2004:2). It is also likely that linguistic features found throughout the Kumeyaay territory facilitated the apparent movement between localities and differing kin groups.

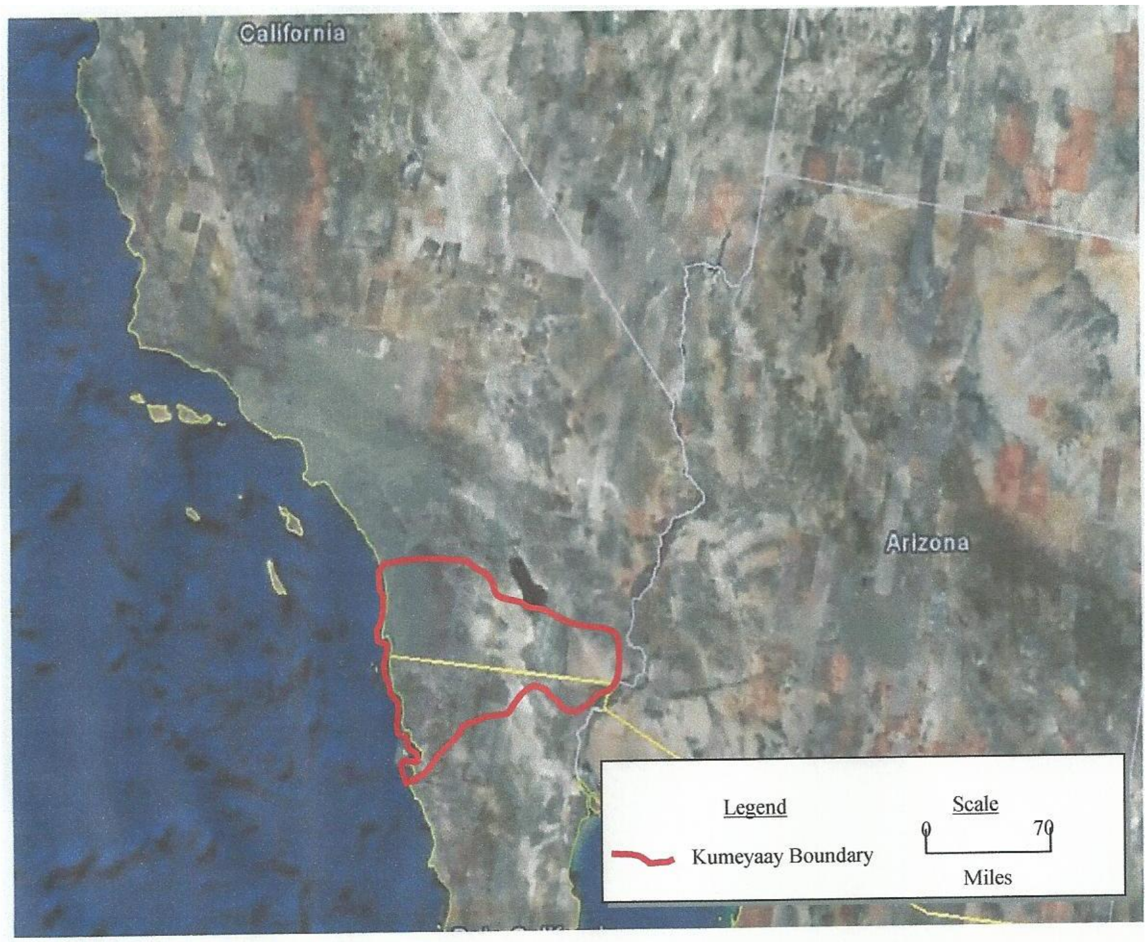

Figure 2-3: Kumeyaay territory (Imagery courtesy of Google Earth)

The Rise of Complex Hunter/Gatherers in the Southern California Bight

> In this part of the Santa Barbara Channel, according to my argument, there landed some Chinese, or person of great skill in his handicrafts and the rest. Because of this superiority the nation has gone on progressing as it has increasedé
>
> (José Longinos Martinez, *California in 1792*)

Early explorers, and researchers, have long noticed that the Chumash of the Santa Barbara Channel (Figure 2-1) were strikingly more óprogressedô than tribal groups north and south of them (although the neighboring Tongva/Gabrielino were just as impressive as the Chumash). As indicated above, the naturalist José Longinos Martinez felt that this advanced state of cultural development was directly related to outside influences (i.e., from a more ócivilized, society). Indeed, this thesis still resonates in the literature. Recently, it has been suggested that critical diffusionist traits were introduced into Chumash society by wayfaring Polynesians (Jones and Klar 2005:457-484). Whether from trans-pacific contact or some other reason, it is irrefutable that the Chumash and the Tongva/Gabrielino society reached a high level of complexity which was blatantly obvious to early observers.

What then could have been the reasons behind the rise of complex hunter gatherers in southern California? As would be expected, many theories have been forwarded to explain this peculiar situation which had far reaching consequences for all Native peoples living on the California Bight (Figure 2-4). Due to its effect on the Kumeyaay and other neighboring groups, it behooves us to investigate this problem to demonstrate exactly how cultural florescence in the Santa Barbara Channel interfaced politically and economically with polities less complex.

Cultural Development in the Santa Barbara Channel

Most researchers will agree that the Chumash seemed to have experienced an extraordinary jump in cultural complexity in what is called the Transitional Period, that

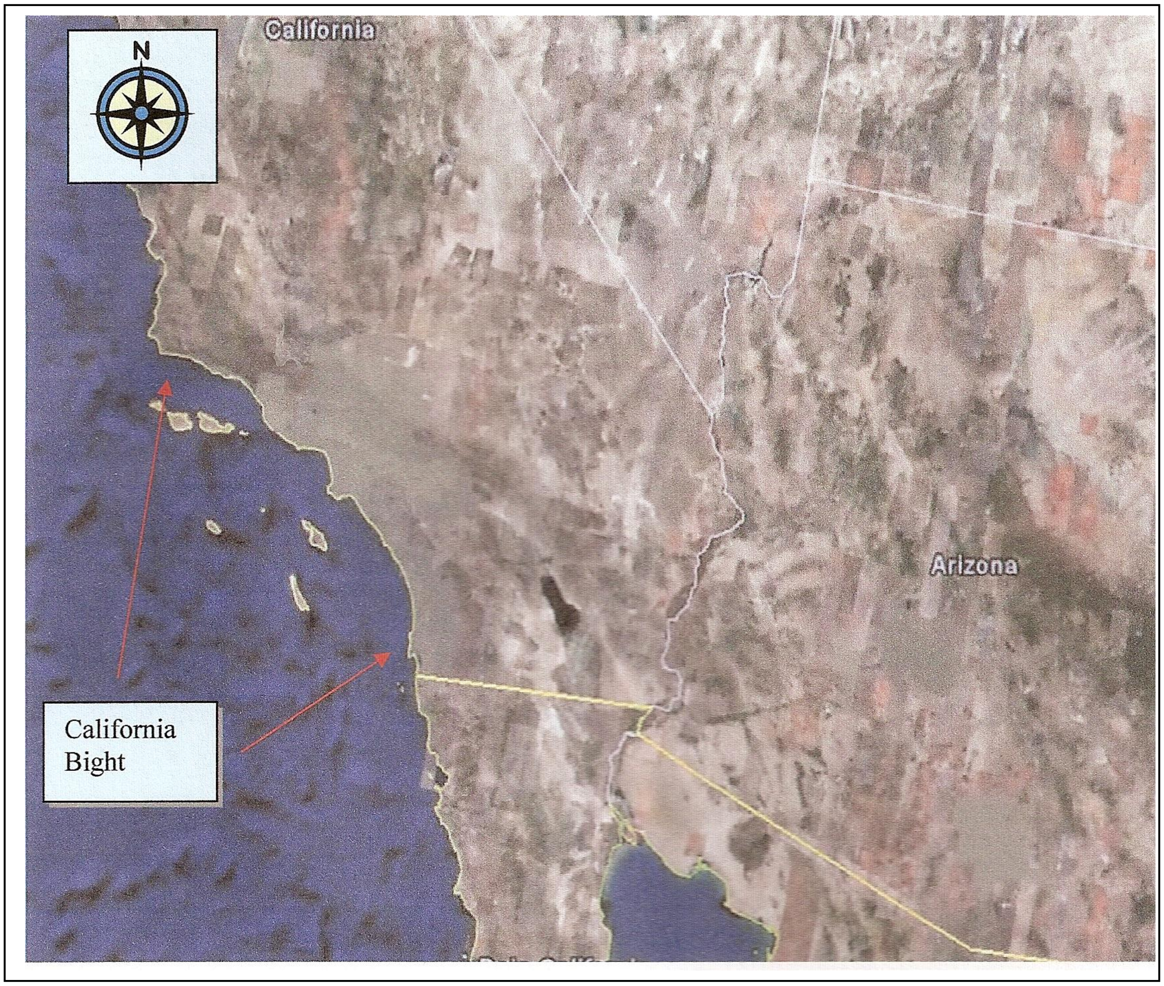

Figure 2-4: The Southern California Bight (between red arrows– imagery courtesy of Google Earth).

period falling between the Middle and Late Periods (Kennett and Kennett 2000:381; Kennett 2005:209-216; Arnold 1987:4, Arnold et al 1997:302; Arnold and Munns 1994:475; Raab and Larson 1997:320). Unfortunately, there is little consensus as to what precipitated this change. Basically there are three views 1) The Chumash culturally evolved due to the complex redistribution of diverse resources within an inter-village exchange system; 2) the Chumash experienced environmental stress due to increased Surface Sea Temperature (SST) which negatively affected aquatic resources and triggered a series of socioeconomic adjustments; and 3) Severe drought led to various cultural adjustments involving factors which eventually increased cultural complexity. The first scenario, forwarded by Chester King (1976, 1991), basically utilizes cultural evolution and social evolution to explain how the Chumash progressed over several millennia to become possibly one of the most complex hunter/fishers/gatherer societies on the Pacific Coast. He infers that the relatively stable environmental conditions enjoyed by Chumash led gradually (and inevitably) to socioeconomic elaboration. Data stemming from ethnographic and current environmental sources are the cornerstones of his theory and form the theoretical shell from which he postulates uninterrupted cultural evolution of prehistoric societies along the Santa Barbara Coast. Unfortunately, this perspective has been recently attacked for its uncritical use of historical data to infer functions and meanings to artifact (e.g. beads) and features (e.g. burial lots) in the prehistoric era. Linkages to the distant past are also said to be vague and the conclusions drawn unconvincing (Arnold and OÕShea 1990). Yet, his approach remains somewhat relevant as it does demonstrate cultural evolution in the Chumash and the development of complex social systems.

The second model, proposed by Jeanne Arnold (1987, 1991, 1997), uses an environmental approach to explain the sudden appearance of ranked social structure towards the end of the Middle Period and the beginning of the Late Period, here termed the Transitional Period. It is her contention, as well as some her colleagues (Colton 1995; Arnold and Munns 1994), that perturbations in the SST led to stress induced collapse of Chumash society and triggered social stratification (Arnold 1995:302). Basic to Arnoldôs theory is that ôbad timesö (increased SST) opened the door for certain opportunistic individuals who had access to ônodesö of transportation and particular sources of valued raw material (1987:251-253; 1997:302). While this appears to somewhat deterministic, she contends it is not, saying that other factors such ôé human agency, political maneuvering, and labor control are also at workö. Unfortunately, the exact nature of these factors and their role in creating the observed changes is not described. Morever, the SST while likely to have fluctuated over the millennia, may not have been as critical a factor as Arnold has implied. Several researchers have criticized her approach (see below) by saying that Chumash society likely had means of adapting to frequent and sometimes devastating increases in the SST, which disrupts kelp beds and depletes certain aquatic resources. To be sure, it appears in some cases that increased SST does not affect all marine resources and that certain marine mammals are not affected (Raab and Larson 1997:326). In any case the argument that SST helped to trigger cultural elaboration does have its merits, but more research obviously needs to be done. As added note, Arnold does mention drought as a factor but does not elaborate on it (1992:89; 1997:302). This omission is unfortunate because it appears to have been a synchronic event with elevated SST, and is likely to have played a role in disrupting native society.

The last model to be discussed is the one forwarded by Mark Raab and Dan Larson (1997). It, like the other two discussed above, has its merits and drawbacks. However, this theory appears to be most convincing. Not only does it provide a well laid out argument, but it also draws upon a variety of regionally-derived data sets, which further strengthens the overall thesis. Briefly, it entails the gathering of data derived from pollen, tree ring, and C-14 analyses to demonstrate that a regional drought occurred between AD 800 and 1400 that affected prehistoric societies throughout the Southwest. Termed the Medieval Warm Period (or Medieval Climatic Anomaly) this block of time is characterized by warm dry conditions around the world and recurrent droughts in California (1997:325). From their research they see a direct relationship between this climatic anomaly and rapid (punctuated) cultural changes in southern California. What makes this argument so provoking is that there are so many investigative foci in their study. They not only cite numerous examples in the Southwest, but also incorporate data from an investigation conducted in San Diego County. The San Diego study, carried out by True in 1990, documents the occurrence of drought conditions in the county during the same time period (i.e., Medieval Warm Period). True, in analyzing the data, saw distinct changes in settlement patterns which may have been related to a drying-up period with reestablishment of villages along more permanent water sources. Although this model too has its drawbacks, it does seem to be born out by on-going research. Drought and lack of water was evidently a recurring theme in California prehistory, and Native societyǿs response to these conditions was probably significant.

Although it has been demonstrated that climatic perturbations occurred along the Southern California Bight, the exact mechanisms triggering sociopolitical complexity are not absolutely clear. According to Arnold (1987, 1992, 1997) higher SST was the kicker that led to social stratification among the Chumash. She cites numerous conditions that possibly led to craft specialization and ultimately to a ranked political structure. Included in her list of possible triggers are óé environmental or social stresses, political opportunism, and elite control over domestic laboré ô(1992:62). She argues that the shift from ósimpleô to complex hunter/gatherers is not a mere matter of social process but a distinct response to stressful conditions, such as ósudden or sustained imbalances in resource-population relationships or external social disturbancesö. Taking data acquired on Santa Cruz Island (Figure 2-4) she demonstrates that higher SST led to lithic and bead production specialties that in turn encouraged the development of elites that were vaguely óattachedô to the specialists (Arnold 1994). The elite class eventually became part of the *antap* society which had differential access to particular nodes of transportation (i.e., the plank canoe). By monopolizing the access to valued resources and the means to transport these resources certain aspiring individuals became more powerful.

Convincing as this theory may be, it has been challenged by several Chumash scholars. As we saw above, some researchers see higher SST values as a questionable factor in food-provisioning problems. They feel that reoccurring arid conditions are more relevant in explaining social evolution in the Santa Barbara Channel area. Still others believe that the perceived climatic variations had little to do with the rise of social complexity. Lynn Gamble in a concise review of the inherent problems with paleoclimatic variables has convincingly shown that sociopolitical factors may have been instrumental in the development of complex societies in the Southern California Bight (2005:102). Although she concedes that climate has indeed varied during the late Holocene, she feels that adaptive measures could have been taken by Native groups that would have allowed them to make adjustments to changing climatic conditions. Such things as diversification (cf. Halstead and O'Shea 1989) could have been just as easily resorted to in times of need. The flexibility inherent in hunting and gathering societies would have allowed for storage, exchange and mobility. Gamble cites a number of examples for each strategy, exemplifying the inherent flexibility of native groups and the ways they minimize risk during short term perturbations in climate (2005:99-101). She also cites evidence that ranked society among the Chumash may have begun much earlier, possibly during the Middle Period (Gamble 2005), which counters the Arnold theory. Overall, this research stands starkly opposite to the foregoing schema. While changing climate is not negated, the causal connection between it and emerging social systems is incisively contested. Unfortunately, many questions are left open and further research is clearly indicated; however, this line of research may prove to be highly fruitful in understanding culture change among complex hunter/gatherers worldwide.

The Development of Interregional Trade Systems

Kroeber (1936) was one of the first ethnologists to attempt an explanation for the evident high level of culture complexity of Channel Island tribes. Using what he called the culture climax concept he subjectively classified California tribes by level of development. Due to the exceptionally high level of complexity seen in the Santa Barbara region, he classified it as one of the three main climax areas in California (see Landberg 1965). His opinion of the area was so high that he felt these maritime based peoples were possibly influenced by trans-Oceanic contacts (Landberg 1965:2-3). As illustrated early on in this chapter, Kroeber was not alone in this assessment. Many early explorers were duly impressed with the level of cultural complexity in these Channel Island Indians.

Almost without exception these early observers saw the Chumash and their southern neighbors as óindustriousô, hard working, and skillful traders. As an early account relates:

> é they are inclined to work, and much more to self-interest. They show with real covetousness a certain inclination to traffic and barter, and it may be said in a way that they are the Chinese of California. In matters concerning their possessions, they will not yield or concede the smallest point (Pedro Fages in Priestly 1937:31).

Thus, several verifiable facts seem to stand-out for the Channel Island area; that is, 1) sometime during the Late Period some form of climatic change occurred; 2) the particular form of this climatic perturbation is problematic; 3) overall population appears to have increased during the Middle and the Late Periods; 4) increased sedentism apparently took place in the later periods and; 5) sociopolitical complexity becomes more evident during these time periods. Although the functional interplay between these factors is poorly understood, archaeological, bioarchaeological, and ultimately ethnographic data appear to support these occurrences. What also seems to be evident during this time period is an exponential increase in trade (Arnold 1987, 1991; Gamble 2005; Kennett and Kennett 2000; King 1976, 1990). How exchange became important to the Chumash and Tongva/Gabrielino is profoundly relevant to the understanding of socioeconomic and sociopolitical changes in the greater southern California interaction sphere. What cultural changes were transpiring in the Channel Island archipelago has great import on the piecing together the observed variance in settlement patterns and social structure in more southern polities under discussion here. Based on the distribution of beads and other ornamental artifacts, trade emanating from the Channel Islands was both intensive and far-reaching (King 1990).

It is obvious that by the time the Spanish first arrived along the Santa Barbara coast, the Chumash (and the Tongva/Gabrielino) were avid traders who carried out lively exchange between and beyond internecine villages (King 1976). Exotic artifacts found in the Channel Island region attest to pan-regional trade (King 1976:315; McCawley 1996:112) and document the extent of the interaction sphere. When this exchange began exactly and how it operated is only partially understood. It is known that *Olivella* Grooved Rectangle (OGR) beads, which are thought to originate in the southern Channel Islands, are found at various locations on the mainland (Howard and Raab 1993; McCawley 1996; Vellanoweth 2001). An early to Middle period bead type, it has been found as far inland as the Colorado Desert in western San Diego County (McDonald 1992:281). Given the distribution of these beads and other ornaments typical of early Holocene periods, it is obvious that the Chumash (or proto-Chumash) interaction sphere was likely operative from a very early date. In San Diego County there is additional evidence that bead and other artifacts from the Channel Islands were present, albeit in small quantities. Santa Catalina Steatite (in the form of a bead) has been reported along the coast (OõNeil 1993:526) and steatite has been found in the desert areas (Treganza 1942:157). Shell beads found here range from saucer and barrel types to *Haliotis* sp. disk types. Although these beads are not particularly diagnostic, they do point to a degree of interaction, albeit minimal, with the Channel area. The reason why beads and other exotic artifacts are so poorly represented in San Diego County is not clearly understood. This particular anomaly will be discussed in Chapter 3.

By Late Middle Period, exchange systems appear to have been jumpstarted. More types of beads appear to have been produced as well as more beads altogether seem to have been in circulation. This increase in beads and ornaments apparently occurs concomitantly with the increase in social complexity. King in his exhaustive study of Chumash evolution (1990) believes that through time the use of beads becomes less political and religious and more secular in nature. This he feels may have triggered a monetized system based on shell bead currency (1990:183). While his theory has merit, it has been criticized as óbeing undefendedô and has no precedent in indigenous hunter-gatherer groups (Arnold and OõShea 1993:770). Nevertheless, King provides a framework on which to hang a puzzling array of beads and chronometric indicators. His baseline data has provided the groundwork for many subsequent studies.

This exponential rise in bead use is clearly seen throughout southern California. As I will be demonstrating in later chapters, the apparent floodgate phenomenon in the Santa Barbara region had a ripple-like effect throughout the southern part of the state. Beginning in the Late Period, beads had become relatively common artifacts among the neighboring tribes in every direction, suggesting that mercantile interaction increased with these groups. Whether this exchange followed down-the-line bartering or long distance trading is not definitively known. However, there is some evidence that the latter did occur on occasion. Father Garces, while traveling westward from the Colorado River to Mission San Gabriel, observed trading parties making their way to the coast óé for their commerce in shellsô. It is likely that down the line trading and ritual exchange (via ófiestasô and other ceremonies) also occurred, although historic and early accounts are somewhat mute. One account, however, says:

> All these Indians are fond of traffic and commerce. They trade frequently with those of the mountains, bringing them fish and beadwork, which they exchange for seeds and shawls (tapalos) of foxskin, and a kind of blanket made from the

> fibers of a plant which resembles cottoné (José Longinos Martinez in Simpson 1938:44-45)

In a brief summary on Tongva/Gabrielino economic principles, William McCawley (1996:114) outlines the salient features of prehistoric exchange systems among native groups in the southern California Bight. Although this discussion is directed toward the Tongva/Gabrielino, the outline was put together using data previously acquired for the Chumash. The outline is as follows:

1) Food and manufactured goods were kept in circulation through trade networks and ritual exchanges.

2) Manufacturing was promoted by the evolution of craft specialists who were organized into professional associations (or guilds).

3) The development of professional associations promoted trade among the communities by establishing a network of partnerships that extended across political boundaries.

4) A standardized medium of exchange was developed using *Olivella* shell beads.

5) An hereditary chief was frequently the most important entrepreneur in trade activities.

6) Ritual destruction of food and manufactured items during ceremonial activities, such as mourning ceremonies, may have served to restrict the amount of goods available at one time. The constant need to replace these

goods helped maintain a demand for skills and services of the Native craftsmen.

Summary

From the above review, it will be obvious to the reader that the Kumeyaay certainly did not reach the level of cultural elaboration achieved by certain groups to the north of them. Possibly owing to distinct differences in climate and resources, the Kumeyaay did not evolve into fully fledged complex hunter-gatherers. It is well known that the Kumeyaay and other adjacent groups did not the have the available water sources that more northerly polities enjoyed (see True 1990). Currently, San Diego County precipitation averages only 11 inches annually and is often in a state of drought. Ethnohistoric studies confirm this tendency and it has been shown that the Kumeyaay often had to contend with shortfalls in water (Shipek 1981). This factor, while not necessarily the overarching variable in Kumeyaay lifeways, did put a limit on the size of human populations in this particular section of the State. In this regard, it is interesting to consider the rise of complex groups north of the Kumeyaay. It could be that the dialectic between social structure, subsistence, and available resources was the critical variable that triggered the rise of complex societies in the California Island Archipelago. Borrowing from principles developed by human behavior ecologists, the elaboration of cultural systems may be simply related to a fortunate suite of factors relating to latitude and physiographic anomalies. The Santa Barbara Channel is favored due to its south facing coast and the island chain that buttresses the coast from unfavorable weather. This factor, taken together with favorable upwelling currents that gave rise to rich fisheries and aquatic resources, created dense resources with ôhigh return ratesö. According to some researchers this frequently leads to population growth and increased sedentism (Kelly 1995:151; Kennett 2005:1-9). The foregoing scenario appears to be more in line with Gambleôs assessment discussed above and seems to agree with the data better. As shown by Kennett and Kennettôs research on the northern Channel Islands climate may be a factor, but ultimately the sociopolitical complexity seen on the southern California coast is óé a product of longer processes including population increase and reduced mobilityô (2000:391).

To return to the Kumeyaay, it is an incontrovertible fact that the relatively rich cultural array found in the Channel Island region had an overarching effect on neighboring polities. Any attempt to understand Kumeyaay sociopolitical and socioeconomic factors must include this particular dynamic. As we will see this effect was of such a magnitude that even after the devastating effects of disease and acculturation, the Chumash interaction sphere continued to be operational long after European contact.

Chapter 3. Beads: Their Use and Distribution in Native Society

Background

Beads have been used world wide for many millennia and were likely first used as decorative objects. The earliest evidence for their use comes from the Middle Paleolithic (ca. 135,000-92,000 BP) sites in the Levant, where bead-like objects were found associated with a Middle Paleolithic occupation. The beads, which were made from shell (*Glycermis insubrica* and *Nassarius* sp.), were likely worn as pendants (Mayer et al 2008; Vanhaeren et al 2007).

From these humble beginnings beads slowly evolved into a plethora of shapes, sizes, and material types. By 31,000 B.C beads were beginning to be used in great quantities and were likely linked to magico-religious practices involving an elaborate structure of symbolism. These beads, dating from about the same time as the intricate cave paintings in southern France (and elsewhere), probably had symbolic significance that went far beyond the elementary decorative value of the object. Like the paintings, beads during this period őé required extraordinary time and effort, which underscores the likelihood that they had symbolic meaning.ô(Klein and Edgar 2002:265).

The pattern of bead use established in the Upper Paleolithic continued through to the Neolithic Period in Europe and the Middle East. However, once populations settled and began to practice agriculture, bead use took on new meaning. As objects of beauty and rare value, they became instrumental in the establishment of trade and long distance exchange between settlements. As a medium of exchange, beads helped facilitate redistribution in areas where resources were unevenly distributed (Dubin 1987:30). By the fourth millennium B.C., stone, shell, and coral beads had become integrated to a complex commercial network that encompassed most of the ancient world.

Beads in the New World also occur early on in the archaeological record. Possibly the earliest find is in Nevada at the Tule Springs site, where a bead was found made from hardened calcium carbonate that was dated at 11,000 B.C. (Dubin 1987:25). Although the dating at this site has been questioned (Fowler and Madsen 1986:173), the antiquity of this artifact remains significant (Ó6000 B.C.). Certainly by this date, beads were being manufactured and used throughout the New World. In California, shell beads have been dated to 7500 to 8000 years ago and have been documented at numerous sites throughout the state (King 1982:49; Kirkish 1999:5.0-44). As in the Old World, early bead use in California was purely decorative (King 1990). However, by Middle Period times (1400 B.C. to A.D. 1150), changes were occurring in social systems, and ascendancy of hereditary and semi-hereditary leaders were becoming evident (Arnold and Munns 1994:477; King 1990:326-327). Possibly relating to these changes was the appearance of new bead types signifying a new emphasis based on prestige and power (as based on differential grave goods). Although this shift is mostly evident in the Santa Barbara Channel area, it is likely that that social complexity was slowly increasing throughout the southern part of the state.

By the end of the Middle Period (ca. A.D. 1150), beads were being made from the callus portion of the *Olivella biplicata* shell. These beads, coming from the harder and more calcareous part of the shell (see Figure 3-1), were more difficult to manufacture and thus more valuable as trade objects. Possibly for this reason these beads became ómoney beadsô and were traded throughout the area (Gibson 1992:27). Other beads were also beginning to be traded at this time, but these were made from the wall section (see 4-1), and were an outgrowth of decorative types from the earlier period. These beads were probably exchanged between prestigious individuals to assist in the maintenance and management of social networks.

Beginning in the Late Period (A.D. 1150 ï 1840), exchange systems throughout California had reached a high point, and beads as a medium of exchange were being utilized by all native polities. In the northern part of the state clam shell discs were the primary money bead, while in the south *Olivella* callus beads such as cupped and cylinder were highly valued as currency (as evidenced by ethnographic accounts). What triggered this proliferation of exchange is largely unknown, but it is possible that an increase in population and changes in climate may have precipitated it (Arnold 1987:252). Whatever the case, trading between groups and individuals was a common occurrence and the use of shell beads was widespread. Archaeologically this widespread and intense networking is documented by the presence of shell beads in the Great Basin (and the Southwest) and the occurrence of Southwestern trade items such as turquoise and Puebloan pottery in the California desert (Davis 1974; Hughes and Milliken 2007).

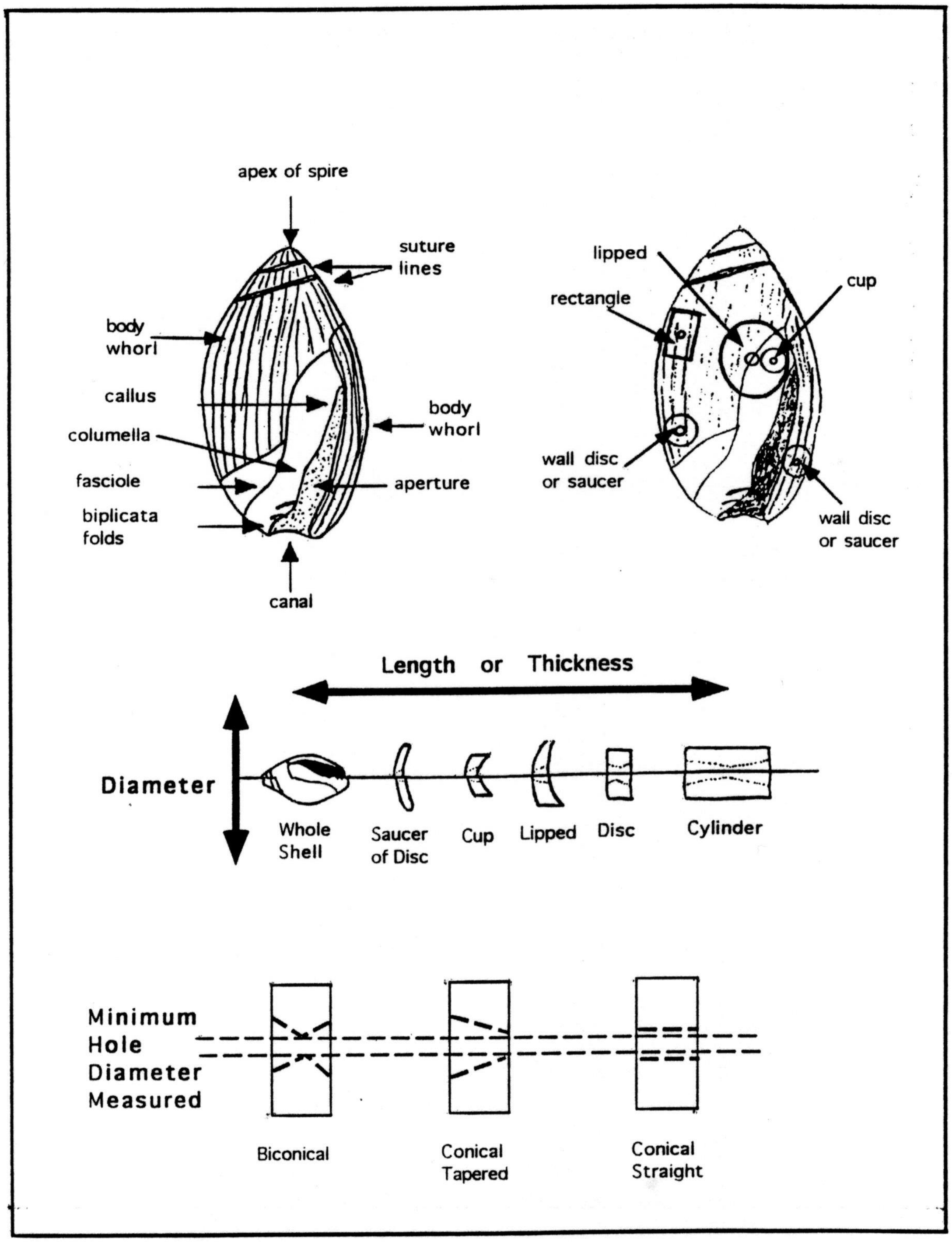

Figure 3-1: Olivella biplicata shell features and bead manufacturing foci (from Gibson 1992)

Bead Use in Native Society

As discussed above, bead use in Native California has ancient roots. However, it is not until the Late Period that bead use acquired new meaning for indigenous societies. Beginning at the end of the Middle Period (ca. 1400 B.C. ï see Table 3-1) bead production intensified with certain beads becoming dominant (Arnold 1987:228-233). These beads, made from the callus portion of the marine mollusk, *Olivella biplicata* (Figure 3-1), began to increase substantially with the rise of the Chumash in the Santa Barbara Channel area. The reason for the increase has been attributed to the intensification of trade and the emergence of hierarchical societies (King 1990:199-200). It has also been postulated by Jeanne Arnold (1987:252) that drought and changes in the sea surface temperature (SST) led to shortfalls in terrestrial and marine resources on the Santa Barbara Channel Islands and this led to various socioeconomic changes. Primary to this theory is that trade became an important means of compensating for shortfalls and that certain kin groups on the islands became instrumental in the production of shell beads due to their proprietary access to key resources such as *Olivella* shells and/or toolstone necessary for the production of microblades and bead drills. According to Arnold, the development of craft specialists may have been linked to the ascendancy of certain high ranked groups (Arnold 1987:228). Through these specialists, highly prized callus beads (i.e., cupped and cylinder) were made and traded to the mainland for needed resources. Facilitating this socially embedded system was the ôBrotherhood of the Tomolö comprising individuals who owned and maintained the extremely navigable plank canoes which plied the channel between islands and mainland. The emergence of the canoe appears to coincide with the intensification of bead production and may have played an instrumental role in the creation of sophisticated exchange systems in southern California (Arnold and Munns 1994:487; Kennett 2005: 198-209).

An alternative theory sees the social changes in the Late Holocene as a result of severe droughts triggered by what researchers call the Medieval Climatic Anomaly (Raab and Larson 1997:319-336). According to this model, prehistoric populations on both the islands and mainland experienced dramatic decreases in water sources and this led to various cultural adjustments which may have included the emergence of ranked systems and upsurge in trade and shell bead production (see Arnold 1987). Whether these factors triggered the observed changes or whether the increase in the SST was responsible is basically problematic. What remains incontrovertible is that during the Transition Period (between Middle and Late Period) social systems did change in the Santa Barbara Channel and elsewhere and shell beads seem to have played an important part in this development.

Archaeologically, callus beads such as cupped and cylinder are firmly dated to the Late Period and are mainly found in the Santa Barbara area (King 1982:253; King 1978:61). However, their appearance is not uncommon in other areas of southern California. Callus beads as well as other ómoney beadsô such as clam shell disc are found as far south as Orange and San Diego Counties and as far east as the Great Basin (Figure 3-2). While the frequency is low (counts are much lower than in the Santa Barbara area), their appearance in these areas testifies to the extensive interaction sphere that was operative from this early time period.

Just prior to the appearance of callus beads in southern California, a wide range of bead types was used by native society (Gibson 1992:40; King 1982:53-54). Of the bead types utilized, *Olivella* wall beads (Types G and J ï see Figure 3-3) are the most common. As documented by Chester Kingõs detailed study (1982) of beads in the Chumash area, these beads are often associated with high ranking individuals (*vis-à-vis* burial lot association) and were apparently used to facilitate social obligations during trade and other social interactions. They are showy beads and are pleasing in appearance (Gibson 1994:9-10). They are made from the shell wall and are normally ground on the edges. The beads were likely bleached and polished to increase luster (Gibson 1992:8). Bead diameter varies, ranging from 2.0 to 10.0 mm ($\bar{x}$ = 7.0). Generally, the earlier form of wall disc (also called saucer ï Type G) occurs in both large and small sizes and is first found in Middle Period sites. Eventually, saucer beads (Type G) grade into wall discs (Type J) towards the beginning of the Late Period. *Olivella* wall discs are often hard to distinguish from saucers, but generally saucers are larger in terms of diameter and hole size.

As discussed above, callus beads were first introduced during the Late Period, following an apparent climatic or environmental disruption which compelled Native Californians to intensify trade to compensate for shortfalls in vital resources. This transition, although difficult to document archaeologically, is dramatically indicated by an exponential increase in bead use during this period. New bead types also appear during the Late Period and these were broadly associated with the population at large. In short, they were less exclusive in distribution than wall discs and other ôhigh statusö beads and are often

Figure 3-2: Southern California and Great Basin physiographic regions (retrieved from www.vacationidea.com).

found evenly distributed throughout Late Prehistoric burial lots (Kirkish 1992:85). At the Medea Creek cemetery in Ventura County, wall disc beads and other particular types (*Haliotus* tube, *Hinnitis* tube, etc.) continued to be associated with high status burials, but unlike in previous periods callus beads such as cupped, lipped, and columella tubes are found throughout this Late Period burial ground and are interpreted as beads available to all classes (L. King 1969; King 1974:88-89). Apparently, these beads were used by individuals and households to assist in the flow of food and durable goods during a time when there was an uneven distribution of resources throughout the study area (King 1982:328). This led to intensification of subsistence activities and the development of complex trade systems which encompassed most of the Great Basin and the southwestern region of the United States (Bennyhoff and Hughes 1987). Not only were new bead types introduced during this period, but the number of beads in circulation also increased. In short, more beads and more bead types are evident at Late Prehistoric sites.

This pattern more or less continues in the period immediately following the Late Period. Called the Protohistoric (ca. A.D. 1542 ï 1769), this period is normally marked by the appearance of European artifacts such as metal objects and glass trade beads. Although only brief encounters occurred with European explorers during this period, their contact with Native American polities had a profound effect on indigenous societies. Besides the introduction of exotic artifacts that immensely affected the socioeconomic fabric of these societies, disease and new species of flora and fauna irrevocably changed the human and physical landscape of aboriginal California (Crosby 1986; Dobyns 1983; Thornton 1987). Perhaps the most immediate change was in the economic sphere involving beads and exchange systems. With the introduction of the glass trade bead, the monetary system was forever changed (Dubin 1987:271; Gibson 1976:128). Glass beads immediately replaced shell beads as the primary currency and by the beginning of historic times, callus beads were replaced by glass beads (see Simpson 1938). With the introduction of these artifacts, cupped and cylinder beads virtually ceased to be made (King 1974:91). However, lipped beads, which first appeared in the Late Period, continued to be produced and succeeded the defunct cupped as an artifact that had marginal monetary value below glass trade beads.

Once Spanish colonization (and ultimately missionization) occurred in Alta California glass trade beads became even more valued by Native populations. Mission Indians were given glass beads to entice them to the missions and were sometimes paid with these beads to complete building projects for the missionaries (King 1990:15). Eventually, however, glass beads became less valuable as more entered the economic system. A form of inflation occurred which devalued the beads, ultimately leading to a brief resurgence of shell bead use.

Triggered in part by the relocation of Native Americans (especially the Chumash who were the premier bead makers for the region) to the missions, a new bead type arose which reflected the new conditions brought about by the European settlement of the area. This type, called rough disc, is characterized by an unfinished look with edges unground and perforations sometimes crudely drilled (Figure 3-3). Presumably, these bead types were mainly manufactured by missionized Indians who produced large amounts of beads that required less energy and time than callus beads (King 1982:300-303; Lightfoot 2005:98). One researcher has described this shift as ôThe reduction of competitive pressures and the increased potential to attain wealth and power é with both the decrease in the refinement of wall discs and an increase in the proportion of the population using themô (King 1974:91). Certainly by this time the missionization process triggered a breakdown in native social structure leading to a more egalitarian society (see Arnold

1987). Political segments gave way to the secular, and wall discs normally associated with the highly ranked became accessible to the general populace, even though these beads were less refined than their predecessors. Likely because of this, rough discs are the most common bead type found at historic sites (ca. A.D. 1770 to 1900) in southern California.

Historic and Ethnographic Accounts of Bead Use in Native California

The first European to contact Alta California was Juan Rodríquez Cabrillo. Cabrillo, who had been commissioned by the Viceroy of New Spain to explore and find if possible a passage to China, left the Port of Navidad in Mexico on June 27, 1542 and arrived in what is now known as San Diego Bay on September 28 of that same year. Naming the port San Miguel, whose saintôs day it was, he proceeded to the protective arm of Point Loma where he landed his craft (Nastir 1991:11). As he and his crew came ashore a small band of natives (probably Kumeyaay ï see Kroeber 1925:709-725) greeted them and made gestures indicating the presence of Spaniards many miles inland (likely in reference to the Coronado expedition ï Nastir 1991). After giving them gifts, the Spaniards continued to explore the harbor encountering many more natives, some of whom were friendly and others hostile (Moriarty and Keistman 1991:13). Finally leaving on October 3 they sailed north toward the Channel Islands. Anchoring off one of the islands, perhaps Santa Catalina, the Spanish encountered more natives on shore and in ógood canoesö. Glass beads and other barter goods were given to these Indians as they appeared to be very friendly and willing to trade with the Spaniards (Moriarty and Keistman 1991:13).

As the *entrada* continued up the coast, more native polities were contacted and likely more glass trade beads were traded.

This pattern of using glass trade beads to facilitate exploration was no doubt repeated with the subsequent mariners, such as Ulloa, Drake, and Vizcaino. Glass beads, which came from Venice, Italy, were inexpensive to make (especially cobalt blue cane beads) and were highly prized by Native Americans everywhere (Dubin 1987:271). Every Spanish land and sea expedition carried thousands of these beads to trade to the Indians. Possibly by the end of the 18th century countless numbers of glass cane beads were in circulation in Native California. During the Gaspar de Portolá expedition in 1769 there were many instances where glass beads were abundantly given out (Bolton 1927:124), and numerous other accounts following the initial colonization attest to the importance of these beads to the Native Californians. On December 31, 1782 Lieutenant Ortega of the Santa Barbara Presidio remarked:

> These Channel Indians are very different from the ones I have dealt with in the entire peninsula (the Californias). They have a particular inclination towards work so that if I have enough beads to hand out to them as gifts, I feel that I should be able to finish the presidio in a short time (Geiger 1965:14).

Certainly by the beginning of colonization these beads were taking precedence over shell ornaments.

Ample historic accounts also exist for shell bead use in California ï many of the early explorers reported the extensive use of shell beads and the sophistication of the Native economic practices. Pedro Fages, who referred to the Chumash as the óChinese of

Californiaö, wrote extensively on their trade and monetary use of shell beads (Priestly 1937:31).

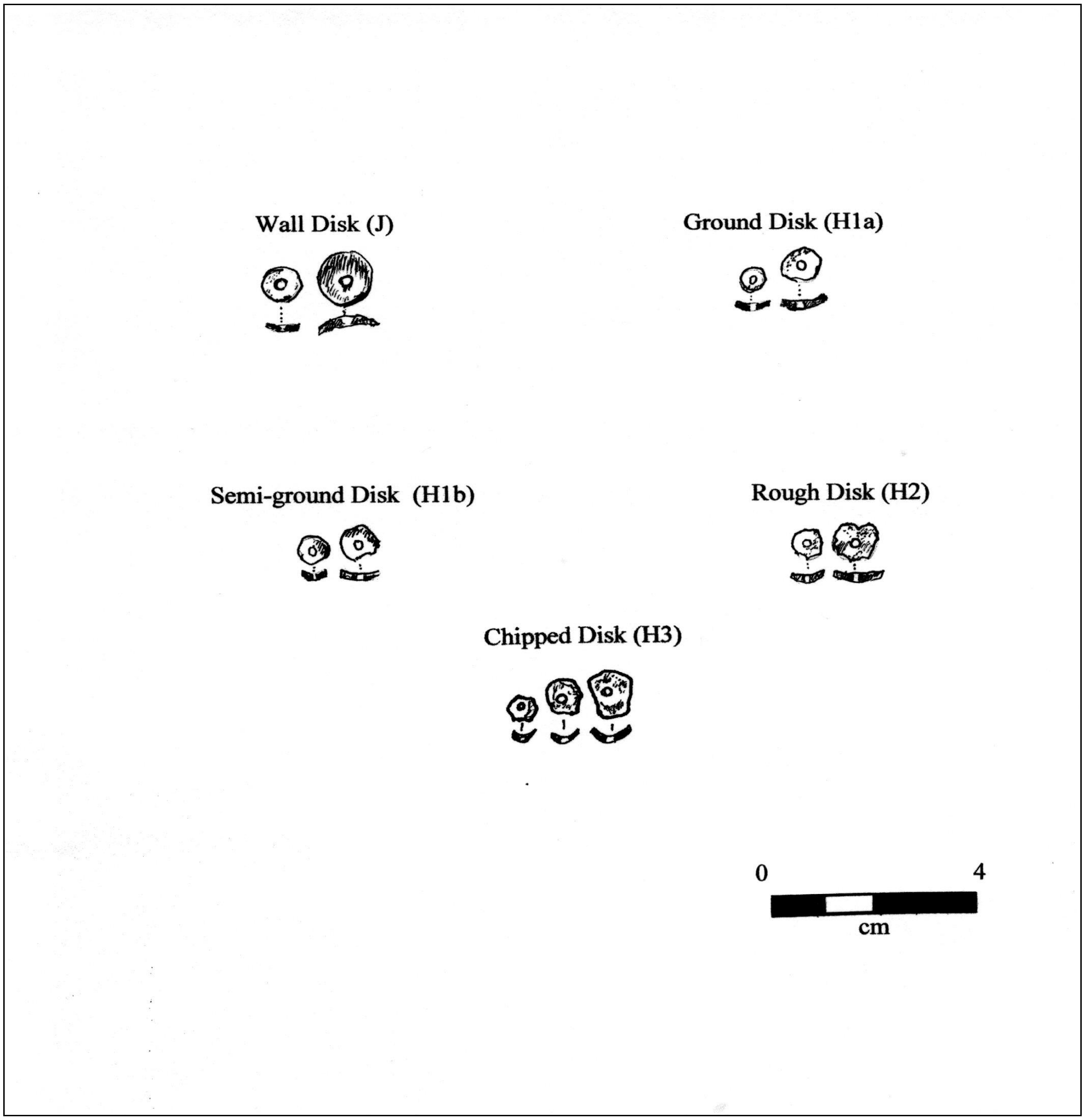

Figure 3-3: Common Late Period/Historic bead types (drawing by Kit Kirkish)

Boscana (1978:24) also reported that ốé they formed a kind of money from shells, which passed as currency among themé â Further accounts included Hugo Reed who wrote in 1852 that:

> They had an equivalent (of money), consisting of pieces of thick rounded shells, less in diameter than a five cent piece. These had a hole in the center and were strung on long strings (Heizer 1968:43).

On the manufacture of shell money, Longinos Martinez observed that:

> They make their beads out of a species of small snail which they break into pieces, shaping them in the form of lentils, then drilling them with our needles and stringing them. After the strings have been made they rub them down until they bring them to a degree of fineness, for in their conception they have more value (Simpson 1938:45).

It should be noted here that prior to European contact stone drills were used to perforate the beads. Primarily made on the northern Channel Islands, these chert drills were very small and usually hafted on a stick which was twirled between the palms (Hudson and Blackburn 1987). Due to their importance to shell bead manufacturing, production of these drills may have led to development of craft specialization on the islands, where sources of toolstone and *Olivella* shells were readily available (Arnold 1987:251-253).

Shell beads may have also been perforated with sea lion whiskers, or wood and bone drills (Hudson and Blackburn 1987). It is even possible that sea urchin spines were used as drills. As demonstrated by researchers working on San Nicholas Island it is conceivable that sea urchin spines were sharpened and used with grit such as sand to perforate beads. Detailed analysis conducted by these researchers has shown that beads could have been easily drilled using this technique (Statistical Research, Inc. 2002:10-5).

Ethnographically there are numerous references to how beads were made and ultimately used. Beginning with the linguistic work of Henry Henshaw in 1884, the nature of bead use in California was actively studied. Henshaw, while working with Chumash informants, was able to identify money beads linguistically and differentiate the various bead types used by the Chumash and their neighbors. Henshaw noted, óé a minute bead was made and strung constituting their most valuable money; the core alone was usedô (Henshaw 1884:269). The ócoreô in this context probably refers to the callus portion of the *Olivella* shell.

Further data on bead use came years later with the study conducted by William Duncan Strong. Working with Cahuilla informants, Strong was able to identify the importance of shell beads in aboriginal exchange systems:

> According to Alejo Potencio, the shell money was received from the Palm Springs clan by his grandfather who received it from the Serrano at Mission Creek. They got it from the Gabrielino, who in turn received it from the Santa Catalina Islandé Alejoös grandfather told him that the shell money was brought across from Santa Catalina on tule rafts to the San Fernando people, who distributed it among the inland groups. There was another kind of money called *somitnektcum*, óthe small onesö, composed of little shells which were much more valuable than the present large shell money (Strong 1929:95-96).

óThe small onesô mentioned here likely refer to cupped beads which are considerably smaller than the lipped and rough discs. As pointed out earlier, cupped beads ceased to be produced in the Late Period and were ultimately replaced by lipped and rough discs as a medium of exchange.

Using Chumash informants, John Peabody Harrington (a contemporary of Strong) collected an enormous amount of data concerning beads (Hudson and Blackburn 1987). Unfortunately, because of the extensive nature of these data, only a brief summary as outlined below is possible at this time:

- *Olivella* shells and disc beads were used as money by the Chumash.
- The Spanish term for money beads was *abalorio*.
- *qo'y, (Olivella)* was made into *abalorio* by old men and women.
- The Indians get *qo'y* from the islands.
- Money (like *qo'y*) always has to be a scarce commodity.
- Extensive description on bead manufacturing ï too lengthy to discuss here.
- Strings of bead money measured by wrapping around hand, called ó*ponco*ô (a standard unit of measure).

Clearly, from the historical and ethnographic accounts, shell beads functioned as an integral part of a unique economic system which encompassed most of southern California, the Great Basin, and parts of the Southwest. As noted by Marshall Sahlins, primitive money (such as beads) is rarely seen ethnographically, being primarily documented in only three areas of the world; western and central Melanesia, aboriginal California, and parts of the South American tropical forest (1972:227). If this is true, then the monetized systems documented here are truly remarkable.

A Bead by Any Other Name: An Introduction to Bead Typology for Southern California

As the first visitors observed, Native Californians had a variety of uses for shell beads. Beads were used not only for decorative purposes, but also were utilized as objects of wealth and status. It is likely that these differing uses contributed to bead style have over time.

Many researchers over the years have proposed numerous typologies accounting for these differences. Initially, classification rather than typology was the standard method of analyzing shell artifacts. Studies such as the ones conducted by Lillard et al in 1939 and Gifford in 1947 were drawn from museum collections and were aimed at simply labeling artifacts without any concern for historical or behavioral interpretation. While a much later study (Bennyhoff and Heizer 1958) addressed these issues, it still fell short in terms of areal extent and regional applicability. Not until 1987 did a true taxonomic system appear that addressed issues of time and space on a regional basis (Bennyhoff and Hughes). Called the óShell Bead and Ornament Exchange Networks Between California and the Western Great Basin,ô this seminal publication crafted a taxonomy which had regional and chronological relevance. The study, which mainly dealt with beads from the purple olive shell (*Olivella* spp.), not only had regional applicability for southern California and the Great Basin (Figure 3-2) and beyond, but also had a clear and usable taxonomy that had obvious temporal implications.

Supplementing this study is a work published by Chester King in 1990. Titled óEvolution of Chumash Society: A Comparative Study of Artifacts Used for Social System

Maintenance in the Santa Barbara Channel Regionô(revision of a 1982 dissertation), this important study, which was based on radiocarbon dates and burial lot seriation, compared changes in bead type with the evolutionary developments within Chumash society. From this investigation King was able to develop a bead chronology specifically for the southern California coast.

Further studies have been conducted on numerous sites throughout the study area which basically have confirmed and supplemented the previous schema (Dahdul 2002; Gibson 1976; Kirkish 1999; Zepeda 1999). Data from these studies have produced a more fine-grained approach. New types have been discovered (Dahdul 2002) and minor chronological adjustments have been made (Gibson 1976). Bead production studies have also been conducted which suggest multiple manufacturing areas for particular bead types (Kirkish 2004:5.3-4; Rosen 1996:13)

As discussed previously, two studies in particular have been instrumental in the creation of a usable shell bead typology ï Bennyhoff and Hughes (1987), and King (1990). While different in theoretical approaches, these two typologies do overlap a great deal and can be used concurrently. In conflating the two approaches a clearer chronological picture can be obtained and a more usable sequence created. Table 3-1 and the outline below typify this approach.

The Early Period (6000 B.C. to 1400 B.C.)

This period is characterized by the presence of rectangular shell bead forms, although round shapes also occur. Rectangular beads (Type L) found associated with this period are usually made from *Olivella biplicata*, *Haliotis,* and *Mytilus californianus*. They are normally single holed, but can also come in a two holed variety that is drilled near the center. Also found in this period are pendants which are rectangular and drilled with two holes.

In the Santa Barbara Channel, clam shell discs, stone discs and whole *Olivella* shells (Type A) with their spires removed are also found in Early Period collections. Other hallmark types for this period include *Olivella* rectangular beads with rounded corners (although by the Late Early Period these beads have squared-off corners), rectangular *Haliotis* beads with two perforations, and punched cowrie (*Cypraea spadicea*).By the Late Early Period, many of the bead types produced become standardized in size and shape. Standardization of clam shell and stone beads becomes evident as do *Olivella* spire and base removed beads (i.e. barrel beads ï Type B2).

Middle Period (1400 B.C. to A.D. 1150)

The biggest formal change in shell artifacts during the Middle Period was the switch from rectangular to circular shapes (i.e. discs and the preference for two-holed to one hole abalone pendants). Other significant developments include the appearance of ground spires that have oblique angles to the long axis of the shell, punched cowries, and the appearance of small to medium saucer beads (Type G ï a bead type that gradually became smaller over time). *Olivella dama* spire lopped (Type A) also makes its first appearance during this time period. *Dama* shells, which come from the Gulf of California, have particular significance because of their association with exchange systems and long distance trade.

Table 3-1
Chronological sequence for Southern California (as defined by King 1990)

Period	Estimated Date	C-14 Dates (B.P.)	Bead Association
Historic	A.D. 1804 ï 1900	----------------------	Semi-Ground Disc, Rough Disc, Chipped Disc, Small Wall Disc, Glass Beads
Late	A.D. 1150 ï 1804	780±80 to l260±80	Wall Disc, Ground Disc, Lipped, cupped, spire-lopped, and Large Columella Tube
Phases: L3a	A.D. 1783-1804		
L2b	A.D. 1650-1782		
L2a	A.D. 1500-1650		
L1c	A.D. 1400-1500		
L1b	A.D. 1250-1400		
L1a	A.D. 1150-1250		
Middle	1400 B.C ï A.D. 1150	3020±100 to 1060±80	*Olivella* sp. Oblique Angle Spire-Lopped, Saucer, Split Punch, Barrel, Limpet ring, and *Dentalium Neohexagonum* Tubes
Phases: M5c	A.D. 1050-1150		
M5b	A.D. 1000-1050		
M5a	A.D 900-1000		
M4	A.D. 700-900		
M3	A.D. 300-700		
M2b	200 B.C.-300 A.D.		
M2a	800-200 B.C.		
M1	1400-800 B.C.		
Early	6000 B.C ï 1400 B.C	6870±100 to 3970±100	Rectangle (*Olivella biplicata*, *Haliotis* sp., and *Mytilus* sp.), Spire-Lopped, Punched Cowrie, Clam Shell and Stone Beads
Phases: Ez	2400-1400 B.C.		
Eyb	3500-2400 B.C		
Eya	4500-3500 B.C		
Ex	6000-4500 B.C.		

Further time markers for this period involve the limpet (*Megathura crenulata*) ring ornament, which is squared on the margins and ground on the ventral and dorsal surfaces.

Other distinctive Middle Period bead types are *Dentalium neohexagonum* tubes, *Olivella* split punch (Type C), *Olivella* barrel (Type B3) and cap beads (Type B4).

Late Period (A.D. 1150 to 1804)

The beginning of the Late Period is usually earmarked by the appearance of *Olivella* callus beads (primarily cupped beads ï Type K) and clam disc and cylinder beads, and the concomitant disappearance of split punched beads and large stone beads. Wall beads such as saucers were still being made but show signs of being superceded by cupped beads during the latter part of this period.

Toward the middle of this period *Olivella* callus beads morphed into three distinct types; small cupped (Type K1), cylinder (Type K3), and lipped (Type E). Of the three types, lipped beads appear to exhibit the greatest amount of change. Apparently lipped beads were initially circular in shape but were later produced in a more oval form with larger perforations. Furthermore, they tend to be more irregular in appearance, lacking ground edges.

Other bead and ornament types that appeared later during the Middle Late Period included *Olivella* tube beads, callus pendants, and large columella tube beads (particularly from the *Kelletia kelleti* shell). This phase of the Late Period, referred to as L2, ended with Spanish colonization. After colonization new artifacts, such as glass beads, metal tools, and other exotic items became more numerous in the native socioeconomic system.

Historic Period (A.D. 1804 to 1900)

The most dramatic change in bead use during this period came about from the introduction of glass beads. Glass beads, which first entered Native societies in California during the Cabrillo expedition, became with time the most sought after artifacts, eventually preempting the use of other beads. By colonization (ca. A.D. 1769) glass beads had become the premier money bead and óoldô money beads such as cupped ceased to be produced (Gibson 1976:127). Eventually, though, as glass beads became more available, a glut occurred and they lost value, opening the way for the reintroduction of shell beads (King 1990:194).

Wall beads, which never ceased to be made, became more popular with the demise of the glass artifacts. Originally called saucers (Class G), wall beads slowly became larger and less refined over time. King (1974: 90-92) has interpreted this change as reflecting a breakdown in Native society and the emergence of entrepreneurial individuals who took advantage of disruption and depopulation following contact to further their own prestige and wealth. These particular beads, called rough discs, were likely made at the missions where Native populations had been relocated. Although this missionization process (i.e., *reducción*) mainly occurred in the coastal areas, all of Native California was affected. The island and coastal Chumash, who were the primary bead producers, were among the first groups to be missionized and their relocation to the missions, which entailed the disruption of Native lifeways, surely influenced the change in bead types.

While social disruption and depopulation likely occurred throughout Native California, trade networks continued to operate. Evidently, some trade routes were used well into the

19th Century. Shell beads such as lipped, rough disc, and chipped disc are frequently found at sites located near established trade and travel corridors. The continued use of some of these trails during the Historic Period is somewhat puzzling since it has long been assumed that exchange systems were severely disrupted by Spanish colonization (Earle and Ericson 1977). This apparent enigma will be discussed at length in the chapters to follow.

San Diego Bead Chronology

Numerous ethnographers have studied the Kumeyaay, but only a few have mentioned shells or shell bead use in San Diego County. Of those accounts that do discuss beads, little is said about who made them or how they were used in Native societies. Gifford in his ethnography of the Kamia (i.e. Desert Kumeyaay), does state that bead necklaces were worn by women and these were usually made of clamshell (1931:37-38). He also states that shell pendants were worn and clamshell disc beads were hung from the nasal septum (Gifford 1931:38). However, he does not state where these beads came from or what particular use if any they were to the Kamia. He also mentions that clamshells were obtained from the Cocopa in Northweastern New Spain. Besides this brief description only one other ethnographic source exists that deals with the subject. This account, derived from an interview with a Kumeyaay informant, simply states that the coastal Kumeyaay traded abalone shells for inland products such as inland acorns, mesquite beans and gourds (Cuero 1991:33).

The archaeological site records and reports for the area also appear to contain little information concerning beads. As these documents attest (Table 3-2), few beads (especially wall and callus beads) are found at San Diego County archaeological sites, and when they are discovered (normally during controlled excavation) they are limited to types that are not very diagnostic. Why this occurs in San Diego is largely unknown, although it is possible that various geographic and cultural factors could have led to a situation where the area was relatively isolated from trade centers to the north.

- Geographic ï In plan view, San Diego County has a very distinct physiographic configuration, especially in regard to the coastal region. What is immediately apparent is the plain, which begins as a wide and flat topographic feature from Tijuana, Mexico and ends suddenly as a sliver at the southern part of San Clemente. Truncated by the Santa Ana Mountains at this point, the coastal littoral and plain are basically pinched off by the mountains. While these mountains are not formidable, they would have hindered progress in either direction. Also evident in this part of the coast are the numerous *esteros* (or estuaries) which would have created additional hindrance to travel along the corridor. Although these features (like the coastal mountains) are not insurmountable, they would have slowed travel along this route.

- Cultural ï Sources dealing with aboriginal trade routes in California invariably show trails going east/west (Davis 1974; Heizer 1978; Sample 1950). None depict corridors along the immediate coast. While this pattern could be explained by the geographic factors outlined above, cultural factors may also be involved. As described by Shackley (2004), the Kumeyaay had strong links with the polities east of them. According to Shackley these ties could have been of an ancestral nature; that is, the Kumeyaay may have originally come from the Colorado River region, where other Yuman speaking tribes currently exist (2004:18-20). Nowhere does Shackley, or for that matter any other source, mention similar ties with polities to the north.

- Ecolological ï another theory, proposed a number of years ago (Moriarity 1968), adopts an ecological approach involving the variability of ecosystems within the Kumeyaay territory. As stated in the theory, resource variability varies more east/west than north/south, and ôUnder such conditions, important trading will develop between people having contrasting products and an available surplus of them.ô (Moriarity 1968:15).

Using the assumption that the Kumeyaay did not directly trade with northern polities such as the Chumash and the Gabrielinos, the general lack of beads in the region becomes understandable. Without fairly direct ties with the centers of intense bead production, these artifacts would not have always made their way into the county, and the chronological sequence seen in the county would be expected to be rather incomplete. As indicated in Table 3-2, the most common bead found at coastal and inland sites is spire-lopped (Type A), a type with a very broad time range (Bennyhoff and Hughes 1987:117-120). Other beads found at San Diego sites are barrel (Type B), saucer (Type G), and

Table 3-2

Bead frequencies at selected sites in San Diego County (adapted from Zepeda 1999*)

SDI-#	Site Name	Report Author	USGS Quad	Bead Types
682	Tom-Kav/Pankay	True, Pankay, and Warren 1991	Bonsall	*Olivella* barrel, 2 *Olivella* a spire-lopped, Olivella disc
308	Molpa	True, Meighan, and Crew 1974	Boucher Hill	11 spire-lopped, 4 disc beads
593	Aqua Hedionda	Koerper, Langenwater, and Schroth 1985	Boucher Hill	1 *Olivella* disc,
4608	Ystagua	Hector 1985	Del Mar	30 *Olivella* spire-lopped, 3 cupped, 1 barrel, 1 saucer
197		Rosen 1987	Del Mar	15 spire-lopped
4531, 7199/H, 8657H		Smith and Associates 2004	Jamul Mountain	25 *Olivella* spire-lopped, 2 capped, 1 saucer, 2 clam shell disc, 1 tube bead, 1 stone bead
5017	La Riconada	Winterrowd and Cardenas 1987	La Jolla	14 spire-lopped, 6 cupped, 2 lipped
19,156/12,599H	Topomai	York, Kirkish, and Harvey 2002	Morro Hill	2 *Olivella disc,* two glass beads, one stone bead
4608		Smith and Associates 1998	Scripps and San Vicente	12 *Olivella* cupped, 17 *Olivella* disc, bone beads
W-132A		Carrico and Phillips 1981	San Luis Rey	1 *Olivella bead*
5130, 5133, 6013, 6014, 6015		Moratto 1994	San Luis Rey	28 spire-lopped, 7 barrel
5130	Mar Lado	Quillen, Carrico, and Gallegos 1984	San Luis Rey	1 spire-lopped bead
CA-SDI-39		Farmer and La Rose 2009	La Jolla	182 spire-lopped, 18 wall disc, 13 ócallusô, 8 glass, 4 barrel, 4 stone, 1 lipped

* A much more comprehensive list exists in this publication.

wall disc (Type J). Conspicuously missing or in very low numbers are beads such as lipped (Type E) and cupped (Type K), split punch (Type D) and rectangle (Type L), all of which are firm time markers for established chronologies discussed above. Taken as a whole, the total number of beads represented in this table is 762, which when divided by the number of sites gives an average of 16 beads per site. This number is indeed low when compared to the sites in the Channel Island area which often possess beads numbering in the thousands (Gibson 1976; King 1990).

While the number of beads within San Diego is conspicuously low, it is evident that local sequences are similar to those found farther north (Kirkish 1999, 2002, 2004). A possible reason for this occurrence is a common point of origin; that is, most beads found in San Diego County originated in the Channel Island area. There is little to no evidence that beads were manufactured locally.

To sum up, bead collections in San Diego County are small, but based on numerous bead studies conducted by the author as well as by other local researchers (see 3-2), there seems to be a strong correspondence with extant sequences. While there may be some minor discrepancies in chronological ordering of certain bead types, there does seem to be overall agreement with established schema. It is further thought that this chronological similarity is to a large degree due to a common origin for most beads. Without a doubt beads were traded into San Diego from the Channel Island area on a sporadic but persistent basis. It is also likely that trade routes were on an east/west basis and that beads probably arrived in the county from inland routes.

A Definitive Bead Typology for Southern California

Over the past few decades, numerous bead typologies for California have arisen to either explain or describe the apparent changes in formal characteristics. Beginning with Beck in 1928, beads were organized in a typology dominated by nomenclature and classificatory measurements. This typology was soon followed with another classificatory system spearheaded by University of California researchers who relied on museum collections and artifacts deriving from recently excavated sites (see Lillard, Heizer, and Fenenga 1939). Further elaboration of this typology was eventually completed by Gifford in 1947. His typological system was exhaustive and relied on coded designations for each bead type investigated. Temporal designations did not appear for any of these schema, and it would be another decade before a seriated typology was formulated. In a landmark study, Bennyhoff and Heizer published an article in 1958 outlining basic temporal changes in bead types for California and the western Great Basin (see Figure 3-6). This typology was soon followed by similar studies which further refined and enlarged upon the typological units identified by Bennyhoff and Heizer. These studies include King (1974, 1990), Gibson (1975, 1976) and Bennyhoff and Hughes (1987). Of these, Kingôs 1990 dissertation stands out as being the most exhaustive (and descriptive) for outlining the various formal changes in bead types over time. In the discussion that follows I will be mainly presenting his temporal typology, as it is crucial to the understanding of the bead analysis in this thesis. I will also adopt the Bennyhoff and Hughes (1987) terminology, as it is the clearest and simplest taxonomy available. As noted above, Kingôs and Bennyhoff and Hughesô taxonomies do not conflict one another, and can be used concurrently.

Beads and their placement in time

Kingǿs dissertation (1982, 1990) was not focused on producing a bead typology. Although beads were central to the thesis, it was about how these artifacts change over time and how these changes reflect socioeconomic developments within the parent society. Nevertheless, from his study of beads he was able to sequence chronologically most of the bead types found at southern California sites. Kingǿs bead sequence (Figures 3-4 and 3-5) is not a typology *per se*, but rather a chronological ordering of these artifacts over time. His sequence comprises periods of time that are broken down further into phases. Into these temporal slots, he placed various bead types as indicated by stratigraphic and chronological data stemming from archaeological investigations conducted in the Santa Barbara area over the last hundred years. His time periods included Early, Middle, and Late, and phases were delineated for each period. Some periods had as many as five phases while other periods only two. Most of the data came from extant collections housed at UC Berkeley and the Museum of Natural History in Santa Barbara. Overall, Kingǿs sequence is a usable seriation and it is relatively easy to identify types and variations within his proposed schema.

Chronological ordering of the beads was accomplished by examining data deriving from stratigraphic, chronometric (C-14), and historic artifact correlations gleaned from excavation records for each of the collections studied. In most cases, burial lot beads were examined. As stated by King, burial lots represent discrete units of time which can be ordered in a relative sense (1982:34). By examining beads found at undisturbed cemeteries, temporal bead placement can be accomplished by association with other artifacts, C-14 dating of the burial lot matrix, or by looking at the relative placement of burial lots in terms of superposition (and association) principles. Utilizing these techniques in an extensive database, King was able to construct a temporal bead sequence.

Early Period Beads

Four categories of beads have been identified (based on cross dating techniques) for most of the phases in the Early Period: (1) *Olivella* spire-lopped beads (the whole shell with the apex ground off ï Figure 3-6.3); (2) Clam and hard stone disc or cylinder beads (Figure 3-1; 4-4g); (3) *Olivella*, abalone, and mussel shell rectangular beads (Figure 3-1; 4-4f); and (4) whole, punched, or abraded shells, including *Dentalium* sp., *Cypraea* sp., and *Trivia* sp. (Figure 3-5h).

Olivella spire lopped beads are probably one of the most common beads in the Early Period sites in southern California and the Great Basin. They are a very simple bead in terms of construction and appearance. The only modification is the removal of the spire either by grinding or cutting to permit stringing. Because of their simplicity, their diagnostic capability is minimal. Spire-lopped beads are found throughout the three periods and seemingly do not change much over time. Some researchers (Gibson 1992; Milliken and Scwitalla 2012), including King (1990), believe that the size of the shell may increase over time, but this has not been conclusively demonstrated. Also some investigators feel (Gibson 1990:27) that base removal may have been a trend, but again this remains conjectural. More convincing probably is the presence of an oblique angle to the spire removal which appears to be exclusively an Early Period characteristic (Figure

3-6.8). Bennyhoff and Hughes (1987:118) have classified this bead as an A2, a late Early Period artifact type.

King is of the opinion that clam disc (and cylinder) beads are another very common bead type during the Early Period, at least in southern California (Figure 3-6.54). Concurrently with thick stone beads, standardization of shape and size in these beads appears to be occurring during the Early Period. According to King (1990), clam and stone discs were likely strung together.

Rectangular beads, made from the abalone nacre, the mussel shell, and *Olivella* shell are found in Early Period contexts in southern and central California and in the Great Basin. Distribution of these rare beads is rather limited, but they have been found on the southern Channel Islands as well as various early and Middle Period mainland sites (Bennyhoff and Heizer 1958; Howard and Raab 1993; Vellanoweth 2001). Many of these beads are grooved around the perforations and have rounded corners (Figure 3-4f). Their formative distribution throughout the study area testifies to the importance of trade at a relatively early date. Their gradual disappearance during the Middle Period may have been triggered by socioeconomic changes that favored hereditary leaders and led to less concern for widespread use of these appliqué types by the general populace (King 1982:181).

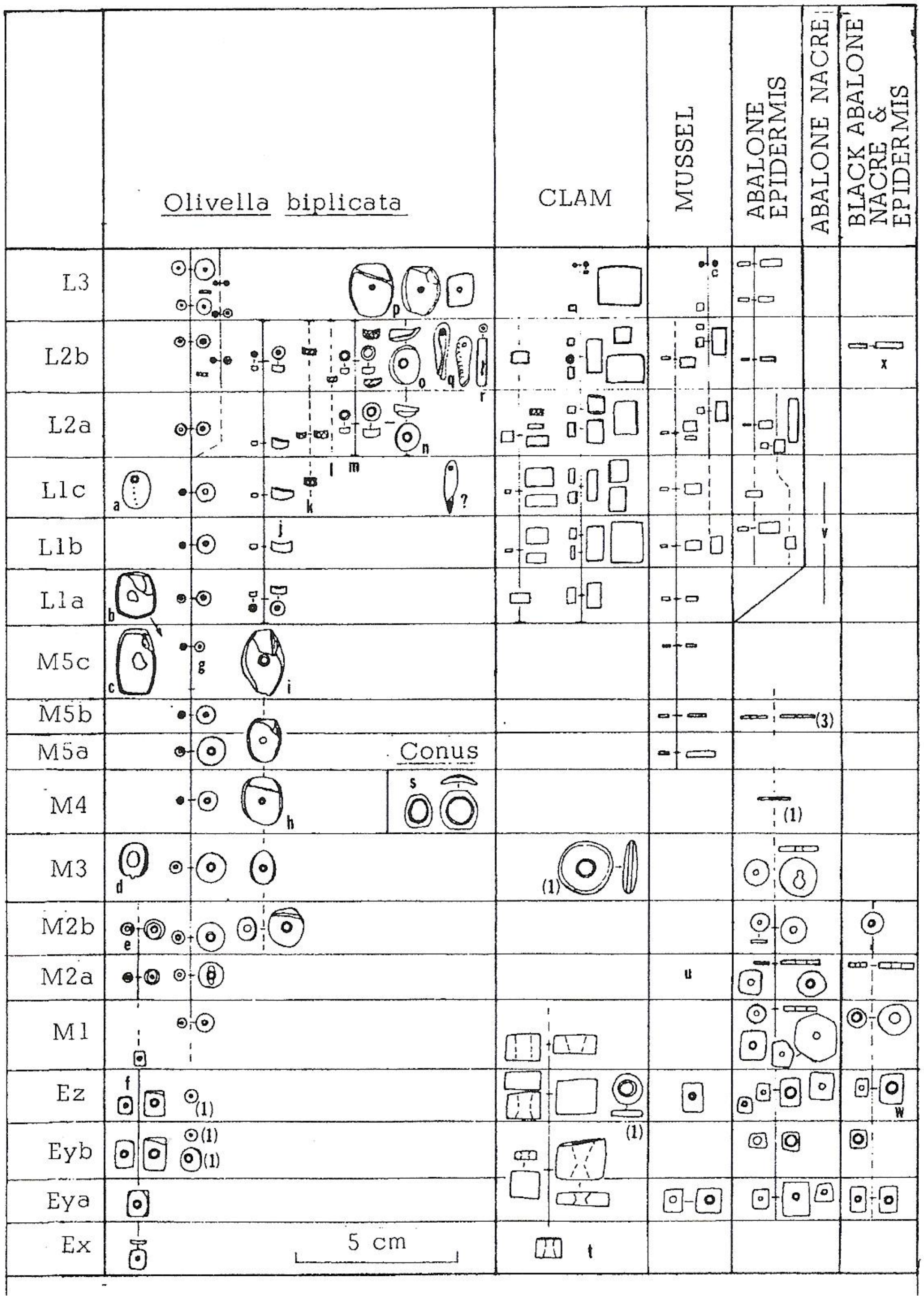

Figure 3-4: Bead Sequence (from King 1982)

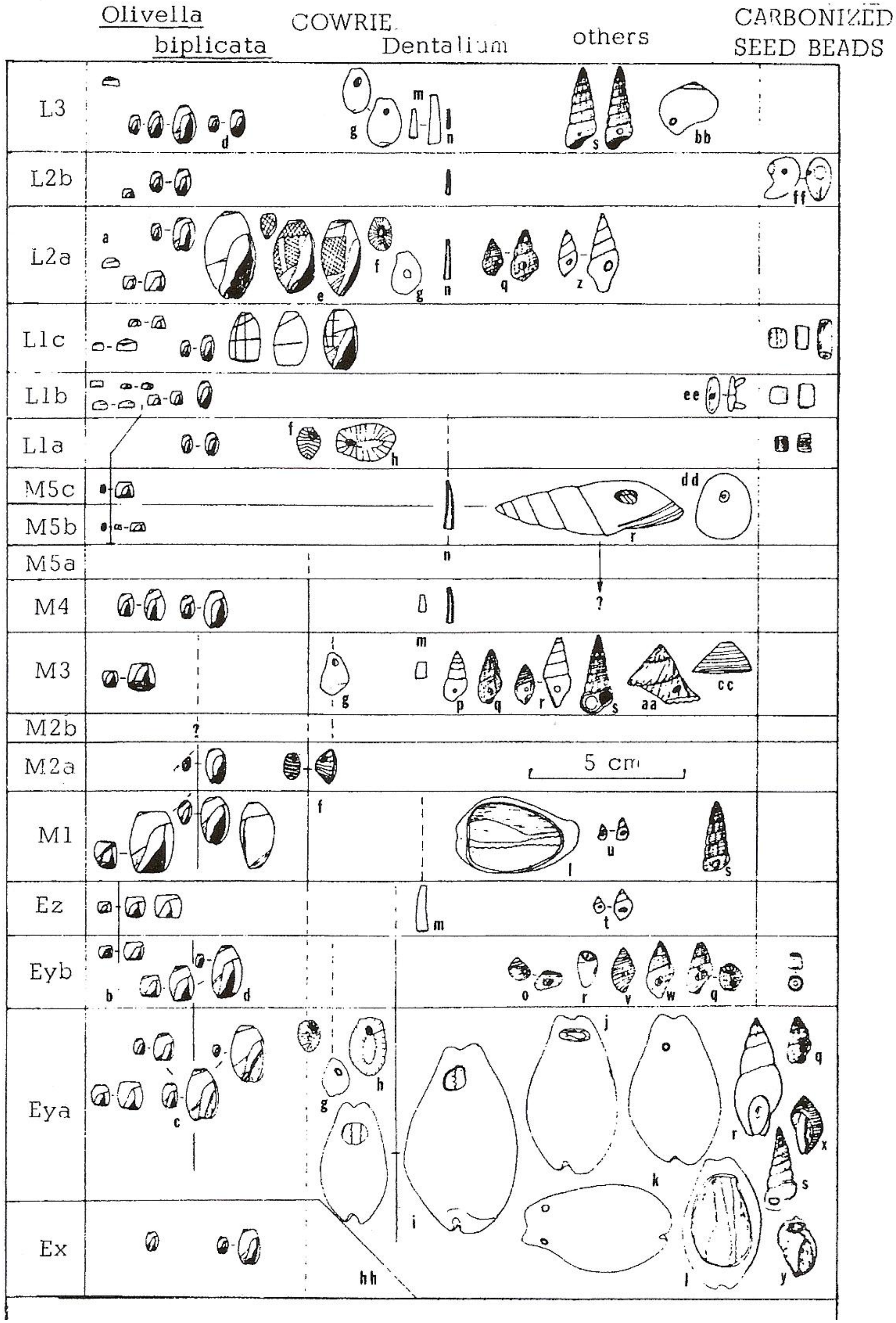

Figure 3-5: Bead Sequence (from King 1982)

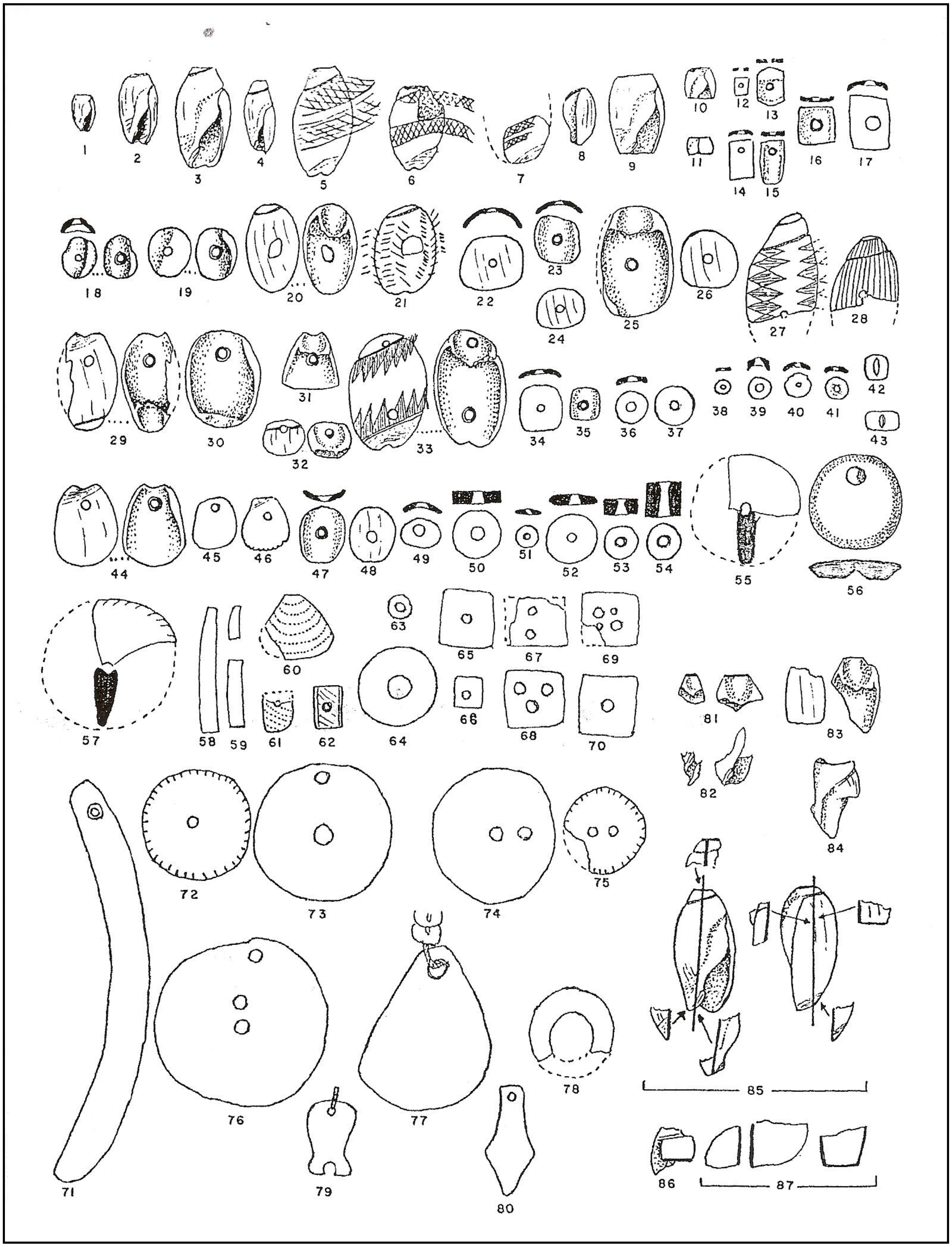

Figure 3-6: Beads commonly found in the Great Basin and southern California (from Bennyhoff and Heizer 1958)

Punched or abraded *Dentalium* sp. (Figure 3-4n) and *Cypraea* sp. (Figure 3-5i) shells were unusual and/or colorful and beads from this genus were easy to manufacture and were likely used as currency during the Early Period. Certainly, *Dentalium* sp. beads were used for this purpose from northern California to Alaska (King 1982:183). Their distribution in southern California is limited and they are mainly found on the coastal strip from Santa Barbara to San Diego (King 1990:113-114).

As opposed to Central California, the southern part of the state during the Early period was more involved in economic pursuits and populations appear (based on bead use) to be more egalitarian (King 1990). Beads for the most part were simple in appearance and easy to manufacture. The overall populace (non-elite groups) at this time period may have been more involved in trade, and generally attaining wealth was more available to these people. As stated by King:

> I interpreted the types of artifacts used in the social interactions during the Early Period and their distribution in cemeteries as indicating that during the Early Period, compared with later periods, political, economic, and religious institutions were not as clearly differentiated from each other (King 1982:189).

Middle Period Beads

Spire-lopped beads continued to be made and traded in the Middle Period. Small to medium sized *Olivella* shells were modified by grinding off the spire at right angles to the long axis and at oblique angles to this axis (Figure 3-6.8) In the latter case, diagonal ground beads diminish in numbers toward the end of the Middle Period (Bennyhoff and Hughes 1987:119; King 1982:192). Except for this diagonal variety, these beads are not very time sensitive and persist throughout all the time periods. The diagonal grinding may have facilitated in appliqué or stringing (King 1982:193). Related to these beads are capped and barrel beads (Figure 3-5c). While these beads persist throughout the three periods, barrel beads during the end of the Early Period and the beginning of the Middle Period have a distinct attribute of grinding the spire at an oblique angle (similar to the spire-lopped bead described above ï Gibson 1992:13).

Clam and stone disc and cylinder beads also continued to be made during this period and look much like their Early Period predecessors (Gibson 1992:36). However, by the M2 phase clam disc and cylinder beads were no longer being used. Stone (e.g. serpentine, chlorite schist) cylinder beads also disappear and globular and tubular types become more prevalent.

Abalone (*Haliotis* sp.) disc beads are a common type during the first part of the Middle Period (Figure 3-4v). Made from the nacre of the shell, these beads remained important, although not as prevalent as *Olivella* saucer beads, until the latter part of the period. After the M3 phase, abalone beads remain rare throughout the timeline dealt with here (King 1982). After their disappearance, only abalone ornaments (e.g. pendants) were utilized.

After the M3 phase, *Olivella* saucers become the most common bead type (Figure 3-4g). Possessing a disc shape, these beads may be the progenitors of wall disc beads that become dominant during the subsequent period. Saucers are thus sometimes hard to distinguish from wall disc beads (as they share similar features ï thin and saucer-like in profile) and often large samples are needed to sequence them properly. King believes that these beads dominated over previous earlier varieties due to a œé decrease in display with a corresponding increase in stored wealth. They required more effort to manufacture and were not as showy as the bead types which were replacedô (1982:195). In other words, inherited political positions were developing and elite individuals were acquiring wealth. Arnold (1987, 1991) sees similar trends in her work but conjectures that environmental stress was the reason behind the change in bead usage (see earlier discussions in Chapter 2).

Bennyhoff and Hughes have distinguished two types of saucers, G1 and G2 (1987:132). G1 saucers are small discs (2.0-5.0 mm) that can occur in any period or phase (after Early Period times) and are thus not very diagnostic. G2 saucers on the other hand are larger beads (5.0-10.0 mm) with conically or biconically drilled holes that are mainly found in Middle Period contexts. Again, large samples are required for accurate determination.

Other beads and ornaments used during the Middle Period include large and small mammal bone tube beads, *Trivia californiana* beads, Keyhole Limpet (*Megathura crenulata*), punched *Cypraea spadica* shell beads, Volcano limpets (*Fissurella* volcano), chlorite schist disc beads, *Dentalium neohexagonum* beads, and Olivella split punched beads (Figure 3-1 and Figure 3-4i).

As mentioned before, King sees the Middle Period as a time when the political systems become more centralized and less egalitarian (1982). This produced a situation where there was unequal access to wealth and power. Conceivably, population increase may have occurred, especially within the coastal areas where there was less access to resources due to the creation of geopolitical boundaries (see Hughes and Milliken 2007:263). However, there may have been a suite of changes occurring during this period that triggered modifications in bead types and use. It is fairly well established that trade between the Great Basin and California drops off during this period (Hughes and Milliken 2007; King 1982; Hughes and Bennyhoff 1978) and this could be due to the factors directly mentioned above.

Late/Historic Period Beads

Beads made from the *Olivella biplicata* shell were the most common beads found in Late Period sites (and burial lots). Cupped beads, made from the callus portion of the shell (see Figure 3-4j), virtually replaced the earlier wall disc varieties (e.g. saucer beads). These beads continued to dominate the period until the Spanish settlement of coastal California. Callus beads such as the cupped types were difficult to manufacture due to the callus being very hard. Possibly because of this reason, these beads were highly prized and were likely used as currency by the general populace (Gibson 1992; King 1982; King, L. 1969). Cylinder and lipped beads also occur during the Late Period and are very similar to cupped and may have derived from this type (Figure 3-4h). Cupped beads can be distinguished from cylinder and lipped by the perforation size; cupped perforations range from 0.9 to 1.6 mm, whereas the other beads have hole sizes exceeding 1.8 mm King 1982:255). *Olivella* cupped beads cease to be used sometime after Phase L3 with the introduction of glass beads by the Spanish. After replacement of cupped (and cylinder) beads by glass beads, lipped types continued to be utilized. These Late Period lipped beads were different from earlier types by being larger in diameter and having smaller perforations (Figure 3-4n). According to King they may be difficult to distinguish macroscopically from Middle Period split drilled beads (King 1982:262). Compared to cylinder and cupped beads, lipped beads required less energy to produce in terms of drilling and shaping.

Other bead and ornaments found in Late Period contexts are columella pedant and tube beads, abalone tube and pendants, Abalone disc, cowrie pendants, *Trivia californiana* beads, and *Dentalium nexgonium* beads. Stone and bone beads also continue through the period and these are smaller than Early and Middle Period types (Figure 3-5f, m).

By far the most popular bead type (after the waning of cupped beads) in the Late Period was the *Olivella* wall disc (Figure 3-4g). Initially, all disc beads were uniformly small, ranging in diameter from 1.7-3.8 mm. Cupped beads were normally larger than wall disc during the early Late Period and continued to be so until the L1c Phase when they became similar in size. Like cupped beads, wall disc beads were drilled with stone drills (Arnold 1987; Bennyhoff and Hughes 1987) and perforations were relatively large and conically or biconically drilled. Eventually these wall disc beads became larger and the hole size smaller. The smaller perforation (å1 mm) was undoubtedly due to metal needles being introduced by the Spanish. This technological advance allowed bead makers to drill the beads straight through, reducing the overall hole size. Concomitantly, these historic beads also became less refined and often had an unfinished look. The reason for this development is probably polysemic, and undoubtedly a series of sociocultutural factors played a part. Certainly the introduction of glass beads had an inflationary effect on shell beads and this may have influenced production methods (Gibson 1992; King 1982).

Just prior to the Historic Period wall disc beads were frequently associated with mussel and abalone beads. In burial lots, they are often found in high status areas (as defined by containing more sumptuous grave goods), indicating that they as well as wall disc were associated with political leaders. Cupped beads and their occurrence in non-elite burials strongly suggest they were used by the general populace. All disc and cupped beads appear to be made in the Channel Island area (Arnold 1987). King believes (based on formative attribute analysis of beads) that some wall discs were made outside the Santa Barbara area (King 1982:301). However, no hard evidence has shown this to be true.

With the introduction of glass beads and large rough disc beads during the Historic Period, cupped beads and refined looking wall disc beads ceased to be made or utilized. Money beads became glass and H series wall beads during the Historic Period (see Bennyhoff and Hughes 1987 and below for H bead descriptions). Trade in these beads became quite active and wealth was open to all (King 1982). What occurred during the Historic Period, a time of major cultural and economic disruption, is almost counterintuitive. While many Native Americans were experiencing great impact to indigenous systems, some groups were able to produce large numbers of beads to trade with neighboring polities (e.g. inland groups). By far the most common beads traded were unrefined wall disc beads and glass beads. These were now the medium of exchange and their distribution over southern California inland areas was truly remarkable given the oppressive effect of Spanish colonization on many Native groups (Sandoz 2004:1-13).

Trends and Patterns

In looking over the temporal column briefly described here, certain trends become obvious. Particular bead types do change over time and it is these that become critical in assigning temporal significance.

Certainly during early times there was a focus on decorative looking artifacts. The rectangular and split punch beads are examples of this sort of artifact and reflect use as sequins and appliqué. As suggested by King (1982) the gradual shift to disc beads in the Middle Period reflects changes in cultural factors where secular elites became more important and disc beads were hoarded for accumulation of wealth.

Other patterns became noticeable while I was completing the data analysis. Most of these features were derived from bead production. They could be seen as anomalous features, but due to the multiple occurrence of some of these characteristics, I felt that possibly a pattern (or trend) was emerging. Some of these anomalies have been noted by other investigators, but most have not. To facilitate the discussion of these features I have provided a table below (Table 3-4). Most of these features are likely idiosyncratic and directly relate to how and (possibly who) made them. Variations should be expected in any manufacturing process where countless items are made repetitively in a relatively short period of time. I believe they are due for the most part to human error.

Table 3-3
Bead Descriptions of Commonly found beads in southern California

E=Early Period; M=Middle Period; L=Late Period; H=Historic Period

Bead Type	Time Period	Description
Chipped Disc	H (A.D. 1834-1910)	Large irregular disc with chipped edges. Diameter ranges fro 6.0-10.0 mm. Needle drilled-hole size 1.0 mm.
Rough Disc	H (A.D. 1816-1834)	Small irregular wall disc bead with chipped edges. Needle drilled-hole size 1.0 mm. Diameter 5.0-7.0 mm.
Semi-Ground Disc	H (A..D. 1800-1816)	Small circular bead with partial edge grinding. Needle drilled perforation (straight)-hole size 1.0 mm.. Diameter 4.0-7.0 mm.
Ground Disc	H (A..D. 1770-1800)	Earliest bead in the H series (as defined by Bennyhoff and Hughes 1987). It is a small circular wall disc bead with all edges ground. Perforations are straight (parallel sided) and probably were drilled with iron needles-hole size 1.0 mm. Diameter 4.0-7.0 mm.
Wall Disc	L	This bead is likely the progenitor to the historic wall beads. They are similar to saucer beads but are larger in diameter than these beads. Diameter ranges from 5.0 - 6.0 mm. Perforation are conically or biconically drilled.
Cylinder	L	This bead is made from the callus portion of the Olivella shell. They are similar to the preceding cup (or cupped). However hole diameter is greater than 1.8. Hole is usually more cylindrical than in cup beads. Conically drilled.
Cupped	L	These relatively thick beads are made fro the hard callus portion of the *Olivella* shell. They were likely used as a medium of exchange during the Late Period. Diameter ranges from 3.0 mm to 7.0 mm. Conically drilled.
Abalone Disc	L	Made from the epidermis (usually *Haliotis rufuscens*) are normally circular or oval in outline. These beads often co-occur with H series beads
Split Punched	M	This bead consists of one-half of a whole shell with the inner whorl present near the top. The bead is squared at the top and bottom and has an irregular hole punched in the middle
Keyhole Limpet	M	This gastropod (*Megathura crenulata*) was minimally modified and probably was worn as a pendant ï cordage was simply strung through the existing hole.
Olivella saucer	M	This bead is made from the wall portion of the *Olivella* shell. It is circular to oval in outline. And curvature of the outer and inner surface is similar. Edges are ground and the bore is usually conical.
Stone Disc	M, L	Stone beads tend to be less standardized than shell beads. Chlorite schist and Talc Schist are two materials typically used to make these beads.
Chlorite Schist Disc	E, M, L	These beads are flat, green discs of green chlorite shist.. Diameters range from 3.2 to 4.8 mm. May have been strung with *Olivella* wall disc.
Dentalium sp.	E, M, L	This tusk shell has a natural hole running throughout and required very little modification for bead use. Was used as a money bead in Northern California
Clam Disc	E, M, L	Made from several species of clam. Diameter of this bead varies greatly and is not particularly temporally diagnostic. They are usually 2.0 to 4.0 mm thick and are biconically drilled.
Spire-lopped	E, M, L	Whole *Olivella* shell with spire (apex) ground off
Rectangular, Grooved Rectangular	E, M	Made from the wall portion of the shell, with square to rounded corners. Grooved variety (OGR) has hole produced by grinding away dorsal side.
Clam disc	E, M	Made from *Tivela* sp., *Saxidomus* sp. and *Tresus* sp. Conical or biconical hole. Diameter ranges from 3.0 to 35.0 mm.
Cypraea spadica	E	Called the Chestnut Cowry, this gastropod was either used whole or in pieces as pendants.

Another evident trend is the morphological development of *Olivella* wall disc beads over time. Making their first appearance during the Middle Period, these beads became larger in diameter through time and their hole sizes became smaller. By historic times, *Olivella* wall disc beads tended to become less refined with many having little to no grinding along the edges (Figure 3-7). Basically many of these beads look unfinished. Nevertheless, they are highly diagnostic for historic (Mission) times. While King subsumed most of these bead types in the rough disc category, Bennyhoff and Hughes (1987) saw many different types within this class (H1a, H1b, H2, and H3). It is primarily this breakdown that I use in this thesis.

Previous investigators have noticed that H series beads (while predominately straight drilled) were sometimes conically drilled during the late Historic Period ï presumably with a stone drill (King 1990; Gibson 1992). This occurrence has never been ethnohistorically documented but it seems reasonable that at times iron needles were not available and Native craftpersons had to fall back on traditional methods. Also of interest in this regard, are the fairly high percentages of conical and biconical drilling at the San Clemente Island site (SCLI-1437). Could it be that some bead manufacturing was taking place here and iron needles were not as readily available on this isolated island refuge?

Nibbling (or splintering) seen on many beads obviously relates to a manufacturing error. Whether it is agential (*chaine operatoire)* or just a fluke remains to be seen.

Figure 3-7: Olivella rough Disc beads (from Ven 1222H collection).

Off-set holes may also fall into this category, off-setting the hole may have had cultural significance (i.e. it may have been a stylistic feature or signature type of the beadmaker), or it my have simply represented a lower skill level of the bead maker.

Bead Exchange During the Protohistoric and Early Historic Periods

As we saw above many new developments in bead types arose during the Late and Protohistoric Periods. These changes included the sudden appearance of callus beads such as cupped and lipped and the slow evolution of wall beads (which appear to get larger over time). The reasons behind these changes likely involved the incremental devolution of southern California polities over a relatively short period of time and the

Table 3-4

Anomalous Characteristics in Class H Beads

Site Number	Bead Type (Number)	Anomaly	Comments
RIV-7882	H3 (1)	Off-Set Hole	Hole normally centered
RIV-7882	H3 (6)	Conicically or biconically drilled	H3 beads are normally straight bored
RIV-7882	H3 (1)	Punched hole	H3 beads are normally straight bore
SCLI-1437	H1b (41)	Conically Drilled	H1b beads are normally straight bore
SCLI-1437	H1b (3)	Off-Set Hole	Hole normally centered
SCLI-1437	H1b (42)	Conically Drilled	H1b beads are normally straight bore
SCLI-1437	H2 (9)	Conically Drilled	H2 beads are normally straight bore
SCLI-1437	H3 (1)	Conically Drilled	H3 beads are normally straight bore
SCLI-1437	H1b (1)	Nibbling on Dorsal side	Normally edge of hole is smooth
SCLI-1437	H2 (3)	Nibbling on Dorsal side	Normally edge of hole is smooth
SCLI-1437	H3 (1)	Nibbling on Dorsal side	Normally edge of hole is smooth
SDI-901	H1b (6)	Nibbling on Dorsal side	Normally edge of hole is smooth
SDI-901	H2 (1)	Nibbling on Dorsal side	Normally edge of hole is smooth
SDI-106	H1a (3)	Off-set Hole	Hole normally Centered
VEN-1222	H1b (4)	Conically Drilled	H1b beads generally have straight holes
VEN-1222	H2 (8)	Conically Drilled	H2 beads generally have straight holes
VEN-1222	H3 (4)	Conically Drilled	H3 beads generally have straight holes

increasing importance of secular activities over religico-political ones. In short, complex hunter gatherers (particularly as seen with the Chumash) were moving from a chiefly organization to a more ranked one (King 1978:61-62). Cupped beads which were highly prized as money, became an important bead type throughout Native societies. In Late Period cemeteries such as the one at the Medea Creek site, cupped beads began to occur throughout burial lots, indicating that the general populace had access to these types

(King 1982:61). *Olivella* wall beads, once restricted to highly ranked individuals slowly became accessible to the entire society (Gibson 1976:128-135). This shift may have been triggered by a variety of factors including disease, climate, population decrease, and acculturative factors deriving from European contact.

Reflecting this shift is the sudden appearance of rough disc beads in the early Historic Period (A.D. 1816 to 1834). These unrefined looking beads, made from the *Olivella biplicata* shell, were larger in diameter than their predecessors and generally less finished looking. It is likely that these beads began to be made by missionized Indians in response to the general devaluation of shell beads from the flooding of the market with glass trade beads (King 1982:321). Also at work was the relocation of Native Americans to the missions and possible demise of craft specialists due to societal disruption and massive depopulation from European pandemic disease. Certainly shell wall beads quickly acquired an unfinished look once relocation programs were initiated and Indian societies began to feel the full brunt of acculturation, which entailed the demise of hereditary leaders, craft specialists, and other high status individuals.

It was not long after the appearance of rough disc beads that an even more unfinished form appeared the chipped disc. This bead was even larger than the rough disc and considerably more crudely produced. None of the edges were ground and no refinement was completed on the blank except for perforating the bead (Figure 3-3). In many ways the bead looked incomplete and not ready for use.

The production of these beads, which began in the Protohistoric Period, continued well into the mid 1800s. However, sometime towards the end of this period, small more finished appearing wall discs (2.0-4.0 mm) became common in the Santa Barbara Channel area. This greater refinement which became evident around 1805 may reflect a small segment of hereditary leaders in Chumash society that continued to exert some control through acquisition of wealth and power (King 1982:302). Although the overall condition of Chumash society was deteriorating, a small number of surviving high-ranked individuals retained a pivotal role in Native society (Lightfoot 2005: 72).

A Crack in the Wall: Bead Chronology in San Diego County

As mentioned above, San Diego bead chronology generally agrees with established bead sequences for more northerly regions of southern California. However, there are some vital anomalies in the San Diego collections which merit attention. First, as noted above, beads are relatively rare in the county; second, the beads recovered at prehistoric sites are limited in terms of type (i.e. spire-lopped appears to be the dominant type); and third, certain time marker beads are conspicuously missing in the chronological sequence.

Another peculiarity is the striking increase in numbers of beads at certain protohistoric and historic sites in the inland portion of the county. At two sites in particular (CA-SDI-106 and CA-SDI-901 ï see Figure 3-8), thousands of beads were found in association with cremated human remains (Rogers 1928, 1937). The beads are, for the most part, rough and chipped disc, although some other types occur at lower frequencies. Based on the predominant bead type present at the site, it is evident that some event during the Protohistoric/Historic Periods triggered a substantial increase of trade at these sites. The factors accounting for this increase must have been unusual for the county, as these sites are the only ones to date that have such extraordinary bead counts. The beads from these sites were originally recovered by Malcolm Rogers in the 1920s and 1930s. Rogers, who was a mining geologist turned archaeologist, had been working for the San Diego Museum of Man as a curator when he did the excavations. As an archaeologist, he was an able fieldworker and was knowledgable regarding geology and geomorphological principles (see Rogers et al 1966:1-19). Although absolute dating techniques were not available to Rogers when he did his work, he was capable at reading stratigraphic sequences and relied heavily on geological concepts (i.e. law of superposition) to date his specimens; and in most cases where sites were largely undisturbed, these techniques allowed for fairly meaningful reconstructions. While his field notes do not specifically state what other methods he used, he does mention utilizing trenches and excavation units to recover cultural material. Furthermore, he appears to have used screens to sift site residues. One photograph taken during his excavations at SDI-901 clearly shows him and his crew employing shaker screens. The size of the wire mesh used in the screens is unknown, but based on the average bead diameter in the collections (å 5.0 mm), it is likely that the screen size was no less than ¼ -inch.

The Bead Data from sites CA-SDI-106 and CA-SDI-901 (San Diego County)

In order to attempt a better ordering of the bead data for these two sites, I will discuss each site separately (the prefix óCAô will be omitted hereinafter). In this discussion I will review previous research at the site. Following this I will discuss the data itself with special emphasis on describing the bead types, the number of beads, and the chronological sequencing of beads within the context of each site. It should be noted that while these sites represent the focus of my study, other sites and archaeological data (especially in regard to beads) will be included in the analysis.

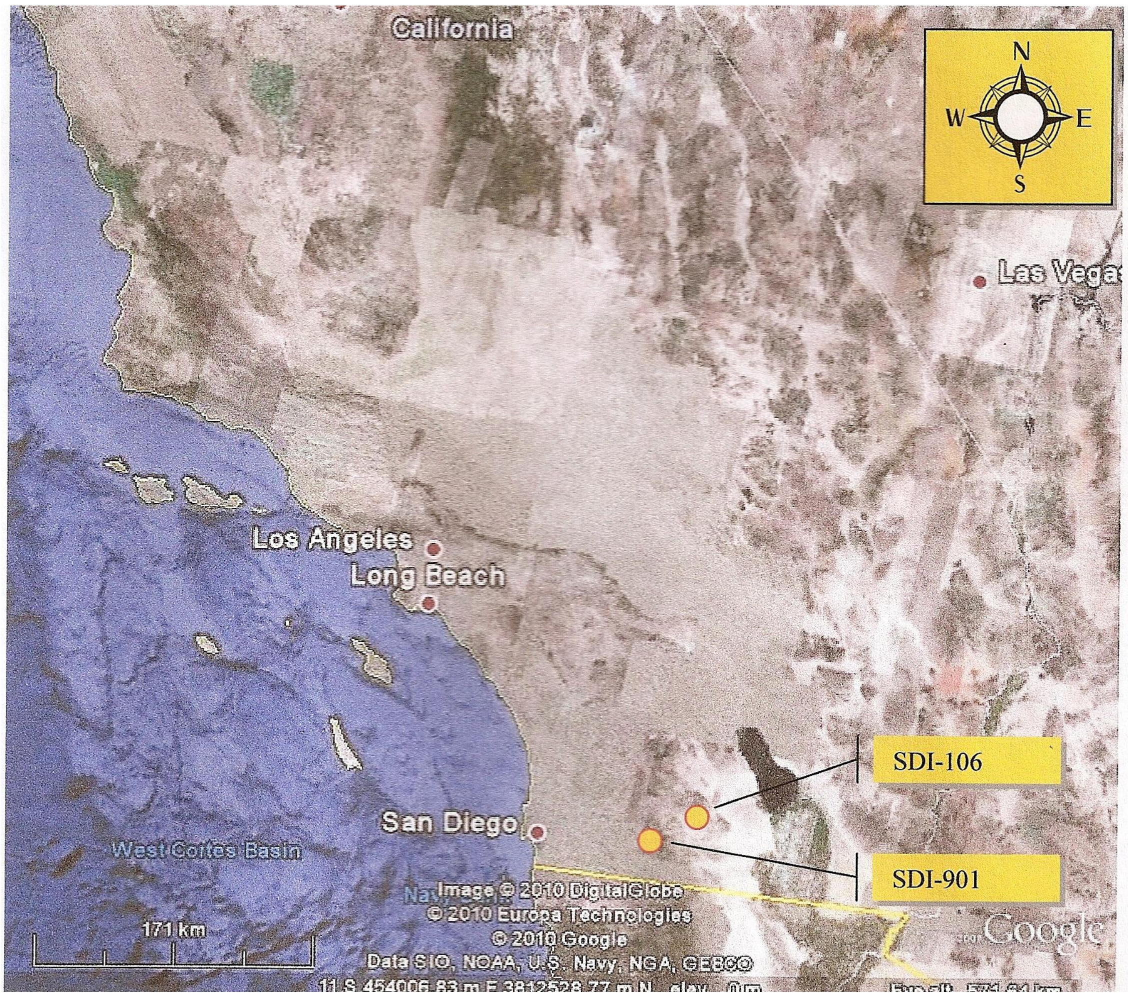

Figure 3-8: Approximate locations of SDI-106 and SDI-901 (Imagery courtesy of Google Earth)

Site SDI-106

What we know of early excavations at this Anza Borrego Desert site (Figure 3-8) derives from the field notes of Malcolm Rogers (1928). While these notes do not always contain thorough or useful information, they are the only link we have to these early years of investigation. As related in his notes, this site had been pothunted by numerous collectors prior to his excavations. The overall damage to the site from collectors is unknown, but it is probable that several burials and pots were removed prior to 1928. Rogersô own work at the site entailed the systematic removal of over 61 burials. From these burials, over two thousand shell and glass beads were recovered.

The beads found at SDI-106 were for the most part rough discs (see Tables 3-5 and 5-5) and these have been shown to have functioned as money beads during the Historic Period (1816-1834 ï Gibson 1976:127). Their dominance throughout the collection (as based on a 7% random sample ï see Chapter 6) suggests that occupation at the site was mainly during this time period. Prior and subsequent occupation is only meagerly suggested by the presence of ground discs (ca. A.D. 1770-1800) and chipped discs (A.D. 1834-1900). Other less diagnostic artifacts supporting an historic occupation are numerous metal objects such as knives, buttons, and culinary objects. Also present are many hundreds of glass trade beads (Nå 880) that were found associated with the burials. For the most part, small opaque blue cane beads were recovered (mainly from cremations 47 and 48) which represent an early Historic Period time marker (Gibson 1976: 101-107). Other glass beads found include red opaque cane beads with black cores, black opaque beads, white opaque wire wound beads, and various other types (e.g. polychrome faceted, etc) representing later time periods (see Table 3-1). While many classificatory typologies exist for glass trade beads (see Karklins 1985; Kidd 1979; and Meighan 1953), few chronological schema have been formulated. To date, no comprehensive glass bead chronological sequence exists for southern California.

Table 3-5
Bead sample from SDI-106

Bead Type	**Number**	**Percent**
A1 (spire-lopped)	1	0.1%
B3 (barrel)	10	1.1%
G1 (tiny saucer)	7	0.7%
G2 (normal saucer)	3	0.3%
E3 (large lipped)	1	0.1%
E1b (deep lipped)	2	0.2%
H1a (ground disc)	25	2.6%
H1b (semi-ground disc)	76	8.2%
H2 (rough disc)	402	44.2%
H3 (chipped disc)	114	12.2%
Glass (various types)	289	31.0%
Total	930	100%

What these data suggest is that the site, was occupied during the early to late Historic Period and was likely focused on trading and other mercantile pursuits (as indicated by the unusual number of money beads). It is also probable that the site was a large village, called *Amat Inuk* that was permanently occupied. Many historic and ethnographic accounts attest to its impressive size and permanence (Cline 1979:16; Rensch 1955:199; Priestly 1913:133-233). Site artifactual content (e.g. numerous milling features, wide range of artifacts and activities represented etc.) also tends to confirm this impression.

Site SDI-901

Site SDI-901 was likely linked to SDI-106 in Mason Valley by a trail system that connected the two areas. Interviews with a Kumeyaay consultant suggest that these two areas were occupied by the same band(s) and that movement between the two areas frequently occurred (Cline 1979:16). Whether this was conducted on a seasonal basis is unknown; however, many ethnographic accounts suggest a mobile subsistence pattern for the Kumeyaay (Luomala 1978:599-600; Spier 1923:334-338). In any case, the site was a large village that was probably occupied on a permanent or semi-permanent basis. Known as *Pisclim*, the village is very impressive (>80 acres) and as with SDI-106 contains many Historic Period artifacts. When Rogers excavated here, he found hundreds, if not thousands (precise number is unknown), of glass and shell beads associated with cremated remains. As with the Mason Valley site, these cremations were úurn gatheredô and were reburied within a cemetery adjacent to the habitation area (Rogers 1937). In total 21 cremations were removed from the site, which varied in depth from 18 to 20 inches. As with SDI-106, all provenience is by burial lot.

From the collection housed in the Museum of Man, a 7% representative sample was analyzed by the author. Close to two hundred beads were carefully examined and metrically recorded as to type, diameter, thickness, hole size, and overall condition (see Table 6-15 in Chapter 6). From this analysis it was determined that the most predominant bead type was semi-ground disc (H1b) and that the collection as a whole represented a slightly earlier time period than SDI-106. While glass beads were not found in the collection, Rogersô field notes clearly state that these artifacts were present in appreciable numbers. The overall impression is that the site dates from the Late Prehistoric through the early Historic periods. Although there are large gaps in the data and field notes, it is likely this temporal placement is correct based on extant historic accounts (Rensch 1955:201).

The site is also adjacent to a known trade route. Referred to as the Cottonwood Trail, it is reputed to have passed near *Pisclim* as well as *Amat Inuk* (Cline 1979:17-18; Rensch 1955:199-201).

Table 3-6
Bead sample from SDI-901

Bead Type	**Number**	**Percent**
H1a (ground disc)	39	21.1%
H1b (semi-ground disc)	133	71.9%
H2 (rough disc)	5	2.7%
J (wall disc)	5	2.7%
K1 (cupped)	2	1.1%
K3 (cylinder)	1	0.5%
Total	185	100%

Further discussions on the bead assemblages for these two sites will be presented in the Chapter 6.

Additional Data Sources

In order to provide an adequate context, other sites and bead data will be considered in this study. Data derived from the Imperial Valley, Coachella Valley, Ventura County, and San Clemente Island (see Chapters 4 and 6) will be utilized to identify exchange systems and trade routes within the overall area.

Summary

The use of shell beads in Native California has ancient roots. Perhaps as early as 7000 B.C, Native societies were producing moderate amounts of beads for decoration and legitimization of power and prestige. However, as societies evolved in complexity, beads acquired new importance and utility. They became in effect a medium of exchange that facilitated economic interfacing with neighboring polities. Eventually this interaction sphere expanded to include most of Native California and beyond. Throughout the archaeological record we see this trend of ever increasing use of beads over time. However, by the beginning of the Protohistoric Period this pattern begins to wane and bead use slowly tapers off. The reason for this change is conjectural but it is reasonable to envision European contact as a precipitating factor. Besides the disrupting effects of new ideas and artifacts, Old World diseases caused havoc on Native Californians. Arguably, Native populations were severely impacted by the devastating effects from new pathogens introduced by the Europeans. Many populations crashed and all aspects of Native life became drastically altered. Anomalous findings in the archaeological record during this time period may indeed be a result of these disastrous events. Nevertheless, as stated above, historic (Mission Period) bead use rebounded in certain inland areas, such as seen in this study, and possibly due to factors involving cults and socioreligious dynamics, bead production and distribution was intensified. The very distinctive H series wall disc beads (e.g. rough disc ï King 1987) with their larger, unfinished appearance and small drill holes seem to flood these inland areas at a time when chaos reigned throughout Spanish California. Certainly, demography and settlement changes brought about by the effects of disease had a part to play, but quite possibly the spread of a new messianic cult could have facilitated this peculiar turn of events. We now turn our attention to this concern, along with other related issues.

Chapter 4: Distribution and Exchange of Beads during the Historic Period – A Model

Introduction

In the last two chapters, the argument was forwarded that a revivalist type of cult was likely responsible for the exponential increase of shell and glass beads in the interior region of southern California during the Historic Period. The cult was undoubtedly triggered by the devastating effects of Spanish colonization and spread rapidly from Gabrielino territory (in the greater Los Angeles area) to neighboring groups (e.g. Luiseno, Serrano, Cahuilla Juaneno, Kumeyaay, etc.) mainly east and south of the Gabrielinos. As the cult evolved it incorporated traditional ceremonial and ritual practices as well as certain aspects of Christianity. These ceremonies traditionally involved gift exchange (mainly shell and glass beads ï Bean and Vane 1978) and as the cult moved inland and south of its origination point, so did beads (Lepowski 2004). Also likely is that the routes utilized by cult members were established trade corridors and trails that had been used over the millennia. In this respect, the mechanisms and operative factors were the same for exchange before the appearance of the cult. While introducing new regalia, songs (usually sung in the Gabrielino language) and whirling dance practices (DuBois 1908:123; Strong 1929:323; Hardy 2000:80), the cult did not necessarily alter Native lifeways. Rather, it incorporated these traditions into the thematic body of the new religion (Lepowski 2004).

Of Trails and Material Conveyance

Before any understanding can be gained concerning the monumental sociopolitical changes taking place during the Historic Period, a deeper appreciation of exchange networks and trade systems needs to be acquired. Understanding how the Kumeyaay and other Native peoples physically moved across the landscape is an important prerequisite in piecing together the economic and socioreligious mechanisms of the Historic Period. An essential part to understanding these mechanisms is identifying and tracing out the trails and travel corridors used by the eastern Kumeyaay and their neighbors. How the bead data is ultimately interpreted is contingent on mapping out the networks utilized by these groups.

What follows is a discussion of exchange systems ï what they are and how they operate ï and a brief review of all the known trails and trade networks for the interior region of southwestern California.

Features of Exchange Networks

Following Fred Plogôs fairly exhaustive discussion on the characteristics of exchange networks (1977), Steven Shackley succinctly outlines what constitutes trade systems (1981). Primarily studying the settlement patterns and exchange systems of the late prehistoric Kumeyaay in Carrizo Gorge, he presents several features which apparently appear in exchange systems cross-culturally. These include network content, network magnitude, material diversity, exchange network size, temporal direction, exchange directionality, exchange symmetry, network centralization, and network complexity.

These constructs have some utility to the current research and will be adhered to in the forthcoming analysis. Basically they are described as:

Network Content

This covers the range of the material types conveyed and exchanged. There are several ethnographic sources which list the types of goods and artifacts traded within the study area (Davis 1974, Gifford 1931, Waterman 1910) and these will be discussed below.

Network Magnitude

This refers to the quantity of goods being exchanged.

Material Diversity

This concept refers to the degree of diversity within the exchanged material.

Network Size

This deals with the territory in which the exchange system takes place.

Temporal Direction

This concerns the diachronic features of an exchange network.

Directionality of Exchange

This refers to how goods flow (e.g. from A to B, B to C, etc.).

Exchange Symmetry

This concerns the nature of the flow; for instance, whether one route is used more intensely than the other.

Network Centralization

Centralization occurs when greater amounts of a particular resource occur at one or more locations (see Hughes and Milliken 2007; Renfrew 1977; Sahlins 1972).

Network Complexity

This variable refers to the degree of variation in some of the features listed above. When a particular network contains links that differ from one another in terms of symmetry, directionality, centralization, and diversity, then it is considered complex.

In a seminal article written in 1977, Colin Renfrew proposed that when a resource is at a highly localized source, the distribution of resource material in space follows a general pattern where frequency of the material decreases with distance. Called monotonic decrement, this non-random pattern essentially deals with ɶeffective distanceô from the source (Renfrew 1977:72). Renfrew recognizes that effective distance can differ depending on a suite of varying factors, such as topographic barriers or sociopolitical impediments. Such impediments essentially increase effective distance whereas rivers and sea may decrease it (i.e. ease of transport). While this model is basically a processual construct fraught with exceptions to the rule, it does have some utility in understanding trade goods distribution over a defined study area. In this sense, it has direct relevance to bead trade mechanisms in my study. The question is, does bead distribution during the historic period conform to the model or does it exhibit an anomalous pattern possessing a unique set of variables?

A subsequent study done by Clay Singer in the 1980s did consider monotonic decrement in explaining the use and distribution of a toolstone material called fused shale which is found several miles inland from the Pacific Coast (Singer 1986). Fused shale, which can only be obtained at highly localized sources, saw increased usage after A.D. 500 and was in conformance with Renfrewøs model. However, it was also discovered that the distribution was directionally skewed indicating a prestige-chain exchange system (Singer 1986:13; Tibbet 2002:26). In other words, frequency of fused shale decreases with distance from the source, but only in a particular direction (in this case towards the coast). Renfrew recognizes this anomalous effect on direction and cites óé preferential access of prominent or wealthy individualsé ô as instrumental in creating this situation (Renfrew 1977:77). Pertinent to the present study is that while preferential access may not have played a major part in the distribution of beads in the Coachella Valley and eastern San Diego County, there was certainly a óskewingô of sorts which not only violated the concept of monotonic decrement, but also affected directional symmetry (see above). That is, beads ï and possibly other exotica ï were flowing copiously in a southerly direction, from their likely origin in Santa Barbara Channel to the inland deserts of southern California (Gamble and King 2011:166). The cause of this phenomenon is likely related to the rise of a messianic cult which suddenly appeared after contact with Europeans. This dynamic will be further discussed in this chapter as well as in Chapter 6.

Trails and Communication Corridors

Over the years it has been recognized by investigators (Davis 1974; Sample 1950) that the identification of trails and travel corridors is the key to understanding trade networks and the consequent distribution of goods and technology (and ideology). In what is now called San Diego County, many trails and communication corridors crisscrossed the territory (see Cline 1979; Davis 1974; Johnston 1980; Rensch 1955; Sample 1950; Shackley 1981:28-32). Of these trails, five have particular import to the current study; the five trails (depicted in Figure 5-1, Chapter 5) are the Maricopa Trail, the Halchidoma Trail, the Yuma Trail, the Fages Trail (or Sonoran Road), and the Xakwinimis Trail. The Maricopa Trail has been roughly described by Johnston as heading:

> é southerly from San Bernardino to Pala, thence easterly through what is now Harpers Well near the confluence of Corrizo Creek and San Felipe Creek, and across desert land at the southerly end of the Salton Sea to the Colorado River in the vicinity of Picacho and Tumco (1980:95).

Johnston also in the same paper described the Halchihdoma Trail. He states;

> The Halchidoma Trail ran roughly east from San Bernardino through the San Gorgonio Pass to the region of the Halchidoma or present day Palo Verde Valley (1980:95)

The Yuma Trail has been described by various authors as generally running in an east-west direction from Yuma to San Diego (Davis 1974; Sample 1950; Shackley 1981). As depicted in Figure 5-1, the trail pretty much hugged the area now demarcated by the California/Mexico border.

The Fages Trail (or ŒEl Camino Viejo a Los Angelesô) was rediscovered by Pedro Fages in 1782 during the Colorado River Campaign which was mounted to quell the rebellious Yumans who had risen up against the Spaniards at the Yuma crossing. It was a punitive expedition and was directed at opening the route to caravans traveling from Mexico to California (i.e. San Diego). It was on his return trip from Yuma that Fages discovered óé the ready-made Indian trail over the Cuyamaca Mountains (Rensch 1955:194). Basically, the trail begins at Harperõs Well, runs south, then east through the Carrizo Corridor to Mason Valley and then over the Cuyamaca mountains through Cuyamaca Valley. Ultimately it terminates at Mission San Diego de Alcala (Figure 5-1). Two study sites, SDI-106 and SDI-901, are directly adjacent to this ancient indigenous trail.

The last major travel corridor is the Xakwinimis Trail. First described in Giffordõs 1931 ethnography of the Kamia (i.e. Kumeyaay), the trail appears to run from Campo to Jacumba Valley and then down the Carrizo Corridor to Harperõs Well (also see Shackley 1981:29-32). This particular trail is also mentioned in an interview with Tom Lucas, a Kumeyaay Indian informant (Cline 1979). Lucas clearly states that the trail was a major communication corridor between the Cuyamaca Mountains and Mason Valley, where the village of *Net Nook* (SDI-106 ï see above) is located (Cline 1979:21).

Many of the trails found within the study area are currently represented by modern highways and roadways. Possibly due to their nature as convenient travel corridors these routes have been used for perhaps millennia prior to the construction of modern thoroughfares (cf. Sample 1950: 2; Warren and Roske 1981:I-1 to I-52). Though some Native trails appear to be dictated by the need to travel by the shortest possible route, overall, natural passes were most commonly utilized.

Another feature of aboriginal trails is the occurrence of artifacts and settlements on or directly adjacent to the route. Certainly, the presence of two large sites (SDI 106 and SDI-901) along the Fages Trail is no accident. Likely the trail preceded the sites, but this can not be easily demonstrated. Whatever the case, this relationship can be seen throughout the study area. Kumeyaay use of these trails must have been frequent. Ethnographic and post-contact accounts repeatedly mention the Kumeyaay and other indigenous people freely traveling back and forth along these corridors for the purpose of trade (Gifford 1931; Sample 1950). This trading no doubt was complex and there are many questions that need to be addressed before tackling the exact nature of these networks. As mentioned above, exchange systems have many features and all of these will be subsequently examined.

Doing Business in the Historic Period

As I have mentioned before, the Historic Period brought many changes to the indigenous people of San Diego County. It is unlikely that we will ever fully know or understand Native lifeways, including trade and exchange, before contact (see Sahlins 1972), but we do know that major disruptions occurred once the Spanish colonized California. Far beyond the obvious impact from the missionization process, the effects (introduction of pandemic disease, disruption of native resources by European livestock, etc.) of Spanish settlement were devastating on Native Californians; both at the missions and in the hinterland (see Hackel 2005; Jackson and Castillo 1995; Lightfoot 2005; Sandoz 2004). While what happened at the missions is important, of greater import for this study are the cultural changes that transpired in the interior regions. Historic and ethnographic data is not rich for eastern San Diego County, but archaeological evidence is. By looking at the material culture at select sites, it is possible to partially reconstruct exchange networks, which will ultimately throw light on how Native polities made changes in response to the Spanish *Entrada*. What follows is a discussion of the mechanism and milieu, in which these processes took place.

Exchange systems during the Historic Period

Why do people trade? They have been doing it from time immemorial, but what motivates them to do so? Many answers can be forwarded dealing with economics, ritual, prestige and power (Sahlins 1972); Mauss 1993). Conceivably, one or all of these could be at work in any given situation. With the Kumeyaay, especially in eastern San Diego County, I surmise it was economics and ritual that played a pivotal role in exchange systems, particularly as it relates to content and direction. As we shall see later in this discussion, the defining events of the Historic Period jumpstarted exchange in this interior region and led to much more trading activity in European goods and glass and shell beads. This of course led possibly to changes in settlement patterns and demographics. However, before delving into this aspect of the Kumeyaay exchange system, further discussion is needed to explain the complexity and exact nature of the network in this interior region.

For example, in 1776 Father Francisco Garcés of the Mission San Pedro y San Pablo de Bicuñer at the Yuma Crossing hired two Mojave Natives to guide him across the Colorado Desert. They told him at the time that they often made the trip to the coast. And indeed while traveling with these guides Garcés did see two groups of Mojave returning from the coast with shells (Sample 1950). This observation appears to be repeated several times in the historic literature (Simpson 1962: 164; Sample 1950:4). Native Americans made long arduous trips to secure provisions and exotica. Certainly this was the case with the Mojave, who were known as middlemen of the Southwest (Sample 1950:4). The Yokuts were also known for long distance travel and were thought to be middlemen for a territory that stretched from the Pacific Coast to the Central Valley of California (Arkush 1993:625). Other long range traders may have included the Chumash (King 1990:150; Davis1974:2; Sample 1950:5), and possibly the Kumeyaay (Sample 1950:4). While long distance trading was not uncommon, other forms of exchange were undoubtedly practiced. Down the line bartering (briefly discussed above) likely was also utilized. Unfortunately it is hard to demonstrate, either ethnographically or archaeologically. We do know that Hohokam pottery originating from Arizona sometimes appears in southern California. Forty Hohokam pot sherds were recovered from the Big Tuhunga site in San Fernando Valley (Wallace 1955:294), and numerous sherds of this type have been found in the Colorado Desert (Moratto 1984:359). Whether this pottery was bartered or directly traded is hard to say, but given the great distances, it might be reasonable to see bartering as the more likely scenario. Other examples of long distance trade include Pacific Coast shells at Pueblo ruins (Sample 1950:4); a *Glycymeris* shell (originating in the Gulf of California) bracelet found in Orange County (Sample 1950:4); woven blankets from the Southwest were known and used by the Chumash on the coast and islands of Santa Barbara Channel (Davis 1974:2); and Hohokam and other Arizona pottery was found among the prehistoric Colorado groups (Davis 1974:3).

It is likely that trading was more complex, and when great distances were involved many people or traders participated. It is also probable that sociopolitical units played a part and that trade partnerships when involved developed along lines of affinal or fictive relationships (Sahlins 1972:304; Hughes and Milliken 2007). Trade partners were often brought together during trade festivals, mourning ceremonies, or other feasts. Normally, these events took place at large village sites (e.g. *Net Nook*) on or near major trails (Sample 1950; Davis 1974).

At trade festivals and ceremonial events, trade partners exchanged ógiftsô in a ógeneralizedô manner ï gifts that are freely given without expecting immediate reciprocity. This concept is called generalized reciprocity (Mauss 1950:41-42; Sahlins 1972:193; Pfeiffer et al 2005). It means that sometime in the future a gift of equivalent value may be returned to the giver by the recipient. If the gift is returned immediately it is called balanced reciprocity (Sahlins 1972:194). Normally, it would be either generalized or balanced reciprocity that operated among the tribes of southern California. The third form of reciprocity, called negative, rarely occurred as it could lead to conflict due to the one-sidedness of the exchange (Narotzsky and Moreno 2002).

Directionality of exchange of goods in most of California appears to be generally in a west-east orientation (Sample 1950:5). The reason for this, according to one researcher, is the ecological diversity in the west-east direction (Sample 1950:5). From west to east in California, there are seacoast, coast range, interior valley, sierra environments, and arid land expanses. By trading from a west-east (and vice versa) direction, the Kumeyaay maximized their resource potential (Hildebrand and Hagstrum 1995:121; Luomala 1978:599). This tendency, however, does change in the Historic Period, and for reasons to be discussed later, the Kumeyaay and their nearby groups adopted a more northwesterly-southeasterly orientation.

The Kumeyaay had at contact a very fluid social organization. Organized in what are called sibs, lacking corporate clans and possessing a vaguely recognized lineage affiliation (Luomala 1976:245). Locality, or place of residence, appears to have been the organizing feature of the Kumeyaay (Luomala 1976:249; Spier 1923:298). Luomala argues that this type of social organization, which differs greatly from neighboring polities, was developed to deal with the unpredictable environment. It gave the Kumeyaay great flexibility in terms of seasonal round and sib affiliation. In effect all members were related, or had the potential to be, and could move freely between sibs and village locations (Luomala 1976:270). Interestingly, the Kumeyaay had a term for people who changed locations ï they were called *kwitxal*. Although this term acquired a somewhat negative connotation in post contact times, it likely was an operative fictive kin designation at one time that accommodated the need to be mobile, allowing members to change sibs or locations as the need arose (Luomala 1976:258-265; Shackley 1981:25). It is also possible that the *kwitxal* were drifters who functioned as óincidentalô traders (Shackley 1981:25).

It was the mobility and flexibility that built into the Kumeyaay social fabric that may have laid the foundation for things to come in the Historic Period. This Kumeyaay practice was traditional and through social discourse was transformed into a much different system (in terms of settlement and exchange) during post-contact times. This tendency to be extremely flexible may have also led the Franciscan Friars to adopt a different approach toward the Kumeyaay in regard to the missionization process. Unlike the other Alta California missions, Mission San Diego de Alcala did not have a large resident neophyte presence. Rather, the padres felt it wiser to keep their neophyte population low and adopt a program which allowed the baptized Indians to come in once every two weeks for Mass and to undergo Catholic indoctrination (Hackel 2005:259; Lightfoot 2005:65). Other than the time spent at the mission, these Indians largely dwelt in their villages in the hinterland. While this program may have grown out of inadequacy of the mission to produce enough food to support a permanent neophyte population (Lightfoot 2005:65), it also likely that the Native social organization was not conducive to adopting a permanent presence at the mission.

Further support for this theory comes from two events (one of which is mentioned above in Chapter 2) that occurred not long after the founding of the mission in 1769. Soon after the Spanish had landed and set up camp, a group of Ipai (i.e. Kumeyaay) attacked the party, wounding two soldiers and killing a neophyte (Bokovoy 2002:5; Hackel 2005:45-46). The attack appears to have been largely unprovoked and may have been carried out to humiliate the new colonists. This attack was followed by a second and more ferocious one in November of 1775. Gathering together hundreds of Indians from as far away as the Colorado River, two Kumeyaay headmen, the brothers Carlos and Francisco, organized a night raid on the mission (Hackel 2005:258-263). The uprising reportedly arose out of a trivial matter, but it is more likely that the Native Americans were upset over the ǿé increased interference in Indian lifeé ô (Shipek 1981:301). After a rain of arrows, the church, the storehouse and the padresô quarters were set afire. During the onslaught the Kumeyaay and their allies killed and mutilated Fr. Jayme and mortally wounded the blacksmith. After the attack, the Indians retired to their villages in the interior. This event illustrates the fact that the Kumeyaay were an extremely independent and sometimes fierce people, at least during colonial times. The two captains, Francisco and Carlos, actively resisted the presence of the Spanish, creating in effect a means to counteract the perceived oppression by the Spanish.

Also at work is the possible connection of this uprising with the *Chinigchinich* cult. As suggested by Lepowski (2004) and others (Jackson and Castillo 1995; Sandoz 2004), many of these uprisings were driven by religious fervor generated by the new cult. Analogous to the Ghost Dance in the Great Plains, the *Chinigchinich* religion was likely an oppositional response to environmental and cultural degradation of traditional values and lifeways. On the Great Plains, it was mainly the decimation of the American bison, and in California it was introduced diseases and livestock that led to the tipping point for Native groups (Kehoe 2006; Lepowski 2004; Thornton 1986). Large gatherings of Native Americans comprising differing ethnolinguistic backgrounds participated in these revolts and were greatly influenced by divinatory prophets who promised protection from the white soldiers and a return to the old ways. In this sense these uprisings were an attempt to overthrow the mission and revitalize the traditional culture (Lepowski 2004).

Persistence and Change

Throughout this thesis I have stressed the anomalous nature of bead distribution in San Diego County. Unlike the case in other regions to the north and east, beads here are virtually nonexistent during the prehistoric period. In the numerous archaeological excavations that have taken place throughout the county, only minimal numbers of beads have been found at prehistoric period sites (see Table 3-2 in Chapter 3). What caused this pattern? Was bead interaction limited to the Chumash and Gabrielino to the north? Or did the Kumeyaay simply elect to refrain from participation for ideological or sociopolitical reasons? Or, lastly, was it simply a matter of geography as I have suggested in Chapter 4? Whatever the reason it is patently obvious that bead exchange in San Diego was only minimally active prior to the historic period. However, once Spanish colonization began in 1769, trading of glass and shell beads exponentially increased in certain regions in the county. In the mountains and desert east of the coastal plain, beads are found in great numbers at large village sites, and almost without exception, these beads date from the historic and protohistoric periods. Instead of a paltry number of beads, many thousands have been found at these sites. And almost without exception these beads are found in association with human burials (i.e. cremations). This situation is not only anomalous in terms of raw numbers of beads but also because it occurred during a time when trade supposedly decreased due to post contact interference. Researchers have repeatedly remarked in the literature that long distance trade broke down from the disruptive effects of colonization (Chartkoff and Chartkoff 1984; Bamforth 1993:68; Earle and Ericson 1977:9). According to these investigators trade was virtually severed along the coast due to the Spanish occupation and missionization process. As stated by Chartkoff and Chartkoff (1984:264).

> The mission program disrupted the focal economies of California. Even the groups that were not missionized felt this adverse impact. Spanish settlement barred many of the remaining California Indians from traditionally important resources, such as clamshell beads, abalone shells, Catalina steatite, shellfish, and asphaltum. Vitally important trade relationships between coast and the interior were severed. The inevitable result was an economic decline even for peoples who had never seen a European.

And yet how did these beads continue to be traded east and south of the Santa Barbara and Ventura area? And how and why did these beads continue to reach the Cahuilla and Kumeyaay nearly one hundred and fifty miles away? I think the answer(s) will ultimately be found in the passive and active resistance to the acculturative and disruptive effects of the Spanish Mission system.

The Mission System

Settlement of Alta California did not immediately follow the initial period of European exploration. Over two hundred years separated the first expedition (Cabrillo-Ferraro) and the ultimate settlement in 1769 (Hackel 2005; Lightfoot 2005; Weber 1992). Unprecedented in the Age of Discovery, settlement of a potential territory was virtually ignored for over two centuries. However, two concerns began to change the Spanish Crownõs attitude:

1) The need for safe harbors along the eastern Pacific for large Manila galleons carrying spices, silks, velvets, gold, silver jewelry and other valuable stores.

2) The incursion of foreign interests (e.g. Spanish, English) within the ôSpanish Lakeö.

Finally in 1767 a colonization plan was crafted by José de Gálvez, the *visidor general* (inspector general) for the North American colonies. Greatly influenced by the Age of Enlightenment, Gálvez had the skills needed to accomplish reforms mandated by the Bourbon monarchy and secure and strengthen the New World colonies. He planned to meld the clerical (Franciscan Order) and secular needs and utilize a cost-effective mission system to take possession of Alta California (Hackel 2005:41-42). The scheme was to establish a number of missions along coastal California that would provide some military protection at several strategic locations. Settlement of the northern territory would be realized at a reduced cost and would effectively Christianize Native inhabitants. By 1769, the conquest of California had begun with the founding of the San Diego de Alcala Mission (Engelhardt 1920).

The conversion doctrine of the Franciscans was not a new concept. Called *congreción/reduccion,* the policy had been in operation since the early colonization of northern New Spain (Mexico) and South America. The system was simple ï bring Natives in from the hinterland and congregate them within mission (or mission-sponsored) compounds so that the padres could manage and oversee the conversion process (Bokovoy 2002:1; Lightfoot 2005:59-66). The objective was to indoctrinate the neophytes in the Catholic faith and teach them skills which would assist in assimilating them into Spanish society. The Franciscans assumed that the Natives were *sin razón* (without reason) and were like little children dependent on the friars for their temporal and religious needs. To facilitate the conversion process most neophytes were carefully watched and were often subjected to daily roll calls and night time sequestering within mission dormitories. This was particularly true for widows and young, unmarried women. Married couples normally resided in neophyte villages close to but outside the immediate confines of the mission (Lightfoot 2005:62). The padres hoped that through this process neophytes would succumb to conversion. But as we will see the conversion process was in most cases incomplete.

Neophyte resistance to the padreôs teachings and the enculturation process was likely the prime reason why missionization was a failure. As we saw in Chapter 2, this resistance sometimes took a violent turn, but in general it was more passive. This latter form is more difficult to document since it was not always recognized by the padres and the military officials as an act of resistance (Jackson and Castillo 1995:74). However, it is likely that many traditional practices continued óundergroundô. Religion and cults such as the *Chingichngish* cult were secretive and were practiced in refuge areas or in areas devoid of prying eyes. Traditional marriages also took place in private and were usually held inside one of the adobes prior to the Catholic ritual in the church (Hackel 2005:199; Lightfoot 2005:95), and during burial rites neophytes would surreptitiously resort to Native customs. As stated in one official church document:

> é on the pyre on which they (the gentiles) burn the corpse, they throw seeds, beads and other trifles they possess. The neophytes do the same thing at the burials in the cemetery when the missionary father is not looking (Geiger and Meighan 1976:119).

There are countless other examples documenting this phenomenon, from the use of traditional tools to perpetuation of Native dances and rituals. All point to the reluctance of Native agents to relinquish autochthonous lifeways. In this vein, the occurrence of hundreds (and sometimes thousands) of *Olivella* wall disc beads at the Missions becomes more comprehensible. Chumash bead makers, who had recently been relocated to the missions, continued to make beads. Was it passive resistance, Native agency, or something more complex that led them to do this? And how or why did these same bead types appear in eastern San Diego County and elsewhere? The answers to these questions are paramount to the objective of this research.

Life and Times at Mission San Buenaventura

Acquiring a firm handle on the processes dealing with missionization and agency will help elucidate bead exchange and distribution throughout southern California. As shown above there is a clear connection between the missions and the beads found in the study area. Mission San Buenaventura exemplifies the mission system and can assist in elucidating this connection.

Shell and glass beads have been identified within two areas at Mission San Buenaventura. One area (VEN-87H) is located directly west of the church (Figure 4-1) and the other (VEN-1222H) is situated 250 meters south of the main mission compound (Figure 4-1). Approximately 45,000 beads were recovered from VEN-87H (Gibson 1976) and over two thousand were collected from VEN-1222H (John Foster, personal communication 2008). Although these sites have different designations, they are in fact one contiguous site. Both are part of the mission compound site, which is on the National Register of Historic Places. The two sites differ from one another due to the unique historic activities which took place in each area. As stated above, VEN-87H is near the church and may have had something to do with the neophyte quarters (*monjerios*) for unmarried women and young children These structures were often within or near the mission quadrangle

(Jackson and Castillo 1995:109; Lightfoot 2005:62). Looking at the aerial photo of VEN-87H (Figure 4-1), it can be seen that five separate foundations are running in an east/west direction and that these structures are very near the sacristy of the church. Given the size and shape of these foundations, it seems possible they functioned as the *monjerio*s for the mission. The fifth structure seen in the photo is likely the original church which burned down in 1802, just prior to the construction of the five buildings (John Foster, personal communication 2008). Early visitors to the missions often remarked on the almost dungeon like quality of these dormitories stating that they were unsanitary and not conducive to good health. One visitor, Diego de Borca, óé identified poor sanitation as a factor in the high death rates observed in the mission, as well as the practice of locking up girls, single women, and the wives of absent or fugitive men in the dormitories at nightô. At times 48 women would be crammed into a structure that roughly measured only eighteen by seventy feet. While it is tempting to see these foundations as the remnants of the mission *monjerios*, it is feasible that they functioned as something entirely different. Mission records report in 1795 a number of adobe buildings going up óoutside the quadrangleô (Englehardt 1930:25). One was the dwelling for the *mayordomo*, and the others were for tanneries and granaries. Further complicating the issue, a number of adobe structures were built for the neophyte families in 1804. In any case, we know that at least five structures existed at VEN-87H and that many thousands of beads were found in the midden near or within these structures. If they were womenös dormitories, it may mean women made beads. One of Harringtonös informants mentioned that, óSP has seen many V. (Ventureño) Indians ï old men and old women, boring beadsâ Interestingly, evidence of bead manufacturing was identified at the site. As documented by Gibson the shell detritus consisted:

> é of various pieces of *Olivella biplicata* shells. Although a detailed analysis was not done with the detritus, it did appear to be the result of bead manufacturing. (1976:97).

Carmen Zepeda in her analysis of beads from SDI-106 (one of the prime study sites) found that there was some concordance in terms of bead diameters between the two sites (1999:78). She thought, as I do, that rough disc beads found at SDI-106 came from the Missions (Benyhoff and Hughes 1987; Zepeda 1999:78-82; Gamble and Zepeda 2002: 84). It appears likely that beads were manufactured at the missions and then traded throughout southern California.

At the San Buenaventura Mission, the southern part of the mission site, designated VEN-1222H, is very similar bead-wise to the northern section. Both areas contained similar rough disc beads and both demonstrate some form of bead production; bead detritus at the northern locus and bead blanks at the southern locus. The bead blanks found at VEN-1222H may represent a specialized aspect of *chaine operatoire.* As quoted by Fernando Librado, a Chumash Ventureño:

> The first thing I do is to break the *qoy*. I take the *qoy* one by one. I stand it on the anvil, my anvil is a rock and I take the rock and strike it on the tip and break it. Although *istik* is applied to the spiraled end of the goy above, Fernando says the Indians properly considered that end to be the *istipiq* and the mouth end of the shell the *istik*. I erect the goy and the spiral part is uppermost when I finish breaking the goy. *I trim them into the figure of beads* (my italics). I hunt a stone and an iron and shape the end and I erect it in the end of the stone, sticking it with *brea* (tar). The stone used to round the fragments (of *Olivella* shell) with is thus. I put a piece on top of the anvil and I peck it and round it into beads.

Figure 4-1: Aerial photo of mission grounds – note Mission Period foundations to the left (northwest corner – imagery courtesy of Google Earth).

I take a large piece of the qoy which I have broken and get two or three beads. I have finished rounding the beads. (They) are already called beads when rounded. They next bleach the *qoy* taking a batea (boiled junco basket for winnowing beads). This is a junco *batea* the size of a washbasin with sloping sides and about 2 inches or 3 inches deep and the inside coated with *brea* mixed with much sand so that it will stand the fire. They take live coals, put them in on top of the tarred surface and then take a double handful of beads and vertically throw them in and toss them both together and then move revolvingly (sic.) from side to side, first pulling one hand and then the other while the *batea* is held horizontally, and then with a palito (little stick) scrape off the *brazos* which thus have risen to the upper surface and then half revolve them some more and scraped off the

> coals from the surface again and then empty the shells into something and quickly proceed to repeat again with a new handful. The anvil board in Spanish is called *quarache.* I cut the hole (in the anvil board) for putting the bead with my knife. The bead is somewhat basket shaped. I take the bead and put it in the hole (of the anvil board) back (dorsal) turned down. When the bead is well fitted in the mold or basin I begin to bore. Beads of various types were drilled with a slender stick, which resembles an arrow. In the end of the stick was inserted a needle like flint splinter. When actually drilling, the stick was twirled between the palms (Gibson 1976 82-83).

The type of anvil board that Fernando Librado mentions likely was used by all bead makers and its use led to a sort of standardization (i.e. somewhat similar diameter holes in the anvil board) of the beads being made (Arnold 1987:33, 57; King 1990:117). Statistically similar bead collections such as described above may be from a common source due to standardization processes. Bead anvils have been found archaeologically on Santa Cruz Island (Figure 4-2).

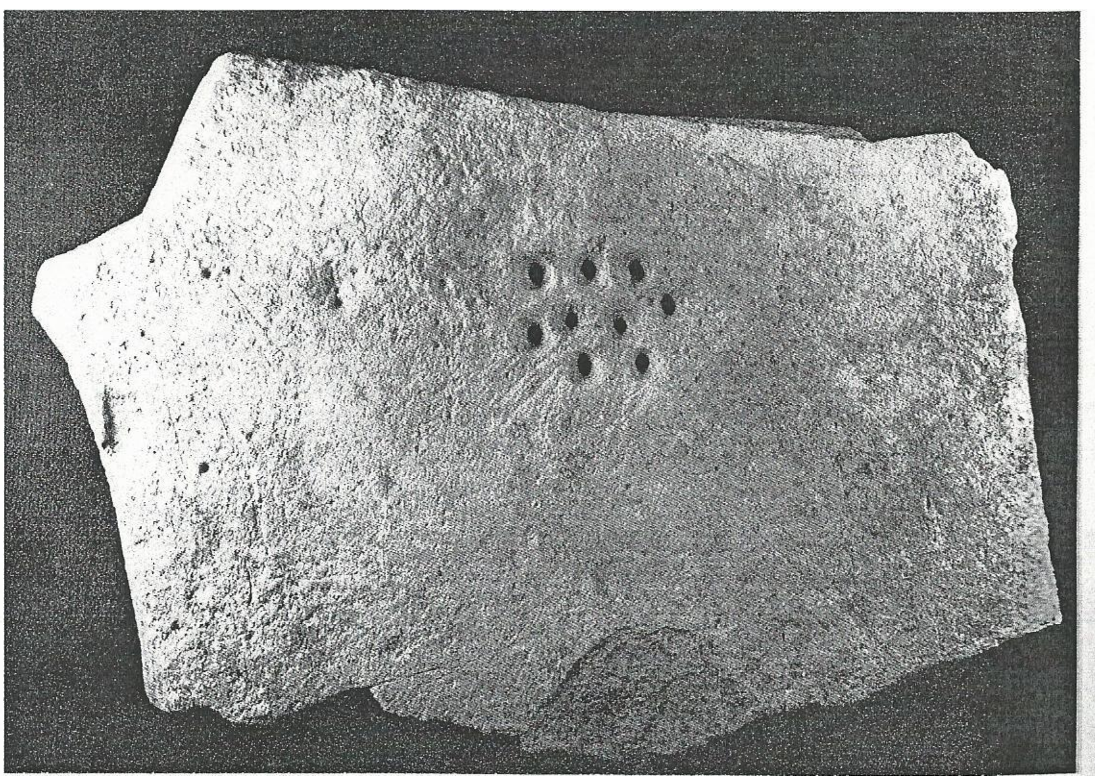

Figure 4-2: Bead anvil made from stone (From Hudson and Blackburn 1986:130).

Also notice that Fernando Librado states that he puts the dorsal side down first; he places it on the anvil board and proceeds to drill the ventral side of the bead. Many beads I have examined indeed exhibit this same technique. In needle-drilled H beads, I have identified splintering on the dorsal aspect of the hole representing the destructive exiting of the metal needle on the dorsum.

Beginning in 1785, members of the Santa Cruz Island population, including bead makers, were relocated to the missions (Johnson and McClendon 1989:647; Kennett 2005:93); once at the mission they were housed in either the adobes or in Native huts. Based on a drawing made by Alfred Robinson (an early Californio) in 1829, these Native shelters (called *jacales*) were usually located in the southwestern portion of the compound (Figure 4-3), the exact same location of site VEN-1222H. The bead blanks and beads found within this area are no doubt a product of Chumash bead makers living in these huts.

In the face of extreme oppression from Spanish enculturation, Native people nevertheless persisted in the traditional practice of making beads. As Pauketat points out, óthe space and artifacts analyzed by archaeologists are themselves the processes of tradition makingô (2001b:10). This he calls ómaterialityô which óé forces anyone seeking to explain the past to shift attention away from interpreting things toward understanding them as continuously unfolding phenomenaô (Pauketat 2001b:10). What was óunfoldingô at VEN-1222H and possibly at other missions was quite astounding and in some ways novel. Bead makers, craftsmen from Santa Cruz Island continued to practice their proud and prestigious trade in new and tradition-breaking manner, and in many ways bead production increased in some areas. Wall beads were being exclusively made and in forms that were never seen before. They were larger than their predecessor beads (e.g. saucer beads) and less refined. Edges were not always ground and through time this trend intensified (Figure 3-7). This development (or unfolding) of *Olivella* wall beads has been looked upon by researchers as either due to acculturative or economic factors ï i.e., acculturative factors created by the Spanish presence and economic factors deriving from the inflationary trends attributed to the introduction of glass beads into the system (see Chapter 3). My own interpretation favors a more agential approach. I feel that the effect and stress of enculturation on the individual must have been tremendous. Relocation to the missions must have led to a sense of loss and disillusionment, sometimes leading to deep melancholy. As Jackson and Castillo (1995:52) state:

> Contemporary accounts describe a melancholy attitude among many converts, symptomatic of the general psychological dislocation caused by the routines, living conditions, and high rates of morbidity and mortality in the missions.

Could this melancholy be read in the artifacts themselves? I think it can to some degree. These unground and sometimes unfinished beads found at the mission may simply reflect a state of mind that traverses tradition. As the converts deteriorated in health and members, so did the quality of their bead production. I also see the rise of the *Chingichngish* cult as a factor in the ramping up bead production. The cult was facilitated by beads and these artifacts played an important role in ritual activity. As ritual and ceremonial life increased (Hardy 2000; Salls and Hale 1990; McCawley 1996) so did bead use. It is likely that in the agitated and impassioned times of the Historic Period, beads had to be made faster and in larger quantities to satisfy and accommodate the needs of cult members.

Bead Exchange During the Historic Period

In Chapter 3, I touched upon the antiquity of shell ornaments and beads. As I pointed out these artifacts may date from 8,000 to 10,000 years ago (Hughes and Milliken 2007; Raab and Howard 2009; Vellenoweth 2001). Numerous studies have been conducted dealing with production and distribution of beads throughout southern California and the Great Basin (Eerkens et al 2005; Howard and Raab 1993; Hughes 1994; Hughes and Bennyhoff 1983). From these studies it appears that beads and ornaments functioned as jewelry and exchange items (and ultimately money) in a very extensive interaction sphere which included all of southern California, the Great Basin, and parts of the Southwest,

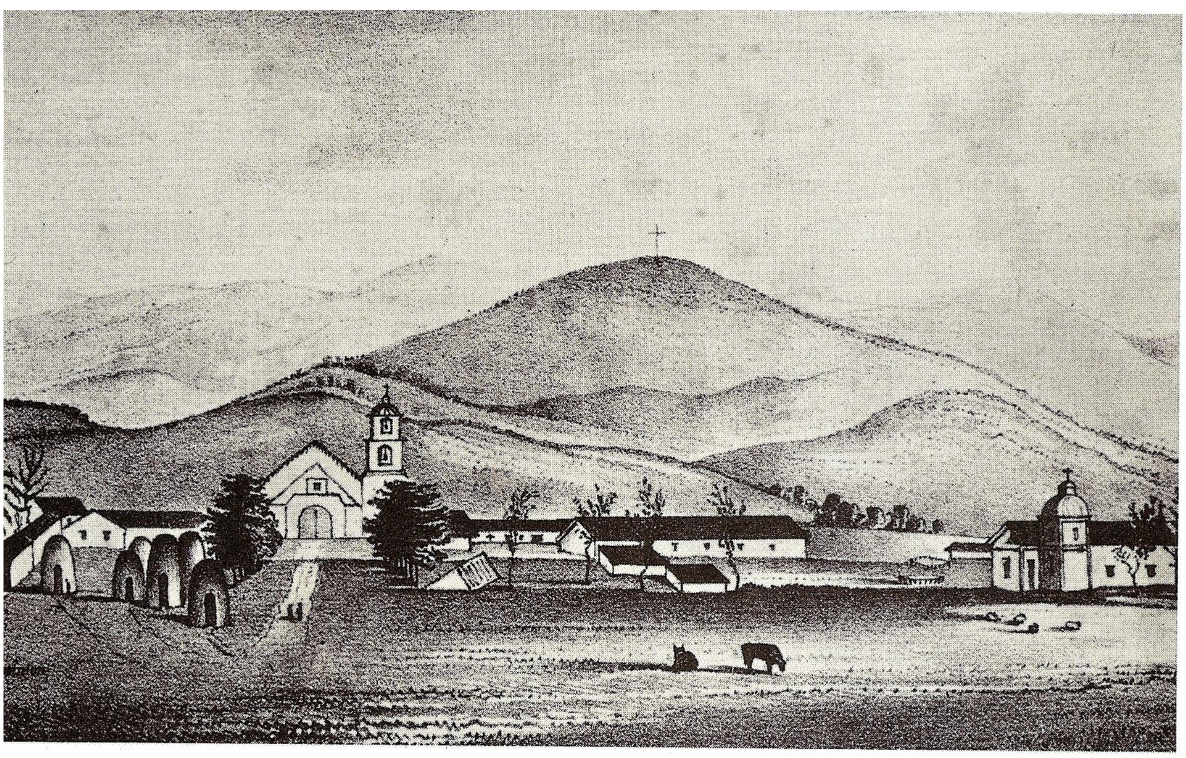

Figure 4-3: View of Mission San Buenaventura (as sketched by Alfred Robinson in 1829) showing mission compound in background and Native dwellings in left foreground (from Engelhardt 1930).

extending hundreds of miles. Throughout these areas beads remained an important commodity and luxury item.

While it is well documented that shell, bone and stone beads were traded throughout the Holocene, it seems that this exchange was not continuous. Bennyhoff and Hughes state:

> Our interpretation of the evidence is that shell bead and ornaments trade between the Great Basin and California was at its peak during the Early Period (ca. 2000 ï 200 B.C.) and that it declined sharply during the subsequent Middle Period (ca. 200 B.C. ï A. D. 700). To judge from the absolute frequency of specimens, shell trade appears to have increased somewhat during the Late Prehistoric period (A.D. 700 ï 1500), but again declined to reach a marked low in the Protohistoric Period (A.D 1500 ï 1800). (1987:161).

It has been suggested that environmental, demographic and sociopolitical factors played a part in affecting bead distribution over time (Hughes and Milliken 2007; Bennyhoff and Hughes 1987; King 1990, Singer 1986). Population increase, drought, and regional turmoil have all been implicated.

Many factors dealing with trade and exchange systems dramatically changed during the historic period. As stated above, trade routes were disrupted along the coast and other routes were more intensely utilized. These latter routes were perhaps marginally used prehistorically or were entirely new transportation corridors (Heizer 1978; Lightfoot 2005; Preston 2005). Most post contact exchange conducted in southern California was located in the interior regions perhaps because colonization and European contact were minimal and cult activity was more intense in these areas. In these regions wall beads

(Class H) supplanted callus beads and became the standardized medium of exchange. For the most part, these beads appear to have been manufactured at the more northerly missions (i.e. Santa Ynez, Santa Barbara, and Santa Buenaventura) after the relocation and missionization of the Island Chumash. From the missions, beads were mainly transported southeasterly to Mission San Gabriel (a known trade center and possibly a bead production site ï see Johnston 1980 and McCawley 1996), whence they were carried through the Los Angeles basin to the San Gorgonio Pass, where the route took a more southerly course into the Coachella Valley, traversing the Cahuilla territory and contining on to the Kumeyaay (Figure 4-4). This route has been largely reconstructed based on historical and ethnographic data. William Duncan Strong, who worked with the Cahuilla in the 1920s, reported the following:

> According to Alejo Potencio, the shell money was received from the Palm Springs clan by his grandfather who received it from the Serrano at Mission Creek. They got it from the Gabrielinoé (1929:95-96).

And in another source, Bean states:

> The most vividly remembered contributors to the Cahuilla cultural inventory were the Gabrielino, who traded their steatite, asphaltum, and shell beads with the Cahuilla for various food products and furs, hides, obsidian, and salt (Bean 1972:123).

McCawley also states that ôExtensive networks of trade and ritual exchange are reported to have linked the Gabrilieno with the Cahuilla, Chumash, Serrano, and Luiseno.ô And finally, both Davis (1974) and Sample (1950) demonstrate similar linkages between the Chumash, Gabrielino, Serrano, Cahuilla, Cupeño and the Kumeyaay (See Figure 5-1). As documented by Davis and Sample, these linkages were facilitated by the use of existing trails and travel corridors. Travel between the mainland and San Clemente and Santa Catalina Islands was facilitated by watercraft (likely plank canoes) and probably continued to be practiced well into the Historic Period. Interestingly, a Palos Verde village on the mainland shared the same Gabrielino name (*Kiinkenga)* as San Clemente (McCawley 1996:203). This may mean that the mainland village was occupied by San Clemente Islanders, possibly before or after abandonment of the island. As recently described:

> Especially notable is a population of Gabrielino living on the village of *Kiinkenga* on Palos Verdes Peninsula which is the closest mainland access to Catalina and San Clemente Island. McCawley notes that *Kiikenga* is a duplicate name for San Clemente Island and suggests that it was populated during the late 1700s and early 1800s by Gabrielinos that had abandoned the island, possibly to escape the hostile Aleuts that were hunting sea otters there at the time. Importantly, McCawley also cites confirmed reports that Gabrielino were still living at this village at Palos Verdes into the early 1900s. Many of these Gabrielino were likely the descendants of those that migrated from the island (York et al 2012).

Given this connection between the mainland and Islands, it is more than probable that a well established travel/trade route was utilized between these two areas (see Figure 5-1).

How trade in shell beads operated prehistorically is not all together clear, however, ethnographic data points to ritual and ceremony as being partly responsible in sustaining the flow of shell bead money. It is likely that every trading event had some form of ritual or ceremony attached to it. In discussing ritual for the Cahuilla, Bean finds that ritual was ó..a constant factor in the life of the Cahuilla Indians ï always directly ahead or immediately finishedöé andé öRitual served as a basic articulating mechanism for all instructions in Cahuilla societyô (Bean 1972:135). With the Cahuilla, ritual became especially important when trading with their immediate neighbors (Bean 1972:123).

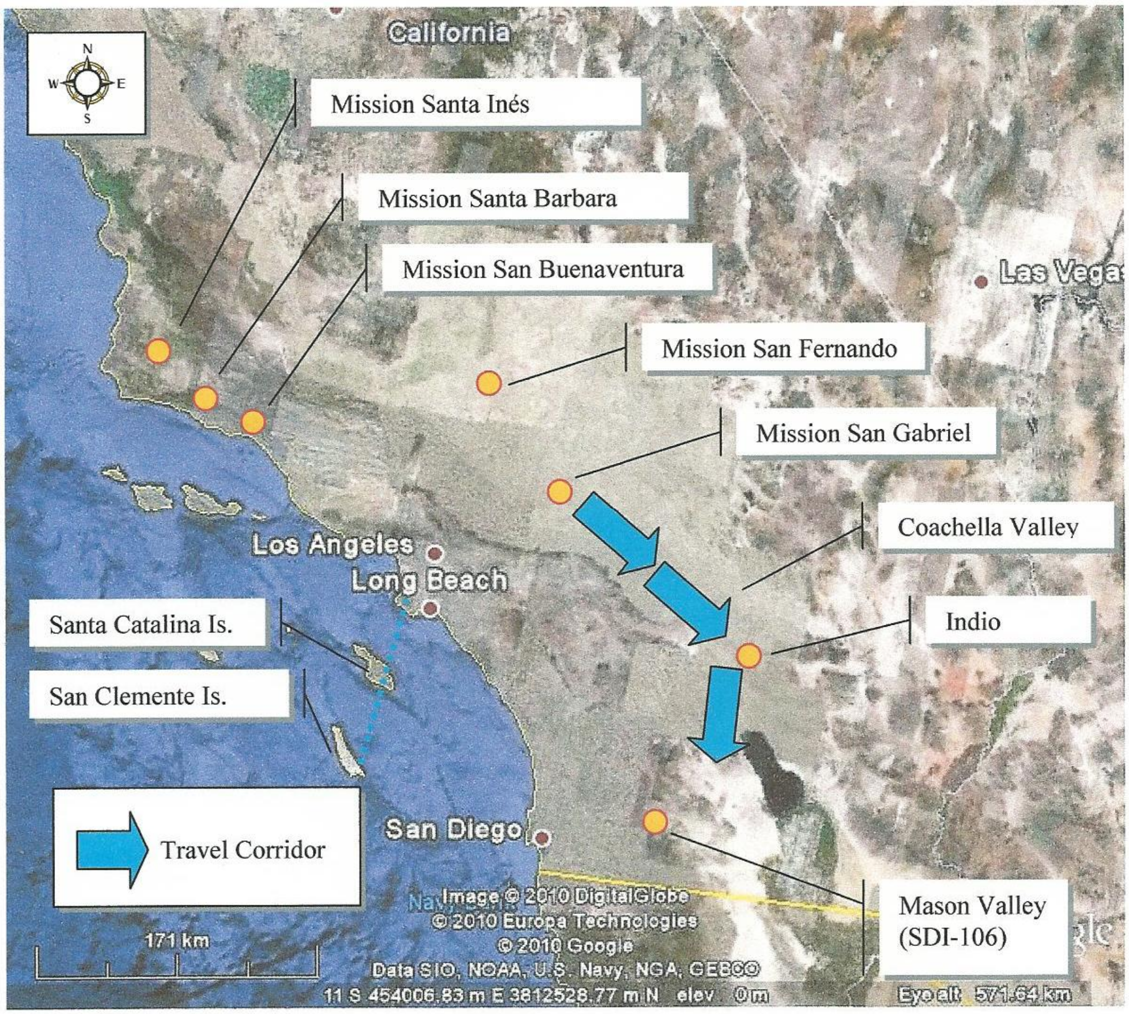

Figure 4-4: Suggested Historic travel corridor from Los Angeles Basin to the Western Colorado Desert (imagery courtesy of Google Earth).

Exchange of gifts and beads became obligatory during the Cahuilla image burning ceremony. A type of mourning ceremony, it often occurred six months to a year after a death. Many southern California tribes practiced a type of mourning ceremony. Among the Cahuilla it was called the *nukil*, the *wakat* for the Serrano, the *toltcinic* for the

Luiseno, and the *keruk* for the Kumeyaay. In the *nukil,* strings of beads were given out initially by the *net* (chief) to the invited, thus establishing a ritual reciprocity between the hosts and the invitees (Bean 1972:137). The host lineage also accumulated surplus food, beads and other treasure goods prior to the ceremony. During the ceremony doll-like images of the dead would be burned as well as other goods purported to belong to the deceased. Once the festivities were complete, beads and other goods were handed out among the guests. Clearly, this ceremony served many purposes, ritually and functionally (Bean 1972: Strong 1929). According to Bean:

> The redistribution of food and goods at the *nukil* through gifts and private exchange provided some safety factors for a lineage. Any area experiencing a serious food shortage could be partially compensated for that shortage through the *nukil*-related exchange (1972).

Beyond its apparent functional use, this ceremony strongly facilitated bead exchange.

The Kumeyaay counterpart ceremony was the *keruk*. The *keruk* began in the late summer or fall, after accumulating food, regalia, and goods and was directed by the clan chief. Normally, the ceremony lasted four to eight days. During this period, painted male and female guests decorated with body paint danced with images of the dead as hosts scattered gifts of currency (beads?), cloth, and baskets to non-relatives. The images were lifelike and adorned with traditional decoration, new European clothes, and beads. Finally at dawn, the images were burned with their regalia and new goods were placed on a pyre and burned (Luomala 1978). Other ceremonies and rituals that may have included bead distribution are: eagle rituals, rites of passage, and anniversary (mourning) rites.

A Time of Change – Prophets and Pathogens

Long before the Spanish occupied Alta California, disruptive factors were affecting Native populations here. Microbial in origin, these factors may have had a devastating impact on the Kumeyaay. Euroasiatic pathogens likely spread throughout southern California during the Protohistoric Period (Preston 2002, 2004; Dobyns 1983; Erlandson and Bartoy 1995).

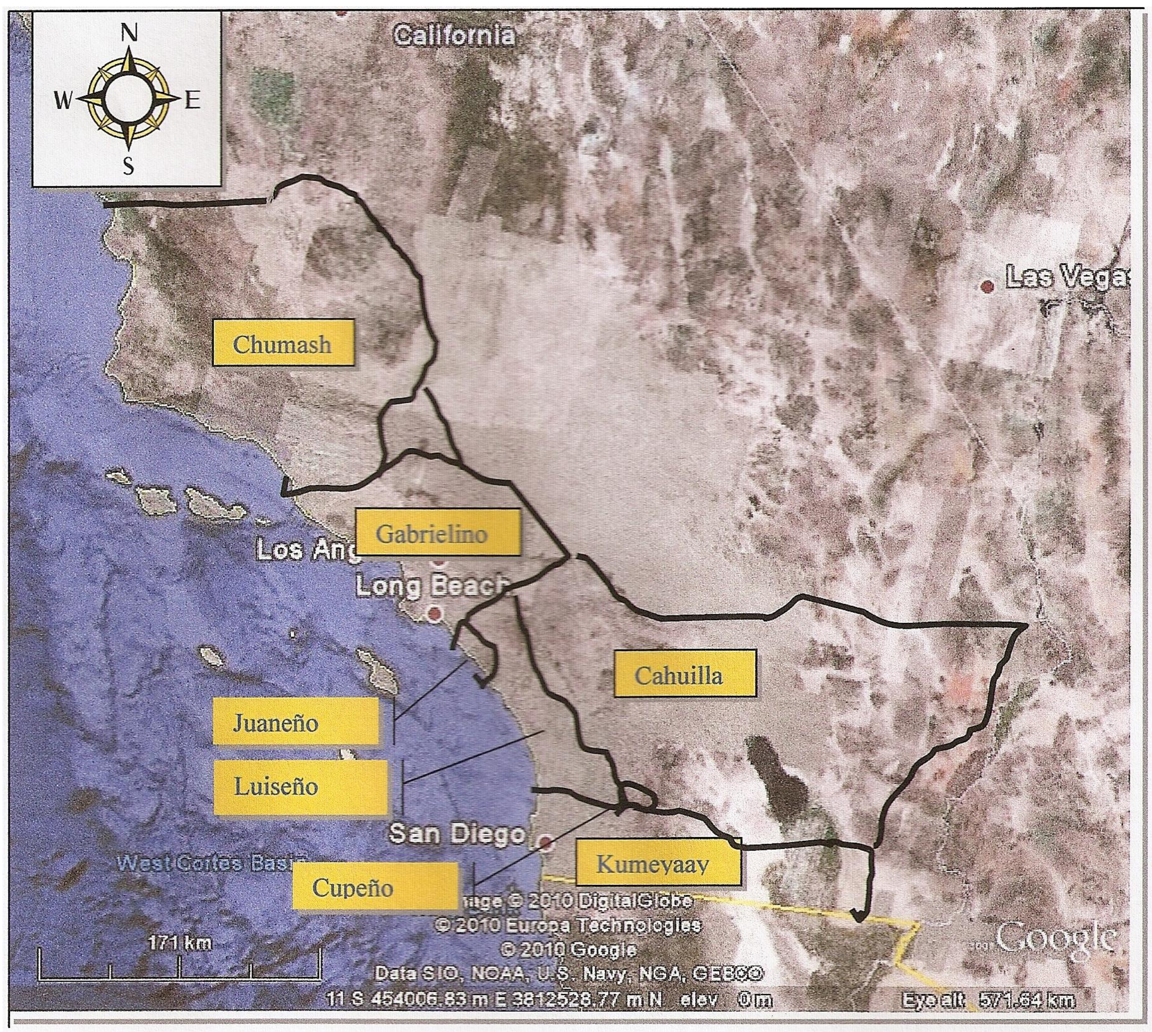

Figure 4-5: Selected ethnolinguistic territories in southern California (imagery courtesy of Google Earth).

Perhaps starting with the maritime explorations of Juan Rodriquez Cabrillo in 1542, these microorganisms may have spread like wildfire throughout southern California killing upwards of 40 percent of the population (Dobyns 1983:3-26). The overall effect on Native polities may have been staggering. Not only were social and political aspects of culture irreversibly changed, but leaders and specialists of the various societies were likely killed off leaving survivors directionless and in peril of losing basic subsistence strategies. Native response to this disaster can only be imagined, but likely social changes took place to accommodate effects on their society. Ideology and religion most likely played a major role in this process.

Pathogens

Probably the most convincing evidence for early decimation is found in the accounts by Spanish explorers who remarked on the health and demographic features of villages they passed through. Diaries and other records from the Portolá expedition of 1769-70 document the presence of sickness and mysteriously abandoned villages (Bolton 1927:271). Fr. Garcés of the Anza expedition encountered Colorado River groups suffering from illness of a pandemic proportion (Bolton 1930: 36-37; Preston 2002:75). Although little is known about introduced illness within the study area, three accounts suggest that Native Americans did suffer from European disease. One ethnographic account relates the following testimonial from a Southern Diegueño (Kumeyaay):

> I killed my first deer at Wiinyai in the foothills on the western side of the desert. My wife was with me. At that time I and my people were fleeing from smallpox (Spier 1923:336).

Another report, a firsthand account by a Franciscan friar stated that many diseases were running rampant through the countryside. The friar, who at the time was stationed in Northern Baja California, witnessed measles and smallpox epidemics and numerous cases of óFrench Boilsô (i.e. syphilis) afflicting Southern Diegueño villagers (Rudkin 1956:55-58). A third account states that the prime study site, in Mason Valley (SDI-106), was abandoned in 1870 due to smallpox (Rogers 1929). Still other incidental sources state that smallpox, measles and syphilis epidemics frequently occurred within Kumeyaay territory (Aschmann 1967:187; Shipek 1981:307). What is clear from these accounts is that the Kumeyaay, as well as other Native Americans in California, were beset by disease dating from initial contact ï possibly from the Protohistoric Period onwards.

Ironically, it may not have been only crowd diseases such as smallpox and measles that devastated Native Californian populations. It may also have been a disease that is currently relatively benign and endemic throughout the world. This disease is syphilis. Once Columbus had returned to the Old World, a devastating disease struck Europe. The malady was called the French disease by the Italians and the Italian disease by the French. In the Netherlands it was assumed to be Spanish; in Russia, Polish. What was called by many names was in actuality syphilis. Unlike its descendant forms, this particular strain of *Trephonema pallidum* was particularly virulent, possibly killing millions in Europe and beyond (Crosby 1968:219; Harper et al 2008:2). Did Columbus bring a killer microbe back to the Old World, or was the disease present in the Old World in a less virulent form during earlier times? These are questions that have plagued paleoepidemiologists for a number of years. Actually there appear to be three divergent theories, pre-Columbian, Colombian, and Unitarian (Crosby 1968). Pre-Columbian sees the origin of syphilis in the Old World; Columbian views syphilis as beginning in the Americas; and Unitarian subscribes to a trans-world source of the disease. But recent serological tests show that it might be a combination of all three. According to Kristin Harper and her colleagues (2008:13), endemic forms of *T. pallidum* occurred in both the Old and New World and a virulent form rapidly evolved once Columbus returned to Europe (2008:1-13). For whatever reason, the fact remains that an additional virulent form of syphilis arose in the New World as well. There is plentiful historical evidence that the Natives of Baja (and later Alta) California were ravaged by this disease (see Aschman 1967; Cook 1976; Rudkin 1956). First observed in Baja by the Franciscan missionary Father Luis Sales, the disease was said to have wiped out entire tribes:

> What afflicts these unfortunate people now is the French disease which has been introduced with such force and violence that since it exterminated the nation of Pericuesé it has penetrated into the northern parts and in the same way has finished off the pueblos (Rudkin 1956:55).

Another source states:

> Syphilis was generally, and probably correctly, recognized by the missionaries as the dominant force in bringing about the extinction of the missions of the peninsula (Aschmann 1967).

What is also evident from these accounts is that the disease was not only extensive but extremely virulent, killing victims in a matter of days (passim Crosby 1968; Harper et al 2008; Livingston 1991; Rudkin 1956). This illness was most definitely not benign, but a deadly disease of pandemic extent.

Further evidence comes from molecular studies recently conducted on ancient and modern mitochondrial DNA (OôFallon and Fehren-Shmitz 2012). The study which looked at mitochondrial DNA sequence was able to reconstruct a molecular clock on all five Native American haplogroups in North and South America and was seemingly successful in estimating population fluctuations over the last 15,000 years by using high resolution statistical models. They estimate that populations in the New World prior to European contact were fairly stable, but precipitously dropped immediately after contact (å500 ybp). This, they point out, strongly agrees with the historical data, lending further confidence to their results. They also estimate that ófemale effective sizeô dropped approximately 50% of during this time period throughout the New World (OôFallon and Fehren-Shmitz 2012:2). While this marked signal in the molecular history could relate to other factors, such as structure related bias or local phenomena, the two investigators feel confident that the perceived óbottleneckô was due to epidemics and other factors deriving from the European presence.

A few years ago I gave an oral presentation at the Society for California Archaeology meetings which dealt with the effect of introduced diseases on Native Americans in Alta California (Kirkish 2006). In that paper I discussed the spread of a new form of syphilis in Baja California which first developed there before spreading to Alta California and afflicting the Kumeyaay and other southern California groups. Because of trails and exchange systems which tied the two areas together, I thought the spread of all pathogens including syphilis would have been rapid and complete. I used Network Theory (see Buchanan 2002) to illustrate this potential graphically (Figure 4-6). Briefly, this theory states that many real systems, such as social organization, power grids, the human brain, and the spread of disease, can be modeled as ógraphsô that have some special properties. One property, the ósmall worldô concept, is found in many, if not all, networks (Boots and Sasaki 1999; Buchanan 2002). Simply put, this concept states that social networks, in spite of being highly clustered, can have óglobal edgesô which span nearly the whole graph and connect to distant clusters, thus greatly increasing the interconnectivity of societies; that is, any one person can be connected to any other person in a relatively small number of steps (commonly known as the six degrees of separation). This connectivity, as shown by the network graph, may be another reason for the rapid spread of disease. In this case, the global edges (or lines) are the trading routes connecting various tribal groups. As depicted on this graph the Kumeyaay have at least six links that interconnect them with other groups including the peoples located in Baja California. This interconnectivity may have expedited disease spread throughout southern California. Ample evidence for this also comes from numerous eyewitness accounts from soldiers, missionaries and raconteurs (Rudkin 1956; Aschmann 1967). All clearly state that syphilis was the one of the most important factors in the disease complex in Alta California. Sherburne Cook states:

> é venereal disease constituted one of the prime factors not only in the actual decline, but also in the moral and social disintegration of the population (1976:23).

It was likely that *T. pallidum* was endemic in both the New and Old World and that once Columbus and his men introduced the Old World strain to the Americas the benign version (possibly yaws) mutated, creating a new more virulent strain (cf. Crosby 1968:225; Livingston 1991:589).

The question is what did this pathogenic onslaught do to Native cultures? The demographic consequence is obvious ï thousands died. But what of other effects involving sociopolitical and socioeconomic factors?

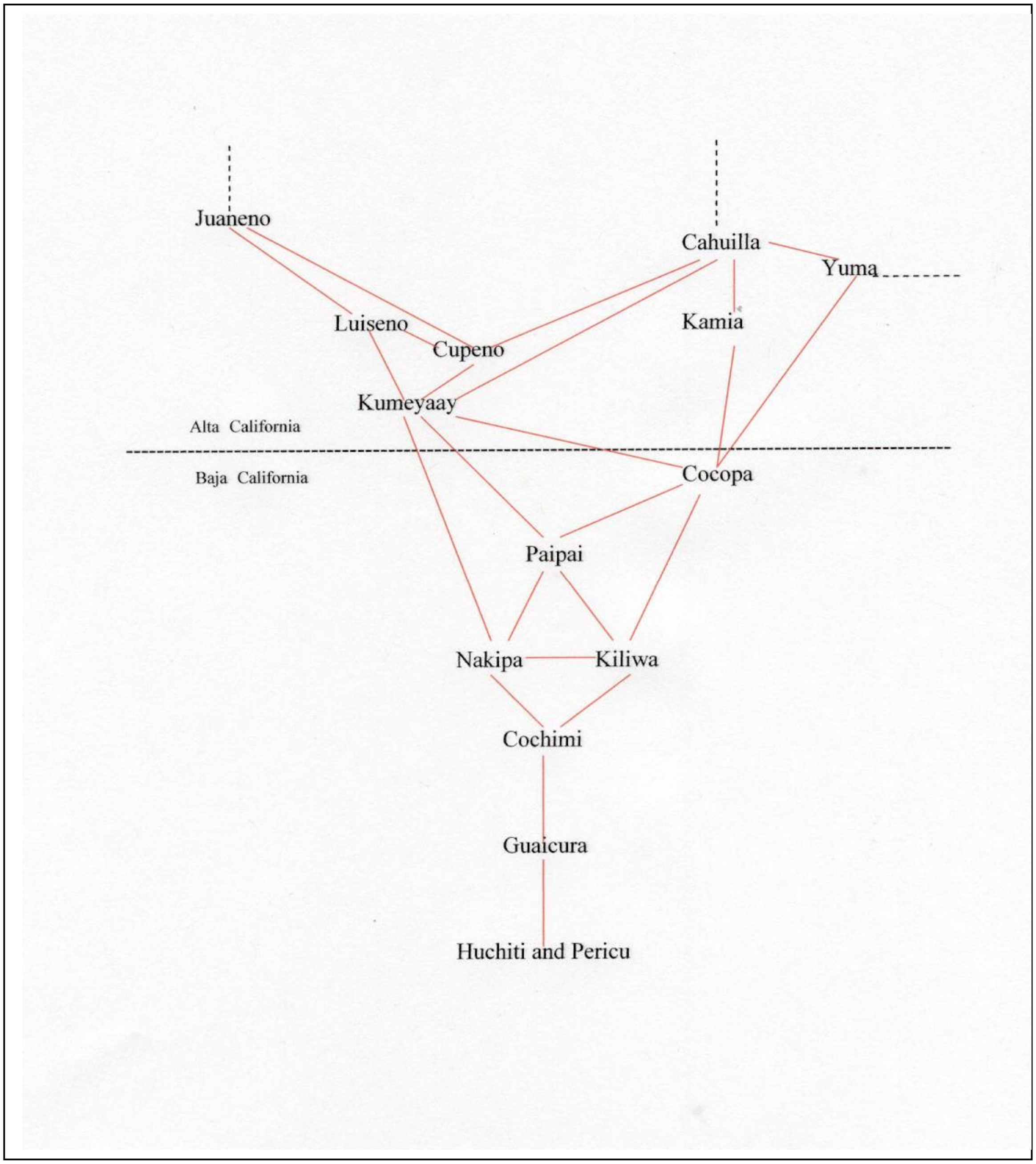

Figure 4-6: Exchange graph illustrating possible disease spread in Baja and Alta California.

Prophets and bead exchange

What do prophets have to do with trade and exchange systems? Perhaps very little as individuals, but as motivators for transregional movements their contribution to socioeconomics is immense. Major rituals, which are always part of world renewal and crisis cults, invariably bring neighboring tribes together and these congregations often involve feasting and exchange of gifts (Bean and Vane 1978:670; Fagan 2003:153). Such religious events as the Keruk (a mourning ceremony) and puberty rites were likely absorbed within local cults ï especially during the post-contact period ï and these ceremonies included feasting and intensive trading (Du Bois 1908; Luomala 1978; Kroeber 1925). One particular prophet driven movement which may have had far reaching effects on exchange and bead distribution was the *Chinigchinich* religion (see Chapter 2). First appearing during the early Protohistoric period, this religion purportedly arose in the Gabrielino territory (McCawley 1996).

Supposedly, the religion diffused from Pubunga (near Long Beach) or on the southern Channel Islands (Santa Catalina and San Clemente) in the Gabrielino territory where a hero named *Chinigchinich* taught a new body of beliefs that became syncretized with preexisting religious practices (McCawley 1996). He was assimilated into Luiseño religious practices as creator of the Luiseño and incorporated in their laws and ceremonials after he had transformed the first people into spirits. He provided a more explicitly moral normative order by creating a new class of spirits, the óavengersô (rattlesnake, spider, tarantula, bear, stingray, raven), who were assigned to watch that people obeyed his laws and to punish wrongdoers (Bean and Vane 1978:669). This religion (or crisis cult) contains many features reminiscent of Christian tenets, and it is thought that it developed in post contact times in reaction to the devastation wrought by European diseases (Bean and Vane 1978:669 and Phillips 1996:15-17). Those groups particularly influenced were the Gabrielino, Luiseno-Juaneno, and Tipai-Ipai (Kumeyaay). Archaeological correlates are many and include animal burials (raptors, dogs, foxes, coyotes, etc), offertory deposits, ceremonial enclosures, and exotic artifacts. Particularly sacred to *Chinigchinich* were tourmaline stones, garnet stones, long quartz crystals, *Toshwaat* stones ï iron concretions, ceremonial mortars and winnowing baskets. Although some information exists about this religion (see Harrington 1978; Boscana 1978; Raab et al 2009), due to secrecy detailed descriptions are lacking and many aspects of this ócrisis cultô are painfully missing.

It may be that many of the anomalous archaeological manifestations seen at sites in the interior regions of southern California are related to the ceremonial and ritual features of this religion. Since the Kumeyaay participated in this cult, the implications for the distribution of beads and other artifacts are obvious. While perhaps not the exclusive factor in the exchange systems of the eastern Kumeyaay, the spread of this religion undoubtedly facilitated the diffusion and dissemination of ideas and artifacts.

Summary

In this review I have presented a discussion of exchange network features (including trails and communication corridors), a brief reappraisal of introduced disease and its consequences, and an assessment of a crisis cult which may have affected bead distribution. It my contention that the *Chinigchinich* cult, which arose during post contact times, reinvigorated interior trade routes and led to increased trade and exchange in glass and shell beads. In the following chapters I will examine bead types found in each collection and attempt to correlate time periods that are associated with the purported spread of the new religion. I will also determine what relationship, if any, the collections have to one another (in order to evaluate the direction and intensity of the exchange and the cult). Further, additional artifacts from the study site assemblages will be examined to identify any ómarkersô or indicators which would suggest the presence of the cult. For instance large numbers of garnet and/or *toshwaat* stones at a site could be an indicator of cult activity. Other features and artifacts will be discussed as necessary to demonstrate the spread of the cult in the overall study area.

Chapter 5: Analytical Methods

Introduction

The core of my research is the metric examination of shell and glass beads recovered at several archaeological sites within southern California. While my analysis entailed sampling from this overall area, a large portion of the beads I examined came from sites located in eastern San Diego County. Within this interior region, beads, it appears, became more common in the archaeological record during the historic period. This occurrence has no precedent; as only small amounts of beads have been found at other pre-Columbian sites in San Diego County. What caused this anomaly (i.e. the sudden appearance of large numbers of beads) is the cornerstone of my research. In this chapter I review the methods with which I analyzed the data coming from eight sites at various locations within the greater southern California area. While primary emphasis was given to the key site SDI-106, all collections in the study were thoroughly analyzed. During this analysis particular emphasis was placed on the relationship, if any, these collections had to one another, both in terms of similarity and in terms of interconnectedness, diachronically and synchronically. It is my assertion that beads were distributed discontinuously and that cult activities ï from the *Chingichngish* movement ï were punctuated with beads flowing into the interior regions at differing times during the Historic Period. Showing similarity between sites could exemplify this ebb and flow. From the analysis it was demonstrated that there were at least three distinct times when beads entered this area. My analysis also included the identification and the elucidation of issues dealing with agency, ethnicity, tradition, and the post-contact revitalization movement.

The Bottom Line – How Beads are Analyzed

Beads and ornaments have long been recognized as useful time markers for dating archaeological assemblages in southern California (see Chapter 4). Although these artifacts are poorly represented in most areas of San Diego County, their typological identification can be secured using established sequences from other parts of California. Particularly useful is the typological schema formulated by King (1990) and Bennyhoff and Hughes (1987). While the sequences are based on data gathered at various sites located both in California and the Great Basin, the overall seriations have generalized relevance to San Diego archaeology. Although correlating form with temporal placement can be somewhat tenuous at the local level (i.e. San Diego area), bead types recognized in California and Nevada can be effectively applied in analyzing San Diego County collections. Typologically, these artifacts are easily identified by following the descriptive guidelines set forth by King (1990) and Bennyhoff and Hughes (1987).

Using this schema, each bead in the current study was analyzed and identified according to class and type. The descriptions and interpretive statements utilized in this study are based on this typological assignment. As documented in the above-referenced bead studies, temporal assessment as well as sociopolitical and economic significance can be achieved in most cases.

During the present analysis, each specimen was individually examined with the aid of a 5x hand lens and a 3.5x OptiVisor. All measurements were made with digital calipers with a scale calibrated in 0.1 mm increments. The critical measurements recorded were diameter, thickness (or length), and perforation size. These metric indices were recorded as diameter/thickness/hole diameter/perforation type (i.e. conical, biconical, and straight ï see Chapter 3, Figure 3-1). These attributes are more fully described in terms of temporal variance and significance in the next chapter. Also identified during the analysis was the condition of each bead and whether it was burnt. Tabulation of data gathered is shown on the table presented in the Appendix.

In terms of clarification, diameter of the bead is the distance from one edge to the opposite edge; thickness is the vertical depth of the bead (from top to bottom); and perforation is the size and shape of the hole. While diameter of the bead (especially for Class H beads) appears to be the most diagnostic and temporally sensitive (i.e. bead diameters get larger over time ï Gibson 1992; King 1990), perforation attributes can be significant in differentiating historic from prehistoric shell beads. For instance, historic beads were mostly drilled with metal needles, have small hole sizes (å1 mm) and are drilled straight through (sides of the holes are parallel); prehistoric beads on the other hand were perforated with stone micro-drills and have larger holes which are either conical in cross-section or biconical (King 1990; Gibson 1992). Edge treatment is also important in distinguishing prehistoric from historic shell beads. As discussed Chapter 3, Class H beads became less refined (vis-à-vis edge treatment) over time (see Figure 3-3). For example:

- Type H2 (rough discs) are Mission and Post-Mission Period *Olivella* disc beads with most of the edge not ground and the holes small and straight drilled ï these beads are dated from 1816-1834 (Bennyhoff and Hughes 1987; Milliken and Schwitalla 2012).

- Type H3 (chipped discs) are Post-Mission period *Olivella* disc beads that are even less ground and are most of the time needle drilled ï these are dated from 1834 to 1900 (Bennyhoff and Hughes 1987; Milliken and Schwitalla 2012)

Research Sites

My research was focused on examining Native American beads recovered from various sites in San Diego, Riverside, Los Angeles and Ventura counties. In choosing site collections I attempted to select Historic sites that occurred in the regions I was primarily interested in. Thus, the site distribution goes from the coast to the Los Angeles basin and then to the interior desert regions further south. It was my intention to show a link between these sites and demonstrate how these óconnectionsô affected bead distribution among the Kumeyaay in eastern San Diego County. Beads coming from these sites were for the most part collected as part of archaeological excavation and/or surface collection activities conducted in the last 80 years. Some of this artifact recovery was highly controlled with extremely accurate provenience. Other recovery methods were less technical (e.g. excavated in the 1930s), or they were completed by avocational archaeologists. However, in most cases the provenience was adequate enough to identify the source sites for the collections analyzed. What follows is a brief description of each site, with discussions on how collections from each site were studied with summary tables of the beads analyzed. From this analysis, an argument will be forwarded that supports a rapid a rapid exchange of these bead types and that the dissemination of a post-contact cult (*Chinigchinich*) was instrumental in the distribution of these artifacts.

From the analysis, it is apparent that the dominant (or at least the most conspicuous) bead type is Class H beads (a bead type temporally associated with this cult). Based on the mean diameter of these beads, which appears to be the most diagnostic variable (although hole size and type is also significant when dealing with historic shell beads), the temporal placement of these artifacts should correspond to the concomitant spread of the cult. Other archaeological evidence will also be presented to assist in this correlation.

Please note that at some sites available background information is somewhat meager. A few collections came from museums where records were occasionally incomplete.

Sampling Strategy

Sampling of bead collections is somewhat standard practice for bead studies. Several important studies completed in the last few years have utilized some sort of sampling in their bead analysis (Gibson 1976, 1994; King 1990; Zepeda 1999; Hintzman and Abdo-Hintzman et al 2006), and it is a well accepted technique in archaeology (see Mueller 1975; Orton 2000). As described by Zepeda (1999), ôThe sample was taken by evenly dispersing the beads on a grid, and then randomly selecting the specified percentages of beads for each cremation boxö. While it is always more preferable to analyze the entire collection, in some cases it is impossible to do so. In the present study, the majority of the analyses were conducted using fairly large samples (>7%), which essentially were randomly selected. Time constraints and/or accessibility issues were the main reasons collections were sampled. Many of the bead assemblages studied were located in the Museum of Man in San Diego and these at the time were being repatriated under new Federal guidelines, i.e. Native American Graves Protection and Repatriation Act

(NAGPRA) requiring artifacts of parsimonious significance to be returned to descendant Native American communities. Special permission was granted to access the bead collections in the museum, but limited availability was always a factor. In short, I could examine the beads but only for a limited amount of time due to the Museumôs need to process them for repatriation. Other collections such as RIV-7882 and RIV-1222H also had limited accessibility, and as with the museum collections, these assemblages had to be analyzed quickly and efficiently. In some cases, where assemblages were relatively small or accessibility was unlimited, entire collections were analyzed. However, for the most part, sampling utilizing the ñgrab techniqueò or probabilistic samples were used. Orton (2000:2) in his review of sampling strategies clearly includes grab sampling (i.e. randomly grabbing a pile of beads) as a legitimate methodology in certain situations, especially where purposive sampling is not feasible. Oftentimes both techniques were adopted on a collection to primarily minimize bias and acquire a certain degree of representativeness (cf. Hester et al 1997:25-37; Orton 2000:2, 8, 21). In the following sections, each bead collection will be discussed in terms of collection size, sample size, sampling techniques, and representativeness.

Site CV-37 (Temporary Field Number)

This desert site is located on the Torres Martinez Indian (Cahuilla) Reservation within Riverside County (Figure 5-1). The universal transverse mercator (UTM) coordinates for the site are 11/579150E and 3713894N. The site was originally found by Douglas Fane, a local avocational archaeologist. Provenience is by site location only. It is unlikely that collection (either by excavation or surface survey) was done systematically. The collection was analyzed by permission from Mr. Fane. A total of 90 beads was analyzed, representing approximately 46% of the collection. Sampling was accomplished by ógrab sampleô of a disparate collection of beads. Based on the questionable quality of provenience and the somewhat haphazard way the beads were bagged, a grab sample was deemed acceptable. Given the nature of the collecting techniques that occurred at this site, it is difficult to ascertain the degree of representativeness. However, the bead types found here are important in themselves and these types generally give a fairly accurate assessment of the chronological placement of the site. This determination will lend itself to the goals of the analysis through intersite comparison and regional distribution studies. How and why these artifacts spread through the interior deserts and valleys is at the hub of this analysis.

Table 5-1
Bead Sample
CV-37

Bead Type	**Number Sampled**	**Percent of Number Sampled**	**Total Number in Collection**	**Percent Total Collection**
A1 (Spire-Lopped)	4	4.5%	-----	2.1%
E1A (Round Thin Lipped)	7	7.8%	-----	3.6%
G1 (Tiny Saucer)	12	13.3%	-----	6.2%
H1a (Ground Disc)	22	24.4%	-----	11.3%
H1b(Semi-ground Disc)	8	8.9%	-----	4.1%
H2 (Rough Disc)	11	12.2%	-----	5.6%
J (Wall Disc)	24	26.7%	-----	12.3%
K (Cupped)	1	1.1%	-----	0.5%
L2 (Rectangle)	1	1.1%	-----	0.5%
Total	90	100%	195	46.2%

Site SCLI-1437

This site occurs on a high plateau on San Clemente Island (Figure 5-1). It consists of shellfish remains, lithic debitage, and assorted stone artifacts. Also observable on the surface are the remains of several historic features related to a water purification plant built in the 1940s. Midden, although compromised by these historic structures, is fairly intact and is very dark grey in color with moderately abundant shell and other cultural materials (York and Wahoff 1997). As is the case at other sites within the plateau area of the island, shell and glass beads are conspicuous within the midden. One excavated feature within the midden yielded 902 beads (York and Wahoff 1997). The site was likely occupied by the Gabrielino (Raab et al 2009).

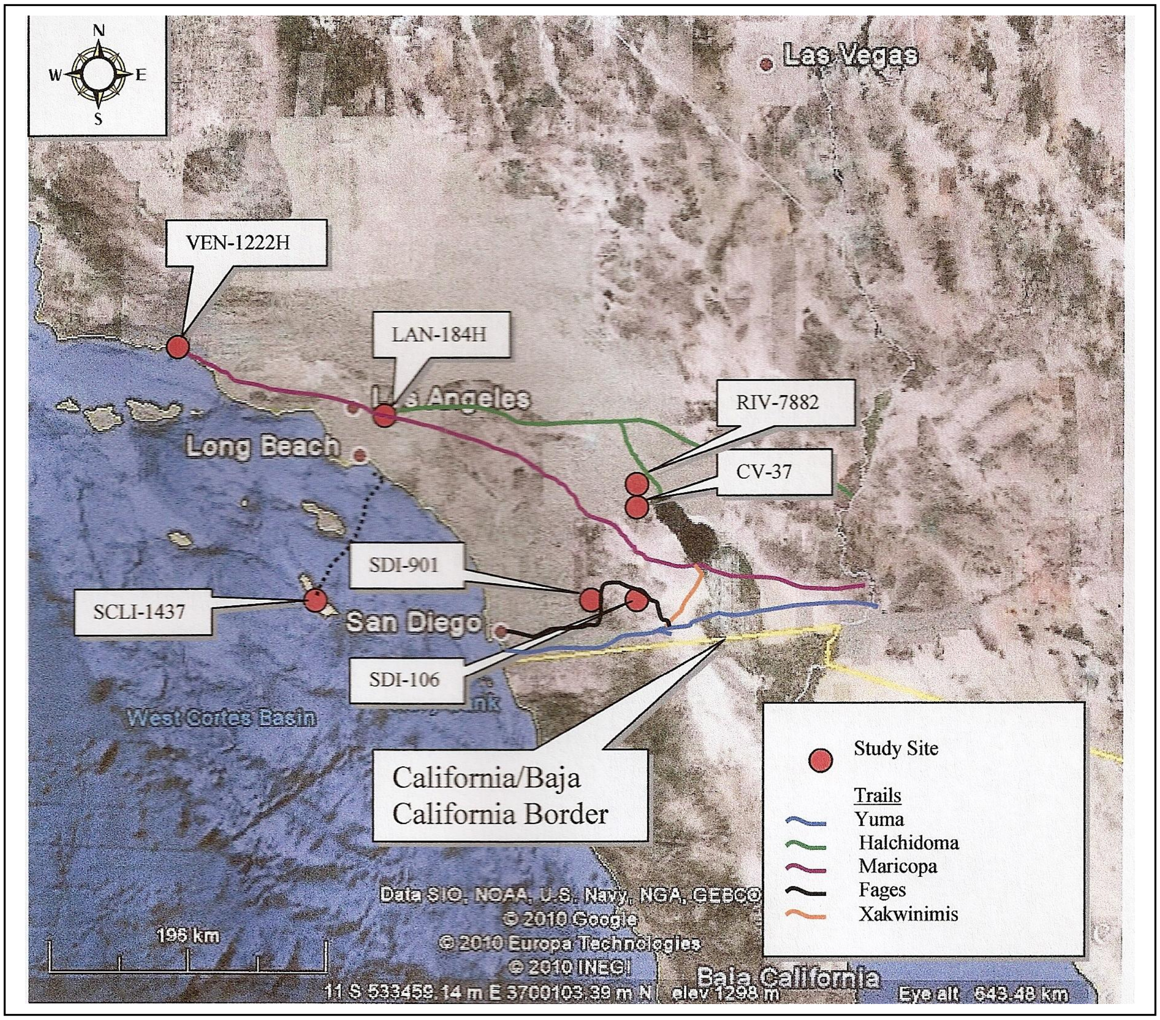

Figure 5-1: Map showing location of study sites and trails (From Davis 1974, Map 1; Ford 1983:719; Sample 1950 – Map adapted from Google Earth).

I analyzed a separate collection from this site, which was curated at the Museum of Man in San Diego. These beads were bagged in plastic zip-sealed baggies with a minimal amount of provenience written on each bag. Generally, each bag had the site number (SCLI-1437), lot number and occasionally the date. Exactly what the lot number represented or who collected them is unknown since there was no supporting documentation whatsoever. The total number of beads in the collection was approximately 1000 beads

Sampling of the bead collection was accomplished by utilizing a random methodology using a baking tin (Figure 5-2) containing 12 identical wells. Each depression had a graduated rule on each side of the opening and an identifying sequential number (i.e. 11 through 22). The graduated strip was broken down into three centimeter squares. If full each depression would hold approximately 250 beads; and each graduated well contained about 80 beads. Since one third of the collection was the target sample each of the 12 wells was filled to one centimeter deep; approximating 900+ beads filled one centimeter deep which represented the entire sample collection. Of the twelve, four partially filled wells were selected using a random numbers table. This constituted 300 + beads, or a 33 to 34 % sample.

Unfortunately, detailed collection provenance is lacking. However, a corresponding collection deriving from recent excavation at the site (York and Wahoff 1997) appears to contain a similar bead assemblage (Tanya Wahoff, personal communication), both in type and temporal distribution. This fact lends further support to the probability that the

Table 5-2
Bead Sample
SCLI-1437

Bead Type	**Number Sampled**	**Percent of Number Sampled**	**Total Number in Collection**	**Percent Total Collection**
C3 (split ovoid)	1	0.2%	-----	0.1%
E1A (lipped)	10	2.9%	-----	1.0%
E1B (lipped)	10	2.9%	-----	1.0%
E2B (Lipped)	1	0.2%	-----	0.1%
G2 (Saucer)	1	0.2%	-----	0.1%
H1A (ground Disc)	24	7.0%	-----	2.4%
H1B (Semi-grnd.) Disc	242	71.0%	-----	24.2%
H2 (Rough Disc)	40	11.7%	-----	4.0%
H3	2	0.7%		0.2%
J (Wall disc)	2	0.7%	-----	0.2%
K1 (cupped)	8	2.3%	-----	0.8%
K3 (Cylinder)	1	0.3%	-----	0.1%
Total	342	100%	1000	34.2%

Figure 5-2: Baking tin used in bead sampling

study collection is truly representative of the site. Based on the beads recovered by York and Wahoff 1997, this site appears to have been historically occupied like many other nearby sites located within the plateau region of the island.

LAN-184H

Originally recorded in 1955, this Los Angeles Basin site was described as an artifact scatter consisting of *Olivella* shell disc beads, glass beads, unglazed pottery, Mexican Majolica, Chinese porcelain, painted European earthenware, and Mission Period tile (Pilling 1955). While the siteǒs areal extent was never completely determined, it was surmised that the site was mainly located along the current Southern Pacific Railroad line, which is southeast of the San Gabriel Mission (see Figure 4-4). Purportedly, this area was once the location of a Gabrielino neophyte village associated with the mission (Dietler et al 2009). Given the copious amounts of Native American artifacts recovered here during the recent archaeological investigation (Dietler et al 2009), it seems likely that this area held a community of Indians who were closely tied to the mission during the Spanish and early Mexican Periods. A total of 150 beads, both shell and glass, was recovered from the site during the Phase II and Phase III investigations.

I analyzed the entire bead collection. From this, it was clearly evident that the site was occupied during the first half of the 18th Century. For the most part historic type beads were recovered here, with Class H beads dominating the collection (Table 5-3). Although only a portion of the LAN-184 was archaeologically sampled, the overall characteristics of the bead assemblage retrieved suggest that these artifacts are typical of the site. Clearly, the bead types found at this site are those that are emblematic for neophyte settlements found throughout southern California (cf. Gibson 1976) during this time period. That is, these bead types were frequently found at these settlements. In this respect the beads found here share many temporal characteristics with the beads coming from the other study sites.

Table 5-3
Bead Sample
LAN-184H

Bead Type	**Number Sampled**	**Percent of Number Sampled**	**Total Number in Collection**	**Percent Total Collection**
AV3 (Tube)	3	0.7%	3	0.7%
E1A (Round Thin Lipped)	5	3.3%	5	3.3%
E1B (Oval Thin Lipped	5	3.3%	5	3.3%
G1 (Tiny Saucer)	13	8.7%	13	8.7%
Glass (Cane)	40	26.7%	40	26.7%
Glass (Mold)	14	9.3%	14	9.3%
Glass (Wire Wound)	4	2.7%	4	2.7%
H1a (Ground Disc)	7	4.7%	7	4.7%
H1b (Semi-Ground Disc)	11	7.4%	11	7.4%
H2 (Rough Disc)	32	21.3%	32	21.3%
H3 (Chipped Disc)	6	4.0%	6	4.0%
J (Wall Disc)	1	0.7%	1	0.7%
K (Cupped)	2	1.4%	2	1.4%
KlCII (Disc)	5	3.3%	5	3.3%
Stone (disc)	1	0.7%	1	0.7%
Total	150	100%	150	100%

RIV-7882

This is a large Cahuilla ethnohistoric village (possibly the village of *Palsetahut* – see Strong 1929:55) which is located adjacent to and south of the Whitewater River near the desert town of Coachella, California (Figure 5-1). The site was recently excavated as part of an environmental impact study and was found to contain a light to moderate cultural deposit consisting of beads, lithic artifacts, ceramics, and groundstone artifacts. Of particular interest, the site contained three separate animal burials ï an interred domestic dog (buried sometime after 1953) and two coyote burials. One of the coyote burials (Feature 3) contained over 2200 artifacts within the burial matrix. Of these, over 1427 were shell beads and glass trade beads. The second coyote burial (Feature 4) contained nearly 1600 artifacts, of which 1203 were beads (Alexandrowicz 2006). Interestingly, most of the beads from this burial (Feature 4) were glass ï there was only one shell bead, whereas Feature 3 was mostly shell. Since this study is primarily based on shell beads the analysis was conducted on Feature 3. A total of 202 beads were randomly sampled using the technique described above for SCLI-1437 (Figure 5-2). Approximately 90 beads were placed in each well and two wells were randomly selected. As with SCLI-1437, my confidence level is high that this sample (9.2%) is representative of the overall bead assemblage in this burial. These features have obvious ceremonial and ritual significance and possibly associated with the Cahuilla moiety system or a historic revivalist cult (i.e. *Chinigchinich*). Currently, no burials associated with the moiety have been indentified, and given the extreme rarity of coyote burials the latter interpretation (ritualized cult activity) appears to be the most likely possibility.

Table 5-4
Bead Sample
RIV-7882

Bead Type	**Number Sampled**	**Percent of Number Sampled**	**Total Number in Collection**	**Percent Total Collection**
Glass (Ovoid)	9	4.5%	-----	0.4%
Glass (Spheroid)	3	1.5%	-----	0.1%
Glass (Cane)	12	5.9%	-----	0.5%
B5 (Barrel)	12	5.9%	-----	0.5%
E1A (Lipped)	19	9.4%	-----	0.9%
E1B (Lipped)	12	5.9%	-----	0.5%
E2B (Lipped)	6	3.0%	-----	0.3%
H1A (Disc)	1	0.5%	-----	.05%
H1B (Disc)	13	6.4%	-----	0.6%
H2 (Disc)	49	24.3%	-----	2.2%
H3 (Disc)	65	32.2%	-----	3.0%
K1 (Cupped)	1	0.5%		.05%
Total	202	100%	2200	9.2%

SDI-106

This site is probably one of the largest (if not the largest) Kumeyaay sites in San Diego County (Rogers 1929). A conservative estimate of its areal extent is 200 acres. Since this inland site (located in Anza Borrego Desert) has never been totally surveyed, it is unknown how large it really is. Located within Mason Valley at the confluence of Vallecito Creek and its attendant tributaries, the site dimensions extend 1200 meters east/west and 600 meters north/south (Figure 6-7). The Spanish explorer Pedro Fages in 1782 apparently encountered this habitation area while searching for an overland route connecting the interior desert region with the mission in San Diego. Passing over a steep grade (now known as Campbell Grade) the expeditionary force encountered őé a very large village of Camillares Indians, who climbed up a hill as we were passing, and came down to talk to the soldiers who were coming behind with the horsesô (Priestly 1913). Based on this observation we know that the village (called *Net Nook* and/or *Amat Inuk*) was occupied at least during late protohistoric times and likely inhabited until 1870, when a smallpox epidemic wiped out the entire village (Rogers 1928). Archaeologically, the village site has experienced repeated investigations ranging from the amateur to the professional. Probably the most notable fieldwork was completed by Malcolm Rogers in 1928. In an effort to save the cemetery from repeated pilfering, Rogers, the curator of anthropology at the Museum of Man in San Diego, excavated approximately 35 cremations. Associated with the burials were numerous artifacts of which shell and glass beads were the most common artifact class. Other artifacts recovered included historic items (metal knives, horse bridles, metal buttons etc.), flaked stone artifacts, and pottery. Rogers found the cemetery was sharply circumscribed and was approximately a meter and half deep. House depressions and other features were also observed during the excavations. Documented by Rogers but not excavated by him were an additional 30 or so burials that had been collected by various individuals prior to his 1928 investigation. Later studies have included areal surveys conducted by staff from cultural resource firms and the Anza Borrego State Park. The most recent of these was a State Parks investigation that identified multitudinous artifacts on the surface and numerous bedrock milling features on and directly adjacent to the site (Thompson et al 2007).

Analysis of the bead collection from this site took place at the Museum of Man at a time when all bead collections and other parsimonious artifacts were being repatriated. Unfortunately, most of the collection for SDI-106 was unavailable or inaccessible due to this process. Nevertheless, I was able to analyze relatively small collections coming from burials 50, 51, and 54, as well as a small collection deriving from excavations carried out by museum staff in the 1960s. In total 79 shell beads and over 404 glass beads were analyzed (the glass beads were not tabulated in the appendix as the study primarily focuses on shell beads). While this represents a small sample (Table 5-5) compared to the total number originally recovered at the site (over 7000 beads), it is appears that the siteòs temporal range (i.e. mostly rough disc beads and other historic bead types) is clearly reflected. Zepeda (1999) during her analysis of the entire collection did find larger beads from the site with a mean diameter of 6.7 mm as compared to 6.3 mm in the current study and slightly fewer rough disc beads (H2). However, from her analysis the site (based on bead typology) dates from 1803 to 1870 (Zepeda 1999:79).

Table 5-5
Bead Sample
SDI-106

Bead Type	Number Sampled	Percent of Number Sampled	Total Number in Collection	Percent Total Collection
B3 (Barrel)	3	0.6%	3	0.6%
E1B (Oval Thin Lipped)	5	1.0%	5	1.0%
E3E (Large Lipped)	13	2.7%	13	2.7%
H1A (Ground Disc)	40	8.2%	40	8.2%
H1B (Semi-Ground disc)	14	2.8%	14	2.8%
H2 (Rough Disc)	2	0.4%	2	0.4%
H3 (Chipped Disc)	2	0.4%	2	0.4%
Glass	404	83.6	404	83.6
Total	483	100%	483	100%

SDI-901

Site SDI-901 is a large (but not nearly as large as SDI-106) historic Kumeyaay village (Mealy 2004) located within the interior region of San Diego County (Figure 5-1). However, unlike the former site, SDI-901 is located in the upper montane region of the Cuyamaca Mountains in an entirely different biotic zone. Instead of mesquite, cholla, and brittlebush, this mountainous site is surrounded by conifers, ferns, and scrub oak. Located adjacent to the current Highway 79, the site covers an extensive area directly south of present day Paso Picacho Campground. Currently the site is covered by thick vegetation and little can be seen on the surface (as witnessed by the author in 2005). Nevertheless, numerous bedrock milling features are clearly visible at various locations within the site. Recorded originally by D. E. True in 1961, the site was described at that time as őé a village ï midden deposit. Bedrock exposure with mortarsû True thought that the site was the ethnohistoric village of *Pisclim*. The site was subsequently rerecorded by California State Parks personnel after a wildfire burn over in 2004. From an intensive survey conducted over the recently burned area many new features and artifacts were located (Mealey et al 2004). Their investigation confirmed the presence of a large village site containing a fairly dense midden with associated milling features. Approximately 800 shell beads were recovered at this site by Malcolm Rogers in the 1930s.

Table 5-6
Bead Sample
SDI-901

Bead Type	Number Sampled	Percent of Number Sampled	Total Number in Collection	Percent Total Collection
H1A (Ground Disc)	39	21.1%	-----	4.9%
H1B (Semi-Ground disc)	133	71.9%	-----	16.6%
H2 (Rough Disc)	5	2.7%	-----	0.6%
J (Wall Disc)	5	2.7%	-----	0.6%
K1 (Cupped)	2	1.1%	-----	0.3%
K3 (Cylinder)	1	0.5%	-----	0.1%
Total	185	100%	800	23.1%

Sampling of the collection followed the random sampling techniques described above. Ten wells were filled to the first graduated mark and two samples were selected using a random numbers table. From this 185 beads (Table 5-6) were ultimately selected (a 23.1% sample).

VEN-1222H

Like LAN-184H described above, this site appears to represent the neophyte (Chumash) village for the San Buenaventura Mission (Foster n.d.). It is located near the coast in downtown Ventura directly south of the mission between Figueroa Street on the west and Junipero Street on the east (Figure 5-1). Archaeological investigations which took place in 2008 revealed a fairly dense midden comprising historic and Native American artifacts (Foster personal communication 2008). From the excavation it was discovered that the site, which occurs in an open lot, contained two very distinct loci, designated north and south. Artifacts found in the north locus consisted of net sinkers, sandstone bowl fragments, pestles, glass and ceramic fragments, and metal objects. Within the south locus mainly historic artifacts were found. However, glass and shell beads were found at both loci. Features were also common at both loci, and these included hearths, stone foundations, and house depressions. Of particular interest was a dog burial which was found in the very northern sector of the lot. The canine burial, which was interred at the foot of a Mission wall foundation, was accompanied by several *Olivella* shell beads. A total of two thousand beads were found throughout the site.

A representative sample was obtained using the technique described above. All 12 wells in the sampling tin were filled to the second graduated level, numbering å160 beads. Using a random numbers table three holders were selected for the sample. A total of 398 beads was sampled from the collection.

Table 5-7
Bead Sample
VEN-1222H

Bead Type	**Number Sampled**	**Percent of Number Sampled**	**Total Number in Collection**	**Percent Total Collection**
A1 (Spire-Lopped)	2	0.5%	-----	0.1%
AV3 (Shell Tube)	1	0.3%	-----	0.1%
B2 (Shell Tube)	2	0.5%	-----	0.1%
E1A (Round Thin Lipped)	51	12.8%	-----	2.6%
E2A (Full Lipped)	7	1.8%	-----	0.4%
E2B (Deep Lipped)	1	0.3%	-----	0.1%
Glass (Cane)	17	4.3%	-----	0.8%
Glass (Wire Wound)	1	0.3%	-----	0.1%
H1a (Ground Disc)	41	10.3%	-----	2.1%
H1b (Semi-Ground Disc)	63	15.8%	-----	3.2%
H2 (Rough Disc)	127	32.0%	-----	6.4%
H3 (Chipped Disc)	51	12.8%	-----	2.6%
J (Wall Disc)	9	2.3%	-----	0.5%
K1 (*Haliotis* Disc)	21	5.3%	-----	1.1%
Bead Blank	4	1.0%	-----	0.2%
Total	398	100%	2000	20.4%

Summary

The above sites all have one thing in common; they all contain Mission Period *Olivella* shell beads (class H1a, H1b, and H2) that occur in unexpectedly large numbers at interior sites. This occurrence is not accidental. During the Historic Period, these beads were the most common types (Gibson 1976; King 1990). As this study will demonstrate, many of these sites were interconnected economically and socially. The disruptive and oftentimes devastating effects of Spanish colonization led, no doubt, to some of these developments. Social systems were crashing during this time period and reactionary movements such as revitalization cults were appearing throughout California. In northern California the Kuksa cult arose, as did a segment of the Ghost Dance (Bean and Vane 1978) which led eventually to the bloody standoff at Wounded Knee in South Dakota. In southern California it was the *Chinigchinich* cult that developed. It appears to have arisen in the Gabrielino territory (i.e. Los Angeles Basin) and spread east and south to the Luiseno, Cahuilla, and the Kumeyaay (Lepowsky 2004; McCawley 1996). Most of the time this crisis cult was peaceful and secretive, but at other times it could be part of violent uprisings (Lepowski 2004). It was a cult that unified and revitalized native polities, often absorbing traditional religious practices (McCawley 1996), such as the mourning ceremony and certain initiation rites. And since bead exchange was typical at religious functions, the spread of this cult from Los Angeles to San Diego was accompanied by the intensified use of beads. This important relationship, religion and bead exchange will be discussed further in the next chapter.

Chapter 6: Data Results and Interpretations

'There may be special significance to the remarkable widespread areal distribution of needle-drilled Olivella disk beads (Class H in Bennyhoff and Hughes 1987), a precise historic time marker...'

Hughes and Milliken, Prehistoric Material Conveyance (2007)

Introduction

As previously discussed, large amounts of beads (mostly Class H) suddenly appear in eastern San Diego County during the Historic Period. Prior to this period, beads were a rarity at sites found throughout the county. Finding 20 or more beads at a San Diego site was unusual (see Chapters 3 and 4). Moreover, the diversity of beads during pre-contact times was low, with spire-lopped beads (conceivably the easiest bead to make) dominating the collections. What caused this exponential increase is the focus of this study. As previously discussed, trade and the use of trails and travel corridors played a part in creating this situation, but what was the trigger or mechanism that seemingly pushed these beads into the study area? From what we know archaeologically shell beads (other than spire-lopped) were likely not made locally and there are several ethnographic sources that firmly suggest that the Kumeyaay and other groups (e.g. Cahuilla) received shell beads from more northern peoples (see Chapter 4 ï Bean and Vane 1978; Strong 1972). It is likely that all wall beads such as the H series type came from the Santa Barbara Channel where it is well documented that these types of beads were made (Gibson 1976; Arnold 1987; Gamble and King 2011). It is also probable that wall beads were made at the missions once Native people were relocated from the Northern Channel Islands (Gibson 1976; Bennyhoff and Hughes 1987). Glass beads likely flowed into the interior regions with shell beads. What caused this sudden increase is perplexing but can be partially explained by the appearance and spread of a post contact crisis revitalization movement, the *Chingichngish* cult, which derived from the Los Angeles area and quickly disseminated in a southeasterly direction. The cult would have utilized beads and cult members would have exchanged beads to facilitate ceremonies and religious events which were an intricate part of the new religion (Bean and Vane 1978). If this were the case, most beads found at cult sites form the post contact period, and time markers for dominant bead types should reflect a rapid and intensive spread. Also evident at cult sites would be other artifactual material and features which are purported to be associated with the new religion. In this chapter I will strive to demonstrate that the *Chingichngish* cult was present at sites where large quantities of beads were found, and that the cult was instrumental in the distribution of these artifacts.

Bead Analysis

Samples of glass and shell beads were analyzed from collections deriving from seven sites located in the southern California area. While the analyzed collections were mainly housed in museums and other curatorial facilities, some assemblages came from private collections. Due mainly to time constraints, the analysis was directed at obtaining manageable and statistically representative samples. In most cases, a 20 percent to 40 percent sample was obtained from each collection. In small collections, such as LAN-184H, the entire collection was analyzed. While complete analysis of the entire collection was the preferred method, it was also realized that in time many of the bead collections would become less accessible due to state and federal laws dealing with patrimony and repatriation. Nevertheless, it is likely that representative samples of the collections were obtained. Perhaps more questionable was the degree of representation from the source sites. Whether the assemblages collected are statistically significant; that is, are the collected samples in line with mathematical terms to the population sampled (Orton 2000)? This may be problematic. Certainly, at sites recently subjected to controlled excavation, the samples are representative. At RIV-7882 and VEN-1222 the deposits were excavated systematically and were relatively large samples. While both excavations utilized a non-probabilistic sampling technique, the sample was big enough at both sites to provide a high degree of confidence in the results. Conversely, other collections were from museums and curation centers, and for the most part came from artifact assemblages that had been previously recovered during surveys and archaeological excavations conducted over the last 90 years. As previously discussed in Chapters 4 and 5, the bulk of the museum collections came from archaeological investigations conducted by avocationalists and as such did not always possess a solid provenience. Nevertheless, site origin was always firmly established and this facilitated general provenience for the current study.

Over 2000 glass and shell beads were analyzed using the metric techniques described in Chapter 4. Bead data was first hand-entered on data sheets and then transferred to Microsoft Excel spreadsheets. All data computations were carried out using Excel and then transferred to tables (see Appendix). The spreadsheets and tables were organized by site, unit, and level (if available). In most cases, only site designation (or burial lot provenience) was obtainable. For recently investigated sites (i.e. LAN-184H, VEN-1222H, RIV-7882), more specific provenience was accessible.

One of the objectives in analyzing these beads was to establish a nexus between the study sites. It was my initial impression that the beads found at SDI-106 and SDI-901 derived from the Santa Barbara Channel area, where ample evidence exists for bead manufacturing (Arnold 1987; Gibson 1976). The beads (especially of the wall disc variety ï see Chapter 4) I was seeing from these sites looked very similar to ones observed at Santa Barbara sites. I also recognized long ago that there was little evidence for local bead manufacturing in San Diego County, especially wall discs. The only bead making evidence that I encountered was found at Otay Mesa and this reflected the manufacturing of spire-lopped beads (see Figure 3-1 and 3-5d). I therefore reasoned *a priori* that any wall disc beads discovered in San Diego were from the Chumash area. Establishing a connection between these two areas (Santa Barbara Channel and San Diego) would go far to explicate historic Native exchange systems during post-contact times (1769-1850).

Metric Examination

One objective of the analysis was determining the overall diameter of each bead. King (1990) and others (Gibson 1976; Bennyhoff and Hughes 1987) have shown that bead diameters in Class H wall disc beads became larger and less refined over time especially during the historic period in southern California (Figure 6-1). This pattern was observed by King in his extensive bead study and he felt that the seriation of historic rough discs was solidly constructed since sites were ǿé founded or abandoned at known dates, and it has been possible to establish a refined chronology of changes in beads used between A.D. 1770 and 1884 based on changes in bead diameters and degree of finish of marginsé ô(1995:XIII-14). The reason behind this morphological change is conjectural but a number of theories have been forwarded. King (1990) in his discussion on *Olivella* wall disc beads sees the breakdown of traditional lifeways during the Spanish colonial period and the concomitant changes in social structure as the reason for the formal changes in beads. His ideas on this are discussed in some detail in Chapter 3. Suffice it to say, the abrupt changes in historic *Olivella* beads are well documented by researchers and most are in agreement that post-contact factors (e.g. missionization process) had a key role in bringing about the observed changes (King 1990; Gibson 1992; Phillips 1996; Sandoz 2004).

In the present study, the sites examined had H beads that varied in terms of mean diameter. The range of mean bead diameter among the seven collections analyzed here was from 5.35±0.14 (CV-37) to 7.26±0.78. (RIV-7882). Within each collection there were varying H type beads (based on degree of edge grinding). As documented by King (1995) and others (Bennyhoff and Hughes 1987; Milliken and Schwitalla 2012) edge grinding became less evident over time. Basically the breakdown of edge grinding is as follows:

H1a ï Early Mission Period, A.D. 1770-1800 ï all edges ground
H1b ï Late Mission Period, A.D. 1800-1816 ï edges partially ground
H2 ï Terminal Mission Period, A.D. 1816-1834 ï small to medium sized beads with slight grinding.
H3 ï post-Mission Period, A.D. 1834 to at least 1900 ï large irregular discs with no grinding (chipped edges).

As alluded to above most of these beads were likely produced at the missions after the recruitment and relocation of the Indians. King (1995) states:

The manufacture of shell beads continued at the missions after the abandonment of the Native villages. The presence of a sequence of beads at the Ventura Mission site (Gibson 1976; King 1990),the beads from the post-1813 La Purisima Mission site (King 1990), ethnographic accounts indicate the manufacture of beads during the later Mission period. Luisa Ignacio told J.P. Harrington that Father Antonio Ripoli, who was at Santa Barbara Mission between 1815 and 1828 before Luisa was born, ordered the Indians to make shell beads to help pay for Fiestas (Hudson et al 1981:104).

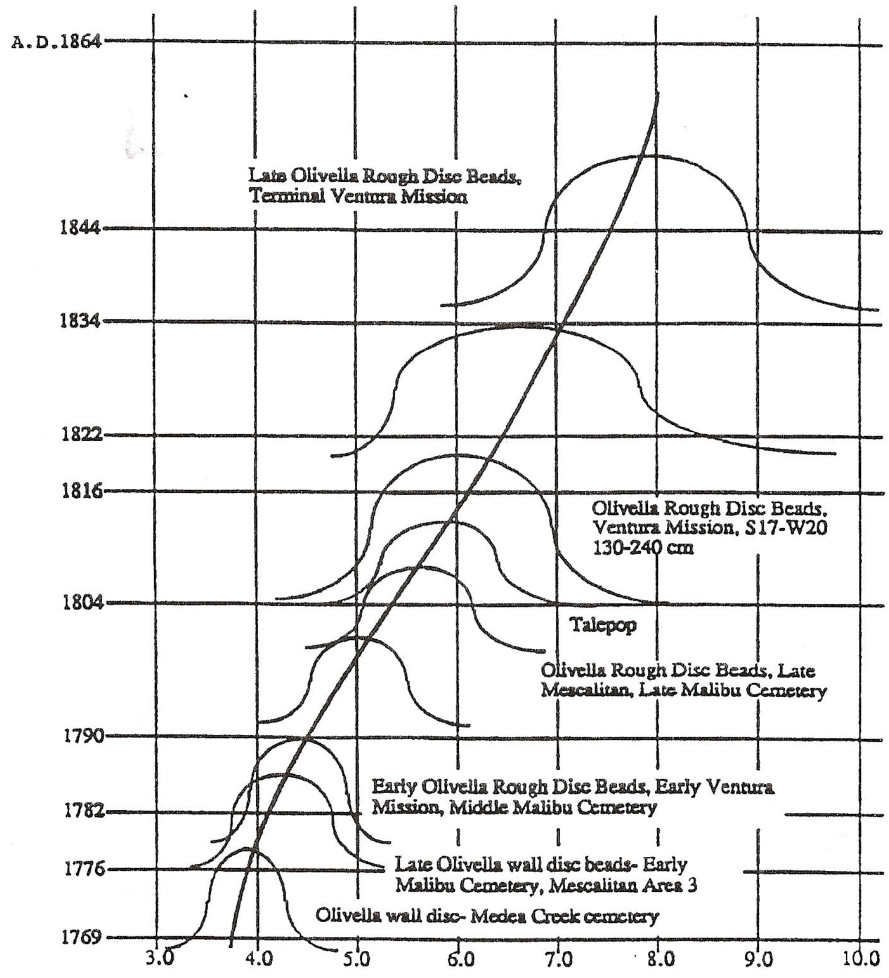

Figure 6-1: Seriation (based on mean diameter) of Olivella Rough Discs between A.D. 1769 and 1864, southern Chumash (From King 1995).

A primary focal point of the present study will be the analysis of what King calls rough disc beads. Utilizing Kingôs definition (1990:180), *Olivella* rough disc beads, a type of wall disc, are generally needle drilled (straight perforations approximately 1 mm wide) with some to no edge grinding. Broadly speaking, Kingôs rough disc type encompasses most of the Class H beads (i.e. H1B, H2, and H3), as defined by Bennyhoff and Hughes (1987) and Milliken and Schwitalla (2012). While all types of beads in the various collections were analyzed (Appendix), the goal of the study was the comparative examination of órough discsô from the seven sites. It was assumed (based on artifact assemblages) that these sites were temporally tied to the Historic Period and were linked to the *Chingichngish* cult. Particular attention was paid to what are classified as H beads. These are exclusively wall disc beads that occur within the Historic Period. Their presence in the archaeological record is especially noticeable during the mission era (ca. 1769 to 1834). They are made from the wall section of the *Olivella biplicata* shell and are relatively large and have poorly ground edges. As stated above, these have been referred to as rough (or chipped) disc (Bennyhoff and Hughes 1987; Gibson 1976, 1992; King 1995) and are the signature bead type for this time period. Due to their commonality at historic sites, it was a logical step to use them in the current analysis. By comparing diameters of rough disc beads from all the study sites it was thought that a meaningful pattern would emerge. As discussed previously, it is likely that all *Olivella* wall beads originated in the Santa Barbara Channel area. The current evidence is quite compelling that the Chumash were the sole producers of this bead type (Bennyhoff and Hughes 1987; King 1990; Zepeda 1999; Gamble and Zepeda 2002; Hughes and Milliken 2007; Gamble 2013). This will be discussed below in more detail.

Metric analysis of the beads was basic to the study. Careful measurements were taken using digital calipers and low to medium magnification (5x to 10x). All measurements were entered onto Excel spreadsheets. From these, basic computations were made for mean, variance, standard deviation, and t-test comparisons.

Statistical Analysis

In order to assist in comparison of the bead collections, t-tests were utilized on bead mean diameter values. While the mean diameter for various bead types in the collections helped in calling out similarities and differences between the collections, it was felt that statistical analysis would provide more exacting data for making these comparisons. Specifically, it was observed that three groups of mean diameter existed within the analyzed collections (5.5 mm, 6.4 mm, and 7.3 mm) and statistical analysis was carried to ascertain whether these groupings were meaningful.

A MATLAB application (version 7.4.0) was utilized to carry out paired t-test computations (Table 6-1). Briefly, these calculations test the null hypothesis that there is no significant difference between data sets. The assumption is that in the difference x-y are a random sample from a normal distribution with mean 0 and unknown variance, which are tested against the alternative that the mean is not 0. In the table below the óhô value denotes whether the null hypothesis is accepted or rejected. An óhô value of 0 signifies acceptance of the null hypothesis (no significant difference between the two data sets and by inference the two collections). On the other hand, an óhô value of 1 represents rejection of the hypothesis (i.e. there are significant differences between the two data sets and by inference the two collections). The ǵpô value is a probability index that reflects degree of confidence in the ǵhô value. Any value over 0.05 (5%) is significant. All calculations are based on the 95% confidence interval.

Results of Statistical Analysis

Based on mean diameter of H beads (ranging from 5.35 mm to 5.58 mm) and t-test results, it is likely that there was some sort of connection (e.g. temporal) between CV-37, LAN-184H, and SDI-901 (Table 6-1). As depicted in Chapter 4, Figure 5-1, these sites are arranged generally in a northwest to southeast orientation which begins in the Los Angeles Basin and ends in San Diego County at SDI-901. The assumption is that rough disc beads found at SDI-901 were transported southeast through the San Gabriel Valley (via Mission San Gabriel) and into the Coachella Valley where they were exchanged (or distributed) into the eastern San Diego County region (see Chapter 4, Figure 4-4).

Two other study sites listed in Table 6-1 appear to be similar in terms of bead diameter as well. The beads from SDI-106 and SCLI-1437 fall within the 6.34 mm to 6.46 mm range and are statistically similar. It is also likely that these beads were manufactured in the Santa Barbara Channel region. Robert Gibson in the 1970s found beads of similar appearance at Mission San Buenaventura (1976:145). These beads have diameters ranging from 6.0 to 6.4 mm and possess poorly ground edges.

The only outlier in Table 6-1 is RIV-7882, a Cahuilla site located in Coachella Valley. The rough disc beads in this collection are considerably larger than the others with a mean diameter of 7.3 mm. Large rough disc beads are found at other Valley sites as well.

A site (RIV-1179) excavated just six miles southeast of RIV-7882 has rough disc

Table 6-1
Statistical Comparisons of Study Sites Using
Mean Diameter of Rough Disc Beads

Site Comparisons	**H value**	**P value (rounded to three significant digits)**
VEN-1222H and SDI-901	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
VEN-1222H and SDI-106	1::null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
VEN-1222H and SCLI-1437	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SDI-1222H and 7882	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SDI-1222H and LAN-184H	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
VEN-1222H and CV-37	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SDI-901 and SDI-106	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SDI-901 and SCLI-1437	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SDI-901 and LAN-184H	0: null hypothesis accepted.	0.345: assuming null hypothesis is true, we have a 34% chance of observing this outcome from this data (moderate probability that H result is correct).
SDI-901 and CV-37	0: null hypothesis accepted.	0.911: assuming null hypothesis is true, we have a 91% chance of observing this outcome from this data. (Very high probability that H result is correct.)
SDI-106 and SCLI-1437	0: null hypothesis accepted.	0.077: assuming null hypothesis is true, we have a 77% chance of observing this outcome from this data (high probability that H result is correct).
SDI-106 and RIV-7882	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SDI-901 and LAN-184H	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect (P value rounded to zero to three significant digits).
Sd-106 and CV-37	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SCLI-1437 and RIV-7882	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SCLI-1437 and LAN-184	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
SCLI-1437 and CV-37	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
RIV-7882 and LAN-184	1: null hypothesis rejected- no similarity.	0.000: very low probability that H result is incorrect
RIV-37 and LAN-184H	0: null hypothesis accepted.	0.304: assuming null hypothesis is true, we have a 30% chance of observing this outcome from this data (moderate probability that H result is correct).

beads with a very comparable size range (King 1986:63-67). The rough disc beads here have a mean diameter of 7.5 mm. Another bead collection of probable relevance was found in Tahquitz Canyon, approximately 11 miles west of RIV-7882. The collection, which was assembled during a data recovery program at RIV-45, contains many rough disc beads which have mean diameters similar to those from the two sites above. Mostly found with cremations, these beads fall within the 7.1 to 7.6 mm diameter range (King 1995:19). Again this agrees quite favorably with mean values found at the other two sites. King (1995) has determined that the larger H series beads (i.e. rough discs) are sequentially later in time. They probably represent very late Historic Period (i.e. terminal Mission Period) beads from the Santa Barbara area (King 1995). King believes, as I do, that once the Chumash were relocated to the missions, wall disc beads became larger and less refined (see Figure 6-1). It is his theory that a reduction in competitive pressure and increased potential to attain wealth accounts for this change in bead manufacturing (King 1990:196-197). He also believes that during the Historic Period many wall disc beads were produced at Mission San Buenaventura and that these beads were widely distributed throughout southern California. He states:

> The beads that have been recovered from historic sites throughout southern California are apparently within the same ranges of sizes and finish as beads found at Ventura Mission. No evidence of bead manufacturing has so far been reported from non-Chumash Late Period sites (King 1990).

As I have mentioned before (see Chapter 4) no bead production sites have been found to date evidencing wall bead manufacturing outside of the Santa Barbara area. While King (1990:184) suspects that some wall bead manufacturing occurred outside the Santa Barbara Channel during early prehistoric times, no such evidence has ever been identified. It is true that bead production sites of less sophisticated beads such as spire lopped and barrel beads have been identified in greater southern California (see Bennyoff and Milliken 2007, Kirkish 1998; Rosen 1996; Zepeda 1999), but no other bead type manufacturing has been identified outside the Channel region. Supporting evidence for this comes from a recent study using isotope fingerprinting (Eerkens et al 2005). The study sampled beads (most of which are *Olivella* wall disc) found at sites throughout California and analyzed them for isotopic values. These values in turn were compared to a regional database representing *Olivella* shell populations along the California and Oregon coasts (Eerkins et al 2005:1511). From this analysis it was found that most of the tested beads came from shells originating in the Channel Island area, probably Santa Rosa, Santa Cruz, and San Nicholas Islands (Eerkens et al 2005:1509). Not surprisingly, these islands have long been known archaeologically to contain bead production centers (as evidenced by bead blanks and detritus), especially for *Olivella* callus and wall beads (Arnold 1987:228-230; Kennett and Kennett 2000:290; King 1990:xxi; Eerkin et al 2005:1509; Fagan et al 2006).

Soon after the establishment of San Buenaventura mission in 1780 and Santa Barbara Mission in 1782, Native Americans (mostly Chumash) were recruited as converts in what the Spanish called *reducción* (Lightfoot 2005:63-66; Jackson and Castillo 1995:6). Among the new émigrés were Chumash bead makers from Santa Cruz Island (Johnson 1999:647). As attested by archaeological investigations over the last four decades, there is ample evidence that these bead makers continued to ply their trade surreptitiously under the purview of the Padres (Lightfoot 2005). The beads deriving from VEN-1222H and found at sites further south were likely made by these same bead makers or their apprentices. Also apparent is the continued occupation of historic sites on the Channel Islands (Kennett et al 2000; Kennett 2005; Fagan et al 2006). It is possible that beads continued to be made well into the Historic Period on these island settlements (Kennett et al 2000:212).

More on the *Chingichngish Cult*

I have previously discussed the origin of this crisis cult, stating that either it arose near Long Beach or on the southern Channel Islands. Because of the secretive and guarded nature of the religion, its origin and other aspects dealing with organization and rituals are largely unknown (Grant 1978; Hackel 2005; Hardy 2000; Jackson and Castillo 1995). However, ethnographic and historical accounts do exist that give the researcher a glimpse of the inner workings of the cult (Boscana 1978; Reid 1968). As stated earlier, the cult likely developed during post-contact times and possessed elements of Christianity in its precepts (Phillips 1996; Bean and Vane 1978). It is also probable that the cult arose in response to disease and acculturative factors that devastated Native cultures during this time period. Although many investigators see the origin of the cult hero/demigod *Chingichngish* as coming from *Pubunga*, a village site located in the Long Beach area (near present day Los Angeles), it is more likely that *Chingichngish* and the religion came from either Santa Catalina or San Clemente Island. Certainly archaeology strongly supports this idea, especially in regard to San Clemente Island (See Figure 4-4, SCLI-1437). On this island, many sites reveal the presence of intense ritualism during the Historic Period. Numerous sites contain ritualized animal burials (particularly dog, fox and birds) and anomalous looking cache (sacrificial) pits containing ceremonial items, beads, and eccentric objects that are rare occurrences archaeologically in California (Raab et al 2009; Salls and Hale 1990). The presence of mission period items in the burials, cache pits and associated features (e.g. ceremonial enclosure) strongly suggest that cult like activity such as seen with the *Chingichngish* religion was present (see Hardy 2000; McCawley; 1996; Salls and Hale 1990; Raab et al 2009). Also of interest is the dominant bead type at most of these ritual sites. Class H beads by far outnumber all other types. For instance at the Ledge Site, nearly 70% appear to be Class H beads, placing the site firmly in the Historic Period and further linking the site to the time period commonly associated with the *Chingichngish* cult (Scalise 2000). At nearby site SCLI-1437, similar percentages of Class H beads were found. Nearly 90% of the bead collection found here (and analyzed by the author) fell into this category (Tables 5-2 and 6-4). In fact many of the sites located on the interior plateau area of the island are strikingly similar in terms of their artifact assemblages (Raab et al 2009; Salls and Hardy 2000). It appears that a greater part of this area (and possibly the entire island) was occupied during the Historic Period (Rechtman 2000). This occurrence agrees well with the hypothesis that the cult arose here and ritual activity was very evident throughout most of the Historic Period. Referring to it as the Toloache cult, Kroeber (1925:621-625) sees these two islands as the óthe seat of the source of this cultô.

At the Ledge Site on San Clemente Island there appears to have been a ceremonial enclosure as indicated by compacted dirt and a berm surrounding the feature (Salls and Hale 1990). It is likely that this enclosure is the remnant of a *Yobar,* a basically circular structure associated with the *Chingichngish* rituals (Raab et al 2009; Rechtman 2000

Salls and Hale 2000 ï see figure 6-2). In 1602 Spanish explorer Sebastian Vizcaino and his crew possibly witnessed one of these enclosures (Figure 6-2) on Santa Catalina Island. The enclosure was described as made of brush and was circular in outline with a smaller chamber within. An idol was supposedly displayed in the enclosure and this image was constructed of coyote hide that was filled with feathers, horns, claws and beaks (Lepowski 2004:57; Kroeber 1976:639; Salls and Hale 2000:4). The Spanish thought the idol was a demon that the Natives were worshipping. However, given descriptions by subsequent ethnographers, this image likely represented *Chingichngish* (Phillips 1981:15; Strong 1929:296-297) the demigod and cult hero of the new religion.

It is conceivable that San Clemente Island was the principal ritual center for southern California (Kroeber 1925; McCawley 1996). The extreme high density of ritual features on the island aggressively supports this conclusion. Moreover, ethnographic documentation suggests that the people living on San Clemente Island were powerful shamans called Hechicheros (Hudson 1978:265) who were intimately associated with the new cult (Rechtman 2000).

The *Chingichngish* Cult and Bead Exchange

Bead exchange during the Historic Period was tied to ritualism that had its roots in the prehistoric period. The new religion that developed during post contact times was inextricably tied to the rituals and ceremonies practiced during earlier times (Hull et al 2013). Primarily, the *Chingichngish* cult was evident in three traditional rituals; boysô initiation, mourning ceremonies, and the eagle killing ceremony (Dubois 1908; Salls and Hale 1990; McCawley 1996; Hardy 2000). The mourning ceremony was important to

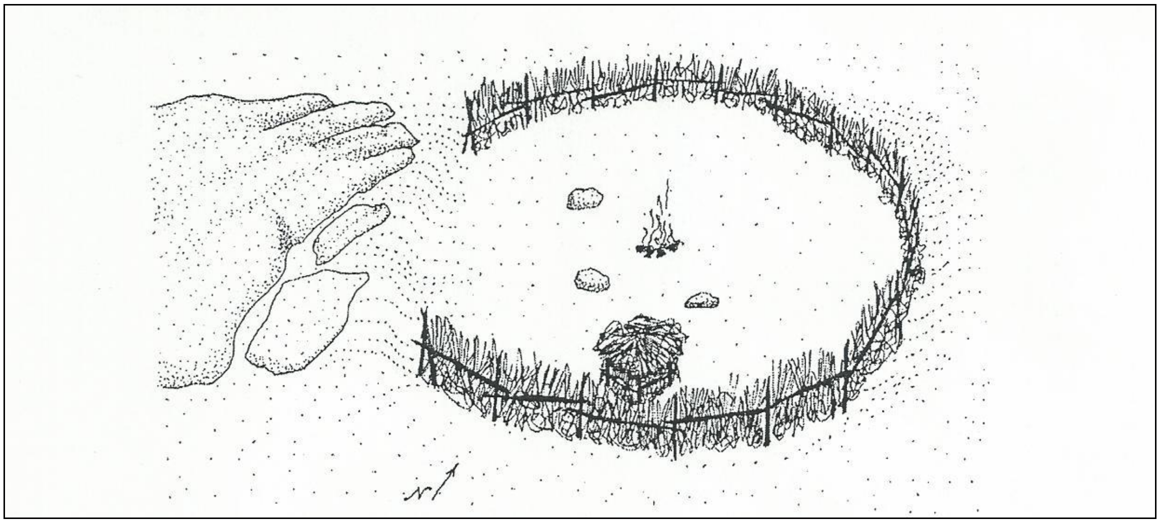

Figure 6-2: Artist reconstruction of a Yobar, ceremonial enclosure, at the Ledge Site on San Clemente Island (from Salls and Hale 2000).

Chingichngish and often included ritualized eagle and hawk burials (Boscana 1978, Salls and Hale 1990). As previously mentioned this ceremony always involved bead exchange. Beads were given to the official overseeing the ceremony and they were frequently given out to attendees by the individual family members of the deceased. Beads (especially Class H beads) during historic times were a medium of exchange and were given freely to shamans and other officials for services rendered. As was the case with the Toypurina, the Gabrielino shaman (mentioned in Chapter 2), she was given beads and óother triflesô when requesting her help, either for healing or prophetic visions (Lepowski 2004:6). It was likely that Toypurina was tied to the *Chingichngish* religion and that she had prophetic visions leading to a regional uprising in 1785 (McCawley 1996:95; Lepowski 2006:6). Another example of beads given to shamans comes from the Santa Barbara area where a female practitioner (name unknown) was given beads and seeds in 1801 for her prophetic visions (Heizer 1941:128-129). As with the Toypurina case a regional revolt was in the making and the visionaryøs prophesies were fueling the uprising (the uprising was mainly a response to a smallpox epidemic that was spreading throughout the region). Although the revolt was defused by the Spanish before violence broke out, the visionary was successful in gathering many hundreds of Native people on a regional basis to oppose the mission and the Spanish. Lepowski (2006) sees similarities between these two events: (1) both were led by a young woman prophet; (2) both were conducted in secrecy; (3) both exhibited rapid diffusion of the prophesy; and 4) both involved the gifting of beads and seeds.

At Trail's End

It is obvious from the previous discussions in Chapter 4 that historic period trade in the study area was conducted in a northwest to southeast direction. Wall disc beads (rough disc) were mainly produced at the missions and exchanged in a southeast direction within the interior region of southern California. As attested at SDI-106 and SDI-901 these beads appear to have gone as far south as San Diego County. It also seems that these types of beads did not go much further west of the Cuyumaca Mountains. Beyond this ôbead lineö, little to no historic beads (such as rough disc, chipped disc, cupped, cylinder, and lipped) occur in the County. Seemingly, the interaction sphere for these beads did not involve the Pacific littoral zone (i.e. including to some extent the western slope of the mountains), but was restricted to a relatively limited area within the interior region.

Based on the bead data, there were at least three distinct waves when Class H beads circulated throughout the study area (*vis-à-vis* Figure 6-1). These could represent either differing time periods or individual bead sources or exchange systems. The first apparent wave contains beads that range from 5.35 to 5.58 mm mean diameter and are seen at CV-37, LAN-184H, and SDI-901 (Tables 6-2, 6-6, 6-13). It is almost certain they came from the Santa Barbara Channel region ï the only definitive evidence for wall bead manufacture comes from this area. Other southern California sites that contain similar diameters are the early Chumash cemetery in Malibu (King 1995:XIII-16) and VEN-87 at the San Buenaventura Mission (Gibson 1976:146). The next sequence of H beads falls within the 6.04 to 6.46 mm mean diameter range and are represented by collections found at SDI-106, VEN-1222H, and SCLI-1437. The last sequence comes from site RIV-7882. This site, located near Indio, contained Class H beads that have a 7.5 mm mean diameter. Large rough discs have also been found at La Quinta, RIV-1179 (King 1986:64) and at Mission San Buenaventura (King 1995:XIII-16).

Exchange Networks and Material Culture

Based on the presence of unusually large numbers of shell and glass beads at two sites in eastern San Diego County, I surmised that a large number of these artifacts originated from the Channel Island area. Time periods for this exchange have been established based on morphological and metric indices. As discussed above, this bead exchange was particularly active during historic times and likely peaked repeatedly during this time period. Based on ethnographic data, ritualized activities such as mourning ceremonies and rites of passage were prime movers in facilitating exchange, and these ceremonies were intimately tied to the *Chingichngish* cult during the Historic Period. Beads (shell and glass) were actively sought after as these artifacts were considered a type of currency (Gibson 1992:40; McCawly 1996:112-114; Simpson 1961:54-55; Strong 1929:153-155). With the neighboring Cahuilla, a unit of exchange (strings of beads) was called the *napapanaa.* It was sent by participants to the clan leader when a death occurred in his clan. The value of a string of beads was determined by:

> wrapping it twice around the left wrist, carrying it under the thumb and twice around the fingers halfway to the tips and back over the palm to a spot on the mid-wrist four inches from the posterior end of the palm (Strong 1929:95).

Money beads could be used for immediate exchange (balanced reciprocity) or they could be given as an obligatory gesture at ritualistic functions such as funerals or mourning ceremonies with the understanding that some form of reciprocity would occur later (generalized reciprocity). These beads could also be used for ôbankingô (or ôsocial storageô) to be utilized later during a time of need (Ford 1983:711; OôShea 1989:125).

While exchanging beads for other types of beads did occur (especially in ritual situations), more frequently money beads were traded for goods, and sometimes services (Strong 1929). During precontact times local unpredictability and variation in part necessitated the use of beads to equalize year to year shortfalls. True, ideology and agency may have played a large part in this process, but the foundation of the whole system was subsistence and reciprocity. As I briefly discussed in the previous chapters, exchange was the great equalizer; it was conditioned by resource variability among neighboring regions and provided its practitioners with a means of coping with environmental heterogeneity and subsistence shortfalls (Ford 1983; King 1990). After contact, the motivational factors for bead use likely changed (especially in the interior regions of southern California). With the rise and rapid spread of the *Chingichngish* religion, bead exchange mainly was used to facilitate the ceremonial requirements of the cult (Stong 1929:349). The differences, particularly in mean diameter, seen in historic bead types may represent periods of cult activity over time where some areas peaked in ritual activity at differing times. Certainly, it seems that the dispersion of the cult was continuous during post contact times; however, there may have been times when cult activities peaked at certain sites ï a sort of ebb and flow of beads and ritualistic activity. Also possible is that the differing mean bead sizes could indicate the time range in which a site was occupied. For instance, at SDI-901, Class H beads include H1A, H1B, and H2 beads. ï no H3 beads exist in the collection. What can be surmised from this occurrence is that the site was not occupied after 1834, which is the latest date that most researchers agree H3 beads began to be made (Bennyhoff and Hughes 1987:135; Millliken and Schwitalla 2012:58).

The process of elucidating the manner in which beads were used in the study area included looking at the full range of beads in each collection and then comparing this data with supplemental information deriving from other material residues from the sites. To this end I have tabulated the bead data. The tables include bead type, number, and percentage for each individual site. These tables are followed by a list of metric indices for diameter for each H bead type. Again, although hole size and bead thickness are important in the seriation of these beads, it is the diameter that is most diagnostic. Granted hole size is particularly important in distinguishing prehistoric from historic wall beads (i.e. historic wall discs primarily were drilled with metal needles and hole sizes are å1 mm) but this attribute is rather standard for Class H beads and varies relatively little within historic H bead collections (see metric index tables). Each table is followed by discussions that deal with chronology and exchange.

Site CV-37

This collection comes from a site located on the Torres-Martinez Cahuilla Indian reservation near Indio, California (Chapter 4, Figure 4-4). The beads were originally collected by an avocational archaeologist who likely used non-systematic methods in recovering the material. Besides the general site location, no finite provenience exists for this assemblage. The private collection consists of 200 or more beads. Due to time constraints (I was allowed only a few hours to analyze the collection), only a portion of the assemblage was examined. Approximately 40 percent of the beads were analyzed (Table 6-2). However, given the large sample size, it is likely the beads analyzed are representative of the entire collection.

Table 6-2
Bead Sample from CV-37

Bead Type	Number	Percent
A1 (Spire-Lopped)	4	4.5%
E1a (Thin Lipped)	7	7.8%
G1 (Tiny Saucer)	12	13.3%
H1a (Ground Disc)	22	24.4%
H1b (Semi-Ground Disc)	8	8.9%
H2 (Rough Disc)	11	12.2%
J (Wall Disc)	24	26.7%
K (Cupped)	1	1.1%
L2 (Rectangle)	1	1.1%
Total	90	100%

Table 6-3
Metric Indices for Class H Beads
From CV-37

Bead Type	Mean Bead Diameter	Standard Deviation (ů)	Thickness ($\bar{x}$)	Hole Size ($\bar{x}$)
H1a	5.24	0.07	1.18	1.40
H1b	5.36	0.05	1.23	1.42
H2	5.51	0.07	1.11	1.47
H1b, H2,H3	5.35	0.14	1.16	1.43

Bead types represented in this collection range from A1 to L2 (Table 6-2). All beads are burnt ï they likely were collected from cremations. The four A1 (spire-lopped) beads are of the species *Olivella dama,* which comes from the Gulf of California. O. dama beads such as these were likely tied into a southeastern interaction sphere that overlapped the exchange network deriving from the Channel Island area (Rosen 1996; Gamble and King 2011). All four beads are medium sized and slender. Also in the collection is an E1 bead (thin-lipped). While not extremely common in the area, they do occur to a certain extent throughout the region. This bead type probably dates from the protohistoric period and represents a descendent form of the cupped bead (Bennyhoff and Hughes 1987; King 1990). By far the most common beads in the assemblage come from the Class H. H1a, H1b, and H2 beads (Table 6-3) are all amply represented (>25%). As previously discussed, these beads date from the Historic Period (i.e. 1770-1900). They are strong time markers for the post-contact era. Interestingly, there are also many J beads in the collection. These beads are thought to have been common during the Late Period (prehistoric) and are somewhat anomalous temporally with the H beads (Bennyhoff and Hughes 1987; King 1990). It is possible the site (CV-37) possessed an earlier component, or perhaps these beads were handed down (curated) from earlier times. The last two beads (K1 and L2) are also earlier type beads.

In terms of exchange, it is likely that the spire-lopped beads (or at least the shells themselves) originated in the Gulf of California. *O. dama* shells are known to come exclusively from this area (Mitchell 1992). While spire-lopped beads are quite common in Kumeyaay territory, they do not normally occur often in Cahuilla bead assemblages

(Schaefer 2000:191). The reason for this distribution is unknown, but according to one investigator the pattern is so pronounced that these beads can be used as őé a good ethnic marker to distinguish the Cahuilla and Kumeyaay sites in the Colorado Desertô (Schaefer 2000:191). The other beads in the collection almost certainly came from the Santa Barbara Channel. As previously discussed, most wall and callus beads (E, H, J etc.) were made by the Chumash. H series beads as seen at this site (Figure 6-3) were most probably traded down the line from the Chumash area to the Gabrielino, and then (via the Halchidoma Trail ï see Figure 4-4) the Cahuilla and Kumeyaay in the western Colorado Desert. It is also likely that the introduction of these beads was related to ceremonial activities associated with the *Chingichngish* cult. Ethnographically, it is known that the Cahuilla accepted the cult and practiced its precepts (dances and songs) throughout the mountain and desert areas (Kroeber 1951:45; Bean 1972:65; Bean and Smith 1978: 667-669; Lepowski 2004:13). At CV-37, wide varieties of artifacts were collected, and some of these may relate to cult activity at the site. Quartz crystal and tourmaline were both found at the site and both of these minerals were associated with the cult (McCawley 1996:97; Lepowsky 2004:14). And of course there are abundant amounts of Class H beads at the site, which place occupation firmly in the time period when the cult was most active. Given the mean diameter of the H beads, bead use may have occurred during the early Historic Period (King 1990; King 1995; Bennyhoff and Hughes 1984). H beads from CV-37, LAN-184H, and SDI-901 are somewhat similar in terms of mean diameter and are statistically alike ï they may be diachronically and synchronically related (e.g. made in the Santa Barbara Channel region and exchanged at about the same time).

Figure 6-3: Beads from CV-37.

Site SCLI-1437

This is the only site in the study that occurs on a Channel island (see Figure 4-4). Located on the high interior plateau region of San Clemente Island, the site consists of shellfish remains, lithic debitage, and assorted stone artifacts. Also observable are the remains of several historic features related to a water purification plant built in the 1940s. The midden, although somewhat disturbed by these historic structures, is fairly intact and is very dark grey in color with moderately abundant shell and other cultural materials (York and Wahoff 2009). As is the case at other sites within the plateau area of the island, shell and glass beads are conspicuous within the midden.

I analyzed the collection from this assemblage while it was curated at the San Diego Museum of Man (SDMM). Besides beads, the collection contained a diverse assortment of artifacts, including flaked stone tools, groundstone, and bone implements. All site materials appeared to be properly curated and were appropriately labeled. Unfortunately, the field notes were missing. Nevertheless, beads were well organized, being bagged by lot and accession number.

Due to repatriation processing taking place at the museum, the maximum allowable time for analyzing the beads was limited. Sampling the collection was thus necessary, and this was done as scientifically (i.e. via random sampling) as possibly. Approximately 30% of the assemblage was analyzed despite the time constraints.

As reflected in Table 6-4, the beads in this collection are dominated by H series. Nearly 90% of the assemblage consists of this historic bead class. As discussed earlier, H beads were most likely made at the missions between 1780 and 1834 and then traded to points south. How these beads got to San Clemente Island is largely unknown. The distance from the mainland (see Figure 4-4), where the beads were likely made (no evidence of bead manufacturing occurs on the island), is approximately 95 miles across open ocean. They must have been transported in ocean going plank canoes. Whether the Chumash or Gabrielino conveyed the beads is also not known. It is recognized that the Gabrielino/Tongva were enthusiastic traders who utilized the plank canoe and often acted as middlemen for long distance exchanges (McCawley 1996; Raab 2009). It is not unreasonable to see the Gabrielino securing beads at the mission and transporting them to the southern Channel Islands (traditionally known to be occupied by the Gabrielino ï McCawley 1996). It is also suspected that San Clemente Island may have been a *refugio* for disenchanted Natives who were distancing themselves from the Spanish (Raab 2009:209). If this is the case, it would partially explain the enormous amount of beads found on the island and the high incidence of ritual-related features. This will be further discussed below.

Also of interest in this assemblage is the presence of œearlierô bead types. The G, J, and K beads are all earlier time markers; the G2 bead normally occurs during the Middle Period (1400 B.C to A.D 1150 ï King 1990). The fact that there is only one of these in the collection suggests that this bead may have been an heirloom, since it so atypical in relation to the assemblage as a whole. The J and K beads are certainly less discontinuous as these predate the H beads by only a few years and may in fact overlap the H beads as temporal indicators. The remaining beads in the collection are lipped beads, which have a broader time range (Bennyhoff and Hughes 1987; King 1990). They can occur in both the prehistoric and historic periods. As stated in Chapter 4 they appear to have replaced their progenitor bead, the cupped. Both beads are made from the callus portion of the *O. biplicata* shell and are sometimes difficult to differentiate due to overlapping characteristics.

Analysis of H beads indicates that there is a strong similarity in terms of mean diameter (and statistical comparability) between this collection and SDI-106 (Table 6-1). This agreement may mean that these beads were made at the same time and may have been

Table 6-4
Bead Sample from SCLI- 1437

Bead Type	Number	Percent
C3 (Split Ovoid)	1	0.2%
E1a (Round Thin Lipped)	10	2.9%
E1b (Oval Thin Lipped)	10	2.9%
E2b (Deep Lipped)	1	0.2%
G2 (Saucer)	1	0.2%
H1a (Ground Disc)	24	7.0%
H1b (Semi-ground Disc)	242	71.0%
H2 (Rough Disc)	40	11.7%
H3 (Chipped Disc)	2	0.7%
J (Wall Disc)	2	0.7%
K1 (Cupped)	8	2.3%
K3 (Cylinder)	1	0.2%
Total	342	100%

Table 6-5
Metric Indices for Class H Beads
From SCLI-1437

Bead Type	Mean Bead Diameter	Standard Deviation (ů)	Thickness($\bar{x}$)	Hole Size ($\bar{x}$)
H1a	6.2	0.6	1.04	1.58
H1b	6.52	0.45	1.06	1.57
H2	6.27	0.55	0.99	1.59
H3	6.35	0.92	1.10	1.35
H1b, H2,H3	6.46	0.49	1.04	1.58

traded or transported within the same exchange system. The data is provocative but certainly not conclusive. However, the fact that these bead types were strictly standardized according to individual bead makers makes it likely that all were from a single source ï probably at one of the Santa Barbara Channel missions.

The ritualized historic features found at this site and other nearby sites (e.g. Lemon Tank, Ledge Site, etc.) suggest that the *Chingichngish* cult was active on the island during the first part of the 19th Century. Numerous cache pits and sacrificial animal burials have been found at these sites as well as anomalous artifacts which appear to have been ritually used. Based on the bead distribution in the collection (approximately 90% are Class beads ï H1a, H1b, H2, and H3) the presumed date of occupation would be AD 1770 to post-1834 (Bennyhoff and Hughes 1987; Milliken and Schwitalla 2012). However, recent excavation at the site (see York and Wahoff 2009) revealed a piece of bottle glass which was probably manufactured between the 1860s and 1910s (Karen Swope, personal communication). The item has bead impressions on it where wall disc beads were inlaid on the glass with asphaltum (Figure 6-4). This artifact may have had ritual significance. The purported date of the bottle glass would certainly place the occupation of the site at a *terminus post quem* of 1860. Although many investigators would place the abandonment of the island before the 1820s (Johnson 1989; McCawley 1996:203; Rechtman 2000:44; Arnold 2010:109), it appears that occupation persisted into the late 19th Century. It is likely that Indians (i.e. Gabrielino) lived and practiced esoteric rituals on the island on a permanent or seasonal basis. Some researchers see the island populated by mission runaways (Salls and Hale 1991:35; Raab et al 2009:197-211) who escaped the oppressive atmosphere of the missions in order to practice the proscribed ceremonies of the *Chingichngish* cult. This could well be the case, given the large amount of archaeological evidence found here that relates to this cult.

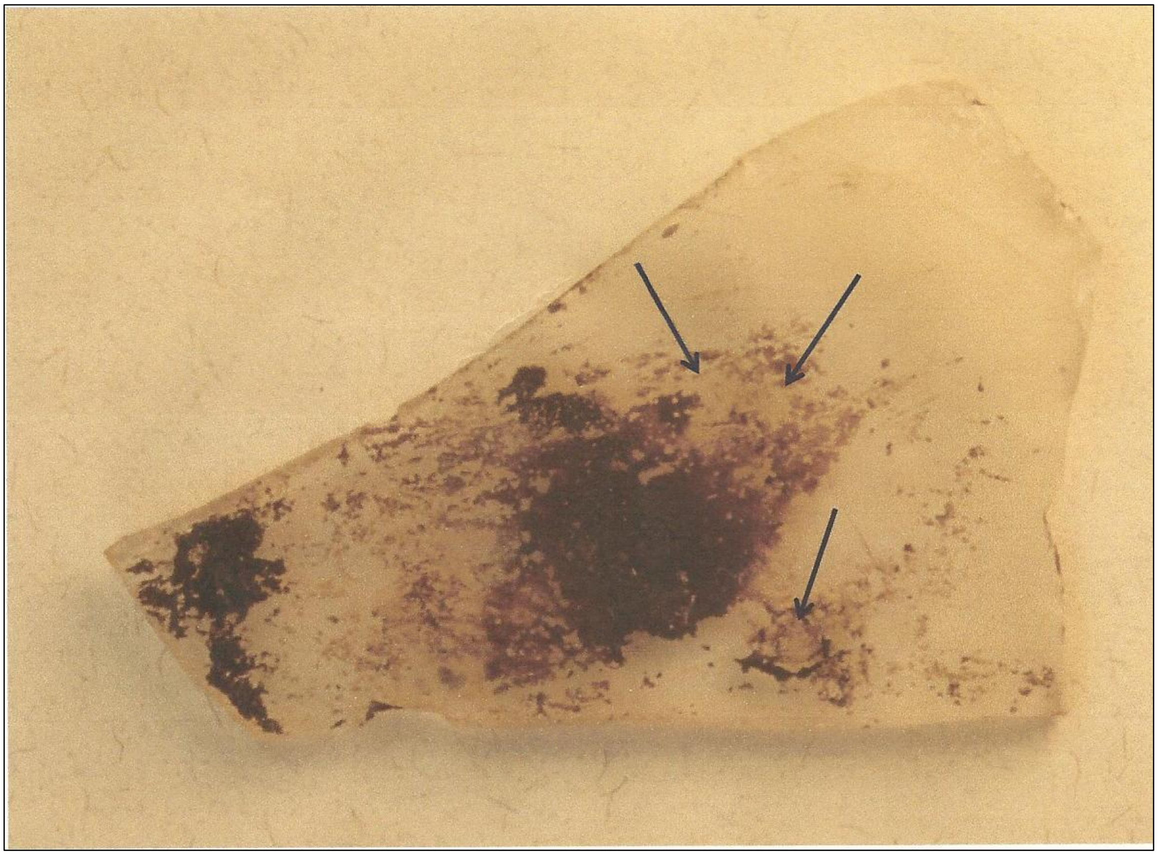

Figure 6-4: Bottle glass recovered from a cache pit at SCLI-1437. Arrows indicate wall disc bead impressions (from York and Kirkish 2011)

LAN-184H

These beads came from the Mission San Gabriel site (Table 6-6). They were recovered during test excavation for an impending project which runs through a known Indian neophyte archaeological deposit. The excavation was controlled and the sample of the impact area fairly substantial. However, the entire site was not sampled, just the area subject to impact. Thus the bead sample seen here (Table 6-6) is likely skewed and may not represent the full range of bead types present at the site. Nevertheless, the beads do for the most part agree with the presumed date of the deposit (i.e. Early to Late Mission Period). The area where the beads and other cultural remains were found is directly south of the mission. The area is unmistakably the location of the neophyte village which was still in existence as late as 1828 (see Pilling 1955). Material culture found here includes, Mission Ware ceramics, adobe bricks (*ladrillos*), roof tile (*tejas*), Native American pottery, groundstone artifacts, flaked tools, and, of course, beads.

Table 6-6
Bead Sample from LAN-184H

Bead Type	Number	Percent
AV3 (shell tube)	3	0.7%
E1a (round thin lipped)	5	3.3%
E1b (thin lipped)	5	3.3%
G1 (tiny saucer)	13	8.7%
Glass	58	42.4%
H1a (ground disc)	7	4.7%
H1b (semi-ground disc)	11	7.4%
H2 (rough disc)	32	21.3%
H3 (chipped disc)	6	4.0%
J (wall disc)	1	0.7%
K (cupped)	2	1.4%
KlCII (*Haliotis* disc)	5	3.3%
Stone disc	1	0.7%
Total	150	100%

Table 6-7
Metric Indices for Class H Beads
From LAN-184H

Bead Type	Mean Bead Diameter	SD (ů)	Mean Thickness ($\bar{x}$)	Mean Hole Size ($\bar{x}$)
H1a	5.41	0.83	0.97	1.14
H1b	5.3	0.83	0.96	1.33
H2	5.51	0.54	1.00	1.48
H3	6.7	0.76	0.87	1.48
H1b, H2,H3	5.58	0.73	0.98	1.37

Although this is a fairly small collection, several patterns and trends can be easily recognized. First, as in most of these collections, H beads (especially rough disc) nearly dominate the collection (37% - Tables 6-6 and 6-7). This bead class, made between 1800 and 1834, is seen in all the study collections, and signifies the importance of these artifacts during post-contact times. As discussed in the first part of the chapter, these were the primary bead types manufactured by the Chumash during the historic period (Gibson 1976, King 1990; Bennyhoff and Hughes 1987; Hughes and Milliken 2007). These beads were used for a variety of reasons, including transactions, decoration, symbols of prestige, etc. King feels that these beads evolved from saucer and wall disc, were at one time originally used exclusively by the elite. However, he believes that this custom changed in Late Prehistoric times and that a secular system arose that gave greater access to beads by the general populace. As stated by King:

> Rapid growth of the secular economic system at the beginning of the Late Period appears to have encouraged the involvement of political leaders in the secular economy. This resulted in a corresponding reduction in emphasis on the use of wall disc beads in relation to cupped beads. During Phases L1b and L1c, both wall disc beads and cupped beads tended to have larger diameters than during Phase L1a. The decrease in degree of refinement of these beads (larger diameters) can be interpreted as indicating participation by a larger proportion of people in both the political and secular economies in the Chumash area. This interpretation indicates that during Phase L1 the growth of the secular economy reduced the relative amount of economic power held by hereditary political leaders (1990).

In other words these beads may have been used by both commoners and elite individuals. These changes, if true, would have great ramifications for bead exchange. The whole system would expand and become more active. Coupled with the rise of the *Chingichngish* cult, bead usage would have been jumpstarted and intensified. However, the presence of the Spanish no doubt put a damper on some Native trade activities. Interestingly, Hugo Reid, a Los Angeles Californio, stated in one of his letters that, óTen years ago shell money was current in the Mission, not only between Indians, but between them and the whitesô (Heizer 1968:103). From this statement it can be inferred that both white colonists and the Native population used beads for trade and other transactions. If this has any credence the interaction sphere for trade and exchange in colonial California may have been considerable ï much more complex than previously imagined. Analogous to this is the Wampanoag and Pilgrim relationship with ówampumô (bead money on the

Atlantic Coast). Both the whites and the Native people used wampum as a form of currency early in the colonization of the Plymouth settlement. Prehistorically, wampum was made from porcupine quills, and wampum belts were used as a record of events. Later, during post contact times, wampum was strung with clam shell discs and used as trade money (Herman 1956:21-23; Philbrick 2006:193; Pritzer 2000:438).

Sixty-four glass beads were also recovered. Of these 21 are green, 17 are white and 10 are blue. Most of the beads are of the cane bead variety and all are commonly found at historic period sites in southern California.

San Gabriel Mission was well known historically to have been at the hub of trade and commerce. At least two major trails crossed near the mission and one of the routes was the famous Maricopa trail (see Figure 4-4). Colorado River people frequently visited the mission for trading purposes (Johnston 1980:88-90). It is likely that the transactions taking place here were facilitated by H series and glass beads (McCawley 1996). While the range of bead types found at this site is rather constrained, some types seen in the other collections are also present here at this site. Lipped, saucer, and spire-lopped beads frequently appear at other historic sites (in general). Abalone (*Haliotis sp.)* discs, as seen in this collection, are also common components in these historic assemblages. On the other hand, the shell tube and stone beads are rather unusual for such a relatively small sample. These beads do occasionally appear at historic sites but are rare. Stone beads in general decrease in frequency over time, being most popular during the middle period (1200 B.C. to A.D. 1100). Their decrease may be explained by the corresponding increase in similar types of ornaments, such as wall discs (King 1990; Gibson 1994).

Bead exchange at Mission San Gabriel may have also been influenced by the *Chingichngish* religion which had its roots in the Gabrielino (Tongva) territory (Figure 4-5). According to Lepowski (2004: 18-20) the revolt of 1785 at the mission may have been triggered by the divinatory visions of a possible cult leader, Toypurina (see discussion above), who morphed the religion from a peaceful underground movement to one bent on violent overthrow of the oppressive Spanish overlords. Apparently one of the instigators, Nicolas José, was (according to depositions taken after the upraising) angered by the padres forbidding their ódances and pagan abusesö. As stated by Lepowski:

> Because honoring Chinigchinich, supplicating him for health and prosperity, meant long nights of dancing in the style sacred to him, the anger of the Tongva at having their dances prohibited, and the opposition of the Franciscans, may become clearer (2004: 18).

Were Toypurina and Nicolas José key figures in the spread of the new religion? Given the proximity to the source of the religion and the time period (the peak of the new cult), it is very likely they were. Constance DuBois (1908:123) in 1906 calculated from oral histories taken from elderly Luiseños that the *Chingichngish* cult reached them 120 years earlier, putting the contact date for this movement at or about 1786. This date, just one year after the uprising, seems right *a priori,* as it would have taken at least that amount of time to reach the Luisenos who lived approximately 100 miles south of the Tongva. It is likely then that the movement was present and active before, during, and after the 1785 uprising, and that beads such as Class H seen in this collection were freely exchanged during ceremonial events involving special costumes and dancing celebrating the diety *Chingichngish* (see Kroeber 1925:660; Boscana 1978:30, 57-60).

Site RIV-7882 (*Palsetahaut*)

This large ethnohistoric Cahuilla village (*Palsetahaut)* is located adjacent to and south of the Whitewater River near the desert town of Indio (Chapter 4, Figure 4-4). The site was recently professionally excavated and was found to contain a light to moderate cultural deposit consisting of beads, lithic artifacts, historic artifacts, ceramics, and groundstone artifacts (Alexandrowicz 2006). Of particular interest, the site contained three animal burials, one dog (*Canis familiaris*) and the other two, coyote (*Canis latrans* ï Figure 6-5). One of the Coyote features contained over 2200 artifacts within the burial matrix. Of these, over 2000 were shell and glass trade beads (Alexandrowicz 2006). This feature has obvious ceremonial and ritual significance and may either be associated with the Cahuilla moiety system or the historic revivalist *Chingichngish* cult.

Excavation at the site was judgmental and guided by surficial artifact concentrations. Numerous 1 x 1 meter excavation units were dug throughout the site. Depth was for the most part by stratigraphic level and all features encountered were recovered as a single unit. All soil was passed through 1/8 inch wire mesh and all artifacts were bagged and labeled. Overall provenience for recovered artifacts was very good and given the fairly intact nature of the site, the reliability of findings is also excellent. A small but significant sample (>2%) was recovered from the site, specifically in regard to the targeted artifact concentrations (Alexandrowicz 2006).

Again because of time constraints (the collection was only available to me for two days), I was forced to merely sample the bead assemblage. Using random sampling techniques, I sampled approximately 9% of Feature 4 (which contained the widest range of bead types). I am confident that the beads analyzed are representative of the entire collection. Based on Tables 6-8 and 6-9, it is patently obvious that the Class H beads once again dominate the collection. Well over half the beads are of this class. Of particular interest is the especially high amount of H3 beads, which were made and traded during post Mission Period times. These beads are larger and cruder than their predecessors (H2, etc) and are not that common at Cahuilla and Kumeyaay sites. Mean diameters of the H series beads are larger and somewhat atypical in relation to the other study collections (Table 6-8 and Table 6-9). There are at least two other sites in the Cahuilla territory that exhibit large mean diameter. I interpret this synonymy as owing to concurrent introduction of these relatively large bead types at roughly the same time period (i.e. post-Mission Period, >AD 1834). The glass beads found at this site also suggest a late date. According to Gibson (1976) and others (Brott 1962; King 1990) ovoid and spheroid glass trade beads were introduced by the Spanish rather late during colonial times. The remaining beads (B5, E1a, E1b, E2, K1) in the assemblage are also somewhat chronologically comparable (historic period), although K1, or cupped bead, normally occurs during the late prehistoric but persists into historic times. Overall, the material culture at this site suggests major occupation during protohistoric and historic times. The most remarkable finds at this site are without a doubt the intact animal burials (Figure 6-5). While Feature 3 (dog burial) may indeed be a relatively recent interment, the second (Feature 4) and third animal burials (Feature 5) are certainly indigenous. Over 2200 artifacts were recovered from Feature 4, and approximately 1590 artifacts (of which 99.9% were glass trade beads) were found in Feature 5.

Figure 6-5: Ceremonial coyote burial from RIV-7882 (from Alexandrovicz 2006)

Table 6-8
Bead Sample from RIV-7882

Bead Type	Number	Percent
Glass (ovoid)	9	4.5%
Glass (spheroid)	3	1.5%
Glass (cane)	12	5.9%
B5 (spire)	12	5.9%
E1a (round thin lipped)	19	9.5%
E1b (oval thin lipped)	12	5.9%
E2b (deep lipped)	6	3.0%
H1a (ground disc)	1	0.4%
H1b (semi-ground disc)	13	6.5%
H2 (rough disc)	49	24.3%
H3 (chipped disc)	65	32.2%
K1 (cupped)	1	0.4%
Total	202	100%

Table 6-9
Metric Indices for Class H Beads
From RIV-7882

Bead Type	Mean Bead Diameter	Standard Deviation (ů)	Thickness ($\bar{x}$)	Hole Size ($\bar{x}$)
H1b	7.05	0.83	1.05	1.35
H2	7.36	0.88	1.07	1.32
H3	7.26	0.70	1.05	1.29
H1b, H2,H3	7.26	0.78	1.06	1.30

Most of the recovered artifacts were strung glass and shell beads. Both features were identified within a high artifact density area, containing a clay lined floor (Feature 1) and multitudinous surface artifacts surrounding the feature. Both burials appear to be coyote (*Canis latrans*). However, positive identification was not affirmed and it is still possible that these are dog burials. As remarked by some investigators, coyote and domestic dogs can be difficult to distinguish due to strong anatomical similarity between the two species and because in Native societies dogs and coyotes often interbred (Heizer and Hewes 1940; Langenwalther 2005; Vellanoweth et al 2008). While ceremonial animal burials are not extremely uncommon in California, they tend to be rare in southern California (Langenwalther 2005:32). There is strong evidence of animal ceremonialism (i.e. with *Toshwaat* stones as burial offerings) on both San Nicholas and San Clemente Islands and both areas may have participated in the *Chingichngish* religion, a toloache (*Datura metaloides)* derived cult. The occurrence of certain paraphernalia and animal internments suggests some unifying belief system. The presence of *Toshwaat* stones at many recognized ceremonial sites on the island, as well as on the mainland lends some credence to these features being tied to *Chingichngish.* These stones were sacred to Native practitioners and were evidently incorporated in the new religion which seemed to arise soon after Spanish contact. The stones are iron concretions and often take lenticular or globular shapes. Fr.Geronimo Boscana was likely the first to mention them in his tome on *Chingichngish*. He states:

> An invisible and all powerful being called *Nocuma* made the world, the sea, and all that is therein contained, such as animals, trees, plants, and fishes. In its form it was spherical, and rested upon his hands. But, being continually in motion, he resolved to secure the world by placing in its center a black rock call *Tosaut*. The Indians sayé the fragments which they collect serve as trowels with which to smooth their mud walls (1978: 31).

These stones have been found throughout southern California and their distribution may relate to the rapid diffusing of the cult during the late Historic Period (McCawley 1996:98; Vellanoweth et al 2008; DuBois 1908; Pritzker 2000:130). While some ritual or ceremonial items have been identified at RIV-7882, no *Toshwaat* stones have been located. This in fact is a little surprising since a source for these stones occurs only a few miles southeast of the site. Reputedly, iron concretions occur naturally in Loop Wash, just ten miles east of the SDI-106. Quite possibly it is a question of misidentification ï if you are not looking for them, you do not see them. As Mark Raab has recently said in regard to archaeologists inability to identify cult objects, óthere was no archaeological ñsearch imageò for recognizing *Chingichngish* ceremonialismô (Raab et al 2009:209). There are examples of these stones in curatorial storage at the SDMM (located within their desert aspect section) and these may have indeed come from SDI-106. Other possible ceremonial objects (found at RIV-7882 and SDI-106) include amber, clay figurines, and quartz and tourmaline crystals. Tourmaline in fact may have had special significance since:

> Tourmaline was used to cure a man punished by Chungichnish (sic.). It was rubbed on his body. But if anyone unauthorized touched it, he was punished (Du Bois 1908:134).

Tourmaline is not a local mineral and is sourced several miles west of the site in the Volcan Mountains (Brown et al 1972).

In any case, the placement of these beads in animalôs graves has strong ideological and socio-religious implications, and it is possible that these burials were connected with the *Chingichngish* cult. The reason behind the coyote burials is problematic and the manner in which they were integrated in the cultôs protocol is unknown. However, Coyote does play an important role in the creation of *Chingichngish* (Sandoz 2004:29) and these burials may venerate the mythological underpinnings of the cult. Alternatively, the coyote burials may relate to the Cahuilla moiety system (Coyote and Wildcat groups), but the extreme rarity of such burials within the Cahuilla Territory argues against this. If they were related to the moiety system, it would be expected that such burials would be found both in prehistoric and historic contexts and there would be many more instances of this type of burial. Furthermore, the similarity (not cremated, containing grave goods, flexed position, etc.) with dog burials found on San Clemente Island is striking (Hale and Salls 2000), and again suggests parallels between the two areas.

Feature 1, the clay-lined floor, may represent a dance enclosure (cf. *Yobar*) associated with the all important dances prescribed by *Chingichngish.* Abundant *Datura* sp. seeds (toloache) found at this feature and at other features on the site further support the interpretation that this site was a participant in the new religion. As stated above *Datura* was used in the *Chingichngish* cult as an intoxicant, especially in the initiation of adolescents to adulthood (Bean and Vane 1978).

The astonishing quantity of historic beads and ceremonial features within the site suggests very strong cult activity at this ethnohistoric village of *Palsetahaut*. Its location places it within a major transportation corridor that includes the well known Halcidoma Trail (see Chapter 5, Figure 5-1). Being strategically located on the trail increases the probability that it played an active role in the spread and establishment of the *Chingichngish* cult in the Cahuilla territory.

Figure 6-6: Class H beads from coyote burial at RIV-7882.

Site SDI-106 (*Amat Inuk*)

This impressive village site is located in Mason Valley within the Anza Borrego Desert State Park (6-7). It is likely one of the largest (if not the largest) historic Kumeyaay sites in San Diego County (Rogers 1928). Areal extent of the site may exceed 200 acres (Figure 6-7). However, due to the lack of thorough archaeological survey and investigation, the exact size of the site is unknown. Current data suggests the site is primarily located within the confluence of Vallecito Creek and its attendant tributaries. Site dimensions appear to extend 1200 meters east/west and 600 meters north/south (Figure 6-7). The Spanish soldier/explorer Pedro Fages in 1782 encountered this village while searching for an overland route connecting the interior desert region with the mission in San Diego. Passing over a steep grade (now known as Campbell Grade) the expeditionary force encountered óé a very large village of Camillares Indians, who climbed up a hill as we were passing, and came down to talk to the soldiers who were coming behind with the horsesô (Priestly 1913). Based on these observations we know that the village (called *Net Nook* and/or *Amat Inuk*) was inhabited at least during late protohistoric/historic times and likely occupied until 1850, when a smallpox epidemic wiped out the entire village (Rogers 1928). Archaeologically, the village site has experienced repeated investigations ranging from the amateur to the professional. Probably the most notable fieldwork was completed by Malcolm Rogers in 1928. In an effort to save the cemetery from repeated pilfering, Rogers, the curator of anthropology at the Museum of Man in San Diego, excavated approximately 35 cremations. Associated with the burials were numerous artifacts of which shell and glass beads were the most common artifact class. Other artifacts recovered included historic items (metal knives, horse bridles, metal buttons etc.), flaked stone artifacts, and pottery. Rogers found the cemetery was sharply circumscribed and was approximately a meter and half deep. House depressions and other features were also observed during the excavations. Documented by Rogers but not excavated by him were an additional 30 or so burials that had been excavated by various individuals prior to his 1928 investigation. Later studies have included areal surveys conducted by cultural resource firms and the Anza Borrego State Park. The most recent of these was a State Parks investigation that identified multitudinous artifacts on the surface and numerous bedrock milling features on and directly adjacent to the site (Thompson et al 2007).

At the time of the analysis this collection as well as others possessing cultural patrimony were being assessed for repatriation. Access to the SDI-106 collection at SDMM was granted me but only with the understanding that time was of the essence and no more than a week or so could be allotted for the examination of the beads. Since there were more than 8000 beads in the collection, only a relatively small sample of the beads could be analyzed. As with some of the other collections used in this study, a technique was worked out where large quantities of beads where separated in equal amounts, assigned numbers and sampled using a random numbers table. Based on very similar results from a previous independent study (Zepeda 1999), the likelihood of the sample being representative is good.

Notwithstanding the time limitations, it was also possible to examine a large separate collection of approximately 400 glass beads from the site. These came from Cremation 48 and it was fortuitous that I was allowed access to them. A large portion of these beads were analyzed (å100%).

Table 6-10
Bead Sample from SDI-106

Bead Type	Number	Percent
B3 (barrel)	3	0.6%
E1b (deep lipped)	5	1.0%
E3c (large lipped)	13	2.7%
H1a (ground disc)	40	8.2%
H1b (semi-ground disc)	14	2.8%
H2 (rough disc)	2	0.4%
H3 (chipped disc)	2	0.4%
Glass (various types)	404	83.6%
Total	483	100%

Table 6-11
Metric Indices for Class H Beads
From SDI-106

Bead Type	Mean Bead Diameter	Standard Deviation (ů)	Thickness ($\bar{x}$)	Hole Size ($\bar{x}$)
H1a	6.24	0.28	1.24	1.55
H1b	6.26	0.51	1.15	1.42
H2	6.66	0.35	1.12	1.34
H3	5.8	0.35	1.10	1.35
H1b, H2,H3	6.34	0.47	1.17	1.43

As indicated on Tables 6-10 and 6-11, the dominant shell bead class at SDI-106 is the H series. Clearly these beads were extremely popular during the Historic Period. They tend to dominate the collection at all the study sites. Possibly due to their purported function as a type of currency, these beads were sought after by Native Americans. Although they were not always as finished looking as antecedent bead types, they appeared to retain residual value among Native groups. Not until the influx of glass beads did these beads lose their value (see Chapter 4). The mean diameter of these beads suggests affinity with SCLI-1437 (Table 6-5 and Table 6-11). Again, the source for wall beads (i.e. H series) was the Channel area, and the beads recovered from SDI-106 and SCLI-1437 most likely originated from this region. Given the overwhelming presence of H1A, H1B, and H2 beads, it is probable that the site was primarily occupied between AD 1170 and 1834, However, the presence of larger bead types (H3) in the collection suggests that beads from the Channel were still reaching the western Colorado Desert during post-mission times. Also of interest is the wide assortment of glass bead types in the assemblage. Table 6-12 shows that blue cane beads dominate within this category. Red beads are the second most frequent color. Blue cane beads, especially cobalt blue beads are the most common types of glass bead found in southern California (King 1990:19). Red is the second most common. According to King, this pattern may have something to do with the cost of producing them, both blue and red beads were the cheapest to produce and thus the most available for distribution to Native groups. Whether cultural factors (i.e. color preferences) played a part is conjectural. It is known that the Kumeyaay depicted the cardinal direction north, as red and south as blue in sand paintings (Waterman 1910; Haekel 2005:44). Certainly colors would matter to the Kumeyaay. All humans appear to have assigned special significance for certain colors. Red, the most recognized and named color worldwide, may have been universally important to all humankind (Berlin and Kay 1969; Deutscher 2010) and blue appears to be important throughout to indigenous people around the world (Stine et al 1996; Lapham 2005).

The glass bead sample also contained large faceted and millefiori types. These beads were traded during the late Historic Period (Gibson 1994; King 1990; Orchard 1975). A *terminus post quem* date for these bead types is approximately 1850, which is the purported date of abandonment of the village due to a smallpox epidemic (Rogers 1928). The remaining bead types in the collection are the E series and as we have seen these beads are often found associated with the types of beads in this collection. The B3 bead is non-diagnostic and can occur anytime between Early Period to protohistoric times (Bennyhoff and Hughes 1987:122).

Table 6-12
SDI-106
Glass Cane Bead Sample (by color)

Color	Number	Percent
Black	41	13.8%
Cobalt Blue	70	23.5%
Copper Blue	83	27.9%
Green	33	11.1%
Red	52	17.4%
White	19	6.3%
Total	298	100%

Like all the sites in this study, SDI-106 occurs adjacent to a major transportation corridor (i.e. Fages Trail ï see Figure 5-1) and possibly played a significant role in the *Chingichngish* movement. The large number of Class H beads found here (over 7000) is unprecedented for the area, either prehistorically or historically (Zepeda 1999; Gamble and Zepeda 2002) and the sudden appearance of great amounts of these artifacts in a relatively short period of time persuasively suggests something exceptional happening with rapidity. The introduction and spread of a revitalization movement that utilized beads for ceremonial exchange would go far in explaining the punctuated appearance of large amount of these artifacts. Other archaeological evidence for this occurrence is thin but provocative. Exotic items such as tourmaline crystals (and possibly *toshwaat* stones) were found on the surface throughout the site (during an informal site survey conducted by the author), and these may indicate ritual activity related to the cult. A very rare owl effigy (measuring 17.5 x 13.5 x 1.5 cm) was also found at the site which was made from steatite (Musser 1980:262). The owl in many southern California cultures was related to shamanism and curing ceremonies (Hudson 1978:265; Musser 1980:262). The owl was also related to the *Chingichngish* religion and its feathers were used in a dance song for the cult (Strong 1987:322). The owl, one of the sacred animals of *Chingichngish,* is represented within the *Yobar* (Figure 6-2) and in sand paintings (Lepowski 2004:16). Interestingly, a very similar effigy was found on San Clemente Island, which is known as a ritual center for the cult (Kroeber 1925:622). Although the material is different ï the San Clemente Island effigy (measuring 20.5 x 14.8 x 10.5 cm) is made from vesicular basalt ï the morphological similarity is strikingly similar. As previously mentioned, the island was known as a place of healers. J. P. Harrington (n.d.) recorded early last century that a Kitanemuk informant stated that, óOn that island (San Clemente) lived hechicheros (bewitchers, wizards). All the people were hechicheros. That was what the old people told Magdalena.ô These shamans that are referred to in this passage may in fact represent an elite ritual caste called the *puplem.* Supposedly, it was *Chingichngish* who created the *puplem,* and it was to this high ranking class that he entrusted the secrets of the cult (Lepowski 2004:16). The *puplem* were not only healers, but they were also holders of the esoteric knowledge that was instrumental in putting on initiation rites, mourning ceremonies, and other rituals involving the use of the sacred hallucinogen datura (toloache). *Chingichngish* also relied upon the *puplem* to ensure that the people observed his precepts. As stated by Lepowski (2004:17), óIt was a stern religion for chaotic and troubling times. The raven, or large crow, was *Chingichngish's* primary messenger and oracle, reporting to *Chingichngish* and his most adept shamans any secret transgressions

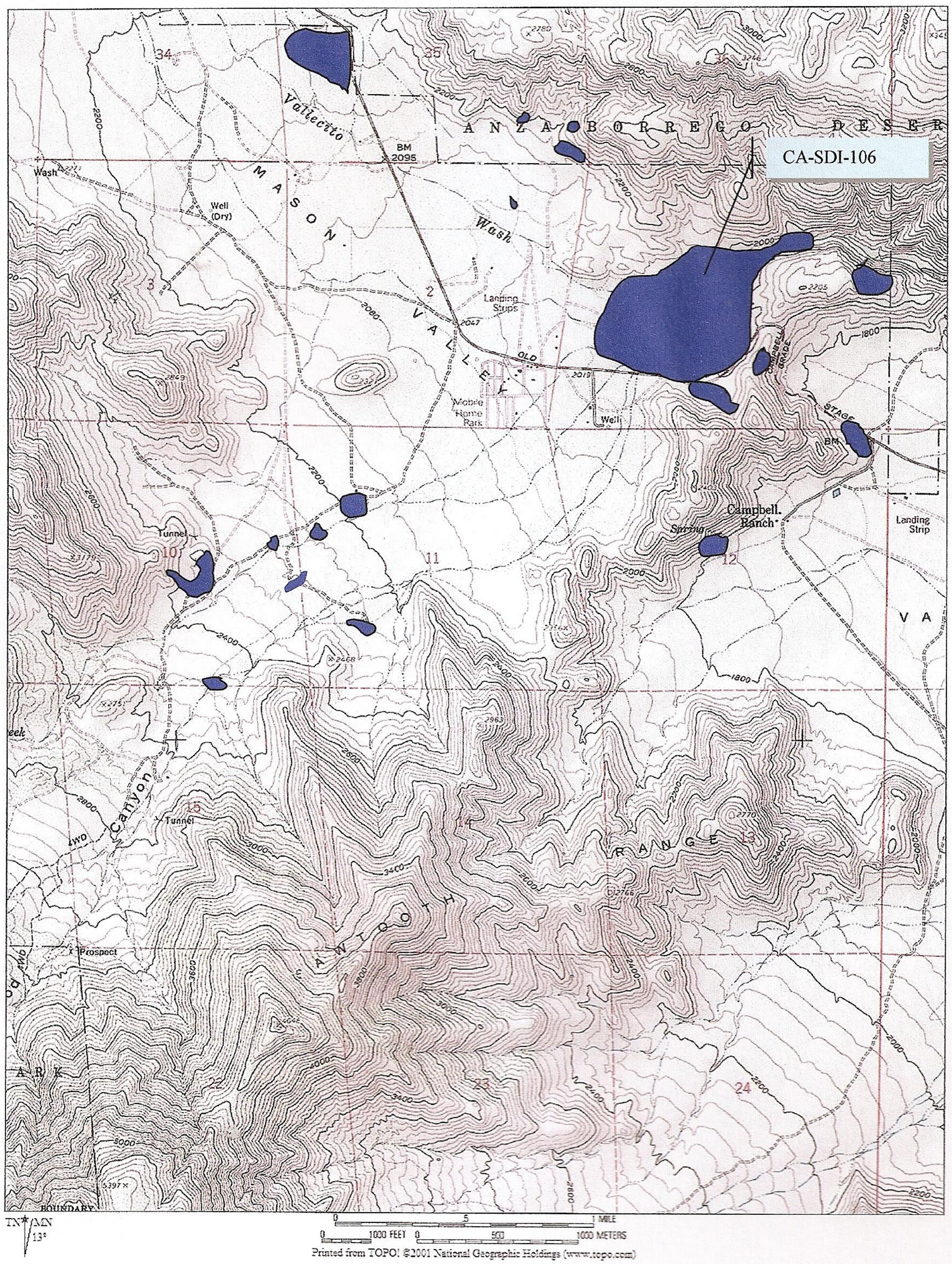

Figure 6-7: SDI-106 and regional site locations (in solid blue).

of his moral code.ô Laws the people were to keep included:

1) Practice the ordained ceremonies.

2) Keep rituals secret.

3) Observe ritual fasting

4) Bathe daily at dawn.

5) The young to eat after the elderly.

6) Eat sparingly.

7) Be kind to strangers.

8) Never whip children.

As part of the new regimen set out, an innovative style of ritualized dancing (i.e. whirling style) was adopted. By dancing, ótheir wants could be relieved. The sick would be cured, and the hungry receive foodô (Boscana 1978:34). The new style of dancing was described as óé full of gestures and violent motionsô (Dubois 1908:75). Talismans also played a role in these ceremonies. Objects such as effigies, *toshwaat* stones, black tourmaline, quartz crystals, amethyst crystals, and kaolin clay were all sacred to *Chingichngish* and were often used for curing rites and rituals to appease the God when infractions were incurred (Harrington 1978:133-135).

Beyond the siteõs involvement with the cult, exotic artifacts such as obsidian flakes and tools, and a plethora of ceramic types (Table 6-14) indicate that an intense exchange system was once active here. The very fact that the site occurs within an ecotonal area that has cultural and ecological implications further corroborates its unique position within the Kumeyaay and Cahuilla interaction sphere and the colonial settlements to the west. The frequent occurrence of historic artifacts in the material residue argues for some form of contact with the Spanish regime. Moreover, as some researchers have proposed, European goods in burials may represent a form of status display (Wesson 2001:103). With burial goods seen at SDI-106 this very well could have been the case. But as pointed out by Stephen Silliman material objects are constituents of practice and in some cases European artifacts can be incorporated by the Native culture, in effect becoming simply Native objects (2009:216). Silliman (2009:216) uses a case study from Australia to illustrate his point:

> Studies in Australia have underscored our need to rethink artifact categorization in the context of social memory. Coupling archaeological studies with oral histories and collaboration with Indigenous Australians produced the startling revelation that Aboriginal people consider metal match tins on Aboriginal sites to be Aboriginal artifacts.

Also present in the historic artifact inventory were horse tack (spurs, bridles, etc.). This suggests that horses were either traded for or possibly stolen. In one study dealing with horse herds at the missions, it was found that there was a positive correlation between Native activity in the area and a significant drop in horse numbers for Mission San Diego (Jackson and Castillo 1995:24). Could this mean that the Kumeyaay raided horses? Certainly other California groups did. It is well known that the Yokuts of the southern Central Valley frequently raided horse herds for trading and for meat (Arkush 1993:627). It is possible that the same thing occurred in San Diego County. The only firm historical statement that documents horse raiding by the Indians in San Diego is from Engelhardt (1920:185), ôHorse-stealing developed early. The culprits were not unceremoniously hangedé but the punishment inflicted produced a lasting effect on the individualö.

Site SDI-901 (*Pisclim*)

Like the previous site, SDI-901 is a large historic Kumeyaay village (Mealy 2004) located within the interior region of San Diego County (Figure 6-8). However, unlike the Mason Valley site, SDI-901 is located in the upper montane region of the Cuyamaca Mountains and is an entirely different biotic zone. Instead of mesquite, cholla, and brittlebush, this mountainous site is surrounded by conifers, ferns, and scrub oak. Situated adjacent to the current Highway 79, the site covers an extensive area directly south of present day Paso Picacho Campground (Figure 6-8). Currently the site is covered by thick vegetation and little can be seen on the surface (as witnessed by the author in 2004). Nevertheless, extensive bedrock milling features are clearly visible at various locations within the site. Recorded originally by D. E. True in 1961, the site was described at that time as a őé é .village ï midden deposit. Bedrock exposure with mortarsȏ True felt that the site was the ethnohistoric village of *Pisclim*.

Several hundred beads were recovered at this site by Malcolm Rogers in the 1930s. The site was subsequently rerecorded by California State Parks personnel in 2004 after a wildfire burn over in 2003. From an intensive survey conducted over the recently burned area many new features and artifacts were located. The investigation confirmed the presence of a large village containing a fairly dense midden with associated milling features (Mealey et al 2004).

Due to time constraints, I could only sample a portion of this very large bead collection. As depicted in Table 6-13, nearly 200 beads were examined. Although a few glass trade beads were present (<50), only shell beads were analyzed. Clearly, Class H beads dominate the collection with H1b types being the most numerous (Tables 6-13 and 6-15). These beads are thought to have been made during the Late Mission Period (1810-1816) and are partially ground ornaments that have needle drilled holes (å1.0 mm) (Milliken and Schwitalla 2012; Bennyhoff and Hughes 1987). Their conspicuous presence at this site implies a somewhat earlier occupation than SDI-106. The co-occurrence of K and J beads further supports this impression ï that is, these bead types were usually made during the late Prehistoric Period (Bennyhoff and Hughes 1987; King 1990). As with other collections described here, these beads likely were produced in the Channel region and then exchanged south to the Cahuilla and Kumeyaay. This village was also near or adjacent to a major communication corridor (see Figure 5-1) and likely participated in a complex network involving areas to the east and north. It is likely that the *Chingichngish* cult and its prophets used these corridors to spread the new religion to the mountain sites in this region. It is also probable that down the line trading as well as specialized exchange occurred between sites. The fact that fewer beads and other cultural material (Tables 6-13, 6-14, and 6-15) were encountered at this site argues for a possible fall-off (or decay rate) as seen in Renfrewôs down the line model ï given that the directionality of trade flows from east to west in this southern part of the network (1977).

Table 6-13
Bead Sample from SDI-901

Bead Type	Number	Percent
H1a (ground disc)	39	21.1%
H1b (semi-ground disc)	133	71.9%
H2 (rough disc)	5	2.7%
J (wall disc)	5	2.7%
K1 (cupped)	2	1.1%
K3 (cylinder)	1	0.5%
Total	185	100%

Table 6-14
SDI-106 and SDI-901
Partial Cremation Inventory
Associated Grave Goods – Material Culture

Cremation Number	SDI-106	SDI-901
1	3 arrow points, *Olivella* beads, Pinon Brown vessel	Rimless bowl, urn, small olla, shell and glass beads, small cook pot.
2	1 Spanish spur, bronze bridle trappings, 1 steel kife.	Metate marker, 1 Desert Ware canteen, 1 Mountain Ware jug, 1 small bowl, 1 Desert Ware bowl, 1 small deep Mountain Ware bowl.
3	*Olivella* beads, blue glass trade beads, big shell beads.	Sherds, Cardium shell, cook pot.
4	Willow cradle, 2 miniature paint jars, abalone pendant, wild plum and screw bean seeds, necklace of Myriopoda carapaces strung on 2-strand milkweed string, 2 Carrizo Buff II tenajas, 1 Carrizo Buff II bowl.	2 arrow points, 1 Olivella bead, 1 broken pestle.
5	*Olivella* beads, bowl, large storage jar, 1 arrowpoint.	-----
6	*Olivella* beads, 2 Pinon Brown cook pots.	Large bowl, small jug, 2 crude points.
7	Pinon Brown sherds, cobble hearth, house post, 1 mano, ½ mano.	Metate marker, urn, crude pestle, small necked olla.
8	------	Metate.
9	Granite metate, cook pot, Pinon Brown bowl, Pinon Brown canteen, abalone shell, clay billet.	Cardium shell, 1arrow point.
10	Many metate fragments, 2 sacrificed mortars, 1 Pinon Brown cook pot, 1 Carrizo Buff II bowl, 2 arrow points, 1 pipe.	9 sherds, glazed china fragment, 1 quartz flake.
11	Pinon Brown cook pot, 1 serrated obsidian arrow point, *Olivella* biplicata beads, 2-ply cord.	1 arrow point, glass beads.
12	Pinon Brown canteen.	Broken deer ulna.
13	2 Santenac Brown bowls, Santenac Brown storage olla and sherd cover.	Shell gorget, *Olivella* beads.
14	Pinon Brown scoop with a Cardium elatum shell cover.	Cardium cover, small pottery cup, *Olivella* beads, 1 arrow point.
15	Stone pottery anvil, 1 bone scapula pendant, 2 abalone pendants, 1 pottery pendant, 1 Buff II canteen, Cardium shell cover, 3 glass beads.	Mano, whole metate, 1 chunk of hematite.
16	Pinon Brown bowl, 1 large glass bead, 2 unfired but tempered clay billet., Pinon Brown water olla.	Two quartz arrow points.
17	2 Santenac Brown cook pots.	7 arrow points, 1 sherd pendant, antler flaker, 1 scraper, 1 hammerstone, 1 storage pot.
18	1 mortuary urn, 1 Pinon Brown bowl.	Sherd pendant.
19	1 Pinon Brown cook pot.	Glass and *Olivella* beads.
20	Pinon Brown bowl.	1 knife, 1 arrow point.
21	2 brown cookpots, 1 brass Army button, 4 bean clam beads, 2 abalone pendants, 1 iron knife, 1 limonite paint stone, *Olivella* beads, melted copper	Glass beads, 2 arrow straighteners, 2 clay balls, 2 arrow points.
22	------	1 arrow point.
23	Sacrificed Pinon Brown bowl.	-----
24	2 chunks of raw clay, 1 bowl and 1 cook pot, broken, 1 Cardium elatum pendant.	-----
25	1 Spanish crockery pendant.	-----
26	*Olivella* beads, 1 chalcedony side-notched arrow point, 1 rhyolite side-notched arrow point.	-----
27	2 brown cookpots, 1 brass Army button, 4 bean clam beads, 2 abalone pendants, 1 iron knife, 1 limonite paint stone, *Olivella* beads, melted copper	-----

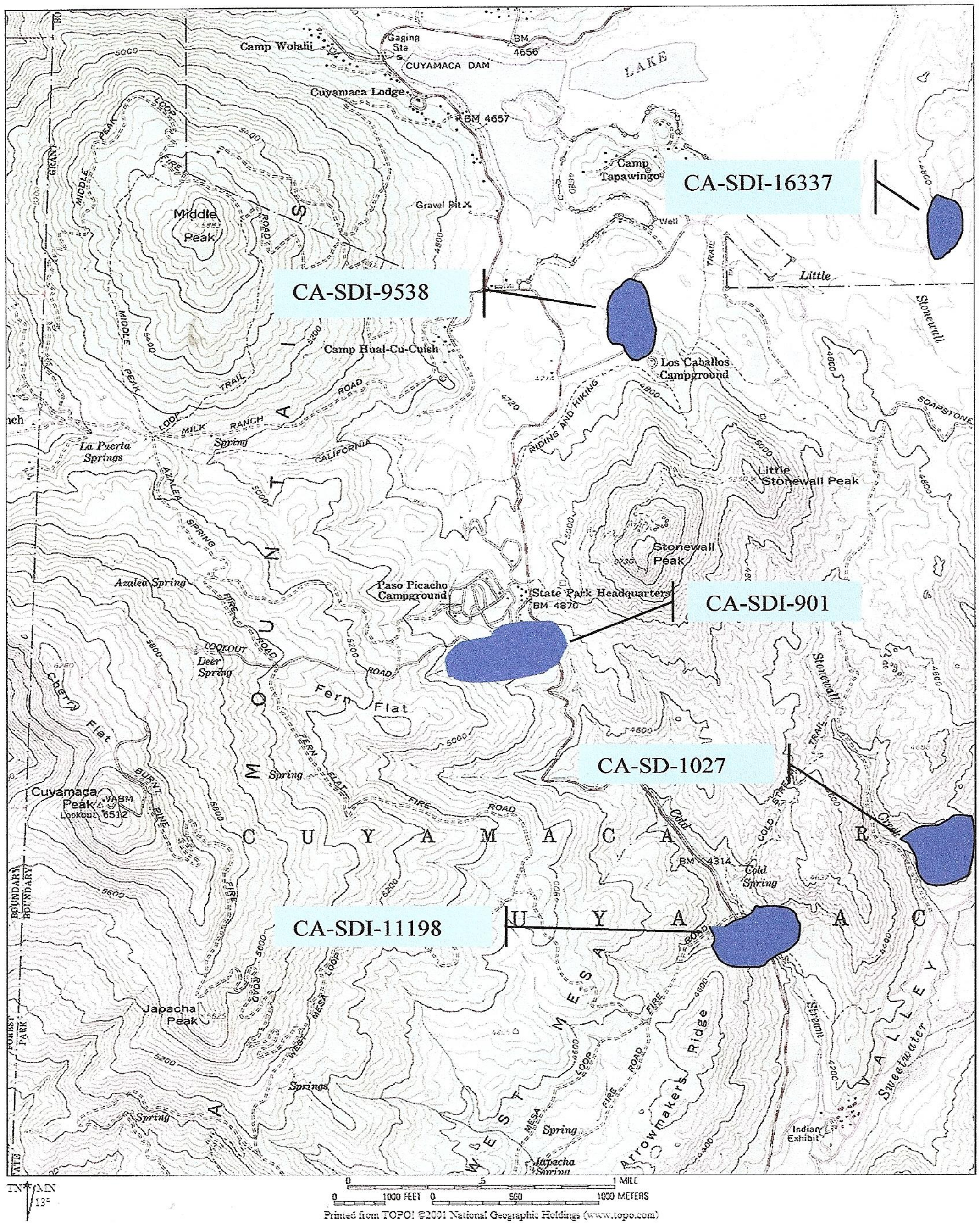

Figure 6-8: SDI-901 and regional site locations (in solid blue).

Table 6-15
Metric Indices for Class H Beads
From SDI-901

Bead Type	Mean Bead Diameter	Standard Deviation (ů)	Thickness ($\bar{x}$)	Hole Size ($\bar{x}$)
H1a	5.35	0.45	1.09	0.89
H1b	5.35	0.46	1.09	0.88
H2	5.69	0.66	1.20	0.90
H1b, H2,H3	5.35	0.47	1.09	0.89

Site VEN-1222H

This site is discussed in detail in the first part of this chapter. However, to recapitulate, the site comprises the Mission San Buenaventura compound and various associated Native midden deposits. One of these loci was irrefutably the large neophyte village (VEN-1222H) located directly south of the mission (see Chapter 4, Figure 4-3). It is from here that large amounts of midden-associated beads were found during a recent excavation and later analyzed by me. The analysis did not entail the entire collection, but a sizable sample ï over 20% was analyzed. The results are summarized in Table 6-16. The mission is the purported source for most of the beads represented on this table. Most certainly the Class H beads dominate the collection (Figure 3-7 and Tables 6-16 and 6-17) and likely were made at the mission (or within the neophyte village). These beads are historic types and date from AD 1770 to 1900. they may have been traded or transported to the inland areas located east and south of the mission. The other bead types might have also been traded out, but given their earlier temporal affiliation (i.e. pre-Columbian beads) they were likely personal ornaments, heirloomed by individuals or households. The five shell tube beads were undoubtedly worn as ornaments. Candelaria Valenzuela, an early Chumash informant, stated that shell tubes were used in necklaces and worn by women (Gibson 1976:95). *Haliotis* discs (*n*=21) were also strung in necklaces and were likely purely for ornamental use. Lipped beads, on the other hand, may have been used as a medium of exchange. The ethnographer, Duncan Strong mentions that the Cahuilla had two forms of shell money, ósmall onesô and ólarge shell moneyô (Strong 1929:96). Could these large money beads be the lipped beads which persist into the Historic Period and are frequently found at Cahuilla sites? Since the predecessor of the lipped bead is the cupped, a known money bead (King 1990:157-160), it is not difficult to interpret these larger and sometimes cruder beads as a continuation of the earlier version. The J beads found at the site suggest that there was some carryover from an earlier period. These J beads were probably made on the Channel Islands.

Table 6-16
Bead Sample from VEN-1222H

Bead Type	**Number**	**Percent**
A1 (spire-lopped)	2	0.4%
AV3 (shell tube)	1	0.3%
B2 (shell tube)	2	0.5%
E1a (round thin lipped)	51	12.8%
E2a (full lipped)	7	1.7%
E2b (deep lipped)	1	0.3%
Glass (cane)	17	4.3%
Glass (wire wound)	1	0.3%
H1a (ground disc)	41	10.3%
H1b (semi-ground)	63	15.8%
H2 (rough disc)	127	31.9%
H3 (chipped disc)	51	12.8%
J (wall disc)	9	2.3%
Kl (*Haliotis* disc)	21	5.3%
Bead Blank	4	1.0%
Total	398	100%

Table 6-17
Metric Indices for Class H Beads
from VEN-1222H

Bead Type	Mean Bead Diameter	Standard Deviation (ů)	Thickness($\bar{x}$)	Hole Size($\bar{x}$)
H1a	5.85	0.99	0.99	1.21
H1b	5.92	0.58	0.99	1.26
H2	6.09	0.79	1.00	1.25
H3	6.3	1.26	1.09	1.28
H1b, H2,H3	6.04	0.89	1.01	1.25

While the glass bead sample was low, there is some agreement ï percentage wise ï between the San Buenaventura site and SD-106 in San Diego County. At both sites, blue beads far outnumber the other colors, and proportionately green and red appear about the same (Table 6-18).

Besides a dog burial found in the north section of the site, there is little evidence that the *Chingichngish* cult was present at the mission. The burial does contain a few beads and is slightly flexed as seen at dog and fox burials on San Clemente Island. It could very well be an indicator of cult activity at this site. Certainly the numerous beads in the midden and the presence of bead blanks and beads in production suggest the rapid manufacture of Class H beads which may have been a facilitator for the new religion. They may have been produced to supply cult members with beads for ceremonial and ritualized activities (see Strong 1987:94-96).

While VEN-1222H was for the most part occupied by the Chumash, it is likely that this northern group also participated in the *Chingichngish* cult. According to Campbell Grant (1978:513), the condor dance of the Chumash was probably related to the *panes* (bird burial), one of the prime ceremonies of *Chingichngish.* According to Fr. Boscana, an early observer of Native practices:

> The most celebrated of all their feasts, which was observed yearly, was the one they called the *panes*. The Indians exhibited a particular adoration for a bird resembling much in appearance the common buzzard or vulture but of larger dimensionsé These ceremonies concluded , they seized upon the bird and carried it to the *vanquech*, or temple, all assembling in united display ï the *puplem* preceding the procession, dancing and singing. Arriving at the temple they killed the birdé The carcass they interred within the temple. (Boscana 1978).

On San Clemente Island, many bird burials have been found at the Ledge Site. These burials contain red tailed hawks and may relate to the *panes* ceremony described above (Salls and Hardy 1990). All burials were found within a large feature which may represent a *yobar* (or *vanquech* ï see above). This ritual, often held in conjunction with the mourning ceremony, may relate to the traditional Eagle Killing Rite (McCawley 1996:165). Sacrificial bird burials have also been recovered from the Lemon Tank Site on San Clemente Island (McCawley 1996:166; Raab et al 2009:204-206) and on San Nicholas Island (York et al 2012). In the latter case bird burials were found dating from the Middle Period (ca. 3000 B.P.) and were (as in the San Clemente features) associated with shell beads and other artifacts (York et al 2012:49-54).

Table 6-18
VEN-1222H
Glass Cane Bead Sample (by color)

Color	Number	Percent
Cobalt Blue	4	23.5%
Copper Blue	7	41.2%
Green	1	5.9%
Red	3	17.6%
Purple	2	11.8%
Total	16	100%

Figure 6-9: Beads from VEN-1222H.

Exchange Patterns

In a recent paper, Hughes and Milliken (2007:259) summarize the current data existing for exchange in California and the Great Basin. It is their opinion that the basic data for trade and exchange, such as point source of origin, deposition context, and dating can be firmly established, but beyond these concerns little firm data exists. How goods and material were transported and what behavioral mechanisms are involved is often at best elusive and not subject to direct quantifiable evidence. Quite possibly this is the case in most studies dealing with material conveyance, but the first step in obtaining an understanding of an exchange network is ordering a set of inferences that tend to fit the data. This is the case in the present study.

The present study strongly supports the Santa Barbara Channel region as the origin for most of the beads seen in the western Colorado Desert. Missions San Buenaventura, Santa Barbara, and Santa Ynez are likely sources for wall beads such as the Class H beads. Other missions may have been additional points of origin (Missions San Fernando, San Gabriel), but no bead production evidence to date has been found at these missions. Bennyhoff and Hughes (1987:135) state that some H type beads were manufactured at Mission Santa Cruz, several hundreds of miles north of the Santa Barbara Channel. What is abundantly evident is that Chumash neophyte bead makers who were relocated from the Channel Islands to the various missions produced these beads and by some mechanism the beads were traded or conveyed southward through the Gabrielino, the Cahuilla and the Kumeyaay. This had little to no precedent. Beads were a rare commodity in the southern interior, and it is likely that the required skill level (see Fernando Libradoôs previous discussion on making *qoy)* for production of these beads was such that manufacturing these artifacts was not easily accomplished outside the Channel area. The time range for this activity was tightly bracketed around the Historic Period. Earlier beads occur in the collections, but by far the most common types are from this period (i.e. historic). There is some ethnographic evidence that trade networks did exist prehistorically between all the ethnic groups dealt with here (Davis 1974; McCawley 1996; Sample; 1950; Strong 1929), but the magnitude was a great deal less. Directionality of trade also changed. Prehistorically, the Kumeyaay mainly traded in a west-east direction (Luomala 1978; Shipek 1982), although some trade occurred with polities north of them (e.g. Luiseno and Cahuilla). After colonization this pattern apparently changed with trade items mainly coming from the east and northwest (e.g. Mission San Buenaventura, Mission Santa Barbara). While it can not be ruled out that trade still continued from west to the east (for instance historic artifacts from Mission San Diego), it appears this exchange network, at least in the Kumeyaay area, was an interior phenomenon.

What is likely is that the *Chingichngish* cult was greatly responsible for the development of an intensified inland trade route during the Historic Period. The cult with its prophesies and teaching was diffused either by the Gabrielino *puplem* or normal trade relations with inland groups. The Ghost Dance, which is somewhat contemporaneous with the *Chingichngish* movement, was primarily spread from its originating area (western Nevada) to the Great Plains by two individuals, Kicking Bear and Short Bull ï both Sioux Indians (Kehoe 2006; Richardson 2010). Kicking Bear and Short Bull traveled hundreds of miles from their reservations to Nevada to hear the teachings of Wovoka. They returned to their homeland to inform their people that the new prophet had óé seen a new era in Indian historyé a world where Indians lived without whites, a land of plenty, a land where the dead lived againô (Richardson 2010:118). In an analogous manner the *Chingichngish* cult may have spread just as rapidly as the Ghost Dance. After all, the Gabrielino (or Tongva) were known for traveling long distances for trade (McCawley 1996), and it is not hard to imagine that the prophets of the new movement traveled to nearby polities to óspread the wordô and teach novitiates the dances and songs of the new religion. As stated previously, these new ceremonies always involved bead exchange. Ethnographically, it is known that during annual mourning ceremonies (*Keruk*) strings of beads were distributed by clan leaders before, during and at the close of the ceremony (Luomala 1978; Strong 1929). Services rendered by hosts of the assemblies were also paid for with beads (Strong 1929: 34).

This spread of beads may not have been continuous. From review of the data it is obvious that there was an ebb and flow in shell and glass beads. At least three major waves of beads entered the Cahuilla and Kumeyaay territories along the many trails (i.e. the Yuma, Halchidoma, Maricopa trails etc.), which interconnected the tribal groups. These time periods are indicated by differing diameters in the H series beads. The rough disc beads within the 5.35 to 5.58 range were the first to appear, 6.3 to 6.46 the next range, and finally 7.26.

As discussed earlier, differing magnitude of exchange over time is not unusual and has been documented in California. The cult may have peaked at different times throughout the Historic Period (see Hughes 1994; Hughes and Milliken 2007). The exact reason for this variance is unknown, although demography and sociopolitical factors may be implicated (Hughes and Milliken 2007:262).

Beads, Cults, and Pathogens

Lightfoot and Simmons (1988) recently proposed that there were several risk factors which increased the incidence of Euro American disease in Alta California (1998). While admitting that exposure to lethal pathogens was relatively rare among the coastal Native populations, they strongly support disease striking during the protohistoric times among certain groups possessing high risk factors. The identified risk factors are:

1) Protected harbors where European voyagers could anchor their craft for long periods of time (longer exposure to potential lethal microorganisms).

2) Existing Native trail systems (aids in the spread of disease along well used transportation corridors.

3) Proximity to centers of disease (obvious consequences in this risk factor)

Those areas within Alta California that would be the most susceptible are the Channel Islands, San Diego Bay, Monterey Bay, and Drakeœs Bay; and those peoples at the highest risk (in southern California) are the Kumeyaay, Serrano, Cahuilla, Mojave, Halchidoma, and Quechan. These people were inextricably linked by broadscale exchange and trade networks that overlapped into areas of disease incidence (northwestern New Spain and Baja California).

Paradise Lost

A great deal of literature is available for this aspect of paleodemographics in the Americas (Dobyns 1983:8-32; Mann 2005:92-93; McNeill 1976:208-241; Preston 2004:184; Ramenofsky 1987:3). Though not always in agreement, many researchers over the past six decades have considered the devastating effects exotic disease had on Native populations. Briefly, these investigators have forwarded the idea that Native Americans, due to their long isolation from the Old World, did not have the necessary antibodies to ward off pathogens introduced by European explorers and settlers which resulted in óvirgin soil epidemicsô. As a consequence, Native American populations were drastically impacted with mortality rates in some cases exceeding 90% (Dobyns 1983:14; Harris 1994:592). Frequently, this pathogenic onslaught preceded the arrival of the Spanish, so when explorers such as De Soto eventually encountered Native groups, villages were already abandoned and Natives were sick. Clearly what the conquistadores saw was not the norm, but an altered version already irreparably reconfigured by disease and devastation. According to all accounts, the first pandemic to hit the New World was in 1518, when smallpox was introduced to Hispaniola by the Spanish (Dobyns 1983:9-16). From the Caribbean the epidemic spread to Mexico via the Narvaez *entrada* (Dobyns 1983:259). It is likely that the pathogen jumped ahead of the Spanish expeditions which were heading for the Valley of Mexico, paving the way for the ultimate conquest of the mighty Aztec empire. Referred to by some investigators as the óshock troops of conquestô, smallpox and other exotic diseases took hold in Mexico and quickly spread to the north and south, devastating populations as it went (Lovell 1992:435). Likely following Native trade routes, diseases such as measles, mumps, typhus, typhoid and influenza spread as far south as the Inca empire and north to Florida, the Northeast, and the Southwest United States (Harris 1994:604). For centuries these trade routes, roads, and travel corridors had formed a complex exchange system that crisscrossed the Americas, facilitating the movement of various goods and materials from one region to another. In northern Mexico and the Southwest United States such items as marine shell, shell beads, salt, obsidian, and other goods were traded either directly or indirectly (Heizer 1978:690-693; Swagerty 1991:474-475). Once the Spanish arrived exotic pathogens were added to this list.

As in Mexico, prehistoric San Diego County had a complicated web of trade routes by which disease most likely spread. Besides the well known trails such as the Yuman, Halchidoma, and the Maricopa trails, there were several other routes that connected the region (Zepeda 1999:19-21). Very likely during the period after Spanish contact, but before settlement (i.e., the protohistoric) these routes were already carrying lethal pathogens. Of course, it is also possible that some of the introduced disease came by sea. Beginning in the mid 16th century, several voyagers visited the coast of California, including the expeditions of Juan Rodriquez Cabrillo, Sir Francis Drake, Sebastian Rodriquez Cermeno, and Sebastián Vizcaíno. Of these, only two, Cabrillo in 1542 and Vizcaino in 1602, actually anchored off the coast of San Diego. Given the fact that illness is mentioned by both explorers, it is very possible that lethal pathogens were on board (Preston 2004:196-197). The óweb of diseaseô had already formed in northern New Spain and it is likely that some of these pathogens were carried north with the two expeditions. Although these early encounters were brief, there was easily enough time to transmit diseases which were endemic to the Europeans and extremely lethal to Native Americans.

The Kumeyaay that Cabrillo and Vizcaino contacted in San Diego were described as tall and well built natives who were initially friendly to the Spanish. The Kumeyaay were Yuman speaking hunter-gatherers who were loosely organized in autonomous bands that had semi-hereditary chiefs and sub-chiefs. Although not as complex socially as their more northerly neighbors the Chumash and Gabrielino, they had an intricate subsistence round that included vertically ordered ecozones, and had an extensive interaction sphere that involved a far reaching exchange system (Luomala 1978:592-609). Interestingly, before Cabrillo left San Diego Bay in September of 1542, the Kumeyaay told him about other Spaniards in the interior ï possibly the Coronado expedition (Nasitir 1991:11). If this account is accurate, the Kumeyaay must have had far reaching networks that extended hundreds of miles inland. It was into this subsistence web that the Spanish introduced European goods, products, and disease. While the iron implements and glass beads were initially welcomed by the Kumeyaay, the price for these luxury items was ultimately too high to pay. Possibly within a short period of time after the Spanish reached the New World, pandemic diseases were rife among the Native groups in California. It is known that disease was rampant throughout the 16^{th} and 17^{th} centuries in northern New Spain and given the interconnectedness between this area and the Southwest (including California), it is very conceivable that pathogens spread northward (Preston 2004:188).

There is also good evidence that disease did spread from northern New Spain to Texas, the lower Misssissippi Valley, Florida, and Baja California during the 17^{th} and early 18^{th} centuries. Besides evidence of mass burials during these periods, there is archaeological documentation of regional demographic changes, including abandonment of settlements, migration, and aggregation of local populations (Perttula 1991:501-518; Ramenosfsky 1987:137-171). In the Caddoan area in eastern Texas, there is some evidence of the formation of a confederacy which led to a reconfiguration of local populations into óGateway Communitiesô which were composed of heterogeneous groups of Native American refugees (Hickerson 1997:44). These ómercantileô communities were located along trade routes and became to all intents and purposes trading centers. According to one researcher, these were formed in response to massive depopulation from pandemic diseases (Hickerson 1997:37).

There is also good evidence that Baja California, first settled in 1695, was overrun by disease throughout the 16th, 17th and early 18th centuries. However, unlike some of the other regions discussed above, syphilis may have been the big killer (Aschmann 1967:189). Although a debatable subject, syphilis may have evolved into a virulent form after contact (see Chapter 5 ï McNeill 1976:226-227). Whether *Trephonema pallidum*, the causative agent of venereal syphilis, originated in the New World or Old is still unknown but it does seem clear that after contact *T. pallidum* became a killer (unlike its relatively benign cousins, yaws and pinta). In any case, syphilis became pandemic in Baja, and according to mission records devastated Native populations in this region (Ashmann 1967:205; Rudkin 1956). Also widespread in the area were smallpox, measles, dysentery, typhoid fever, malaria, flu, and typhus. There is even evidence that these diseases struck in tandem creating, if you will, a web of disease that had extremely high morbidity and mortality rates. In some cases, three-quarters of the local population was wiped out. It has been estimated that the Native population in Baja decreased from 60,000 in 1697 to 1,500 by the end of the Mission Period (Preston 2004:192).

Besides the fact that Native Americans had little immunity to exotic pathogens, it is possible another factor was at play. Recognition of this factor comes from the relatively new set of mathematical techniques known as network theory (Buchanan 2002). As briefly described in Chapter 5, this theory stresses the interconnectivity of some systems and suggests that social networks such as seen in trails and communication corridors work as facilitators in tying societies together. This concept, depicted in Figure 4-6 in

Chapter 4, schematizes this connectivity, which may have accelerated the spread of disease. As shown in the graph, Alta and Baja California were literally tied together in terms of interaction (i.e. exchange). The trade routes funneled disease as well as trade goods from exchange nodes. Disease from Baja and possibly Northern Mexico infiltrated southern California during the Protohistoric Period. The Kumeyaay, as depicted on this graph, could have received disease from at least six points of origin. Likely a web of disease formed where tandem epidemics occurred episodically. The devastation caused by this would have been extreme, affecting all aspects of Native life.

Crisis Cults and Beads

In 1602 Sebastian Vizcaino and his expedition stumbled across a strange Native American feature on San Clemente Island. A ceremonial circle had been constructed and decorated with bird feathers; inside the circle was a possible sand painting with a sacred figure flanked by representations of the sun and moon. Huge crows or ravens apparently were also venerated within the enclosure (Phillips 1975:16; Lepowski 2004:14). As the Spaniards approached this óshrineô two crows flew out and one of the soldiers shot and killed them with his arquebus. According to one source, óthe soldiers believed the devil spoke through the birds. The Indians present wept openlyö (Phillips 1975:15). Being products of their time, the Spaniards would have never guessed that this structure possibly represented the roots of a fledgling religion that would sweep through most of southern California during the Protohistoric and Historic Periods. The *Chingichngish* religion is thought by many anthropologists to be a form of messianic or millenarian cult that arose as a result of disease (primary factor) and environmental and cultural disruption from European contact (Lepowski 2004; Kehoe 2006; Phillips 1996; Wallace

2004). According to Native legend, *Chingichngish*, a powerful shaman, was born either at Santa Catalina or San Clemente Island or on the mainland at a village called *Puvugna*, near the estuary of the Long Beach and Los Angeles Rivers. From his place of origin, his prophesies, teachings, moral codes, and ceremonies spread throughout southern California, reaching the Juaneños, Luiseños, Cupeños, Cahuillas, and Kumeyaay (Bean and Vane 1978; Lepowski 2004:13). The new movement utilized the same type of enclosure (*Yobar*) described above and utilized the same symbolic objects. The cult also had elements suggesting strong Christian influence; i.e., a universal god, a deified prophet who ascends to the heavens, a set of commandments, and evil doers who are severely punished. Most investigators see the religion as a revitalization cult with syncretic features (Lepowsky 2004; Phillips 1975; Raab 2009).

The movement became especially prevalent during colonial times. Although practiced secretly, it was observed by Spanish padres and other early observers (Raab 2009). An especially important narrative exists which was written by Fray Geronimo Boscana in the early 19th century (Boscana 1978). In this work, many aspects of the ceremonies (e.g. whirling dances, offertory shrines, ritualized animal burials) and paraphernalia (quartz crystals, charmstones, and ceremonial bundles) are described. It is clear that this covert movement represented an active resistance to the Spanish presence and their religion and functioned as a means of recapturing Native lifeways (Lepowsky 2004; Phillips 1975). The full manifestation of the Chingichngish cult will likely be resolved with further archaeological investigations at SD-106 and SDI-901.

What is also evident in the literature is that this revitalization movement which used toloache (*Datura metaloides)* as a hallucinogenic stimulant was incorporated in preexisting ceremonies using this intoxicant (Strong 1929; Bean and Vane 1978). Rituals such as rites of passage, eagle killing, and mourning ceremonies were probably incorporated in the new movement. As was typical in these ceremonies beads were freely exchanged prior to, during, and after completion of the rituals (Lepowski 2004). Thus as the cult spread in response to the devastating effects of disease and environmental degradation, beads and their use as a medium of exchange became even more important. It is likely that the distribution we see in the interior region is the result of the rapid spread and pervasive nature of this crisis cult. It is also notable that one of the more respected early ethnographers for the area remarked that the historic period is characterized by άthe spread of the *Chungichnish* (sic) religion and the development of a shell money exchangeô (Strong 1929:349).

As outlined above, one line of archaeological evidence for the cult includes a series of animal burials and cache pits on San Clemente Island. Investigators working at the Lemon Tank site and Big Dog Cave found extremely atypical historic features and artifacts that suggest an offertory function which possibly correlates to the *Chingichngish* religion (Raab et al 2009; Arnold 2010:111). This interpretation is certainly in keeping with the thematic site types on the plateau region of San Clemente Island, which appear to be primarily ceremonial in nature and mostly based in the Historic Period. It is likely the island was used as a religious center and refuge during historic times.

Other archaeological confirmation for the presence of this cult may come from the Cahuilla site RIV-7882 included in this study. Here in the desert at the southern tip of the Coachella Valley two coyote burials were discovered associated with thousands of beads (Alexandrovicz 2006). These are unusual finds in southern California although dog and other animal have been found elsewhere in California. These are usually interpreted as highly ritualized features (Langenwalter 2005). The fact that Historic period shell and glass beads were found within the burial matrix makes it even more anomalous. In the pantheon of the *Chingichngish* religion, Coyote was a sacred spirit (Boscana 1978:45; Lepowski 2004:16). Given the time period and the species and inordinate amount of associated beads, this feature is a good candidate for being associated with this cult. Also convincing is the nature of the burials. They are interments not cremations. The syncretism associated with the cult could have affected burial practices from the traditional cremation to interment for both human and ritualized animal burials.

While archaeological evidence is slim for this cultõs presence at the key study site, SDI-106, it is strongly suspected that the inordinate amount of beads found here can be made more understandable if this particular socio-religious movement is factored in. We know that this movement, like all ceremonial and ritualized events, involved exchange of beads and other goods and certainly this enhanced the generalized trading activities that took place here. The chronological occupation (1780-1850) of the site (based on bead types) also places it firmly within the time period when the *Chingichngish* cult was at its peak. Further research at this site will surely reveal features and artifacts related to this revitalization movement.

Summary

In this chapter I have presented all my data which involves an intensive analysis of shell and glass beads. Ancillary data such as associated material culture at each site is also considered and is presented in tabular form (e.g. Table 6-14 in Chapter 6). Some statistical analysis was completed including mean diameter comparisons of H series beads using T-Tests for paired data. The results showed significant similarity between some of the key sites involved in the study. A clear connection was found between CV-37, LAN-184H, SDI-901 and SDI-106 and SCLI-1437. Coupled with ethnographic and ethnohistorical data, this similarity strongly indicates the following:

1) Most, if not all, of the *Olivella* wall beads found in the study were made at the missions sometime between approximately 1810 and 1850.

2) These beads were traded or transported to the Cahuilla and Kumeyaay.

3) The route(s) utilized were part of an intensified exchange network triggered by the *Chingichngish* cult in the interior regions during the Historic Period.

Other factors leading to the enormous increase in inland trade were examined, including the demographic changes and the effects of disease and environmental degradation. Historically, these factors played a significant role in the appearance of the revitalization movement which was in direct opposition to the oppressive effects of the Spanish colonization. This movement likely played an important role in the distribution and intensification of bead exchange and explains the extrordinary increase in shell and glass beads in the interior regions of San Diego County.

Chapter 7: Conclusions

The focus and overall objective of this study is to gain a better understanding of the anomalous occurrence of large numbers of shell and glass beads at Kumeyaay sites located in eastern San Diego County. Particular attention has been directed at site SDI-106. Located towards the eastern edge of the County, this desert site has unique features including extremely large dimensions, developed midden, and distinct temporal placement within the Historic Period. An extensive review of the existing archival and current literature and an historical overview (Chapters 2 and 4) of this site as well as the other six sites in the study has been provided to appropriately situate the bead data within a local and regional context. The data have been extensively analyzed using both quantitative and qualitative methods. My analysis has shown that some sites are statistically similar and may be linked in time and possibly shared a common exchange network. The bead analysis also demonstrated that all the study sites had overwhelming amounts of Class H *Olivella* beads which temporally place the sites firmly within the Historic Period.

From my research it has become clear that something extraordinary developed during post contact times and that the startling appearance of beads in large numbers in the interior regions was linked to some socio-cultural change affecting most of southern California. I argue that this change derived from a revitalization movement which swept through these regions soon after initial European contact (Boscana 1978; Harrington 1978). Called the *Chingichngish* cult, this religious movement likely arose as a reaction to introduced disease, depopulation, and acculturative factors relating to Spanish presence in Alta California (Phillips 1996; Lepowski 2004; Raab 2009). In many ways, this movement was a meaningful way for Native populations to adjust to the disturbing consequences of colonization (Phillips 1996:17).

As argued in Chapters 2, 5, and 6, the new cult combined traditional ritualism (particularly in regard to mourning ceremonies) with precepts of Christianity forming a syncretic religion that was similar but different to ancient ceremonial practices. As Hull et al (2013) point out, the ritual practices seen on San Clemente Island (i.e. small cache pits and animal burials) differ in terms of size and content from identified mourning ceremonial features on the mainland (i.e. large buried stone objects), and these differences may indicate divergent forms of ritualism. Probably more significant is the fact that mainland features, which date from the Intermediate Period (3000 ï 1000 B.P), are antecedent, and possibly functionally akin, to the more recent ceremonialism on the island. Based on this relationship, it is possible that the cult evolved from a traditional base that has ancient roots.

What is certain from archaeological and ethnographic data is that beads continued to play an important role in these ceremonies over the entire time period. Shell beads were found at most putative mourning ceremony features and there is ample evidence (discussed earlier in Chapter 2) that bead exchange always played an important role in these rituals, with increased usage of beads over time. Massive amounts of glass and shell beads were found at sites on San Clemente Island (some features contained over 15,000 beads) and in northern parts of coastal southern California (Moratto 1984; King 1990).

The current study presents an hypothesis which states that the exponential increase of beads during the Historic Period at various inland sites in San Diego County is mostly due to the rise of the *Chingichngish* religion which rapidly spread east and south of its point of origin in the Los Angeles basin/San Clemente Island. Class H *Olivella* beads were shown by the current analysis to dominate the study collections, and it is these artifacts that may be emblematic of this revitalization movement. Based on available data these beads were manufactured in the Santa Barbara Channel area.

While other means of bead dispersal (down-the-line bartering, balanced or generalized reciprocity for goods or services) can not be ruled out, it is likely these exchange systems played a secondary role in the dramatic Historic Period increase in bead usage in the interior. It was primarily the cult and its activities that ramped up bead exchange in these inland regions. It would be expected that if normal trade relations were responsible for bead distribution, bead numbers would have either remained static or possibly decreased over time (due to the Spanish presence disrupting traditional trade routes ï see Gamble and Zepeda 2002). The best explanation for the punctuated increase in wall disc beads at these sites is that a new religious movement, i.e., the *Chingichngish* cult arose and became the operative factor in the intensified bead usage.

Although ethnographic and historic accounts are slim regarding the *Chingichngish* cult, the data are greatly amplified by relevant archaeological investigations, especially on the interior plateau area of San Clemente Island. It is likely that more cult-related features and artifacts will be discovered here and on the mainland; however, before this can occur sensitivity to these finds must be adopted by future investigators. Southern California archaeologists should be particularly attentive to certain indicators when working at Historic Period sites in non-coastal areas such as interior regions and Channel Island locales. It was in these outlying regions (far from Spanish influence) that the *Chingichngish* movement seemingly flourished, thus making it more likely that ritualized features and artifacts related to this cult will be encountered. Particular consideration should be exercised when certain archaeological constituents are found that may be related to the cult. These factors may include: (1) large numbers of glass and shell beads (especially Class H) associated with cache pits or animal burials; (2) any type of concentrated bird bone (especially raptors); (3) concentrated canid bone (dog, coyote, fox etc.) with associated Historic Period artifacts; (4) anomalous artifacts dating from the Historic Period (for instance, bottle glass inlaid with shell beads); (5) unusual concentrations of manuported rocks and minerals ï tourmaline crystals, quartz crystals, *toshwaat* stones (iron concretions), white kaolin clay, garnet, steatite, and galena; (6) shamanic paraphernalia especially when associated with burials (e.g. sucking tubes, cloud-blowers, quartz crystals, ceremonial bowls used in connection with *toloache* rituals; (7) cache pits containing Historic Period artifacts, beads, groundstone, and other artifacts; (8) round or oval ceremonial enclosures as indicated by clay daub or hardened soil; and (9) effigies reflecting curing or mourning ceremonies. It is very likely that thoughtful future excavation at Historic Period sites such as the ones included in this study will reveal more evidence of this interesting religious movement which possibly gave solace to people facing cultural dissolution and/or extinction.

Appendix: Bead Database

Notes on terms and abbreviations:

ST=straight drilled hole (perforation)
CON=conically drilled hole (perforation)
BI=biconically drilled hole (perforation)
Dorsal=drilled on the dorsal side of the bead
Ventral=drilled on the ventral side of the bead
Cotton=cottonwood projectile point
O. Dama=Olivella Dama – Shell species
L Hole=large hole drilled in bead
Turq=turquoise
Punched=punched hole
Columel=columella
Tourq=tourqoise
Irrid=iridescent
Weath=weathered
Nibbling=nibbling around perforation
Hal pen= Haliotis pendant
Cl disc=clamshell disc
Pt geound=partially ground
Irr hole=irregular hole
Con drl=conically drilled
Asym hl=asymmetrical hole
Punched= punched hole
Off-set=off-set hole
Asphalt=tar on bead
Erratic=anomalous attribute
Frag=fragment
BIP=bead in production
Lopped=spire lopped bead
Brott=name of investigator at SDI-106
Spher=spherical
Pantone=color chart
Facet=faceted

CV-37

Site No.	Class	Type	Diameter	Thickness	Hole Size	Hole Shape	Burnt	Condition	Comments
DFCCV37	E1A	DISC	4.8	1.3	1.2	ST	YES	WHOLE	
DFCCV37	E1A	DISC	4.9	0.7	1.5	ST	YES	WHOLE	
DFCCV37	G1	DISC	4.9	0.9	1.8	CON	YES	WHOLE	VENTRAL
DFCCV37	G1	DISC	4.9	0.7	1.1	ST	YES	WHOLE	
DFCCV37	G1	DISC	5	1.1	1.1	ST	YES	WHOLE	
DFCCV37	G1	DISC	5	1.1	1.8	CON	YES	WHOLE	
DFCCV37	G1	DISC	5	1	1.3	ST	YES	WHOLE	
DFCCV37	G1	DISC	5	1	2	CON	YES	WHOLE	VENTRAL
DFCCV37	G1	DISC	5	0.9	1.7	BI	YES	WHOLE	
DFCCV37	G1	LIPPED	5	1.9	1.3	CON	YES	WHOLE	VENTRAL
DFCCV37	G1	DISC	5.1	0.9	1.4	CON	YES	WHOLE	
DFCCV37	G1	LIPPED	5.1	1.4	1.3	CON	YES	WHOLE	
DFCCV37	G1	DISC	5.1	0.6	1.1	ST	YES	WHOLE	
DFCCV37	G1	DISC	5.1	0.8	1.2	CON	YES	WHOLE	
DFCCV37	H1A	LIPPED	5.1	1.5	1.4	ST	YES	WHOLE	
DFCCV37	H1A	DISC	5.1	0.9	1.7	CON	YES	WHOLE	DORSAL
DFCCV37	H1A	DISC	5.2	1.7	1.2	CON	YES	WHOLE	
DFCCV37	H1A	DISC	5.2	1.3	1.2	ST	YES	WHOLE	
DFCCV37	H1A	DISC	5.2	1	1.3	ST	YES	WHOLE	
DFCCV37	H1A	DISC	5.2	0.9	1.8	CON	YES	WHOLE	VENTRAL
DFCCV37	H1A	DISC	5.2	1.4	1.5	ST	YES	WHOLE	L HOLE
DFCCV37	H1A	DISC	5.2	0.8	1.8	CON	YES	WHOLE	VENTRAL
DFCCV37	H1A	DISC	5.3	1.2	1.2	CON	YES	WHOLE	
DFCCV37	H1A	DISC	5.3	1	1.3	ST	YES	WHOLE	
DFCCV37	H1A	DISC	5.3	0.8	1.2	CON	YES	WHOLE	DORSAL
DFCCV37	H1A	DISC	5.3	2	1.7	CON	YES	WHOLE	VENTRAL
DFCCV37	H1A	DISC	5.3	0.9	1.2	ST	YES	WHOLE	
DFCCV37	H1A	DISC	5.3	1.4	1.1	ST	YES	WHOLE	
DFCCV37	H1B	DISC	5.3	1.2	1.6	CON	YES	WHOLE	VENTRAL
DFCCV37	H1B	DISC	5.3	1.6	1.9	CON	YES	WHOLE	VENTRAL
DFCCV37	H1B	DISC	5.3	1	1.7	BI	YES	WHOLE	L HOLE
DFCCV37	H1B	DISC	5.4	1.3	1.3	CON	YES	WHOLE	
DFCCV37	H1B	DISC	5.4	1	1.2	ST	YES	WHOLE	
DFCCV37	H1B	DISC	5.4	1.1	1.7	CON	YES	WHOLE	VENTRAL
DFCCV37	H1B	DISC	5.4	1.6	1	ST	YES	WHOLE	
DFCCV37	H1B	DISC	5.4	1	1	ST	YES	WHOLE	
DFCCV37	H2	DISC	5.4	0.8	1.4	ST	YES	WHOLE	
DFCCV37	H2	DISC	5.4	0.7	1.5	CON	YES	WHOLE	
DFCCV37	H2	DISC	5.5	1.3	1.8	CON	YES	SEMI	
DFCCV37	H2	DISC	5.5	1.6	1.3	ST	YES	WHOLE	
DFCCV37	H2	DISC	5.5	1	1.6	CON	YES	WHOLE	
DFCCV37	H2	DISC	5.5	0.9	1.7	ST	YES	WHOLE	
DFCCV37	H2	DISC	5.5	1.1	1.4	CON	YES	WHOLE	
DFCCV37	H2	DISC	5.5	1.7	1.4	CON	YES	WHOLE	VENTRAL
DFCCV37	H2	DISC	5.6	11.5	2.3		YES	WHOLE	O.DAMA
DFCCV37	H2	DISC	5.6	0.7	1.4	CON	YES	WHOLE	
DFCCV37	H2	DISC	5.6	1	1.1	ST	YES	WHOLE	
DFCCV37	J	DISC	5.6	1	1.3	ST	YES	WHOLE	
DFCCV37	J	DISC	5.6	1.0-2.3	1.2	ST	YES	WHOLE	
DFCCV37	J	DISC	5.6	1.4	1.1	ST	YES	WHOLE	
DFCCV37	J	DISC	5.6	1	1.4	CON	YES	WHOLE	VENTRAL
DFCCV37	J	DISC	5.7	1.1	1.7	CON	YES	WHOLE	VENTRAL
DFCCV37	J	DISC	5.7	0.9	1.7	CON	YES	WHOLE	VENTRAL
DFCCV37	J	DISC	5.7	1.1	1.9	CON	YES	WHOLE	
DFCCV37	J	DISC	5.7	1.2	1.6	CON	YES	WHOLE	VENTRAL
DFCCV37	J	DISC	5.7	1.3	1.8	CON	YES	WHOLE	VENTRAL
DFCCV37	J	DISC	5.7	1.3	1.8	CON	YES	WHOLE	VENTRAL
DFCCV37	J	DISC	5.7	1	1.2	ST	YES	WHOLE	
DFCCV37	J	DISC	5.8	0.9	1.5	CON	YES	WHOLE	
DFCCV37	J	DISC	5.8	1.4	1.1	ST	YES	WHOLE	
DFCCV37	J	DISC	5.8	1.4	1.6	ST	YES	WHOLE	

DFCCV37	J	DISC	5.8	1	1.1	ST	YES	WHOLE	
DFCCV37	J	DISC	5.8	1.3	1.3	ST	YES	WHOLE	
DFCCV37	J	DISC	5.9	1	1.5	CON	YES	WHOLE	VENTRAL
DFCCV37	J	DISC	6	1.2	1.2	ST	YES	WHOLE	
DFCCV37	J	DISC	6	1	1.6	ST	YES	WHOLE	VENTRAL
DFCCV37	J	DISC	6	1.2	1.1	ST	YES	WHOLE	
DFCCV37	J	DISC	6.1	12.6	2		YES	WHOLE	O.DAMA
DFCCV37	J	DISC	6.1	1	1.1	ST	YES	WHOLE	
DFCCV37	J	DISC	6.2	12.1	3.5		YES	WHOLE	O.DAMA
DFCCV37	K	CUPPED	6.8	13	2.3		YES	WHOLE	O.DAMA
DFCCV37	L2	RECTANGLE	5.0X5.7						BROKEN
DFCCV37		POINT						WHOLE	COTTON
DFCCV37	J	DISC	5.9	1.2	1.2	ST	YES	WHOLE	

LAN-184H

Site Number	Class	Type	Diameter	Thickness	Hole size	Hole Shape	Burnt	Condition	Comments (Pantone #)
LAN-184H	AV3	TUBE	8.4	33	2.3		NO	WHOLE	COLUMEL
LAN-184H	E1B	LIPPED	6.9X6.9	1.8	1.5	CON	NO	WHOLE	
LAN-184H	EE4	DISC	6.2	2.1	1.6	BI	NO	WHOLE	BONE
LAN-184H	G1	DISC	4.1	0.5	1.3	CON	NO	WHOLE	WEATH
LAN-184H	CANE	GLASS	6	5.4	2.7	ST	NO	WHOLE	LT BLUE
LAN-184H	CANE	GLASS	3	1.9	1.6	ST	NO	WHOLE	TOURQ
LAN-184H	CANE	GLASS	4.4	3.5	1.4	ST	NO	WHOLE	TOURQ
LAN-184H	CANE	GLASS	FRAG						
LAN-184H	CANE	GLASS	3.5	3.1	1	ST	NO	WHOLE	WHITE
LAN-184H	CANE	GLASS	4.7	2.1	2	ST	NO	WHOLE	IRRID
LAN-184H	H1A	DISC	6.1	1.4	1.2	ST	NO	WHOLE	
LAN-184H	H2	DISC	5.2	0.8	1.3	ST	NO	WHOLE	
LAN-184H	H2	DISC	5.3	1.1	1.7	CON	NO	WHOLE	WEATH
LAN-184H	H2	DISC	5.7	0.6	1.1	ST	NO	WHOLE	WEATH
LAN-184H	H2	DISC	4.8	0.8	1.5	ST	NO	WHOLE	WEATH
LAN-184H	H2	DISC	5.2	1.2	2.1	CON	NO	WHOLE	ERRATIC
LAN-184H	H2	DISC	5.8	0.9	1.3	ST	NO	WHOLE	
LAN-184H	KLCII	DISC	6	2.3	1.9	BI	NO	WHOLE	HALIOTIS
LAN-184H	E1A	LIPPED	5	1.3	1.2	ST	NO	WHOLE	
LAN-184H	E1A	LIPPED	4.4	1.2	1.7	CON	NO	WHOLE	
LAN-184H	E1B	LIPPED	5.8X6.1	1.6	1.4	ST	NO	WHOLE	NIBBLING
LAN-184H	H2	DISC	5.7	1.3	1.4	ST	NO	WHOLE	WEATH
LAN-184H	H2	DISC	6.2	1.2	1.4	ST	NO	WHOLE	
LAN-184H	H1B	DISC	5.9	0.8	1.4	ST	NO	WHOLE	NIBBLING
LAN-184H	H1B	DISC	5.5	1	1.2	ST	NO	WHOLE	WEATH
LAN-184H	H1B	DISC	5.3	0.8	1.9	CON	NO	WHOLE	ANOMALY
LAN-184H	H2	DISC	5.7	1.2	1	ST	NO	WHOLE	
LAN-184H	H2	DISC	4.9	0.8	1.1	ST	NO	WHOLE	
LAN-184H	H2	DISC	6.6	1.6	1.7	CON	NO	WHOLE	ANOMALY
LAN-184H	H1B	DISC	4.8	0.9	1	ST	NO	WHOLE	
LAN-184H	J	DISC	5.8	1.6	1.5	BI	NO	WHOLE	
LAN-184H	H2	DISC	4.6	0.9	1.5	BI	NO	WHOLE	LG HOLE

LAN-184H	H2	DISC	5.6	1.1	1.1	ST	NO	WHOLE	
LAN-184H	H1B	DISC	6.6	1.1	1.3	ST	NO	WHOLE	NIBBLING
LAN-184H	H2	DISC	5	0.9	2.1	ST	NO	WHOLE	BIG HOLE
LAN-184H	H2	DISC	6	0.9	1.4	ST	NO	WHOLE	
LAN-184H	H1A	DISC	6.3	1.2	1.2	ST	NO	WHOLE	ASPHALT
LAN-184H	E1B	LIPPED	5.1 X 5.4	1.7	2	BI	NO	WHOLE	
LAN-184H	H2	DISC	5.4	1	1.6	ST	NO	WHOLE	
LAN-184H	E1B	LIPPED	4.6 X 6.1	1.7	1.1	ST	NO	WHOLE	
LAN-184H	E1A	LIPPED	4.8	1.3	0.9	ST	NO	WHOLE	ST DRILL
LAN-184H	E1B	LIPPED	6.7 X 7.1	1.8	1.9	CON	NO	WHOLE	VENTRAL
LAN-184H	KLCII	DISC	4.9	1.1	2.6	BI	NO	WHOLE	HALIOTIS
LAN-184H	H2	DISC	6	1.3	1.4	ST	NO	WHOLE	
LAN-184H	KLCII	DISC	10.3	0.8	1.7	ST	NO	WHOLE	HAL PEN
LAN-184H	H2	DISC	4.6	0.9	1.5	ST	NO	WHOLE	
LAN-184H	EE4	DISC	6.3	1.5	1.4	CON	NO	WHOLE	CL. DISC
LAN-184H	H1A	DISC	5.8	0.7	1.2	ST	NO	WHOLE	NIBBLING
LAN-184H	E1A	LIPPED	5.9	1.7	1.7	BI	NO	WHOLE	
LAN-184H	H2	DISC	5.4	1.2	1.2	ST	NO	WHOLE	CUPPED ?
LAN-184H	H2	DISC	7.1	2.5	1.6	CON	NO	WHOLE	SCHIST
LAN-184H	H2	DISC	5.2	1	1.3	ST	NO	WHOLE	
LAN-184H	H2	DISC	6.2	1	2.3	BI	NO	WHOLE	LG HOLE
LAN-184H	H2	DISC	6	0.9	1.1	ST	NO	WHOLE	NIBBLING
LAN-184H	H1A	DISC	4.6	1	1	ST	NO	WHOLE	
LAN-184H	H1B	DISC	5.5	1.1	1.2	ST	NO	WHOLE	
LAN-184H	H1B	DISC	6.1	1.1	1.1	ST	NO	WHOLE	
LAN-184H	KLCII	DISC	5.9	1.6	1.6	BI	NO	WHOLE	HALIOTIS
LAN-184H	H1A	DISC	6	1.1	1.2	ST	NO	WHOLE	
LAN-184H	G1	DISC	4.8	1.1	2.1	CON	NO	WHOLE	
LAN-184H	G1	DISC	4.6	1.3	1.7	CON	NO	WHOLE	ASPHALT
LAN-184H	GI	DISC	4.5	0.9	1.6	CON	NO	WHOLE	ASPHALT
LAN-184H	G1	DISC	4.1	0.8	1.2	CON	NO	WHOLE	
LAN-184H	G1	DISC	4.2	0.7	1.8	CON	NO	WHOLE	
LAN-184H	G1	DISC	4.4	1.1	1.7	CON	NO	WHOLE	
LAN-184H	G1	DISC	4.7	1.1	1.8	CON	NO	WHOLE	
LAN-184H	G1	DISC	4.3	1.2	1.2	CON	NO	WHOLE	PT GRND
LAN-184H	G1	DISC	4	0.8	1.6	CON	NO	WHOLE	
LAN-184H	G1	DISC	3.7	1.2	1.8	CON	NO	WHOLE	
LAN-184H	G1	DISC	4	1.1	1.7	CON	NO	WHOLE	
LAN-184H	H3	DISC	8	1.2	1.3	ST	NO	WHOLE	
LAN-184H	H2	DISC	4.8	0.9	1	ST	NO	WHOLE	
LAN-184H	H2	DISC	6	0.7	1.3	ST	NO	WHOLE	WEATH
LAN-184H	H2	DISC	6.6	1.2	1.1	ST	YES	WHOLE	
LAN-184H	H2	DISC	6.1	0.9	1.3	ST	NO	WHOLE	
LAN-184H	H1B	DISC	4.9	0.9	1.4	ST	NO	WHOLE	IRR HOLE
LAN-184H	H1A	DISC	4.2	0.6	1.1	ST	NO	WHOLE	
LAN-184H	H2	DISC	5.3	1.2	1	ST	NO	WHOLE	
LAN-184H	H1B	DISC	4.5	1.2	1.6	ST	NO	WHOLE	
LAN-184H	H1B	DISC	4.7	1	1.3	ST	NO	WHOLE	
LAN-184H	H1B	DISC	4.5	0.7	1.3	ST	NO	WHOLE	

LAN-184H	KLCII	DISC	5.9	2.8	1.9	BI	NO	WHOLE	HALIOTIS
LAN-184H	H2	DISC	5.4	0.7	1.4	ST	NO	WHOLE	NIBBLING
LAN-184H	H2	DISC	5.1	1.1	1.6	ST	NO	WHOLE	LG HOLE
LAN-184H	H3	DISC	6.7	0.9	1.5	ST	NO	WHOLE	LG HOLE
LAN-184H	H3	DISC	6	0.8	1.6	CON	NO	WHOLE	CON DRL
LAN-184H	H3	DISC	7.1	0.9	1.5	CON	NO	WHOLE	CON DRL
LAN-184H	H2	DISC	5.3	1.2	1	ST	NO	WHOLE	
LAN-184H	H1A	DISC	4.9	0.8	1.1	ST	NO	WHOLE	
LAN-184H	G1	DISC	3.9	1	1.6	CON	NO	WHOLE	
LAN-184H	H2	DISC	4.9	0.6	1.2	ST	NO	WHOLE	
LAN-184H	H3	DISC	6.5	0.9	1.8	ST	NO	WHOLE	BIG HOLE
LAN-184H	H3	DISC	6	0.5	1.2	ST	NO	WHOLE	ASYM HL
LAN-184H	EE4	DISC	5.3	1.5	1.9	CON	NO	WHOLE	CL. DISC
LAN-184H	H2	DISC	5.6	0.9	1.9	CON	NO	WHOLE	LG HOLE
LAN-184H	CANE	DISC	3.1	2.7	1.9	ST	T-BLUE	BAR-IRID	316
LAN-184H	CANE	DISC	4.8	2.9	2.5	ST	BLACK	CYL-IRID	BLK22X
LAN-184H	CANE	DISC	4.8	4.1	1.7	ST	RED/BLK	CYL-WEA	186
LAN-184H	MOLD	DISC	5.8	5.8	3.2	ST	GREEN	CYL	1350
LAN-184H	CANE	DISC	4	4	1.7	ST	BLUE	CYL-IRID	2965
LAN-184H	CANE	DISC	4.4	3.8	2.1	ST	WHITE	CYL-IRID	5875
LAN-184H	MOLD	DISC	5.8	5.6	3.6	ST	WHITE	CYL	5807
LAN-184H	CANE	DISC	4.3	3.2	1.7	ST	RED/BLU	CYL-IRID	711
LAN-184H	CANE	DISC	2.8	2.1	0.9	ST	WHITE	CYL-IRID	568
LAN-184H	CANE	DISC	2.4	3	0.8	ST	TRNS/GRE	CYL-IRID	325
LAN-184H	CANE	DISC	3.8	3.4	0.8	ST	TRNS/ GREEN	SPH-IRID	325
LAN-184H	CANE	DISC	5.7	4.7	1.8	ST	BLACK	CYL	426
LAN-184H	CANE	DISC	3.5	2.9	1.6	ST	WHITE	CYL-IRID	552
LAN-184H	CANE	DISC	5	4.4	1.7	ST	T-GREEN	CYL-IRID	3302
LAN-184H	CANE	DISC	3.8	2.5	1.5	ST	T-GREEN	CYL-IRID	555
LAN-184H	CANE	DISC	2.6	3.8	1.6	ST	WHITE	TUB/WEA	5747
LAN-184H	CANE	DISC	5.9	5.3	3.8	ST	WHITE	TUBE	5595
LAN-184H	CANE	DISC	3.5	3.2	1.4	ST	GREEN	CYL-IRID	577
LAN-184H	CANE	DISC	3.9	2.8	2.1	ST	WHITE	CYL	5747
LAN-184H	CANE	DISC	2.8	2.2	1.2	ST	T-GREEN	CYL-IRID	339
LAN-184H	CANE	DISC	3.7	2.7	2.4	ST	T-BLUE	CYL-IRID	335
LAN-184H	CANE	DISC	2.7	3.8	1.3	ST	T-GREEN	CYL/WEA	346
LAN-184H	WW	DISC	7.2	7.9	2.4	ST	BLUE	SPH/WEA	2995
LAN-184H	MOLD	DISC	6.1	4.7	4.7	ST	GREEN	TUBE	3435
LAN-184H	K1	CUPPED	5	1.8	1.6	CON	NO	WHOLE	
LAN-184H	MOLD	DISC	4.7	2.3	1.6	ST	GREEN	FACET	325
LAN-184H	MOLD	DISC	4.3	10.2	1.8	ST	T-GR/IRR	FACET	318
LAN-184H	KI	CUPPED	3.9	1.5	1.7	CON	NO	WHOLE	
LAN-184H	CANE	DISC	4.1	3.4	2.2	ST	GREEN	CYL-IRID	3385
LAN-184H	CANE	DISC	5.8	5	3.9	ST	BROWN	CYL	1545
LAN-184H	CANE	DISC	5.8	4.9	3.5	ST	GREEN	CYL	3425
LAN-184H	MOLD	DISC	5.9	4.9	3.5	ST	BROWN	CYL	545
LAN-184H	CANE	DISC	3.5	2.1	1.3	ST	WHITE	CYL-IRID	CL/GRY 3
LAN-184H	CANE	GLASS	3.7	2	1.2	ST	WHITE	CYL-IRID	CL/GRY 3
LAN-184H	WW	GLASS	5.4	4.2	2.1	ST	BLUE	SPHER	280

LAN-184H	CANE	GLASS	2.7	2.3	1.2	ST	GREEN	CYL-IRID	361
LAN-184H	CANE	GLASS	3.6	3.7	1.4	ST	GREEN	CYL-IRID	339
LAN-184H	WW	GLASS	6.3	5	3.9	ST	WHITE	SPH-IRID	427
LAN-184H	WW	GLASS	4.2	4.4	1.5	ST	WHITE	SPHER	5875
LAN-184H	MOLD	GLASS	6	5.7	3.4	ST	WHITE	CYL	5875
LAN-184H	MOLD	GLASS	5.9	4.9	3.8	ST	GREEN	CYL	347
LAN-184H	MOLD	GLASS	6.4	6.2	1.8	ST	BLUE	RUS/FAC	289
LAN-184H	CANE	GLASS	2.3	2.2	1.2	ST	GREEN	CYL/IRID	353
LAN-184H	MOLD	GLASS	5.8	5.4	3	ST	WHITE	CYLINDER	427
LAN-184H	CANE	GLASS	3.7	2.9	1.7	ST	GREEN	CYL/IRID	3268
LAN-184H	CANE	GLASS	4	2.9	1.5	ST	BLACK	CYL/IRID	426
LAN-184H	CANE	GLASS	3.6	3.4	2	ST	GREEN	CYL/IRID	376
LAN-184H	MOLD	GLASS	5.8	5.2	2.9	ST	WHITE	CYLINDER	427
LAN-184H	MOLD	GLASS	5.3	5.1	2.5	ST	WHITE	CYLINDER	427
LAN-184H	CANE	GLASS	3	2.3	1.3	ST	GREEN	CYL/IRID	377
LAN-184H	CANE	GLASS	4	2.6	0.8	ST	WHITE	CYL/IRID	5747
LAN-184H	MOLD	GLASS	5.9	5.4	3.2	ST	WHITE	CYLINDER	5747
LAN-184H	CANE	GLASS	3.3	2.6	2	ST	?	CYL/IRID	?
LAN-184H	MOLD	GLASS	5.8	4.5	3.2	ST	BLUE	CYLINDER	324
LAN-184H	CANE	GLASS	4.3	2.8	1	ST	GREEN	CYL/IRID	377

RIV-7882

Feature	Class	Type	Diameter	Thickness	Hole Size	Hole Shape	Burnt	Condition	Comments
Feature 4	GL	OVOID	N=9						LT BLUE
Feature 4	GL	SPHER	N=3						YELLOW
Feature 4	B5	BARREL	N=12						
Feature 4	E1A	LIPPED	7.4	3.1	1.8	CON	NO	WHOLE	VENTRAL
Feature 4	E1A	LIPPED	8.4	1.6	1.4	CON	NO	WHOLE	
Feature 4	E1A	LIPPED	7.9	2.3	1.4	ST	NO	WHOLE	
Feature 4	E1A	DISC	7.9	1.9	1.6	CON	NO	WHOLE	
Feature 4	E1A	LIPPED	5	1.3	1.5	CON	NO	WHOLE	VENTRAL
Feature 4	E1A	LIPPED	6.6	1.1	1.2	CON	NO	WHOLE	DORSAL
Feature 4	E1A	LIPPED	7	2.1	1.4	CON	NO	WHOLE	
Feature 4	E1A	LIPPED	7.2	3.1	1.8	CON	NO	WHOLE	VENTRAL
Feature 4	E1A	LIPPED	7.5	3.1	1.5	CON	NO	WHOLE	VENTRAL
Feature 4	E1A	LIPPED	7.5	3.5	1.3	CON	NO	WHOLE	VENTRAL
Feature 4	E1A	LIPPED	7.2	2.8	1.4	?	NO	WHOLE	?
Feature 4	E1A	LIPPED	7.9	3.5	1.7	CON	NO	WHOLE	VENTRAL
Feature 4	E1A	LIPPED	8.2	2.7	1.2	CON	NO	WHOLE	VENTRAL
Feature 4	E1A	LIPPED	8.2	2.1	1.2	CON	NO	WHOLE	VENTRAL
Feature 4	E1A	LIPPED	7.6	2.4	1.2	CON	NO	WHOLE	
Feature 4	E1B	LIPPED	7.6	3.2	1.6	CON	NO	WHOLE	DORSAL
Feature 4	E1B	LIPPED	6.7	1.1	1.4	CON	NO	WHOLE	
Feature 4	E1B	LIPPED	6.7	7.1	1.4	CON	NO	WHOLE	
Feature 4	E1B	LIPPED	8.1	2.4	1.4	CON	NO	WHOLE	
Feature 4	E1B	LIPPED	7.4	1.9	1.2	CON	NO	WHOLE	
Feature 4	E1B	LIPPED	7.7	1.3	1.3	CON	NO	WHOLE	DORSAL
Feature 4	E1B	LIPPED	7.9	2.2	1.5	CON	NO	WHOLE	VENTRAL
Feature 4	E1B	LIPPED	6.8	1.9	1.6	CON	NO	WHOLE	VENTRAL
Feature 4	E1B	LIPPED	7.5	2.8	1.7	CON	NO	WHOLE	
Feature 4	E1B	LIPPED	7	2.3	1.4	CON	NO	WHOLE	VENTRAL
Feature 4	E1B	LIPPED	8.0 X 7.0	3.4	1.4	CON	NO	WHOLE	VENTRAL
Feature 4	E21	LIPPED	7.6	2.1	1.1	CON	NO	WHOLE	VENTRAL
Feature 4	E2A	LIPPED	7.6	3.1	1.5	CON	NO	WHOLE	
Feature 4	E2A	LIPPED	7.9	1	1.6	CON	NO	WHOLE	VENTRAL

Feature 4	E2A	LIPPED	7.4	2.4	1.7	CON	NO	WHOLE	VENTRAL
Feature 4	E2A	LIPPED	6.5	3.9	1.6	CON	NO	WHOLE	VENTRAL
Feature 4	E2A	LIPPED	6.8	1.8	1.4	CON	NO	WHOLE	VENTRAL
Feature 4	E2A	LIPPED	7.4	2.4	1.2	CON	NO	WHOLE	VENTRAL
Feature 4	E2A	LIPPED	7.5	2.5	1.3	ST	NO	WHOLE	VENTRAL
Feature 4	E2B	LIPPED	8.7	2.9	1.5	CON	NO	WHOLE	
Feature 4	E2B	LIPPED	8.7	2.8	1.6	CON	NO	WHOLE	VENTRAL
Feature 4	E2B	LIPPED	8.7 X 6.1	1.9	1.5	CON	NO	WHOLE	VENTRAL
Feature 4	E2B	LIPPED	7.4 X 6.4	3.3	1.3	CON	NO	WHOLE	VENTRAL
Feature 4	E2B	LIPPED	8.5 X 7.0	3.7	1.5	?	NO	WHOLE	?
Feature 4	E2B	LIPPED	7.3	2.9	1.2	ST	NO	WHOLE	
Feature 4	EIA	LIPPED	6.9	2.8	1.6	CON	NO	WHOLE	
Feature 4	EIA	LIPPED	8.1	3.1	1.2	CON	NO	WHOLE	
Feature 4	EIA	LIPPED	7.7	1.3	1.8	CON	NO	WHOLE	VENTRAL
Feature 4	GL	FACET	N=12						
Feature 4	GL	CANE	N=8						
Feature 4	GL	CANE	N=4						
Feature 4	H1A	DISC	6.3	1	1.4	ST	NO	WHOLE	
Feature 4	H1B	DISC	7.3	1	1.4	ST	NO	WHOLE	
Feature 4	H1B	DISC	6.8	1.1	1.4	ST	NO	WHOLE	
Feature 4	H1B	DISC	7.9	1.6	1.5	ST	NO	WHOLE	
Feature 4	H1B	DISC	6.5	1	1.5	ST	NO	WHOLE	
Feature 4	H1B	DISC	6.5	1	1.6	ST	NO	WHOLE	
Feature 4	H1B	DISC	6.7	0.9	1.2	ST	NO	WHOLE	
Feature 4	H1B	DISC	8	1	1.3	ST	NO	WHOLE	
Feature 4	H1B	DISC	7	0.8	1.6	ST	NO	WHOLE	
Feature 4	H1B	DISC	7.7	0.7	1.2	ST	NO	WHOLE	
Feature 4	H2	DISC	6.3	0.9	1.2	ST	NO	WHOLE	
Feature 4	H2	DISC	7.2	1.2	0.9	ST	NO	WHOLE	
Feature 4	H2	DISC	7.6	0.9	1.4	ST	NO	WHOLE	
Feature 4	H2	DISC	6.6	1.1	0.9	ST	NO	WHOLE	
Feature 4	H2	DISC	7.3	1.2	1.2	ST	NO	WHOLE	
Feature 4	H2	DISC	6.7	0.9	1.2	ST	NO	WHOLE	
Feature 4	H2	DISC	6.1	1	1.2	ST	NO	WHOLE	
Feature 4	H2	DISC	5.3	1.1	1.5	BI	NO	WHOLE	
Feature 4	H2	DISC	7.3	0.9	1.2	ST	NO	WHOLE	
Feature 4	H2	DISC	5.6	1.1	1.2	CON	NO	WHOLE	
Feature 4	H2	DISC	5.6	1.1	1.2	BI	NO	WHOLE	
Feature 4	H2	DISC	7.5	1.3	1.1	ST	NO	WHOLE	
Feature 4	H2	DISC	7.4	1.6	1.3	ST	NO	WHOLE	
Feature 4	H2	DISC	6.4	0.8	1.3	ST	NO	WHOLE	
Feature 4	H2	DISC	7.3	0.6	1.8	ST	NO	WHOLE	
Feature 4	H2	DISC	7.5	1.1	1.8	ST	NO	WHOLE	
Feature 4	H2	DISC	7.7	1.1	1.6	ST	NO	WHOLE	
Feature 4	H2	DISC	6.8	0.9	1.5	ST	NO	WHOLE	
Feature 4	H2	DISC	6.8	0.9	1.8	ST	NO	WHOLE	
Feature 4	H2	DISC	7	0.9	1.3	ST	NO	WHOLE	
Feature 4	H2	DISC	6.4	0.6	1.5	ST	NO	WHOLE	
Feature 4	H2	DISC	6.4	0.6	1.4	ST	NO	WHOLE	
Feature 4	H2	DISC	8.1	1.2	1.3	ST	NO	WHOLE	
Feature 4	H2	DISC	7.1	1.2	1.6	ST	NO	WHOLE	
Feature 4	H2	DISC	7.4	1.2	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	6.7	1.1	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	7.9	1.2	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	8	1	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	7.8	1.8	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	7.3	1	1.5	ST	NO	WHOLE	
Feature 4	H3	DISC	7.7	0.9	1	ST	NO	WHOLE	
Feature 4	H3	DISC	7	0.6	1.1	ST	NO	WHOLE	
Feature 4	H3	DISC	7.8	0.7	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	8.6	1.2	2.3	CON	NO	WHOLE	PUNCHED
Feature 4	H2	DISC	7.1	1.2	1.6	ST	NO	WHOLE	
Feature 4	H2	DISC	7.4	1.2	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	6.7	1.1	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	7.9	1.2	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	8	1	1.3	ST	NO	WHOLE	

Feature 4	H3	DISC	8	0.9	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	8.4	1	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	6.4	0.8	1.1	ST	NO	WHOLE	
Feature 4	H3	DISC	6.9	1.1	1	ST	NO	WHOLE	
Feature 4	H3	DISC	8	0.9	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	7.1	0.9	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	6.9	1.6	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	8.9	1.1	1.1	ST	NO	WHOLE	
Feature 4	H3	DISC	6.9	1	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	7.1	1.1	1.1	ST	NO	WHOLE	
Feature 4	H3	DISC	6.6	0.8	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	7	1	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	8.2	0.8	1.1	ST	NO	WEATH	OFF-SET
Feature 4	H3	DISC	6.9	1	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	7.1	1	1.1	ST	NO	WHOLE	
Feature 4	H3	DISC	6.2	1.1	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	8	1.4	1	ST	NO	WHOLE	
Feature 4	H3	DISC	7.1	1.2	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	8.8	1.2	1.5	BI	NO	WHOLE	
Feature 4	H3	DISC	8.8	0.9	1.6	ST	NO	WHOLE	
Feature 4	H3	DISC	6.5	1	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	7.9	1.4	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	8.2	1.5	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	6.1	1	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	7.4	1.2	1	ST	NO	WHOLE	
Feature 4	H3	DISC	6.5	1.4	1.5	ST	NO	WHOLE	
Feature 4	H3	DISC	7.5	1.2	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	7.7	1.3	1.4	CON	NO	WHOLE	
Feature 4	H3	DISC	7.2	0.8	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	6.8	0.6	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	6.3	1.2	1.5	CON	NO	WHOLE	
Feature 4	H3	DISC	6.7	0.9	1.6	ST	NO	WHOLE	
Feature 4	H3	DISC	7.5	1.2	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	6.4	1.3	1.1	ST	NO	WHOLE	
Feature 4	H3	DISC	7.1	1.2	1.5	ST	NO	WHOLE	
Feature 4	H3	DISC	7.7	1.2	1	ST	NO	WHOLE	
Feature 4	H3	DISC	6.2	0.9	1.5	ST	NO	WHOLE	
Feature 4	H3	DISC	6.5	0.9	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	6.4	1.2	1	ST	NO	WHOLE	
Feature 4	H3	DISC	7.1	1.4	1.6	ST	NO	WHOLE	
Feature 4	H3	DISC	7.3	1.1	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	7	0.9	1.4	ST	NO	WHOLE	
Feature 4	H3	DISC	7	1	1.3	ST	NO	WHOLE	
Feature 4	H3	DISC	7.6	1.3	2	ST	NO	WHOLE	
Feature 4	H3	DISC	7.5	0.6	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	7.5	0.8	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	6.7	1	1	ST	NO	WHOLE	
Feature 4	H3	DISC	6.5	1.2	1.2	ST	NO	WHOLE	
Feature 4	H3	Disc	7	0.8	1.2	ST	NO	WHOLE	
Feature 4	H3	DISC	6.4	0.5	1.7	ST	NO	WHOLE	
Feature 4	H3	DISC	6.1	1	0.9	ST	NO	WHOLE	
Feature 4	H3	DISC	7.5	0.7	1.2	ST	NO	WHOLE	
Feature 4	HIB	DISC	7.8	1	1.1	ST	NO	WHOLE	
Feature 4	K1	CUP	6.7	2.4	2.1	CON	NO	WHOLE	

SCLI-1437

Site#	Class	Type	Diameter	Length	Hole	Perfor.	Burnt	Condition	Comments
1437	Stone (5)	DISC						STEATITE	
1437	C3	SPLIT	8	6.3	1.7	CON	NO	WHOLE	
1437	E1A	LIPPED	7	2.8	1.8	CON	NO	WHOLE	
1437	E1A	LIPPED	6	2.3	1.5	ST	NO	WHOLE	
1437	E1A	LIPPED	6.7	2.3	1.6	ST	NO	WHOLE	
1437	E1A	LIPPED	6.3	2.4	1.8	BI	NO	WHOLE	
1437	E1A	LIPPED	7	2.2	1.4	ST	NO	WHOLE	
1437	E1A	LIPPED	6.9	2.9	2	CON	NO	WHOLE	
1437	E1A	LIPPED	7.1	2.4	1.4	CON	YES	WHOLE	
1437	E1A	LIPPED	6.9		1.8	CON	YES	FRAG.	
1437	E1A	LIPPED	6.4	2	1.4	CON	YES	WHOLE	
1437	E1A	LIPPED	6.2	2.3	1.3	CON	YES	WHOLE	
1437	E1A	LIPPED	7.2	1.9	1.6	CON	NO	WHOLE	
1437	E1B	LIPPED	5.8	1.9	1.5	CON	NO	WHOLE	
1437	E1B	LIPPED	6.2	1.8	1.6	CON	NO	WHOLE	
1437	E1B	LIPPED	6.9	2.3	1.6	CON	YES	WHOLE	
1437	E1B	LIPPED	7.3	2.3	1.4	ST	NO	WHOLE	
1437	E1B	LIPPED	7.1	2.2	1.8	CON	YES	WHOLE	
1437	E1B	LIPPED	6.6	2.5	1.9	ST	YES	WHOLE	
1437	E1B	LIPPED	7.5	2.5	1.9	BI	YES	WHOLE	
1437	E1B	LIPPED	6.8	2.4	2	CON	YES	WHOLE	
1437	E1B	LIPPED	7.2	2.7	2	CON	YES	WHOLE	
1437	E1B	LIPPED	7.2	2.7	1.5	CON	YES	WHOLE	
1437	E1B	LIPPED	7	2.6	1.6	ST	YES	WHOLE	
1437	E2B	LIPPED	7.1	2	1.4	CON	NO	WHOLE	
1437	G2	DISC	6.7	0.7	2	CON	NO	WHOLE	.
1437	H1A	DISC	6.3	0.9	1.7	ST	NO	WHOLE	
1437	H1A	DISC	6.2	1	1.9	ST	NO	WHOLE	
1437	H1A	DISC	6.3	1.1	2	ST	NO	WHOLE	
1437	H1A	DISC	5.3	0.9	1.5	ST	NO	WHOLE	
1437	H1A	DISC	6.7	1	1.8	ST	NO	WHOLE	
1437	H1A	DISC	5.9	0.9	1.4	ST	NO	WHOLE	
1437	H1A	DISC	6.2	0.9	1.5	ST	NO	WHOLE	
1437	H1A	DISC	6.9	1.5	1.7	ST	NO	WHOLE	
1437	H1A	DISC	6.7	1.1	1.6	ST	NO	WHOLE	
1437	H1A	DISC	6.6	0.8	1.6	ST	NO	WHOLE	
1437	H1A	DISC	6.3	1.1	1.8	ST	NO	WHOLE	
1437	H1A	DISC	6.4	0.9	1.8	ST	NO	WHOLE	
1437	H1A	DISC	6.8	1	1.7	ST	NO	WHOLE	
1437	H1A	DISC	5.8	1.8	1.5	BI	NO	WHOLE	
1437	H1A	DISC	7.1	1.1	1.4	ST	NO	WHOLE	
1437	H1A	DISC	6	1.1	1.3	ST	NO	WHOLE	ASPHALT
1437	H1A	DISC	6.6	1.4	1.5	ST	NO	WHOLE	
1437	H1A	DISC	6.8	1				FRAG.	
1437	H1A	DISC	5.5	0.7	1.5	ST	NO	WHOLE	
1437	H1A	DISC	6.8	1.1	1.4	ST	NO	WHOLE	
1437	H1A	DISC	5.2	1	1.2	ST	YES	WHOLE	
1437	H1A	DISC	5.1	1	1.3	ST	YES	WHOLE	
1437	H1A	DISC	5	0.9	1.4	ST	NO	WHOLE	
1437	H1A	DISC	6.5	0.9	1.5	ST	YES	WHOLE	
1437	H1A	DISC	6	0.9	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.7	0.9	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.1	0.8	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.3	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.2	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.6	0.8	1.7	ST	NO	WHOLE	
1437	H1B	DISC	7.3	0.8	1.9	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1.1	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.3	1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.1	1	1.9	ST	NO	WHOLE	

1437	H1B	DISC	6.9	1.2	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.3	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.2	0.9	1.3	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.2	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.5	1.2	1.5	ST	NO	WHOLE	ASPHALT
1437	H1B	DISC	6.1	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.2	1.7	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.2	1.3	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.1	1.6	ST	NO	WHOLE	
1437	H1B	DISC	5.5	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	5.4	1.2	1.6	ST	NO	FRAG.	
1437	H1B	DISC	6.3	1.2	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.2	1.2	1.2	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1.1	1.6	ST	NO	WHOLE	
1437	H1B	DISC	5.4	0.8			NO	FRAG.	
1437	H1B	DISC	6.3	0.9	2	ST	NO	WHOLE	
1437	H1B	DISC	5.2	1.4	1.7	ST	NO	WHOLE	
1437	H1B	DISC	6.9	1.3	1.6	ST	NO	WHOLE	
1437	H1B	DISC	6.4	0.8	1.8	ST	NO	WHOLE	
1437	H1B	DISC	5.8	0.7	0.9	ST	NO	WHOLE	
1437	H1B	DISC	6	0.9	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.4	0.9	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.3	0.9	1.5	CON	NO	WHOLE	
1437	H1B	DISC	6	1	1.3	ST	NO	WHOLE	
1437	H1B	DISC	6	0.7	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.3	1.2	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.9	0.9	1.9	ST	YES	WHOLE	
1437	H1B	DISC	6.8	1.2	1.5	BI	NO	WHOLE	
1437	H1B	DISC	6	0.9	1.7	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	7.1	1.3	1.9	CON	NO	WHOLE	
1437	H1B	DISC	5.8	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	7	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.9	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.1	1.1	1.4	ST	NO	WHOLE	
1437	H1B	DISC	7	1.5	1.6	ST	NO	WHOLE	
1437	H1B	DISC	7.1	0.9	1.4	ST	NO	FRAG.	
1437	H1B	DISC	6.9	1.3	1.5	ST	NO	WHOLE	
1437	H1B	DISC	7	1.3	1.6	BI	NO	WHOLE	
1437	H1B	DISC	6.8	1.3	1.6	ST	NO	WHOLE	
1437	H1B	DISC	6.7	0.9	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.2	1.6	ST	NO	WHOLE	
1437	H1B	DISC	7.1	1.2	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	7.2	1.5	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1.3	1.5	CON	NO	WHOLE	
1437	H1B	DISC	6.9	1.9	1.9	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.9	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1.5	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1	1.6	ST	NO	WHOLE	
1437	H1B	DISC	7.4	1.3	1.2	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1.2	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1.2	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1.1	1.6	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.2	1.6	ST	YES	WHOLE	
1437	H1B	DISC	6.8	1.1	1.4	ST	YES	WHOLE	
1437	H1B	DISC	6.1	1	1.6	ST	YES	WHOLE	
1437	H1B	DISC	6.7	1.3	1.4	ST	NO	WHOLE	
1437	H1B	DISC	5.8	1.2	1.6	ST	YES	WHOLE	
1437	H1B	DISC	6.7	1.6	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.4	0.9	1.7	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.4	1.7	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.2	1.7	ST	NO	WHOLE	

1437	H1B	DISC	6.7	1.1	1.7	BI	NO	WHOLE	
1437	H1B	DISC	6.9	1.2	2	ST	YES	WHOLE	
1437	H1B	DISC	6.7	1.1	2.1	CON	NO	WHOLE	
1437	H1B	DISC	7.1	1.3	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1	2	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.1	1.9	CON	YES	WHOLE	
1437	H1B	DISC	6.7	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	7.3	0.9	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.1	1.2	1.2	CON	NO	WHOLE	
1437	H1B	DISC	6.2	1.2	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.1	1.8	ST	NO	WHOLE	
1437	H1B	DISC	5.9	1.2	1.7	CON	NO	WHOLE	
1437	H1B	DISC	6.7	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.1	1.6	ST	NO	WHOLE	
1437	H1B	DISC	6.8	1.5	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.4	0.9	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.7	0.9	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.3	1	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.1	1.2	ST	YES	WHOLE	
1437	H1B	DISC	7	1	1.8	ST	NO	WHOLE	
1437	H1B	DISC	7	1.2	1.3	CON	YES	WHOLE	
1437	H1B	DISC	5.9	0.6	1.4	CON	NO	WHOLE	
1437	H1B	DISC	6.8	0.9	1.6	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1.6	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1	1.3	ST	YES	WHOLE	
1437	H1B	DISC	5.8	0.8	1.6	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1	1.6	CON	NO	WHOLE	
1437	H1B	DISC	6.3	1.3	1.7	BI	NO	WHOLE	
1437	H1B	DISC	7	1.4	1.6	BI	NO	WHOLE	
1437	H1B	DISC	6.4	1	1.2	CON	NO	WHOLE	
1437	H1B	DISC	7.1	1	1.6	CON	NO	WHOLE	
1437	H1B	DISC	6.7	1.5	1.7	ST	NO	WHOLE	
1437	H1B	DISC	7	1.1	1.1	ST	YES	WHOLE	
1437	H1B	DISC	6.9	1	1.4	CON	YES	WHOLE	
1437	H1B	DISC	6.3	1.2	1.8	CON	YES	WHOLE	
1437	H1B	DISC	6.8	1.2	1.7	CON	YES	WHOLE	
1437	H1B	DISC	6.5	1	1.7	ST	YES	WHOLE	
1437	H1B	DISC	6.4	0.9	1.6	CON	YES	WHOLE	
1437	H1B	DISC	5.7	1.2	1.5	CON	YES	WHOLE	
1437	H1B	DISC	6.7	1	1.4	ST	YES	WHOLE	
1437	H1B	DISC	6.6	1	1.8	ST	YES	WHOLE	
1437	H1B	DISC	6	0.9	1.5	ST	YES	WHOLE	
1437	H1B	DISC	6.7	1	1.8	ST	YES	WHOLE	
1437	H1B	DISC	6.8	1	1.8	ST	YES	WHOLE	
1437	H1B	DISC	6.5	1.4	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.1	1	1.2	ST	NO	WHOLE	
1437	H1B	DISC	6.8	0.9	1.3	ST	YES	WHOLE	
1437	H1B	DISC	6.4	1	1.5	ST	YES	WHOLE	
1437	H1B	DISC	6.4	1	1.5	ST	YES	WHOLE	
1437	H1B	DISC	6.5	1.2	1.5	ST	YES	WHOLE	
1437	H1B	DISC	6.6	0.8	1.3	ST	YES	WHOLE	
1437	H1B	DISC	6.3	1.2	1.6	BI	YES	WHOLE	
1437	H1B	DISC	6.7	1.1	1.7	ST	YES	FRAG.	
1437	H1B	DISC	6.6	0.8	1.4	ST	YES	WHOLE	
1437	H1B	DISC	6	1	1.4	ST	YES	WHOLE	
1437	H1B	DISC	6.8	0.9	1.7	ST	YES	WHOLE	
1437	H1B	DISC	6.2	1	1.4	ST	YES	WHOLE	
1437	H1B	DISC	6.9	1.3	1.3	ST	NO	WHOLE	
1437	H1B	DISC	6.3	0.9	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.3	1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.1	0.7	1.4	ST	NO	WHOLE	
1437	H1B	DISC	7.3	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.1	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	5.8	0.8	1.7	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1	1.7	ST	NO	WHOLE	

1437	H1B	DISC	6.8	0.9	1.8	ST	NO	WHOLE	
1437	H1B	DISC	7.2	1.2	1.9	ST	NO	WHOLE	
1437	H1B	DISC	6.3	1	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.6	1	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1	1.8	ST	NO	WHOLE	
1437	H1B	DISC	5.8	0.6	1.6	ST	NO	WHOLE	
1437	H1B	DISC	6.8	0.9	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.5	0.8	1.4	ST	NO	WHOLE	
1437	H1B	DISC	7.3	1.1	1.8	BI	NO	WHOLE	
1437	H1B	DISC	7.2	1	1.6	BI	NO	WHOLE	
1437	H1B	DISC	6.2	0.8	1.5	BI	NO	WHOLE	
1437	H1B	DISC	6.6	1.2	1.7	BI	NO	WHOLE	
1437	H1B	DISC	6.1	0.9	1.7	BI	NO	WHOLE	
1437	H1B	DISC	6.9	1.2	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.9	0.7	1.5	ST	NO	WHOLE	
1437	H1B	DISC	7	1.2	1.5	BI	NO	WHOLE	
1437	H1B	DISC	6.8	1.1	1.4	BI	NO	WHOLE	
1437	H1B	DISC	6.6	0.8	1.7	CON	NO	WHOLE	
1437	H1B	DISC	7	1.2	1.6	CON	NO	WHOLE	
1437	H1B	DISC	5.7	1.4	1.4	ST	NO	WHOLE	
1437	H1B	DISC	7.1	1.1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	7.8	0.9	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.7	1.1	1.6	BI	NO	WHOLE	
1437	H1B	DISC	6.4	0.9	1.3	CON	NO	WHOLE	
1437	H1B	DISC	6.3	0.8	1.3	CON	NO	WHOLE	
1437	H1B	DISC	6.8	1	1.5	BI	NO	WHOLE	
1437	H1B	DISC	6	0.8	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.3	0.9	1.5	CON	NO	WHOLE	
1437	H1B	DISC	6.3	1	1.5	ST	NO	WHOLE	
1437	H1B	DISC	5.2	0.8	1.3	CON	NO	WHOLE	
1437	H1B	DISC	6	1.1	1.2	BI	NO	WHOLE	
1437	H1B	DISC	6.6	1	1.5	CON	NO	WHOLE	
1437	H1B	DISC	6.6	1.1	1.2	ST	NO	WHOLE	
1437	H1B	DISC	6.4	0.9	1.3	ST	NO	WHOLE	
1437	H1B	DISC	7.1	0.6	1.5	CON	NO	WHOLE	
1437	H1B	DISC	6.6	0.9	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.7	0.9	1.3	ST	NO	WHOLE	
1437	H1B	DISC	5.4	0.8	1.4	ST	NO	WHOLE	
1437	H1B	DISC	7	1.3	1.6	ST	NO	WHOLE	
1437	H1B	DISC	6.5	1.1	1.4	ST	NO	WHOLE	
1437	H1B	DISC	6.4	0.9	1.7	BI	NO	WHOLE	
1437	H1B	DISC	6.6	0.8	1.5	ST	NO	WHOLE	
1437	H1B	DISC	6.5	0.8	1.8	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1.1	1.4	ST	YES	WHOLE	
1437	H1B	DISC	6.5	1.3	1.2	ST	YES	WHOLE	
1437	H1B	DISC	5.7	1	0.8	ST	NO	FRAG.	
1437	H1B	DISC	6.7	1.1	1.8	CON	NO	WHOLE	
1437	H1B	DISC	6.8	1.3	1.7	CON	YES	WHOLE	
1437	H1B	DISC	6.3	1	1.8	CON	YES	WHOLE	
1437	H1B	DISC	6.7	1.5	1.4	BI	YES	WHOLE	
1437	H1B	DISC	6	1.6	1.9	CON	YES	WHOLE	
1437	H1B	DISC	6.7	1.1	1.4	ST	YES	WHOLE	
1437	H1B	DISC	6.6	1	1.9	BI	YES	WHOLE	
1437	H1B	DISC	6.5	0.7	2	CON	NO	WHOLE	
1437	H1B	DISC	6.5	1.4	2	CON	YES	WHOLE	
1437	H1B	DISC	6.4	1	1.9	ST	YES	FRAG.	
1437	H1B	DISC	6.9	1	1.3	ST	NO	WHOLE	
1437	H1B	DISC	6.8	0.9	2.1	ST	YES	WHOLE	
1437	H1B	DISC	6.6	1	2	ST	YES	WHOLE	
1437	H1B	DISC	7	0.8	1.7	CON	YES	FRAG.	
1437	H1B	DISC	6.1	0.9	1.8	CON	YES	WHOLE	
1437	H1B	DISC	5.8	1.8	1.4	CON	YES	WHOLE	
1437	H1B	DISC	5.3	0.7	1.9	ST	NO	WHOLE	
1437	H1B	DISC	6.2	0.9	1.7	ST	YES	WHOLE	
1437	H1B	DISC	6.8	0.9	2.1	ST	YES	WHOLE	OFF-SET
1437	H1B	DISC	5.4	0.9	1.6	ST	YES	WHOLE	

1437	H1B	DISC	6.2	1.1	1.9	ST	YES	FRAG.	
1437	H1B	DISC	5.6	0.8	1.5	ST	YES	WHOLE	
1437	H1B	DISC	7.3	1.2	1.5	BI	YES	WHOLE	
1437	H1B	DISC	6.9	1.3	1.5	ST	YES	WHOLE	
1437	H1B	DISC	6.5	0.9	1.6	ST	YES	WHOLE	
1437	H1B	DISC	5.7	0.9	1.5	ST	YES	WHOLE	
1437	H1B	DISC	5.7	0.9	1.5	ST	YES	WHOLE	
1437	H1B	DISC	6	0.6	1.3	ST	NO	WHOLE	
1437	H1B	DISC	6.1	0.9	1.5	BI	YES	WHOLE	
1437	H1B	DISC	6.7	1.1	1.2	BI	YES	WHOLE	
1437	H1B	DISC	6.5	1.4	1.5	ST	YES	WHOLE	
1437	H1B	DISC	6.4	1.2	2	CON	YES	WHOLE	
1437	H1B	DISC	6.5	1	1.5	CON	YES	WHOLE	
1437	H1B	DISC	5.9	0.9	1.9	CON	YES	WHOLE	
1437	H1B	DISC	7	1.1	1.8	CON	YES	WHOLE	OFF-SET
1437	H1B	DISC	6.6	1.3	1.9	CON	YES	WHOLE	NIBBLING
1437	H1B	DISC	6.7	1.2	1.8	BI	YES	WHOLE	
1437	H1B	DISC	6.3	0.8	2	ST	YES	WHOLE	
1437	H1B	DISC	6.7	1	1.8	ST	YES	WHOLE	
1437	H1B	DISC	6.4	1.1	1.9	ST	NO	WHOLE	OFF-SET
1437	H1B	DISC	6.9	1	1.7	CON	NO	WHOLE	
1437	H1B	DISC	7	1	1.6	ST	YES	FRAG.	
1437	H1B	DISC	6.7	1	1.7	ST	YES	WHOLE	
1437	H1B	DISC	6.5	1.2	2.1	CON	YES	WHOLE	
1437	H1B	DISC	6.9	1.4	1.3	ST	YES	WHOLE	
1437	H1B	DISC	5.5	1	1.6	ST	YES	WHOLE	
1437	H1B	DISC	7.3	1.1	1.7	**CON**	NO	WHOLE	
1437	H1B	DISC	6.4	1.4	1.2	BI	YES	WHOLE	
1437	H1B	DISC	6.5	0.9	1.6	CON	NO	WHOLE	
1437	H1B	DISC	7.8	1.2	1.8	ST	YES	WHOLE	
1437	H1B	DISC	5.8	0.6	1.2	ST	NO	WHOLE	
1437	H1B	DISC	6.4	1.1	1.4	ST	YES	WHOLE	NIBBLING
1437	H1B	DISC	5.8	0.9	1.4	ST	NO	WHOLE	
1437	H1B	DISC	7	1.2	1.5	BI	NO	WHOLE	
1437	H2	DISC	6.8	1	2.3	ST	NO	WHOLE	
1437	H2	DISC	6.5	1.2	1.7	ST	NO	WHOLE	
1437	H2	DISC	5.4	0.7	1.7	ST	NO	WHOLE	
1437	H2	DISC	6.1	1	1.5	ST	NO	WHOLE	
1437	H2	DISC	6.5	0.9	1.5	ST	NO	WHOLE	
1437	H2	DISC	6.1	0.9	1.5	ST	NO	WHOLE	OFF-SET
1437	H2	DISC	5.7	1.7	1.6	ST	NO	WHOLE	
1437	H2	DISC	6.9	0.9	1.6	BI	NO	WHOLE	
1437	H2	DISC	6.3	1.1	1.7	ST	NO	WHOLE	
1437	H2	DISC	6	1.1	1.8	ST	NO	WHOLE	
1437	H2	DISC	6.6	0.9	1.5	ST	NO	WHOLE	
1437	H2	DISC	5.7	1	1.2	ST	NO	WHOLE	
1437	H2	DISC	7.1	1	1.4	ST	NO	WHOLE	
1437	H2	DISC	6.8	1.2	1.7	ST	NO	WHOLE	
1437	H2	DISC	6.2	0.6	1.5	ST	NO	WHOLE	
1437	H2	DISC	6	0.7	1.4	ST	NO	WHOLE	
1437	H2	DISC	6.7	1.3	1.5	CON	NO	WHOLE	
1437	H2	DISC	5.6	0.8	1.5	CON	NO	WHOLE	
1437	H2	DISC	6.5	1.2	1.5	ST	NO	WHOLE	
1437	H2	DISC	6.1	0.7	1.4	ST	NO	WHOLE	
1437	H2	DISC	6.4	0.9	1.2	ST	NO	WHOLE	
1437	H2	DISC	5.6	0.7	1.5	ST	NO	WHOLE	NIBBLING
1437	H2	DISC	6	1.3	1.6	ST	NO	WHOLE	
1437	H2	DISC	6.5	1.3	1.7	BI	YES	WHOLE	
1437	H2	DISC	7	0.9	1.9	BI	YES	WHOLE	
1437	H2	DISC	7.5	0.9	1.6	ST	YES	WHOLE	
1437	H2	DISC	6.5	1	1.6	CON	YES	WHOLE	
1437	H2	DISC	7.3	1	2.1	CON	YES	WHOLE	
1437	H2	DISC	5.8	0.8	1.5	CON	YES	FRAG.	
1437	H2	DISC	5.9	0.9	1.7	CON	YES	WHOLE	NIBBLING
1437	H2	DISC	5.9	0.7	2	ST	YES	WHOLE	
1437	H2	DISC	4.7	1.1	1.5	ST	YES	WHOLE	

1437	H2	DISC	6.5	1.1	1.3	CON	YES	WHOLE	
1437	H2	DISC	6	1	1.3	CON	YES	WHOLE	
1437	H2	DISC	6.8	1.1	1.5	ST	YES	WHOLE	
1437	H2	DISC	6.2	0.7	1.5	ST	YES	WHOLE	
1437	H2	DISC	6.3	1.1	1.7	BI	NO	WHOLE	
1437	H2	DISC	5.6	1.2	1.6	CON	YES	WHOLE	
1437	H2	DISC	6.6	1.2	1.4	ST	YES	WHOLE	
1437	H2	DISC	6.1	1	2.1	ST	YES	WHOLE	
1437	H2	DISC	6.2	1	1.6	ST	YES	WHOLE	
1437	H3	DISC	5.7	1.1	1.4	ST	NO	WHOLE	
1437	H3	DISC	7	1.1	1.3	CON	YES	WHOLE	NIBBLING
1437	HIB	DISC	7	1	1.9	ST	NO	WHOLE	
1437	J	DISC	6.7	1	1.5	BI	NO	WHOLE	
1437	J	DISC	6.9	1.5	1.6	BI	NO	WHOLE	
1437	K1	CUPPED	6.8	2	1.5	BI	NO	WHOLE	
1437	K1	CUPPED	6.7	2.3	1.5	CON	YES	WHOLE	
1437	K1	CUPPED	6.9	2.1	2	CON	YES	WHOLE	
1437	K1	CUPPED	6.3	2.1	1.4	CON	NO	WHOLE	
1437	K1	CUPPED	6.5	1.9	1.4	CON	NO	WHOLE	
1437	K1	CUPPED	6.2	2	1.6	CON	YES	WHOLE	
1437	K1	CUPPED	6.8	1.8	1.4	BI	YES	WHOLE	
1437	K1	CUPPED	6.8	2.1	1.7	CON	YES	FRAG.	
1437	K1	CUPPED	6.8	2	1.5	CON	YES	WHOLE	
1437	K3	CUPPED	6.3	2.1	1.7	CON	YES	WHOLE	
1437	STONE	DISC	5.8	1.4	2.2		NO	WHOLE	

SDI-901

Feature	Class	Type	Diameter	Thickness	Hole Size	Hole Shape	Burnt	Condition	Comments
W-263-1966	E1A	LIPPED	5.5	2.3	1.7	ST	YES	WHOLE	
W-263-1966	G1	SAUCER	4	0.4	0.8	CON	YES	FRAG	
W-263-1966	G1	SAUCER	4.1	0.5	0.6	?	YES	WHOLE	
W-263-1966	G1B	SAUCER	4.2	0.5	0.8	CON	YES	WHOLE	
W-263-1966	H1A	DISC	5.3	0.9	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.9	1	1.1	ST	YES	FRAG	
W-263-1966	H1A	DISC	5.3	1	1.1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	6	1.3	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.2	0.9	0.7	ST	YES	FRAG	
W-263-1966	H1A	DISC	4.8	1.3	0.7	ST	YES	WHOLE	
W-263-1966	H1A	DISC	6	1.3	1.2	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.2	1.1	1.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	4.9	1.2	0.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.1	1.1	0.6	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.6	1.1	1.1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.6	0.9	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.5	1.4	0.9	ST	YES	WHOLE	
W-263-1966	H1A	DISC	4.6	0.9	0.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5	1	0.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.2	1.3	0.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.8	1.1	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	4.9	0.8	0.6	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.5	0.9	0.7	ST	YES	WHOLE	

W-263-1966	H1A	DISC	4.5	0.7	0.9	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.9	0.9	0.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5	0.9	0.5	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.1	0.8	0.6	ST	YES	WHOLE	
W-263-1966	H1A	DISC	6.1	0.7	0.4	ST	YES	WHOLE	
W-263-1966	H1A	DISC	6	0.8	0.9	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.1	1.1	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.1	1.1	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.6	1.4	1.1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	4.5	1.3	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.5	1.1	0.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.5	1.1	0.6	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.4	1.8	0.9	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.8	1.2	0.6	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.1	1.4	0.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.3	1.2	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.2	1	1.1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.4	1.2	0.7	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.3	1.1	1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	4.5	1	0.8	ST	YES	WHOLE	
W-263-1966	H1A	DISC	6.2	1.2	1.1	ST	YES	WHOLE	
W-263-1966	H1A	DISC	5.8	1.2	1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.3	1.2	0.6	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.2	1.1	0.5	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.3	1.1	0.4	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.9	1.3	0.9	ST	YES	WHOLE	
W-263-1966	H1b	DISC	6.1	1.6	0.7	ST	YES	WHOLE	
W-263-1966	H1b	DISC	6.4	1.3	0.5	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.1	1.1	1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.2	0.9	0.6	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5	1	1.6	ST	YES	WHOLE	
W-263-1966	H1b	DISC	4.9	1.1	0.6	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.1	1.1	0.9	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.5	0.8	0.7	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5	1.1	0.5	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.3	1.7	0.6	CON	YES	WHOLE	
W-263-1966	H1b	DISC	6.1	1.4	0.8	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.5	1.1	0.7	ST	YES	WHOLE	
W-263-1966	H1b	DISC	4.7	0.7	1.4	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.5	0.9	0.6	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.3	1	0.7	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.2	1.2	1	BI	YES	WHOLE	
W-263-1966	H1b	DISC	5.6	1	0.9	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.4	0.8	1	CON	YES	WHOLE	
W-263-1966	H1b	DISC	5.3	1.4	1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.9	1.3	1.1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.6	1.6	0.9	ST	YES	WHOLE	
W-263-1966	H1b	DISC	4.9	0.8	1.3	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.5	1	1	ST	YES	WHOLE	

W-263-1966	H1b	DISC	5.5	0.6	1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.3	1	1.1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.5	0.9	1.2	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.7	0.7	1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5	1	1.3	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.4	0.8	1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5	1.4	0.7	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.6	0.9	0.9	ST	YES	FRAG	
W-263-1966	H1b	DISC	5.6	1.4	1.1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.5	0.9	1.2	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.7	1.3	1	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.4	0.9	0.8	ST	YES	WHOLE	NIBBLING
W-263-1966	H1b	DISC	5	1.3	0.9	ST	YES	WHOLE	
W-263-1966	H1b	DISC	5.3	1.3	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.3	0.9	1.3	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.7	0.9	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5	0.8	1.2	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.8	0.9	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	6.5	1	1.4	ST	YES	FRAG	
W-263-1966	H1B	DISC	5.6	1.1	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	6	1.2	1.3	ST	YES	FRAG	
W-263-1966	H1B	DISC	5.7	1.6	1	ST	YES	FRAG	
W-263-1966	H1B	DISC	6	1	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	1.3	1.2	ST	YES	FRAG	
W-263-1966	H1B	DISC	5.7	1.4	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.5	0.9	0.8	ST	YES	WHOLE	NIBBLING
W-263-1966	H1B	DISC	5.6	0.9	1.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.3	1.1	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	6	1.2	1.3	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.3	1.1	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	0.8	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.6	0.8	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.5	0.6	1.2	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.8	1.3	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.4	1.1	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.2	0.6	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.8	1.1	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.3	0.9	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.3	0.5	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.8	1.2	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.5	0.8	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	6.3	1.3	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.8	1.2	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.6	1	1.2	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.8	0.8	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	0.8	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	0.6	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	1	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.9	1	0.5	ST	YES	WHOLE	

W-263-1966	H1B	DISC	5.2	1.1	0.4	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.1	0.9	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.7	1.3	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.9	1.5	0.4	CON/ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.7	1	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.8	1.1	1.1	ST	YES	WHOLE	NIBBLING
W-263-1966	H1B	DISC	4.9	1.2	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.6	1.4	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.6	1.1	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.6	0.7	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.4	1.4	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.1	1.1	0.5	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.8	1.3	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.4	1.3	1	ST	YES	WHOLE	NIBBLING
W-263-1966	H1B	DISC	5.5	0.9	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.5	0.9	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	1.1	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.7	1	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.5	1.2	1	ST	YES	WHOLE	NIBBLING
W-263-1966	H1B	DISC	5.9	0.9	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.9	1.5	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	6.2	1.1	1.2	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.9	1.7	1.1	ST	YES	WHOLE	OFF-SET
W-263-1966	H1B	DISC	5.6	0.8	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.4	1	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.4	1	0.7	ST	YES	WHOLE	NIBBLING
W-263-1966	H1B	DISC	5.7	0.8	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	6	1	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	6.1	1.4	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.5	1.1	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.4	1.1	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.6	1	1.2	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.8	1.2	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.2	0.7	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.9	1	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.1	1.2	0.9	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	1.2	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.3	1.1	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	1.1	0.5	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.8	0.8	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5	1.1	1	ST	YES	WHOLE	
W-263-1966	H1B	WALL DISC	6.2	1.1	0.9	CON	YES	WHOLE	
W-263-1966	H1B	DISC	4.6	1.1	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.1	1.3	0.9	ST	YES	WHOLE	
W-263-1966	H1B	CUPPED	4.3	1.5	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.9	1.1	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.3	0.9	0.4	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.8	1.6	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.9	0.9	1	ST	YES	WHOLE	

W-263-1966	H1B	CUPPED	5.6	1.7	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	1.9	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.8	1.2	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.7	1.2	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.4	1.4	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.2	0.6	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.6	1.3	1.1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	4.8	0.9	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.3	1	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.6	1.4	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.7	1.1	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.4	0.8	1	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.8	1.2	0.7	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.1	0.7	0.8	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.7	1.2	0.6	ST	YES	WHOLE	
W-263-1966	H1B	DISC	5.6	1	0.7	ST	YES	WHOLE	
W-263-1966	H2	DISC	5	1	0.7	ST	YES	WHOLE	NIBBLING
W-263-1966	H2	DISC	6	1	1.1	ST	YES	WHOLE	
W-263-1966	H2	DISC	5.3	1.1	1.1	ST	YES	WHOLE	
W-263-1966	H2	DISC	5.5	1.6	0.7	ST	YES	WHOLE	
W-263-1966	H2	DISC	5	1.1	0.6	ST	YES	WHOLE	
W-263-1966	H2	DISC	6.3	1.6	0.9	ST	YES	WHOLE	
W-263-1966	H2	DISC	6.7	1	1.2	ST	YES	WHOLE	
W-263-1966	J	DISC	5.5	0.8	1.1	CON	YES	WHOLE	
W-263-1966	J	DISC	5.3	0.8	0.9	BI	YES	WHOLE	
W-263-1966	J	DISC	5.5	0.8	1	CON	YES	WHOLE	
W-263-1966	J	DISC	6.1	1.3	1.2	CON	YES	WHOLE	
W-263-1966	J	DISC	5.1	1.5	1.4	CON	YES	WHOLE	
W-263-1966	J	DISC	5.5	1.1	1.1	CON	YES	WHOLE	
W-263-1966	K1	CUPPED	6.2	2.2	1.1	CON	YES	WHOLE	
W-263-1966	K3	CYLINDER	5.4	0.9	0.7	ST	YES	WHOLE	
W-263-1966	K3	CYLINDER	4.5	1.5	0.5	BICON	YES	WHOLE	

SDI-106

Feature	Class	Type	Diameter	Thickness	Hole Size	Hole Shape	Burnt	Condition	Comments
C-144-51	B3	BARREL	10.6	15.5		ST	NO	WHOLE	
C-144-54	E1B	LIPPED	6	2.5	2	ST	YES	WHOLE	ERRATIC
C-144-54	H1A	DISC	6.1	1.2	1.6	ST	YES	WHOLE	
C-144-54	H1A	DISC	6.4	1.7	1.7	ST	YES	WHOLE	
C-144-54	H1A	DISC	6	1.1	1.6	ST	YES	WHOLE	
C-144-54	H1A	DISC	6.2	0.9	1.6	ST	YES	WHOLE	
C-144-54	H1A	DISC	6.2	1.7	1.1	ST	?	WHOLE	
C-144-54	H1A	DISC	6.6	1.3	1.3	ST	?	WHOLE	
C-144-54	H1A	DISC	6.1	1.1	1.4	ST	?	WHOLE	
C-144-54	H1A	DISC	6.3	1.2	1.7	ST	?	WHOLE	
C-144-51	H1A	DISC	5.7	1.1	1.5	ST	YES	WHOLE	
C-144-51	H1A	DISC	6.2	1	1.3	?	YES	WHOLE	
C-144-51	H1A	DISC	6.5	1	1.9	ST	YES	WHOLE	
C-144-51	H1A	DISC	6	1.1	2.4	ST	YES	WHOLE	OFF-SET
C-144-51	H1A	DISC	6.3	1.1	1.3	ST	YES	WHOLE	
C-144-51	H1A	DISC	5.8	1	1.8	ST	YES	WHOLE	

C-144-54	H1A	DISC	6.1	0.9	1.2	ST	NO	WHOLE	
C-144-54	H1A	DISC	5.9	1.2	0.9	ST	NO	WHOLE	
C-144-54	H1A	DISC	6.5	0.8	1.2	ST	NO	WHOLE	
C-144-54	H1A	DISC	7	0.7	1.6	ST	YES	WHOLE	
C-144-54	H1A	DISC	6.4	1.1	1.3	ST	YES	WHOLE	
C-144-54	H1A	DISC	6.1	0.9	1.5	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.5	1.3	1.4	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.4	1.2	1.5	ST	YES	WHOLE	
C-144-54	H1B	DISC	6	1.3	1.6	ST	YES	WHOLE	
C-144-54	H1B	DISC	6	0.9	1.6	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.6	1.9	1.5	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.8	1.6	1.2	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.7	1.3	1.2	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.6	1.4	1.3	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.3	1.4	1.7	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.1	1.5	1.6	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.6	1.3	1.8	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.4	1.2	1.6	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.4	1.5	1.4	ST	YES	WHOLE	
C-144-54	H1B	DISC	5.6	1.1	1.5	ST	?	WHOLE	
C-144-54	H1B	DISC	6.5	1.1	1.5	ST	?	WHOLE	
C-144-54	H1B	DISC	6.3	1.1	1.8	ST	?	WHOLE	
C-144-54	H1B	DISC	6.5	0.9	1.6	ST	?	WHOLE	
C-144-54	H1B	DISC	5.2	1.1	1.5	ST	?	WHOLE	
C-144-51	H1B	DISC	6.4	1.3	0.8	ST	YES	WHOLE	
C-144-51	H1B	DISC	6.6	1	1.4	ST	YES	WHOLE	
C-144-51	H1B	DISC	5.6	1.6	1.7	ST	YES	WHOLE	
C-144-51	H1B	DISC	6.6	1.1	1.3	ST	YES	WHOLE	
C-144-51	H1B	DISC	5.9	1	1.2	ST	YES	WHOLE	
C-144-51	H1B	DISC	4.9	1.2	1.5	ST	YES	WHOLE	OFF-SET
C-144-51	H1B	DISC	6.3	1.2	1.6	ST	YES	WHOLE	
C-144-51	H1B	DISC	6.5	0.8	1.5	ST	YES	WHOLE	
C-144-51	H1B	DISC	6	1	1.4	ST	YES	WHOLE	
C-144-51	H1B	DISC	6	0.8	1.5	ST	YES	WHOLE	
C-144-51	H1B	DISC	5.4	0.9	1.6	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.6	1.3	1	ST	NO	WHOLE	
C-144-54	H1B	DISC	6.6	1	1.2	ST	NO	WHOLE	
C-144-54	H1B	DISC	5.7	1.2	0.9	ST	NO	WHOLE	
C-144-54	H1B	DISC	6.6	1	1.2	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.8	0.9	1.5	ST	YES	FRAG	
C-144-54	H1B	DISC	6.5	1.1	1.3	ST	YES	WHOLE	
C-144-54	H1B	DISC	6.3	1.3	1.5	ST	YES	WHOLE	
C-144-54	H1B	DISC	5.2	1.1	1.5	ST	?	WHOLE	
C-144-54	H2	DISC	6.8	1.3	1.3	ST	YES	WHOLE	
C-144-54	H2	DISC	6.8	1.6	2.3	ST	YES	WHOLE	
C-144-51	H2	DISC	5.3	0.9	1.6	ST	YES	WHOLE	
C-144-51	H2	DISC	6.7	1.1	1.7	ST	YES	WHOLE	
C-144-54	H2	DISC	6.6	1	1.2	ST	NO	WHOLE	
C-144-54	H2	DISC	6.5	1.2	1.1	ST	NO	WHOLE	
C-144-54	H2	DISC	6.9	0.9	1.2	ST	NO	WHOLE	
C-144-54	H2	DISC	7.1	1.3	1.5	ST	YES	FRAG	
C-144-54	H2	DISC	7	1.7	1	ST	YES	WHOLE	
C-144-54	H2	DISC	6.8	1	1.4	ST	YES	FRAG	
C-144-54	H2	DISC	7.3	1.3	1.3	ST	YES	FRAG	
C-144-54	H2	DISC	6	1.1	1.2	ST	YES	WHOLE	
C-144-54	H2	DISC	7	1.5	1.2	ST	YES	WHOLE	
C-144-54	H2	DISC	7	1.5	1.2	ST	YES	WHOLE	
C-144-54	H2	DISC	6.7	0.9	1.4	ST	YES	WHOLE	
C-144-54	H2	DISC	6.5	1	1.3	ST	YES	WHOLE	
C-144-54	H2	DISC	6.5	1	1.3	ST	YES	WHOLE	
C-144-54	H2	DISC	6.5	0.9	1.5	ST	YES	WHOLE	
C-144-54	H2	DISC	6.4	1.1	1.2	ST	YES	WHOLE	
C-144-51	H3	DISC	7.1	1.5	1.6	ST	YES	WHOLE	
BROTT	GLASS	VARIED	24 BEADS					LATE	
BROTT	GLASS	FACETED	7.8	6.5	3.5		NO	MILLE	

BROTT	GLASS	FACETED	5.1	4.7	2.7		NO	WHITE	
BROTT	GLASS	SPHERICAL	6.4	6.5	2.7		NO	BLUE	
BROTT	GLASS	FACETED	6.2	6.4	3.2		NO	WHITE	
BROTT	GLASS	FACETED	5.6	5	2.2		NO	BLACK	
BROTT	E3C	LIPPED	7.7	3.1	2.1		NO		
BROTT	H2	DISC	7	1.2	2.2	ST	NO		
BROTT	H2	DISC	>100						
BROTT	H3	DISC	6.3	1.4	2.2	CON	NO		
BROTT	GLASS	CANE	60-70					VARIED	

VEN-1222H

Feature	Class	Type	Diameter	Thickness	Hole Size	Hole Shape	Burnt	Condition	Comments
N0/W8	A1	LOPPED	6.2	9.2	2.7		NO	WHOLE	
N1/W7	A1	LOPPED	8.8	14.4	2.6		NO	WHOLE	
S19/W1	AV3	TUBE	5.5	16			NO	FRAG	
N1/W7	BB								
S19/W1	BB	DISC	7	1.1			NO		
N0/W8	CANE	GLASS	3.4	2.7	1.8			WHOLE	
N1/W7	CANE	GLASS	6.9	4	2		NO	WHOLE	
N1/W7	CANE	GLASS	3.1	3			NO	WHOLE	
N1/W7	CANE	GLASS	3.8	3.5			NO	WHOLE	
N1/W7	CANE	GLASS	3.1	3			NO	WHOLE	
N1/W7	CANE	GLASS	3.8	2.5			NO	WHOLE	
N1/W7	CANE	GLASS	4.1	3.4	1.6		NO	WHOLE	
N1/W7	CANE	GLASS						FRAG	
N1/W7	CANE	GLASS	4.9	5.1	2		NO	WHOLE	
S72/E8	CANE	GLASS	2.7	1.7	0.8		NO	WHOLE	
S72/E8	CANE	GLASS	2.7	2.2	1		NO	WHOLE	
S19/W1	CANE	GLASS					YES	MELD	
S19/W1	CANE	GLASS	3.1	3.2			NO	WHOLE	
S19/W1	CANE	GLASS	6.4	5.4	3		NO	WHOLE	
S19/W1	CANE	GLASS	3.7	3.4	1.9		NO	WHOLE	
S19/W1	CANE	GLASS	3.5	2.4	1.9		NO	WHOLE	
S19/W1	CANE	GLASS	3.3	2.2	1.7		NO	WHOLE	
N0/W8	E1A	LIPPED	7.2x6.6	2	1.5	CON	NO	WHOLE	
N0/W8		DISC	5.5	2	2	BI	NO	WHOLE	HALIOTIS
N0/W8	E1A	LIPPED	6.2X6.8	2.5	1.2	CON	NO	WHOLE	
N0/W7	E1A	LIPPED	6.3	1.7	1.7	ST	NO	WHOLE	VENTRAL
N1/W7	E1A	LIPPED	5.5	2.1	1.2	ST	NO	WHOLE	
N1/W7	E1A	LIPPED	5.5	1.2	1.1	ST	NO	WHOLE	
N1/W7	E1A	LIPPED	6.6	1.8	1.4	CON	NO	WHOLE	
N1/W7	E1A	LIPPED	6.1	2.2	1.2	CON	NO	WHOLE	VENTRAL
N1/W7	E1A	LIPPED	6.6	2.2	1.6	CON	NO	WHOLE	
N1/W7	E1A	LIPPED	5.5	1.2	1.1	CON	NO	WHOLE	
N1/W7	E1A	LIPPED	6.6	1.8	1.4	ST	NO	WHOLE	
N1/W7	E1A	LIPPED	6.1	2.2	1.2	CON	NO	WHOLE	VENTRAL
N1/W7	E1A	LIPPED	6.6	2.2	1.6	CON	NO	WHOLE	
N1/W7	E1A	LIPPED	6.4	2	1.5	ST	NO	WHOLE	

N1/W8	E1A	LIPPED	6.3	1.1	2	CON	YES	WHOLE	
N1/W8	E1A	LIPPED	5.6	1.1	1.7	BI	NO	WHOLE	
N1/W8	E1A	LIPPED	6.6	1.3	1.4	CON	NO	WHOLE	
N1/W8	E1A	DISC	6.9	1.7	1.7	CON	NO	WHOLE	VENTRAL
S72/E8	E1A	LIPPED	6.8	2.1	1.7	CON	NO	WHOLE	VENTRAL
S72/E8	E1A	LIPPED	7.3	2.4	1.4	BI	NO	WHOLE	
S72/E8	E1A	LIPPED	5.9	1.5	1	ST	NO	WHOLE	
S72/E8	E1A	LIPPED	6.1	1.7	1.4	BI	NO	WHOLE	
S72/E8	E1A	LIPPED	6.2	1.8	1.3	BI	NO	WHOLE	
S72/E8	E1A	LIPPED	5.8	2	1.1	ST	NO	WHOLE	
S19/W1	E1A	LIPPED	6.2	1.8	1.4	ST	NO	WHOLE	
S19/W1	E1A	LIPPED	5	0.8	1.2	CON	NO	WHOLE	VENTRAL
S19/W1	E1A	LIPPED	6.8	2	1.8	CON	NO	WHOLE	VENTRAL
S19/W1	E1A	LIPPED	6.8	2.1	1.8	ST	NO	WHOLE	DORSAL
S19/W1	E1A	LIPPED	6.2	3.3	1.3	ST	NO	WHOLE	
S19/W1	E1A	LIPPED	6.7	1.5	1.5	CON	NO	WHOLE	
S19/W1	E1A	LIPPED	6.9	1.9	1.7	CON	NO	WHOLE	
N0/W8	E1B	LIPPED	6.3	2.3	1.7	CON	NO	WHOLE	
N1/W7	E1B	LIPPED	7.2	2.1	1.5	CON	NO	WHOLE	VENTRAL
N1/W7	E1B	LIPPED	7.2	2.2	2	CON	NO	WHOLE	VENTRAL
N1/W7	E1B	LIPPED	6.1	2	1.7	ST	NO	WHOLE	
N1/W7	E1B	LIPPED	7.2	2.1	1.5	CON	NO	WHOLE	VENTRAL
N1/W7	E1B	LIPPED	7.2	2.2	2	CON	NO	WHOLE	VENTRAL
N1/W7	E1B	LIPPED	6.1	2.4	1.6	CON	NO	WHOLE	VENTRAL
N1/W7	E1B	LIPPED	6.1	2	1.7	ST	NO	WHOLE	
N1/W7	E1B	LIPPED	6.3X7.1	2.2	2	CON	NO	WHOLE	
N1/W7	E1B	LIPPED	6.0X6.1	2.4	1.7	CON	NO	WHOLE	
N1/W8	E1B	LIPPED	6.8	3.1	1.9	CON	NO	WHOLE	VENTRAL
N1/W8	E1B	LIPPED	5.8	1.7	1.2	CON	NO	WHOLE	
N1/W8	E1B	LIPPED	5.3	2	1.7	CON	NO	WHOLE	VENTRAL
N1/W8	E1B	LIPPED	5.6	1.9	1.7	CON	NO	WHOLE	
S72/E8	E1B	LIPPED	5.2	1.3	1.7	ST	NO	WHOLE	
S72/E8	E1B	LIPPED	5.5	1.1	1	ST	NO	WHOLE	
S19/W1		BLANKS					NO	WHOLE	N=12
S19/W1	E1B	LIPPED	9.1	2.8	2	CON	NO	WHOLE	
S19/W1	E1B	LIPPED	7.1	2.7	1.5	ST	NO	WHOLE	
S19/W1	E1B	LIPPED	7.2	2.6	1.6	CON	NO	WHOLE	
S19/W1	E1B	LIPPED	6.6	2.2	1.2	CON	NO	WHOLE	
N0/W1	E2A	LIPPED	7.4X8.2	3	1.2	ST	NO	WHOLE	
N0/W7	E2A	DISC	7.5X7.5	2.7	1.7	CON	NO	WHOLE	
N0/W7	E2A	LIPPED	7.9X7.8	2.6	1.5	ST	NO	WHOLE	
N1/W7	E2A	LIPPED	7.7	4	2	CON	NO	WHOLE	VENTRAL
S19/W1	E2A	LIPPED	6.9	2.9	1.4	CON	NO	WHOLE	VENTRAL
S19/W1	E2A	DISC	6.6	2.4	1.7	BI	NO	WHOLE	
S19/W1	E2A	LIPPED	6.4	1.4	1.4	ST	NO	WHOLE	
N1/W7	E2B	LIPPED	7.3	2.9	1.6	CON	NO	WHOLE	VENTRAL
N1/W7	EIB	LIPPED	6.1	2.4	1.6	CON	NO	WHOLE	VENTRAL
S19/W1	GLOB	GLASS	6.9	5.7	2.9		NO	WHOLE	

N1/W7	H1	DISC	7.5	1.1	1.4	ST	NO	WHOLE	
N0/W8	H1A	DISC	7	0.8	1.1	ST	NO	WHOLE	
N0/W8	H1A	DISC	5.5	1.2	1	ST	NO	WHOLE	
N0/W8	H1A	DISC	3.6	0.9	0.8	ST	NO	WHOLE	
N0/W7	H1A	DISC	6.4	1.3	1.4	ST	NO	WHOLE	
N0/W7	H1A	DISC	6.3	1.3	1.4	ST	NO	WHOLE	
N0/W7	H1A	DISC	5.7	0.8	1.3	ST	NO	WHOLE	
N0/W7	H1A	DISC	5.5	1.1	1.1	ST	NO	WHOLE	
N1/W7	H1A	DISC	5.5	0.9	1.1	ST	NO	WHOLE	
N1/W7	H1A	DISC	5.5	0.9	1.1	ST	NO	WHOLE	
N1/W7	H1A	DISC	4.8	1.1	1.2	ST	NO	WHOLE	
N1/W7	H1A	DISC	5.5	1	1.5	ST	NO	WHOLE	
N1/W7	H1A	DISC	5.2	1.2	1	ST	NO	WHOLE	
N1/W7	H1A	DISC	3.3	0.6	1	ST	NO	WHOLE	
N1/W7	H1A	DISC	7.6	1.2	1.3	ST	NO	WHOLE	
N1/W7	H1A	DISC	7	1	1.4	ST	NO	WHOLE	
N1/W7	H1A	DISC	3.3	0.6	1	ST	NO	WHOLE	
N1/W7	H1A	DISC	7.6	1.2	1.3	ST	NO	WHOLE	
N1/W7	H1A	DISC	7	1	1.4	ST	NO	WHOLE	
N1/W8	H1A	DISC	6.9	1.3	1.4	ST	NO	WHOLE	
N1/W8	H1A	DISC	5.7	0.8	1.3	ST	NO	WHOLE	
N1/W8	H1A	DISC	6.2	1	1.4	ST	NO	WHOLE	
N1/W8	H1A	DISC	5.8	1.2	1.5	ST	NO	WHOLE	
N1/W8	H1A	DISC	5.6	0.8	1.2	ST	NO	WHOLE	
N1/W8	H1A	DISC	5.8	1.1	1.2	ST	NO	WHOLE	
S72/E8	H1A	DISC	5.9	1.1	1.4	ST	NO	WHOLE	
S72/E8	H1A	DISC	6	1.1	1	ST	NO	WHOLE	
S72/E8	H1A	DISC	5.8	0.9	1.2	ST	NO	WHOLE	
S72/E8	H1A	DISC	5.7	1.7	1.1	ST	NO	WHOLE	
S19/W1	H1A	DISC	6.2	1	1	ST	NO	WHOLE	
S19/W1	H1A	DISC	5	0.8	1	ST	NO	WHOLE	
N0/W8	H1A	DISC	5.5	2	2	BI	NO	WHOLE	HALIOTIS
S19/W1	H1A	DISC	5.7	1.1	1	ST	NO	WHOLE	
S19/W1	H1A	DISC	7.4	1	1.3	ST	NO	WHOLE	
S19/W1	H1A	DISC	6	0.9	1.2	ST	NO	WHOLE	
S19/W1	H1A	DISC	5.3	0.5	1.1	ST	NO	WHOLE	
S19/W1	H1A	DISC	5.6	0.9	1.5	ST	YES	WHOLE	
S19/W1	H1A	DISC	6.4	1.2	1.5	ST	NO	WHOLE	
S19/W1	H1A	DISC	5.7	0.8	1	ST	NO	WHOLE	NIBBLING
S19/W1	H1A	DISC	6.1	0.6	1.2	ST	NO	WHOLE	
S19/W1	H1A	DISC	5.8	1	1.2	ST	NO	WHOLE	
S25/8E	H1A	DISC	5.9	0.8	1.3	ST	NO	WHOLE	
S25/8E	H1A	DISC	5.2	1.2	1.2	ST	NO	WHOLE	
N0/W8	H1B	DISC	6.6	0.9	1.5	CON	NO	WHOLE	
N0/W8	H1B	DISC	5.5	0.8	1.1	ST	NO	WHOLE	
N0/W8	H1B	DISC	6.5	1	1.3	ST	NO	WHOLE	
N0/W1	H1B	DISC	6.5	1.3	1.3	ST	NO	WHOLE	
N0/W1	H1B	DISC	5.8	0.7	1.1	ST	NO	WHOLE	

N0/W/1	H1B	DISC	6.3	1.2	1.4	ST	NO	WHOLE	
N0/W1	H1B	DISC	6.5	1	1.5	ST	NO	WHOLE	
N0/W7	H1B	DISC	6.3	1.2	1.5	CON	NO	WHOLE	VENTRAL
N0/W7	H1B	DISC	6.2	0.8	2	CON	NO	WHOLE	
N0/W7	H1B	DISC	6.1	0.8	1.5	ST	NO	WHOLE	
N1/W7	H1B	DISC	6.1	0.8	1.1	ST	NO	WHOLE	
N1/W7	H1B	DISC	5.8	1.1	1.2	ST	NO	WHOLE	
N1/W7	H1B	DISC	4.7	1.3	1.4	ST	NO	WHOLE	
N1/W7	H1B	DISC	5.7	0.7	1.2	ST	NO	WHOLE	
N1/W7	H1B	DISC	5.6	0.9	1.2	ST	NO	WHOLE	
N1/W7	H1B	DISC	5.8	1	1.1	ST	NO	WHOLE	
N1/W7	H1B	DISC	5.3	0.8	1.3	ST	NO	WHOLE	
N1/W7	H1B	DISC	6.6	1.2	1.6	ST	NO	WHOLE	
N1/W7	H1B	DISC	5.8	1	1.1	ST	NO	WHOLE	
N1/W7	H1B	DISC	5.3	0.8	1.3	ST	NO	WHOLE	
N1/W7	H1B	DISC	6.6	1.2	1.6	ST	NO	WHOLE	
N1/W7	H1B	DISC	5.1	1.1	1.1	ST	NO	WHOLE	
N1/W7	H1B	DISC	7.2	0.9	1.4	ST	NO	WHOLE	
N1/W8	H1B	DISC	5.3	0.9	1.3	ST	NO	WHOLE	
N1/W8	H1B	DISC	6.1	1.1	1.2	ST	NO	WHOLE	
N1/W8	H1B	DISC	5.5	1.1	1.3	ST	NO	WHOLE	
N1/W8	H1B	DISC	5.9	1	1.4	ST	NO	WHOLE	
N1/W8	H1B	DISC	7.2	1.1	1.1	ST	NO	WHOLE	
N1/W8	H1B	DISC	6.6	1.5	1.6	ST	NO	WHOLE	
N1/W8	H1B	DISC	5.5	0.8	1.4	ST	NO	WHOLE	
N1/W8	H1B	DISC	6.1	0.8	1.1	ST	NO	WHOLE	
N1/W8	H1B	DISC	5.5	0.9	1.5	ST	NO	WHOLE	
N1/W8	H1B	DISC	6.6	1.3	1.4	ST	NO	WHOLE	
N1/W8	H1B	DISC	6.3	0.9	1.1	ST	NO	WHOLE	
N0/W8	H2	DISC	5.4	1.3	1.1	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.3	1.2	1.2	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.4	0.9	1	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.7	0.9	1	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.6	0.3	1	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.3	0.9	1.1	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.8	0.8	1.1	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.6	1	1.3	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.7	1.1	1	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.8	1.3	1.1	ST	NO	WHOLE	
S72/E8	H1B	DISC	5.6	1.2	1.1	ST	NO	WHOLE	
S19/W1	H1B	DISC	5.5	1	1	ST	NO	WHOLE	
S19/W1	H1B	DISC	6.6	0.7	1.4	ST	NO	WHOLE	L HOLE
S19/W1	H1B	DISC	6.3	1	1.4	ST	NO	WHOLE	
S19/W1	H1B	DISC	5.6	0.7	1.1	ST	NO	WHOLE	
S19/W1	H1B	DISC	5.5	1	1.3	CON	NO	WHOLE	
S19/W1	H1B	DISC	5.4	1	1.1	ST	NO	WHOLE	
S19/W1	H1B	DISC	6.9	1.1	1.5	ST	NO	WHOLE	
S19/W1	H1B	DISC	7.1	1	1.2	ST	NO	WHOLE	

S19/W1	H1B	DISC	5.3	1	1.1	ST	NO	WHOLE	
S19/W1	H1B	DISC	4.6	1	1.5	CON	NO	WHOLE	VENTRAL
S19/W1	H1B	DISC	6.3	1.1	1.4	ST	NO	WHOLE	
S25/8E	H1B	DISC	7.1	1	1.3	ST	NO	WHOLE	
S25/8E	H1B	DISC	6.3	1	1	ST	NO	WHOLE	
S25/8E	H1B	DISC	5.5	0.9	1.1	ST	NO	WHOLE	
S25/8E	H1B	DISC	5.2	1	1.5	ST	NO	WHOLE	
S25/8E	H1B	DISC	5.9	1.3	1.1	ST	NO	WHOLE	
S25/8E	H1B	DISC	5.8	1	1.6	ST	NO	WHOLE	
S25/8E	H1B	DISC	5.8	1	1	ST	NO	WHOLE	
S25/8E	H1B	DISC	6.2	1	1.1	ST	NO	WHOLE	
N0/W8	H2	DISC	5.9	1	1	ST	NO	WHOLE	
N0/W8	H2	DISC	6.6	1	1.1	ST	NO	WHOLE	
N0/W8	H2	DISC	6.3	0.8	1.5	ST	NO	WHOLE	
N0/W8	H2	DISC	5.3	1.1	1.1	ST	NO	WHOLE	
N0/W8	H2	DISC	6.7	1.9	1.7	ST	NO	WHOLE	
N0/W8	H2	DISC	5.8	0.8	0.8	CON	NO	WHOLE	
N0/W8	H2	DISC	6.6	1.1	1.1	ST	NO	WHOLE	
N0/W8	H2	DISC	5.6	0.9	1.1	ST	NO	WHOLE	
N0/W8	H2	DISC	7	1.1	1.1	ST	NO	WHOLE	
N0/W8	H2	DISC	6.6	0.8	1.9	CON	NO	WHOLE	
N0/W8	H2	DISC	5.4	1	1.3	ST	NO	WHOLE	
N0/W8	H2	DISC	5.2	0.8	1	ST	NO	WHOLE	
N0/W8	H2	DISC	5.2	1.1	1.3	ST	NO	WHOLE	
N0/W8	H2	DISC	5.8	1.1	1.1	ST	NO	WHOLE	
N0/W8	H2	DISC	6.3	1.1	1.3	ST	YES	WHOLE	
N0/W1	H2	DISC	7.9	1.3	1.5	ST	NO	WHOLE	
N0/W/1	H2	DISC	7.6	0.7	0.9	ST	NO	WHOLE	
N0/W1	H2	DISC	4.6	0.7	1.2	ST	NO	WHOLE	
N0/W7	H2	DISC	5.4	1.2	1.5	ST	NO	WHOLE	
N0/W7	H2	DISC	6.5	0.8	1.4	ST	NO	WHOLE	
N0/W7	H2	DISC	6.1	1.2	1.3	ST	NO	WHOLE	
N0/W7	H2	DISC	5.1	1	1.3	ST	NO	WHOLE	
N0/W7	H2	DISC	5.7	0.8	1.4	ST	NO	WHOLE	
N1/W7	H2	DISC	5.9	1.2	1.2	ST	NO	WHOLE	
N1/W7	H2	DISC	4.8	1	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	3.4	1.1	0.9	ST	NO	WHOLE	
N1/W7	H2	DISC	6.1	0.8	1	ST	NO	WHOLE	
N1/W7	H2	DISC	5.3	0.7	1.2	ST	NO	WHOLE	
N1/W7	H2	DISC	6.2	0.9	1.7	ST	NO	WHOLE	
N1/W7	H2	DISC	6	1	1.2	ST	NO	WHOLE	
N1/W7	H2	DISC	4.2	1.2	1.4	ST	NO	WHOLE	
N1/W7	H2	DISC	5.2	0.5	1.2	ST	NO	WHOLE	
N1/W7	H2	DISC	6.7	0.8	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	6.2	0.7	1.1	ST	NO	WHOLE	
N1/W7	H2	DISC	6.6	1.1	1.2	ST	NO	WHOLE	
N1/W7	H2	DISC	6.3	1.1	0.9	ST	NO	WHOLE	
N1/W7	H2	DISC	6.1	0.7	1.1	ST	NO	WHOLE	

N1/W7	H2	DISC	6.5	1.3	0.9	ST	NO	WHOLE	
N1/W7	H2	DISC	7.3	1.3	1.3	CON	NO	WHOLE	
N1/W7	H2	DISC	6.2	0.9	1.1	CON	NO	WHOLE	
N1/W7	H2	DISC	6.1	0.9	1.1	ST	NO	WHOLE	
N1/W7	H2	DISC	4.8	1	1	ST	NO	WHOLE	
N1/W7	H2	DISC	6	0.9	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	6.6	1.1	1.1	CON	NO	WHOLE	VENTRAL
N1/W7	H2	DISC	6.3	1.4	1.7	BI	NO	WHOLE	
N1/W7	H2	DISC	6.3	0.8	1.4	ST	NO	WHOLE	
N1/W7	H2	DISC	5.9	0.6	1.3	ST	YES	WHOLE	
N1/W7	H2	DISC	6.3	1	1.2	ST	NO	WHOLE	
N1/W7	H2	DISC	6.7	1.3	1.7	ST	NO	WHOLE	
N1/W7	H2	DISC	6.4	1.1	1.3			WHOLE	
N1/W7	H2	DISC	6	1	1.5	ST	NO	WHOLE	
N1/W7	H2	DISC	5.7	0.6	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	6	1.2	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	4.8	1	1.1	ST	NO	WHOLE	
N1/W7	H2	DISC	6	0.9	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	6.6	1.1	1.1	CON	NO	WHOLE	
N1/W7	H2	DISC	6.3	1.4	1.7	BI	NO	WHOLE	
N1/W7	H2	DISC	6.3	0.8	1.4	ST		WHOLE	
N1/W7	H2	DISC	5.9	0.6	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	5.7	1.1	1.3	ST	NO	WHOLE	
N0/W8	H2	DISC	5.5	2	2	BI	NO	WHOLE	HALIOTIS
N1/W7	H2	DISC	6.3	0.7	1.3	ST	YES	WHOLE	
N1/W7	H2	DISC	6.3	1	1.2	ST	NO	WHOLE	
N1/W7	H2	DISC	6.7	1.3	1.7	ST	NO	WHOLE	
N1/W7	H2	DISC	6.4	1.1	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	6	1	1.5	CON	NO	WHOLE	VENTRAL
N1/W7	H2	DISC	5.7	0.6	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	6	1.2	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	6.1	1.2	1.1	ST	NO	WHOLE	
N1/W7	H2	DISC	6.2	1.1	1.1	ST	NO	WHOLE	
N1/W7	H2	DISC	6.2	0.9	1.2	ST	NO	WHOLE	
N1/W7	H2	DISC	6.1	0.9	1.3	ST	NO	WHOLE	
N1/W7	H2	DISC	6.2	1	1	ST	NO	WHOLE	
N1/W7	H2	DISC	6.4	0.7	1.1	ST	NO	WHOLE	
N1/W7	H2	DISC	5.6	1	1.2	ST	NO	WHOLE	
N1/W8	H2	DISC	6.9	1.2	1.2	ST	NO	WHOLE	
N1/W8	H2	DISC	5.9	1.1	1.1	ST	NO	WHOLE	
N1/W8	H2	DISC	6.7	1.7	0.9	ST	NO	WHOLE	
N1/W8	H2	DISC	6.2	1.2	1.1	ST	NO	WHOLE	
N1/W8	H2	DISC	5.8	1.2	1.2	ST	NO	WHOLE	FRAG
N1/W8	H2	DISC	6.1	0.8	1.2	ST	NO	WHOLE	
S72/E8	H2	DISC	6.5	1	1.5	ST	NO	WHOLE	
S72/E8	H2	DISC	5.9	0.9	1.1	ST	NO	WHOLE	
S72/E8	H2	DISC	6.3	0.7	1	ST	NO	WHOLE	
S72/E8	H2	DISC	6.2	0.8	1.5	ST	NO	WHOLE	

S72/E8	H2	DISC	6.2	0.8	1.4	ST	NO	WHOLE	
S72/E8	H2	DISC	6	1.1	1	ST	NO	WHOLE	
S72/E8	H2	DISC	5.8	0.8	0.8	ST	NO	WHOLE	
S72/E8	H2	DISC	6.1	0.9	1.3	ST	NO	WHOLE	
S72/E8	H2	DISC	6.5	1.1	1.1	ST	NO	WHOLE	FRAG
S72/E8	H2	DISC	1.1	0.9	0.9	ST	NO	WHOLE	
S19/W1	H2	DISC	6.2	1.5	1	ST	NO	WHOLE	
S19/W1	H2	DISC	6	1.1	1.3	ST	YES	WHOLE	
S19/W1	H2	DISC	6.8	1.2	1.4	ST	NO	WHOLE	
S19/W1	H2	DISC	6.5	1.2	0.9	ST	NO	WHOLE	OFF-SET
S19/W1	H2	DISC	6.1	0.7	1.1	ST	NO	WHOLE	
S19/W1	H2	DISC	5.8	1.1	1.1	ST	YES	WHOLE	NIBBLING
S19/W1	H2	DISC	5.8	1	1.2	ST	NO	WHOLE	
S19/W1	H2	DISC	6.9	1	1.4	ST	NO	WHOLE	
S19/W1	H2	DISC	7.5	1.7	1.4	ST	NO	WHOLE	
S19/W1	H2	DISC	7.4	1.2	1.4	ST	NO	WHOLE	
S19/W1	H2	DISC	6	0.9	1	ST	NO	WHOLE	
S19/W1	H2	DISC	6.1	0.8	1.2	ST	NO	WHOLE	
S19/W1	H2	DISC	6.9	1.4	1.5	ST	NO	WHOLE	
S19/W1	H2	DISC	6.3	1.2	1.2	ST	NO	WHOLE	
S19/W1	H2	DISC	6.6	0.7	1.7	ST	NO	WHOLE	
S19/W1	H2	DISC	6.7	0.9	1.7	ST	NO	WHOLE	
S19/W1	H2	DISC	6	1	1.3	ST	NO	WHOLE	
S19/W1	H2	DISC	5.8	0.9	1.4	ST	NO	WHOLE	
S19/W1	H2	DISC	6.6	0.9	1.3	ST	NO	WHOLE	
S19/W1	H2	DISC	5.6	0.6	1.1	ST	NO	WHOLE	
S19/W1	H2	DISC	7.2	1	1.2	ST	NO	WHOLE	
S25/8E	H2	DISC	6.6	1	1.7	ST	NO	WHOLE	
S25/8E	H2	DISC	5.9	0.8	1	ST	NO	WHOLE	
S25/8E	H2	DISC	5.9	0.9	1	ST	NO	WHOLE	
S25/8E	H2	DISC	6.5	0.9	1.3	ST	NO	WHOLE	
S25/8E	H2	DISC	5.9	0.5	1.1	ST	NO	WHOLE	
S25/8E	H2	DISC	6.2	1.1	1.4	CON	NO	WHOLE	
S25/8E	H2	DISC	6	1	1.1	ST	NO	WHOLE	
S25/8E	H2	DISC	6	1.3	1.4	ST	NO	WHOLE	
S25/8E	H2	DISC	6.4	1.1	1.2	ST	NO	WHOLE	
S25/8E	H2	DISC	6	1.1	1.1	ST	NO	WHOLE	
S25/8E	H2	DISC	6	1.1	1.2	ST	YES	WHOLE	
S25/8E	H2	DISC	6	0.7	1.2	ST	NO	WHOLE	
S25/8E	H2	DISC	6.4	0.6	1.6	ST	NO	WHOLE	
S25/8E	H2	DISC	6.5	1	1.3	ST	NO	WHOLE	
N0/W8	H3	DISC	8	1.3	2.1	CON	NO	WHOLE	
N0/W8	H3	DISC	8	1.3	1.3	CON	NO	WHOLE	ASPHALT
N0/W8	H3	DISC	5.3	0.9	1.1	ST	NO	WHOLE	
N0/W8	H3	DISC	8.2	0.9	1.3	ST	NO	WHOLE	
N0/W1	H3	DISC	4.5	1.4	1.4	ST	NO	WHOLE	
N0/W1	H3	DISC	6.4	0.9	1.1	ST	NO	WHOLE	
N0/W7	H3	DISC	7	0.8	1.1	ST	NO	WHOLE	

N0/W7	H3	DISC	8.3	1.1	1.7	ST	NO	WHOLE	
N0/W7	H3	DISC	6.1	0.8	1.4	ST	NO	WHOLE	
N0/W7	H3	DISC	5.2	1.4	1.2	ST	NO	WHOLE	
N1/W7	H3	DISC	6.9	1.1	1.2	ST	NO	WHOLE	
N1/W7	H3	DISC	8.2	1.1	1.4	ST	NO	WHOLE	
N1/W7	H3	DISC	5.4	0.8	1.1	S	NO	WHOLE	
N1/W7	H3	DISC	6.5	1.7	1.2	TST	NO	WHOLE	
N1/W7	H3	DISC	6.1	0.9	1.2	ST	NO	WHOLE	
N1/W7	H3	DISC	4.6	1.2	1.2	ST	NO	WHOLE	
N1/W7	H3	DISC	5.4	2.2	1.2	ST	NO	WHOLE	BIP
N1/W7	H3	DISC	7.8	1	1.9	ST	NO	WHOLE	BIP
N1/W7	H3	DISC	8.5	0.9	1.2	ST	NO	WHOLE	BIP
N1/W7	H3	DISC	7.8	1.3	1.3	ST	NO	WHOLE	BIP
N1/W7	H3	DISC	7.5	1	1.2	ST	NO	WHOLE	
N1/W7	H3	DISC	4.6	1.2	1.2	ST	NO	WHOLE	
N1/W7	H3	DISC	5.4	2.2	1.2	ST	NO	WHOLE	BIP
N1/W7	H3	DISC	7.8	1	1.9	ST	NO	WHOLE	BIP
N1/W7	H3	DISC	8.5	0.9	1.2	ST	NO	WHOLE	BIP
N1/W7	H3	DISC	7.5	1	1.2	ST	NO	WHOLE	
N1/W7	H3	DISC	6	0.8	1.4	ST	NO	WHOLE	
N1/W7	H3	DISC	6.5	1.1	1.1	ST	NO	WHOLE	
N1/W7	H3	DISC	7.3	0.9	1.5	ST	NO	WHOLE	
N1/W7	H3	DISC	6.8	0.9	1.2	ST	NO	WHOLE	
N1/W8	H3	DISC	7.5	1.1	1.4	ST	NO	WHOLE	
N1/W8	H3	DISC	7.2	0.8	1.3	ST	NO	WHOLE	BIP
N1/W8	H3	DISC	7.3	0.9	1.1	ST	NO	WHOLE	
N1/W8	H3	DISC	4.3	1.1	1.3	ST	NO	WHOLE	
S72/E8	H3	DISC	6.4	1.4	1.2	ST	NO	WHOLE	
S72/E8	H3	DISC	4.5	0.8	1.1	ST	NO	WHOLE	
S72/E8	H3	DISC	4.9	0.9	1.3	ST	NO	WHOLE	BIP
S72/E8	H3	DISC	4.8	0.9	1.1	ST	NO	WHOLE	
S72/E8	H3	DISC	5.6	1.2	1.3	ST	YES	WHOLE	
S19/W1	H3	DISC	5.9	1.1	1.5	ST	NO	WHOLE	
S19/W1	H3	DISC	5.8	1.1	1.1	ST	NO	WHOLE	
S19/W1	H3	DISC	7.1	1.2	1.3	CON	NO	WHOLE	BIP
S19/W1	H3	DISC	6.4	1.1	1.1	ST	NO	WHOLE	
S19/W1	H3	DISC	6.6	1.2	1.4	ST	NO	WHOLE	
S19/W1	H3	DISC	4.8	0.8	1.6	CON	NO	WHOLE	
S19/W1	H3	DISC	4.2	1.1	1.2	ST	NO	WHOLE	
S19/W1	H3	DISC	5.2	0.8	1.2	ST	NO	WHOLE	
S25/8E	H3	DISC	6	0.8	1.3	ST	NO	WHOLE	
S25/8E	H3	DISC	4.4	1.1	1.3	ST	YES	WHOLE	
S25/8E	H3	DISC	5.1	0.8	1.4	ST	NO	WHOLE	
S25/8E	H3	DISC	6.2	1.1	1.2	ST	NO	WHOLE	
N1/W7	HIB	DISC	5.5	0.9	1	ST	NO	WHOLE	
N0/W8	J	DISC	4.3	1	1.3	BI	NO	WHOLE	
N1/W7	J	DISC	5.5	0.9	1.7	CON	NO	WHOLE	VENTRAL
N1/W7	J	DISC	5.5	0.9	1.7	CON	NO	WHOLE	

N1/W8	J	DISC	6.9	1.2	2.1	CON	NO	WHOLE	
N1/W8	J	DISC	6.2	1	1.4	CON	NO	WHOLE	
S72/E8	J	DISC	6.2	1.3	1.6	CON	YES	WHOLE	
S72/E8	J	DISC	6.2	1	1.2	CON	NO	WHOLE	VENTRAL
S72/8E	J	DISC	6.3	1.1	1.7	CON	NO	WHOLE	
S25/8E	J	DISC	6.5	1.2	1.5	CON	NO	WHOLE	
N0/W8	KLCII	DISC	6.5	1.9	2.1	BI	NO	WHOLE	HALIOTIS
N0/W8	KLCII	DISC	5.4	1.9	1.9	BI	NO	WHOLE	HALIOTIS
N0/W8	KLCII	DISC	5.6	1.7	1.4	BI	NO	WHOLE	HALIOTIS
N0/W8	KLCII	DISC	6.9	2.7	1.9	BI	NO	WHOLE	HALIOTIS
N0/W8	KLCII	DISC	5.7	1.7	1.3	ST	NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	7.3	1.8	1.1	ST	NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	6.1	1.8	1.1		NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	5.8	1.7	1.7	BI	NO	WHOLE	HALIOTIS
S19/W1		BLANKS					NO	WHOLE	N=12
N1/W7	KLEII	DISC	6.2	2.8	1.7	CON	NO	WHOLE	HALIOTIS
N0/W8	KLEII	DISC	5.3	1.3	1.4	BI	NO	WHOLE	HALIOTIS
N0/W8	KLEII	DISC	5.5	2	2	BI	NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	5.6	1.5	1.5	CON	NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	6	1.5	1.9	CON	NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	5.7	2.4	1.7	CON	NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	7	1.6	2.1	CON	NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	6	2	1.3	CON	NO	WHOLE	HALIOTIS
N1/W7	KLEII	DISC	6.8	1.6	1.7	CON	NO	WHOLE	HALIOTIS
S72/E8	KLEII	DISC	6.2	2.1	1.6	BI	NO	WHOLE	HALIOTIS
S19/W1	KLEII	DISC	6.7	2.2	1.6	BI	NO	WHOLE	HALIOTIS
S19/W1	KLEII	DISC	5.1	2.2	1.6	BI	NO	WHOLE	HALIOTIS
S19/W1	KLEII	DISC	5.1	1.1	1.1	ST	NO	WHOLE	HALIOTIS
N1/W7	KLII	DISC	7.5	1.9	1.5	CON	NO	WHOLE	HALIOTIS
N1/W7	KLII	DISC	7.5	1.9	1.5	CON	NO	WHOLE	HALIOTIS
N0/W8	STON	DISC	6.3	1.3	1.6	CON	NO	WHOLE	STEATITE
N0/W8	KLII	4 BEAD BLANKS		6.1 TO 7.3					
N0/W8	KLII	DISC	6.9	2.1	1.6	BI	NO	WHOLE	HALIOTIS
N0/W8	KLII	DISC	6.1	1.6	1.4	BI	NO	WHOLE	HALIOTIS
N0/W8	KLII	DISC	5.9	1.8	1.4	BI	NO	WHOLE	HALIOTIS
N0/W8	KLII	DISC	5.5	2	2	BI	NO	WHOLE	HALIOTIS

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