Continuities in a Time of Change: Lithic Technology at Mission Santa Catalina, Baja California

Lee M. Panich

Abstract

This article explores the flaked stone assemblage and associated materials from Mission Santa Catalina, Baja California, with a particular focus on possible continuities and changes over time in the lithic technologies employed by the indigenous inhabitants of the region. Issues such as raw material procurement and lithic reduction strategies will be examined to understand how mission neophytes used stone tools and the ways in which lithic artifacts may shed further light on the social context of native life at the mission. Overall, the lithic assemblage points toward the continuation of some important aspects of stone tool technologies but also a general de-emphasis of the role of flaked stone tools during the colonial period.

Introduction

Mission Santa Catalina was founded on the western slope of the Sierra Juárez on the northeastern frontier of the Dominican mission system in northern Baja California, Mexico (Figure 1). The mission was located in an area that bordered the territories of indigenous groups speaking Kumeyaay and Paipai languages and who were culturally and linguistically related to one another and to indigenous groups from the Colorado River Valley, southern California, and peninsular Baja California (Hohenthal 2001; Wilken-Robertson and Laylander 2006). The basic unit of social organization among these hunting and gathering peoples was the lineage or clan, and such groups traditionally maintained localized autonomous homelands, although seasonal movements were common (Meigs 1939; Owen 1965; Hohenthal 2001). Ceramics were known in late pre-contact times, but agriculture in the traditional sense was not practiced in the sierra before the mission period. Within the diverse ecological zones of the region, the members of a particular clan would have seasonally exploited an array of resources including small game and marine resources, as well as acorns, piñon, agave, and other desert plants (Hicks 1963; Jöel 1976; Lightfoot et al. 2009). Prior to European contact, population density was as low as one person km^2, with people living in dispersed *ranchería* style settlements (Mason 1978; Hildebrand and Hagstrum 1995). Given their frequent interactions with neighboring groups, the indigenous peoples of the Sierra Juárez were likely aware of the European presence in the region early on, but it was not until 1797 that they became actively incorporated into the Dominican mission system.

The Dominicans arrived in Baja California in 1772, replacing the Franciscans who themselves had just recently taken over missionary operations from the Jesuits who had established a chain of missions stretching across the southern two thirds of the peninsula (Crosby 1994). From the outset the Dominicans were charged with extending the Spanish colonial frontier and the Camino Real, its main thoroughfare, northward along the Pacific coast toward San Diego. At the same time, Spanish authorities also sought to extend their influence east to the Colorado River in order to reestablish an overland route between the California colonies and the rest of mainland Mexico after the

Yuma Uprising of 1781. Mission Santa Catalina, which was located near a strategic mountain pass, was established as part of this latter effort (Meigs 1935; Mason 1978).

Mission Santa Catalina Virgen y Mártir was founded in 1797, and by the end of the year, the mission complex included a church, a priests' room, a storehouse, soldiers' quarters, a granary, and a dormitory for single women and girls (Mason 1978: 279). A large adobe wall eventually surrounded the mission with a tower or bastion on the northwest corner. Despite these imposing architectural features, recent archaeological excavations at the site indicate that many of the indigenous neophytes who lived and worked at Santa Catalina resided outside the northeast and southeast mission walls (Figure 2). The mission grew domesticated plants including maize and wheat and was home to herds of cattle, sheep, and horses, although native people supplemented their diet with wild foods such as rabbit, deer, agave, and cactus fruits (Meigs 1935; Panich 2010b). From 1812 onward Santa Catalina did not have a missionary of its own, as the padre in charge of the mission shared his duties first with Mission San

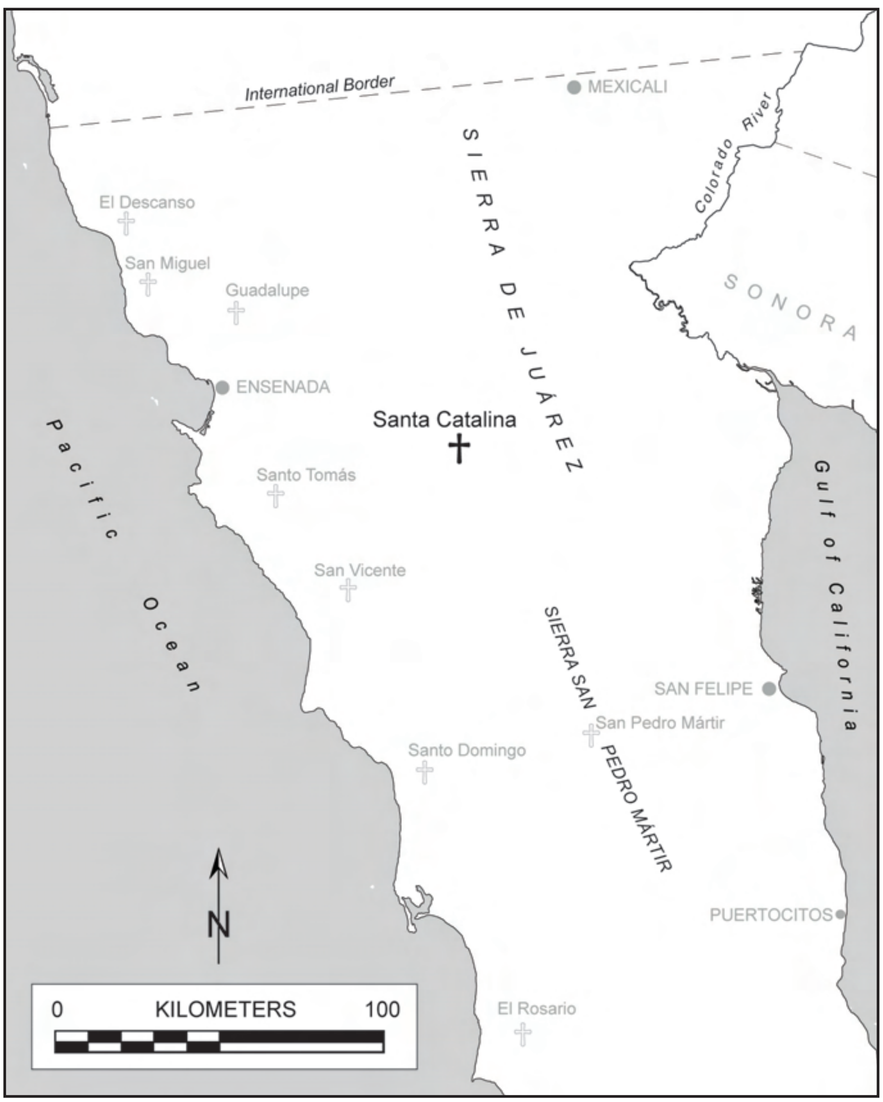

Figure 1. Location of Mission Santa Catalina.

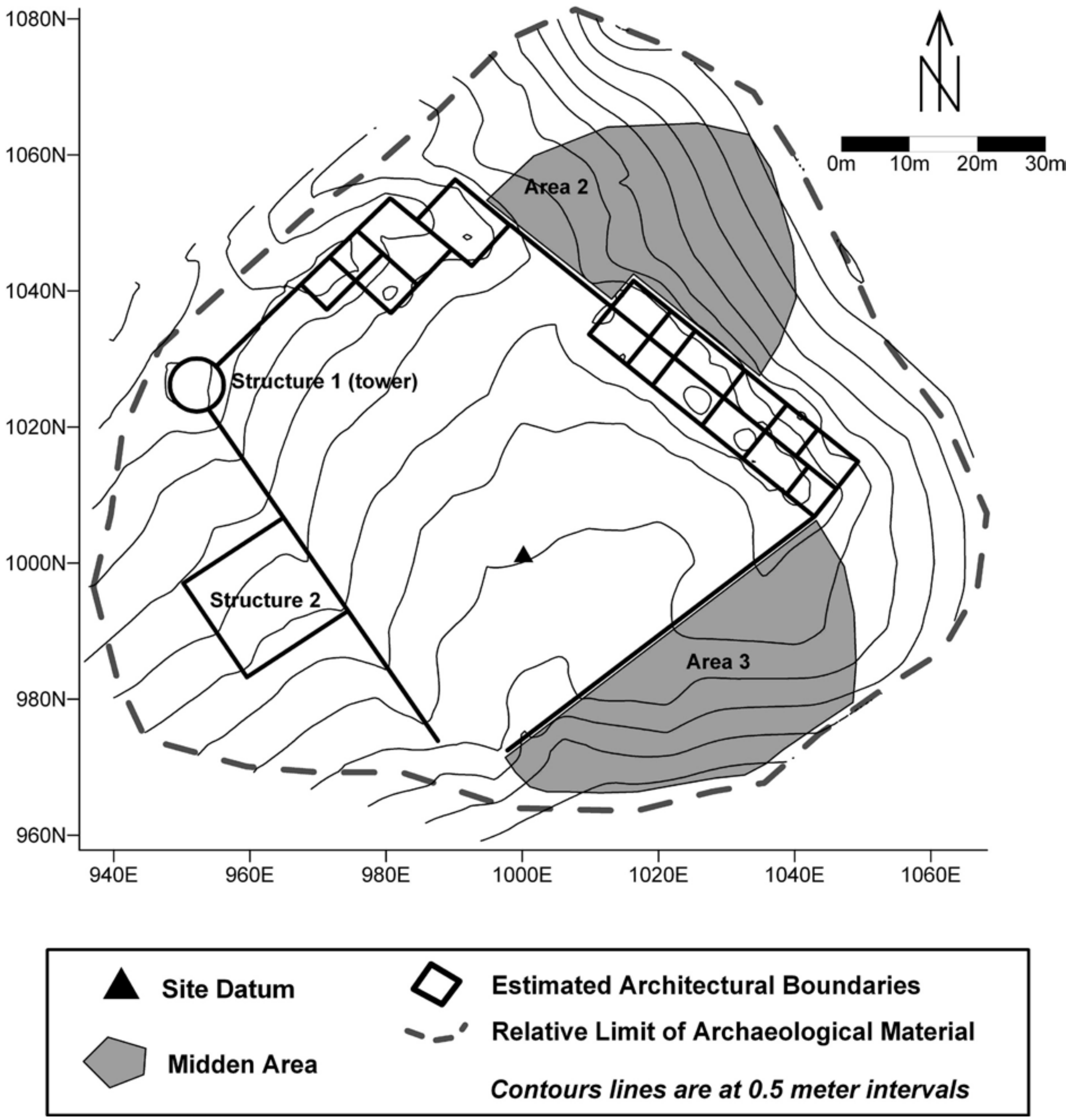

Figure 2. Plan of Mission Santa Catalina.

Vicente and later with Mission San Miguel. By the 1820s the Dominicans had only three missionaries in the entire frontier region, and at the time of its destruction during a native uprising in 1840, Santa Catalina was one of four missions administered by a single missionary (Nieser 1960: 280). Today the adobe walls of the mission itself have melted into history, but the direct descendants of the mission neophytes continue to live in the area around the mission site in the indigenous Paipai community of Santa Catarina.

In this article I will examine two simultaneous yet distinct trends in the utilization of flaked stone tools by mission neophytes living at Santa Catalina.[1] First, the lithic assemblage as a whole is small relative to the number of native ceramic and other artifacts recovered from the site. The assemblage is dominated by locally available raw materials that were used primarily as expedient tools. These interrelated patterns suggest a general shift away from the use of formal stone tools for some everyday tasks for which introduced metal implements may have served as a functional equivalent. While lithic technology at the mission does not appear to have been relegated to areas beyond the padres' control, it was only employed on a small scale, using raw materials readily available in and around the mission site. Second, and contrastingly, the use of nonlocal obsidian continued for specialized tools such as projectile points. The obsidian was likely obtained through trade from Kiliwa-speaking peoples living to the south of the mission or through direct procurement forays into the territories of Kiliwa groups; the projectile points employed (and possibly manufactured) by mission neophytes all appear to conform to the general Desert Side-notched type that was widely used throughout California and the Great Basin in the late prehistoric and early historic periods. Taken together, this evidence indicates that native people at Mission Santa Catalina continued to engage in regional trade relationships and procurement strategies and to utilize regional projectile point styles. In sum, the lithic assemblage from Santa Catalina supports the hypothesis that the mission's indigenous inhabitants retained ties to groups living outside colonial control at the same time that their residential patterns and social organization began to coalesce around the site of the mission itself (Panich 2010a, 2010b).

Background

Archaeological Context

With regard to stone tools, Baja California offers an extremely rich and diverse archaeological record. The region contains a number of discrete sources of artifact quality obsidian, and lithic manufacturing is represented by artifacts ranging from fluted points to flaked porcelain (Aschmann 1952; Hyland and Gutiérrez 1995a; Ritter 2008a). Yet published archaeological reports on sites in Baja California are relatively rare, and information pertaining particularly to stone tools is even more limited. Within the existing data set on flaked stone, most archaeological examples are from widely divergent spatial and temporal contexts. In order to contextualize the lithic assemblage from Mission Santa Catalina, it may be more productive to concentrate on those published archaeological reports that shed light on the pre-contact lithic industries of the northern peninsula and the implications such research has for understanding how lithic technologies and associated social relationships were transformed during the colonial period.

The only previous archaeological research at Mission Santa Catalina and the surrounding area took place in the late 1950s as part of the Paipai Project conducted by anthropologists from the University of California, Los Angeles. The use of information from these excavations is problematic in that very little data was ever published, and the collections themselves were not entirely available for examination as part of this research. Of the salvageable material there is a report on the site of Cerrito Blanco, a prehistoric seasonal village located near the former gold mining town of El Álamo, 20 km west of Mission Santa Catalina. The research at Cerrito Blanco yielded an unknown number of "crude flake scrapers made chiefly from obsidian," but no other information about lithic artifacts from this site is available (McKusick and Gilman 1959: 50). Other sites investigated by the Paipai Project included temporary campsites in the Jamau-Jaquijel region in the lowland desert portion of the Paipai reserve (Hicks 1959). Of the six projectile points recovered by Hicks, two appear similar to late prehistoric point types such as the Desert Side-notched points collected from Mission Santa Catalina during my recent research. Hicks (1959) stated that these small points are common on sites in the highlands of northern Baja California (see also Treganza 1942).

The Cerrito Blanco report also mentions archaeological excavations that were conducted at Mission Santa Catalina as well as in what the investigators presumed was the neophyte village associated with the mission.[2] Within the mission walls no flaked stone was recovered, although four flaked bottle glass fragments were collected. In the supposed neophyte village, several pieces of flaked stone were found, including an obsidian scraper and a quartz knife. One piece of apparently worked glass was also recovered, as were several other flaked stone items, but the materials from which they were made were not recorded (McKusick and Gilman 1959). The lithic assemblage from the mission site as well as the Cerrito Blanco and Jamau-Jaquijel collections have recently been on loan and were not available for analysis at the Fowler Museum, though they may yet be of use for comparative purposes or for obtaining obsidian provenance data.

These early studies from the Sierra Juárez correspond in a general manner to more recent and better documented archaeological research in Baja California. Ritter (1998), for example, characterized the lithic tool kits of pre-contact people living near the Bahía de los Ángeles as being comprised of basalt or quartz flakes, with projectile points of obsidian or other higher quality materials such as microcrystalline or cryptocrystalline rocks. The later period projectile points include both Side-notched and triangular forms, as well as some serrated points of the Comundú series. In his work at Laguna Guerrero Negro, Ritter (2008a) also noted a projectile point made from historic period porcelain as well as several artifacts fashioned from historic glass. Native people may have salvaged these materials from a Manila galleon that sunk off the coast of Baja California, or they may have been traded to the coast from inland sites. In either event the use of porcelain and glass in a protohistoric context suggests that many indigenous knappers recognized the value of European goods as sources of raw material for traditional practices, an idea that has been demonstrated elsewhere (Shackley 2001; Harrison 2002).

Ethnographic Context

Of the scattered information regarding stone tools in the ethnographic literature on Baja California, Hohenthal's work with the Kumeyaay is particularly useful. In an article focusing on the use of lithic materials among the Kumeyaay living in northern Baja California, Hohenthal (1950) examined the indigenous classification of lithic raw materials. Interestingly, his Kumeyaay informants distinguished between different types of quartz, including clear quartz, milky quartz, and quartz crystals, the latter being particularly prized by shamans for important ritual purposes. With the exception of obsidian, they lumped all other stones that could potentially yield tools into a single category that encompassed a wide range of regional metamorphic and igneous rock types. Hohenthal suggested that the Kumeyaay classification is based on the ease of fracture of particular rocks. Indeed, Hohenthal (1950: 11) reported that the Kumeyaay employed any rock that "breaks right" and that archaeological data from the area suggested that locally available raw materials were most commonly used. The Kumeyaay toolkit as reported by Hohenthal was characterized by a wide variety of primarily local raw materials, thus indicating that lithic technology, at least for flaked stone, was relatively expedient.

The daily use of flaked stone tools had all but disappeared by the time American ethnographers visited the native groups of northern Baja California, and within the ethnographic literature the sparse information on the use of stone tools was largely reconstructed through interviews with elderly informants. Stone points were common, although fire-hardened wood points were also used for small game. Arrows were made of reed, usually with a wooden foreshaft. Meigs (1939) in his ethnography of the Kiliwa provided a nearly identical account of the bow and arrow and associated stone artifacts for that area as Hohenthal (2001) did for the Kumeyaay of Baja California. Drucker's (1937, 1941) cultural element lists for the indigenous groups of northern Baja California and southern California include arrows and points that are also very similar to those mentioned in Hohenthal (2001) and Meigs (1939).

Flaked Stone from Mission Santa Catalina

Raw Materials

The flaked stone assemblage from Mission Santa Catalina that was collected as part of this research is relatively small (n=486), especially when compared to the large amounts of indigenous pottery recovered from the site (n=12,972). Nonetheless, the lithic artifacts do provide an interesting glimpse into native life at the mission. In terms of raw materials, the flaked stone lithic assemblage is comprised largely of locally occurring rock types. Quartzite and cryptocrystalline silicates (chert, chalcedony) predominate, with quartz (milky quartz, quartz crystal, clear quartz) making up the next most abundant category (see Table 1 for exact counts). No heat treatment was noted among the cryptocrystalline silicates. The remainder of the lithic assemblage is made up primarily of igneous rocks, including obsidian, gneissic rocks, basalt, granite, and rhyolite, in order of prevalence. A few bottle glass and porcelain artifacts show signs of intentional flaking and are also included in this analysis. Of the raw material sources, only obsidian (n=39) and non-local cherts represented by gunflints (n=3) do not occur naturally within 10 km of the mission site (CETENAL 1977). Nearly 92 percent (n=444) of the flaked stone artifacts were likely made from local materials.

This trend may be expected given the fact that the lithic assemblage is characterized by a lack of formal tools and retouched flakes, a situation that may be the result of easily available workable raw materials. This idea has been explored by a number of authors, who are in general agreement that in regions that contain locally occurring (typically defined as within a 10-20 kilometer radius) high quality materials, hunting and gathering groups will rely largely on a toolkit comprised of expedient tools made from local materials while employing only minimal use of curated tools displaying high amounts of retouch (Bamforth 1986; Andrefsky 1994). In his consideration of this pattern of raw material utilization, however, McDonald (2008) found that in an area of abundant but moderate quality chert, prehistoric hunter-gatherers actually curated many uniface and biface tools made from a nonlocal but superior chert source. While not a direct refutation of the relationship between raw material availability and the organization of lithic technologies, McDonald's findings suggested that the picture is more complex than simply the presence or absence of workable local materials.

The rock types local to Mission Santa Catalina—including quartzite, quartz, and cryptocrystalline silicates—cannot be considered high quality raw materials, and thus it is not surprising that the majority of the formal tools recovered from the site were made from nonlocal obsidian. I will discuss these tools in further detail below, but in terms of raw materials, the lithic assemblage not only fits well with expectations from archaeological analysis (e.g. McDonald 2008)

Table 1. Quantities and Proportions of Raw Material Types by Site Area.

	Area 1		Area 2		Area 3		Southwest		Total
	#	%	#	%	#	%	#	%	#
Quartzite	45	29%	81	41%	33	34%	10	23%	169
CCS[a]	57	38%	53	27%	38	40%	8	19%	156
Quartz[b]	13	9%	28	14%	7	7%	6	14%	54
Obsidian	2	1%	13	7%	7	7%	17	39%	39
Gneissic	22	15%	9	5%	5	5%	0	0%	36
Other Igneous[c]	10	7%	11	6%	3	3%	1	2%	25
Colonial[d]	2	1%	1	<1%	3	3%	1	2%	7
Total	151		196		96		43		486

[a]Cryptocrystalline silicates (chert, chalcedony).
[b]All quartz types (milky quartz, clear quartz, quartz crystal).
[c]Basalt, granites, rhyolite.
[d]Flaked glass and porcelain.

but also with the ethnographic information provided by Hohenthal (1950) for the Kumeyaay of northern Baja California. His work suggested that the Kumeyaay differentiated between different types of quartz, but they grouped all other workable stones except for obsidian into a single category. This classificatory scheme corresponds well to the lithic assemblage from the mission site in which quartzite and cryptocrystalline silicates appear in roughly equal quantities. Clearly, obsidian was recognized as a superior raw material, as evidenced by the nearly exclusive use of volcanic glass for formal tools, but other materials appear to have been used on a more or less expedient basis. These patterns also generally conform to those established by archaeological work in the region (e.g., Treganza 1942; McKusick and Gilman 1959).

Spatial Analysis of Raw Material Types

There is ample evidence that indigenous people living at Spanish mission sites in Baja and Alta California continued to engage in many traditional native practices including flintknapping as well as hunting, gathering, and fishing. In many cases such practices were precisely the ones that the Jesuit, Dominican, and Franciscan missionaries sought to eliminate, and as such they often took place “behind closed doors” (e.g., Lightfoot 2005). At Mission Santa Catalina, for instance, certain artifacts such as perforated pottery disks that may represent gaming devices were found only in the neophyte habitation areas located beyond the mission walls and the watchful eyes of the padres (Panich 2009). The lithic assemblage collected by McKusick and Gilman (1959) as part of the Paipai Project seems to suggest a similar pattern—one in which stone tool use and manufacture was relegated to areas outside the mission compound. Yet my recent excavations of deposits within the mission quadrangle, guided by geophysical survey and systematic surface collection, suggest that the relative frequency of lithic artifacts within the mission itself was not substantially different than neophyte habitation sites and other areas outside the mission walls. [3]

Indeed, when the various raw material types found at the site are compared spatially, it appears that most materials occurred in roughly the same proportions in each of the site areas investigated as part of this research (refer to Table 1). For the ease of presentation in the accompanying table, all quartz types have been grouped together; basalt, granite, and rhyolite, each of which occurred only in small numbers in the assemblage, are together in the category "other igneous." CCS stands for cryptocrystalline silicates, and flaked glass and porcelain are together in the category "colonial." The three primary areas investigated at Santa Catalina included deposits located within the mission quadrangle (Area 1), deposits in the northeastern midden (Area 2), and deposits in the southeastern midden (Area 3). Each area was the site of both excavation and systematic surface collection. The area titled "Southwest" was comprised of isolated finds and surface collection units placed along the southwestern wall of the mission compound. This area appears to have had relatively shallow cultural deposits but nonetheless yielded relatively large numbers of lithic artifacts during the systematic surface collection conducted at the site.

Interestingly, obsidian defies the pattern. A plurality of the obsidian artifacts found at Mission Santa Catalina (43 percent, n=16) was recovered from systematic and judgmental surface collection in the southwestern area of the site. While obsidian appeared in equal proportions in Areas 2 and 3 (roughly 7 percent in each area), it makes up a very small percentage (about 1 percent) of the lithic assemblage from inside the mission walls (Table 1). Obsidian is the only truly nonlocal rock source that can be readily identified in the mission assemblage, and its near absence from contexts inside the mission compound may indicate that neophytes living or working within the mission walls had restricted access to obsidian, which may have been a particularly prized resource. Nonetheless, the diversity of raw materials and the relatively large sample size collected from within the mission walls suggest that flintknapping was not an activity that was practiced only in areas outside the mission. Little patterning exists when raw materials are broken out by stratigraphic level for the different site areas, and it appears that all of the local raw materials were used throughout site occupation. Similarly, differentiating between different types of quartz, as Hohenthal's (1950) Kumeyaay informants did, does not produce significant spatial or stratigraphic patterns, although sample size may be an issue here.

Obsidian Provenance Research

Through the use of x-ray fluorescence analysis, scholars have been able to chemically characterize individual geological sources of obsidian, of which there are several in and around Baja California (Bouey 1984; Shackley 1988; Hyland and Gutiérrez 1995b; Shackley et al. 1996; Laylander 2006; Panich et al. 2010). At Mission Santa Catalina, all archaeological obsidian fragments analyzed as part of this study (n=36) can be linked to an as yet unknown obsidian source similar in chemical composition to the San Felipe and Puerto el Parral obsidian sources in the Puertocitos Volcanic Field (Panich et al. 2010). The geological source of neither the obsidian in use at Santa Catalina nor San Felipe glass is known, and it is therefore unclear whether the obsidian recovered from the mission site originated in the steep arroyos of the eastern slope of the Sierra San Pedro Mártir or the broad alluvial fans in the area of Puertocitos south of the modern city of San Felipe. In either case the obsidian was probably obtained more than 150 km southeast of Mission Santa Catalina.

Obsidian from the Puertocitos Volcanic Field occurs in the form of small marekanites, or nodules, which typically do not measure more than a few centimeters in diameter. Due to the small sample size, it is difficult to say if obsidian was brought to the mission in the form of unmodified marekanites or if finished tools such as projectile points were manufactured closer to the geologic source. Nevertheless, based on the high frequency of angular shatter (n=21), combined with multiple flakes that display cortex and breakage patterns consistent with bipolar reduction, it is likely that mission neophytes obtained whole obsidian nodules, which were then reduced in and around the mission.

Interestingly, the probable geological source of the obsidian recovered from Mission Santa Catalina is in the ethnographically documented territories of Kiliwa-speaking groups, whose homelands were all located south of the mission (Meigs 1939). Based on an analysis of a census document from 1834, however, none of the native inhabitants of Mission Santa Catalina are known to have spoken the Kiliwa language (Panich 2010a). This pattern suggests that mission neophytes likely obtained the obsidian, which comprises roughly eight percent of the lithic assemblage, either through direct procurement or trade with indigenous peoples living beyond the control of the Spanish colonial system. The obsidian used at Mission Santa Catalina has not been noted at prehistoric sites in the region even though obsidian from the Puertocitos Volcanic Field, including glass from San Felipe and Puerto el Parral sources, is relatively common in the Paipai and southern Kumeyaay regions. San Felipe obsidian has also been found as far north as San Diego County, and Puerto el Parral and San Felipe obsidians were additionally noted on the Pacific coast in the San Quintíin/El Rosario region (McFarland 2000; Moore 2001; Laylander 2006; Panich et al. 2010).[4] Future research will undoubtedly further our understanding of prehistoric and historic era indigenous trade networks and obsidian procurement strategies, but the data from Santa Catalina suggest strong continuities in the use of obsidian even though patterns of procurement may have shifted during the colonial period.

Projectile Points

There is no firmly established projectile point typology for Baja California, and scholars of the region disagree on how to classify points (Massey 1966; Davis 1968; Carmean 1994;), although some archaeologists have fruitfully employed typologies modified from those that were developed by Thomas (1981) for the Great Basin (Ritter 1979; Ritter and Payen 1992; Ritter and Burcell 1998). In terms of the projectile points and point fragments recovered from the site of Mission Santa Catalina, there appears to be a strong regularity of form. Seven points and point fragments were collected, and six fit unambiguously within the general Desert Side-notched category, as defined by Thomas (1981) and Justice (2002) (Table 2; Figure 3). Only one point is unbroken (Figure 3d), but four others (Figures 3a-c) are complete enough to measure the proximal shoulder angle (PSA), which is the defining characteristic for Desert Side-notched points in Thomas's (1981) formulation. One other point fragment represents the distal end of a projectile point that was broken at the notch, so while the PSA could not be measured, the existence of a notch could nonetheless be noted. Following McDonald (1992), this point fragment is tentatively classified with the others as Desert Side-notched. The final point fragment is the far distal end of a projectile point that appears to have broken at the distal extent of the notch; its final classification is uncertain.

Points retaining basal ends (n=5) have forms that range from concave to straight. Comparison of length, thickness, and weight (Table 2) shows that although most of the projectile points are incomplete, they are nonetheless very similar morphologically. One of the nearly complete points (Figure 3c) was made of dark green bottle glass, while all of the remaining examples were made of obsidian. Only two of the projectile points/fragments were found during excavations; the remaining five artifacts were recovered during surface collection. Of the excavated artifacts, one projectile point fragment was found in each of the extramural neophyte habitation areas. Four of the other five artifacts were found in the vicinity of the southeastern midden, and one was found on the surface near Structure 2, along the southwestern wall of the mission. The incomplete artifacts comprise both distal and proximal ends, but none appears to be from the same complete projectile point.

Table 2. Provenience and Attributes of Projectile Points from Santa Catalina.

Catalog Number	MSC-PP-50	MSC-PP-38	MSC-U22S1-18	MSC-U8S5-14	MSC-PP-35	MSC-PP-40	MSC-PP-43A
Figure	Fig. 3d	Fig. 3a	–	–	Fig. 3b	Fig. 3c	–
Classification	Desert Side-notched	Desert Side-notched	Desert Side-notched	Desert Side-notched	Desert Side-notched	Desert Side-notched	Unknown
Provenience	SE Midden, Surface	SE Midden, Surface	NE Midden, Strat 1	SE Midden, Strat 5	Structure 2 area, surface	SE Midden, surface	NE Midden, surface
Material	Obsidian	Obsidian	Obsidian	Obsidian	Obsidian	Bottle Glass	Obsidian
Portion	Complete	Distal tip, both ears broken	Proximal end missing	Distal tip broken	Distal tip, one ear broken	Distal tip broken	Far distal end only
Maximum Length	16.7	18.2[a]	16.4[a]	5.9[a]	18.5[a]	12.5[a]	11.4[a]
Axial Length	16.2	18.2[a]	–	–	16.6[a]	11.2[a]	–
Maximum Width	14.2	10.8	9.1	14.3	13.2[a]	13.2	7.0[a]
Neck Width	6.7	6.3	5.9	6.3	8.5	5.1	–
Thickness	3.8	3.1	2.1	2.6	3.1	3.2	3.3
Weight	0.5	0.6	0.3	0.3	0.9	0.5	0.2
PSA[b]	165°	150°	–	180°	180°	155°	–

Note: Measurements are in mm and g.
[a]Incomplete measurement.
[b]Proximal shoulder angle.

Overall, the points, almost all of which can be seen as conforming to the general Desert Side-notched type, indicate that projectile point technology was relatively stable during mission times and that mission neophytes were incorporating new materials, such as glass, into this existing technology. Two deer antler pressure flakers were also recovered from excavations in the northeastern midden, and based on the lack of retouched flakes encountered at the site, it is likely that these objects could have been used for projectile point manufacture.

Other Flaked Tools

Aside from the projectile points very few additional formal flaked stone tools or retouched flakes were noted. Of the formal tools, two bifacially flaked scrapers were recovered during surface collection, one from inside the mission walls and the other from the southeastern midden area. Three gunflints were also recovered during excavations in the external middens. These artifacts were created from cherts, or flints, that appear based on macroscopic characteristics to be nonlocal and show further retouching, perhaps for use as scrapers. An additional 12 lithic artifacts were found that show intentional edge modification. Of these, nine are flakes or flake fragments, two appear to be retouched core remnants, and one is angular shatter. Taken as a whole, the edge modified flaked stone tools appeared in all of the primary site areas and at almost all stratigraphic levels.

Lithic Reduction

As with lithics in general, little has been written on the lithic reduction strategies employed by the native

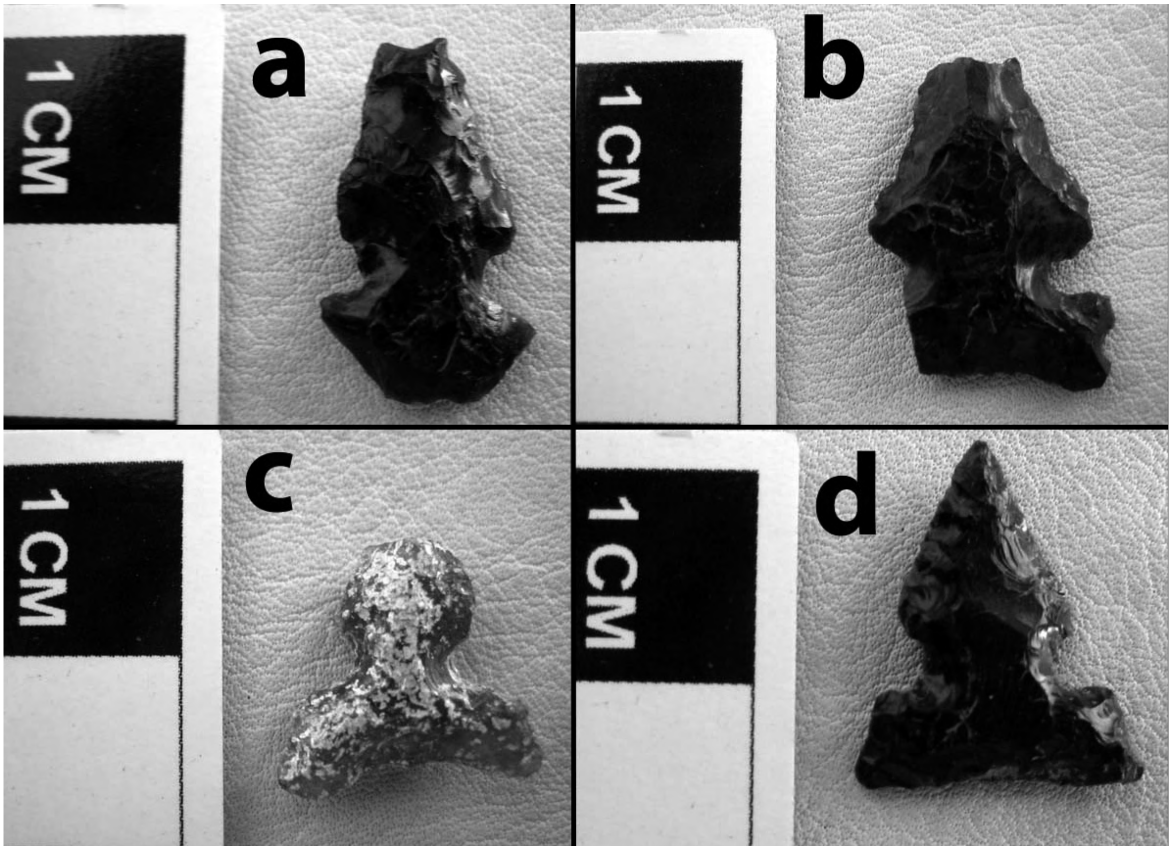

Figure 3. Selected projectile points from Mission Santa Catalina. (a) Cat. No. MSC-PP-38; (b) Cat. No. MSC-PP-35; (c) Cat. No. MSC-PP-40; (d) Cat. No. MSC-PP-50.

inhabitants of Baja California. Ritter (1998; 2008b) noted that bipolar reduction, small core reduction, and biface reduction were all practiced on obsidian artifacts from the Bahía de los Ángeles area and from the western lagoons. This is not surprising since many of the known artifact quality obsidian sources on the peninsula are in the form of marekenites, and the exploitation of these small nodules can require the use of bipolar reduction techniques (Hyland 1997). Production techniques such as bipolar reduction may also suggest efforts to conserve raw material, and such inferences may reveal insights into seasonality, scheduling, and other social aspects of raw material procurement (Shott 1989). At least some of the obsidian artifacts recovered from the site of Mission Santa Catalina (n=5) show evidence of bipolar reduction of obsidian nodules. This may have been the result of resource maximization or simply of the small nodule size, or likely both.

The lithics from Mission Santa Catalina provide other interesting clues into reduction strategies. Taking the chipped stone assemblage (n=486) as a whole, angular shatter (n=274) and flakes with 50 percent or higher dorsal cortex (n=85) predominate. This suggests that core reduction was a primary lithic-related activity in the areas directly outside the mission walls. The relative prevalence of flakes compared to finished tools (n=12) found at the site also suggests that cores were typically being reduced for usable flakes rather than for further reduction into formal tools. This may be the result of easily available workable material (such as quartzite, rhyolite, and cryptocrystalline silicates), but this relationship may also suggest a greater degree of sedentism, which often correlates with a preference for expedient tools like flakes or shatter resulting from bipolar reduction (Andrefsky 1994). Evidence of formal tool production was also lacking; no flakes with modified striking platforms were noted, and a careful sort of the heavy fraction from over 40 liters of flotation samples yielded just two pressure flakes. Only five cores were found at the site, two of which were depleted and had been retouched for use as cutting or scraping tools, although information about the exhaustion of cores suffers from a small sample size. The evidence indicates that mission neophytes may have attempted to maximize their use of obsidian, while little evidence exists for economizing activities in the use of other lithic raw materials.

Conclusions

The lithic assemblage from Mission Santa Catalina was analyzed with the purpose of understanding how stone tools of various kinds may shed light on the social contexts of native life at Mission Santa Catalina. Based on previous research, certain social processes may be reflected by distinct patterns in the lithic assemblage. For example, if the indigenous people only lived at Mission Santa Catalina seasonally, one might expect a lithic assemblage that reflected practices associated with residential mobility. Such patterns may include a higher percentage of formal tools vis-à-vis nonstandardized flakes, as well as the presence of both exotic and locally available raw materials, with neither showing significant signs of economizing activity, such as exhaustion of cores, reworking of flakes, or the use of bipolar reduction (e.g., Odell 2003). If instead, indigenous neophytes were aggregated at the mission site—the ideal Spanish policy of *reducción*—then a lithic assemblage implying increased sedentism along with a loss of direct access to exotic raw materials would be expected. Such an assemblage might include higher percentages of utilized flakes and shatter, more prevalent economizing behavior, scarcity of exotic materials (i.e., obsidian), and the extensive use of colonial materials such as glass and porcelain as a proxy for high quality raw material such as obsidian. Native peoples at Santa Catalina may also have consciously resisted the use of introduced goods and accordingly maintained a continued reliance on stone tools despite the availability of metal tools at the mission. This third scenario may additionally be reflected in an uneven spatial patterning of lithic artifacts and debitage in which stone tool manufacture and use took place outside the view of mission authorities (e.g., Lightfoot 2005).

The lithic assemblage on the whole can be seen to support patterns of both external connections and aggregation. While some of the criteria for the first scenario were not met (e.g., high percentages of formal tools), the presence of obsidian artifacts from the Puertocitos Volcanic Field indicates that mission neophytes did indeed maintain access to distant resources, either through direct procurement or trade relations with native groups living outside colonial control. Similarly, the evidence does not fully correspond to the expectations for the second scenario, but the relatively high proportions of flakes and shatter indicate that mission neophytes employed a lithic reduction strategy aimed at the production of expedient and usable cutting surfaces rather than formal tools. This pattern generally correlates with sedentism, but it may also simply reflect a de-emphasis of lithic technology for certain tasks during the mission period; however, Laylander (2001) and Ludwig (2005) separately argued that a highly expedient toolkit may have facilitated mobile foraging in the Mojave Desert and along the Lower Colorado River, respectively. It also does not appear that mission neophytes actively resisted the colonial program by using stone tool technologies "behind closed doors." Instead, the spatial distribution of flaked and ground stone artifacts indicates that native people engaged in lithic practices in all areas of the mission site. Metal objects were found in relatively high frequency in the two extramural neophyte habitation areas (Panich 2009: 270-272), providing further confirmation that native peoples readily incorporated metal tools into their daily lives, perhaps at the expense of certain lithic practices (however, no metal projectile points were recovered from the site).

The notion that mission neophytes in the Californias continued to utilize stone for tools during the mission period is well documented, as is their use of glass and porcelain for the same purposes (e.g., Allen 1998; Silliman 2001, 2003; Lightfoot 2005: 96). The incorporation of such materials at Santa Catalina comprised a relatively minor component of the total assemblage but nonetheless shows that mission neophytes used introduced materials in ways that made sense from the standpoint of their own cultural dispositions. One area of uncertainty, however, is how the lithic assemblage from Mission Santa Catalina compares to late pre-contact stone tool technologies employed by the ancestors of the mission neophytes. As discussed above, the work of McKusick and Gilman (1959) and Hicks (1959) at sites near Santa Catarina suggests that certain items such as projectile points and flaked scrapers from the mission site had important antecedents in the region. Yet without analysis of the full lithic assemblage from those sites, a direct comparison is not possible. Other work in southern California and northern Baja California is refining the image of late pre-contact hunting and gathering groups. Hildebrand and Hagstrum (1995), for example, used the relative occurrence of projectile points, utilized flakes, and groundstone to posit a shift away from hunting and toward foraging and collecting among the Kumeyaay during the late prehistoric period. It may have been then that broad changes in lithic technology were already occurring at the time of contact and that the de-emphasis of flaked stone at Mission Santa Catalina could be understood as part of the same general trajectory. Future research in the mountains of northern Baja California will no doubt refine our understanding of the complex and interrelated changes that were occurring in late pre-contact times and were affecting the ways in which native peoples negotiated the even more dramatic social, political, environmental, and technological changes of the colonial period.

Endnotes

1. Due to length considerations, groundstone tools recovered from the mission site will be excluded from this discussion. See Panich (2009:241-242) for an overview.

2. While the area referred to as the neophyte village by McKusick and Gilman (1959) was probably occupied at some point in the colonial period, recent archaeological investigations at Santa Catalina indicate that more substantial neophyte habitation areas were located directly adjacent to the northeastern and southeastern walls of the mission.

3. Excavation volume and systematic surface collection area were roughly equivalent in the three main site areas (Areas 1-3). Although the general area was home to native people prior to the founding of Santa Catalina, archaeological excavations at the mission site did not reveal evidence of pre-contact occupation of that particular location.

4. The presence of San Felipe obsidian in late prehistoric sites near the modern international border may also be the result of the increased demand for obsidian in southern California during the period in which the Obsidian Butte source was covered by Lake Cahuilla, approximately A.D. 1000-1450 (Banks 1971).

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