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The Kern County Archaeological Society Journal is published on an occasional basis. The journal publishes articles and reports on the archaeology and ethnography of Kern County and surrounding areas.

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Front cover photos: Top photo is one of the pictograph panels at CA-KER-17 without any enhancement. Bottom photo is the same photo enhanced with DStretch (photo by J. Sprague, DStretch program to enhance photo was compliments of Jon Harman).

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MESSAGE FROM THE EDITOR

This is the 10th volume of the Kern County Archaeological Society Journal (KCASJ) that has been published to date. The goal of the Kern County Archaeological Society (KCAS) was to publish an annual journal. This has not always been possible and there is a two year gap between volume 9 and volume 10 and a seven year gap between volume 8 and volume 9. The current goal of KCAS is to publish an occasional journal every few years.

KCAS is interested in papers on archaeology, anthropology or ethnographies of the San Joaquin Valley and surrounding areas. The papers can be written by KCAS members or others in the community, whether they are professionals, students, or avocationalist. By publishing these papers, it is our hope that we may benefit our members as well as educating the public about the significance of the archaeological and ethnographic work being done in the Kern County area. Most importantly, we hope the content of the journals contributes to a better understanding and appreciation of the local prehistory and history of the area.

The editors greatly appreciates the endurance and patience displayed by those who submitted papers in this volume. For the past several years, the hard work of the editors and authors has made this journal a prominent and viable entity, not only in Kern County, but throughout California.

Authors wishing to submit papers for consideration into the future issues of the KCAS Journal should consult this issue's style. Submissions should be made on 8 ½ by 11 inch paper, double spaced, and clearly legible. A CD or other electronic storage device with the text, maps, photos, drawing, tables, etc, should accompany the paper copy. Upon acceptance, the paper will be copyrighted by KCAS.

Address all submissions to:

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Jack Sprague, Editor
Gale Grasse Sprague, Assistant Editor
Kern County Archaeological Society Journal, Volume 10 (2008)

ROCK ART OF THE WESTERN MOJAVE DESERT- A VIEW FROM THE FIRST DECADE OF THE 21st CENTURY

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Douglas H. Milburn (USDA - Angeles National Forest)
Barbara Tejada (California Department of Parks and Recreation)

INTRODUCTION

This paper provides an overview of the Native Californian rock art found in the western Mojave Desert. Rock art may be defined as "landscape art" that is comprised of painted, engraved, pecked, ground, or incised images on natural rock surfaces (see Whitley 1998:11). The rock art of the region is best known from Mark Q. Sutton's (1982) *Rock Art of the Western Mojave Desert* and Albert Knight's (1993) *Rock Art of the Western Mojave Desert: A Reevaluation* (see also Knight 1997; Sutton 1988:67-70). These now somewhat dated publications describe the rock art of the western Mojave Desert as comprised of monochrome and polychrome painted images (pictographs), ground pit petroglyphs (cupules), and a few pecked petroglyph panels. This paper is intended to expand, clarify, and, in some cases, correct information found in those reports and, also, to share results of subsequent rock art research.

BACKGROUND

The Western Mojave Desert

The western Mojave Desert is encompassed within an internally draining hydrologic basin formed by the Fremont and Antelope Valleys (Sutton 1988:3). This desert basin is bounded on the north by the Tehachapi and Sierra Nevada Mountains, to the south by the Transverse Mountain Ranges, and to the east by an indistinct topographical divide punctuated by several granitic buttes. Broad environmental zones in the western Mojave Desert are described as valley floors, playas, interior mountains, and foothills/upper slopes of flanking mountain ranges (Sutton 1988:9).

The boundaries of Sutton's (1982) western Mojave Desert study area, which were also adopted by Knight (1993), circumscribe a great triangle with one point situated on Interstate 5 near Gorman, another on Highway 395 near the southeastern El Paso Mountains, and a third along Highway 395 at the north end of Cajon Pass. It is noted that Knight (1993), following Sutton (1982), discusses rock art sites found in desert-facing foothills of the Tehachapi, San Gabriel, and Castaic Mountains but omits a few rock art sites found near Goler Canyon in the southern El Paso Mountains. To facilitate comparison with Knight (1993) and Sutton (1982), this paper will also include rock art sites located at desert flanking slopes of the Tehachapi and Transverse Mountain Ranges but will not discuss the rock art from the El Paso Mountains (see Figure 1).

Native Californians

At the time of the European intrusion, the western Mojave Desert was inhabited by at least four distinct Uto-Aztecan linguistic-culture groups, the Kitanemuk, Tataviam, Serrano/Vanyume, and Kawaiisu. These groups probably entered the region at least 1500 - 2000 years ago and their historically known territories are suggested as applicable during much of the protohistoric period

(Earle 1990:100). Given relatively rapid rates of weathering in the western Mojave Desert, painted rock art most likely date to no more than the last 800-1000 years and most panels are probably less than half of that age (Earle 2004; Sutton 1988:67; see also Whitley 1996). The relatively recent ages of pictographic rock art permits tentative connections to be made with historically known Native Californian groups (Earle 2004). By contrast, the antiquity of petroglyphic rock art, which is more resistant to weathering, remains highly uncertain and any connections with later period Uto-Aztecan culture groups are problematic.

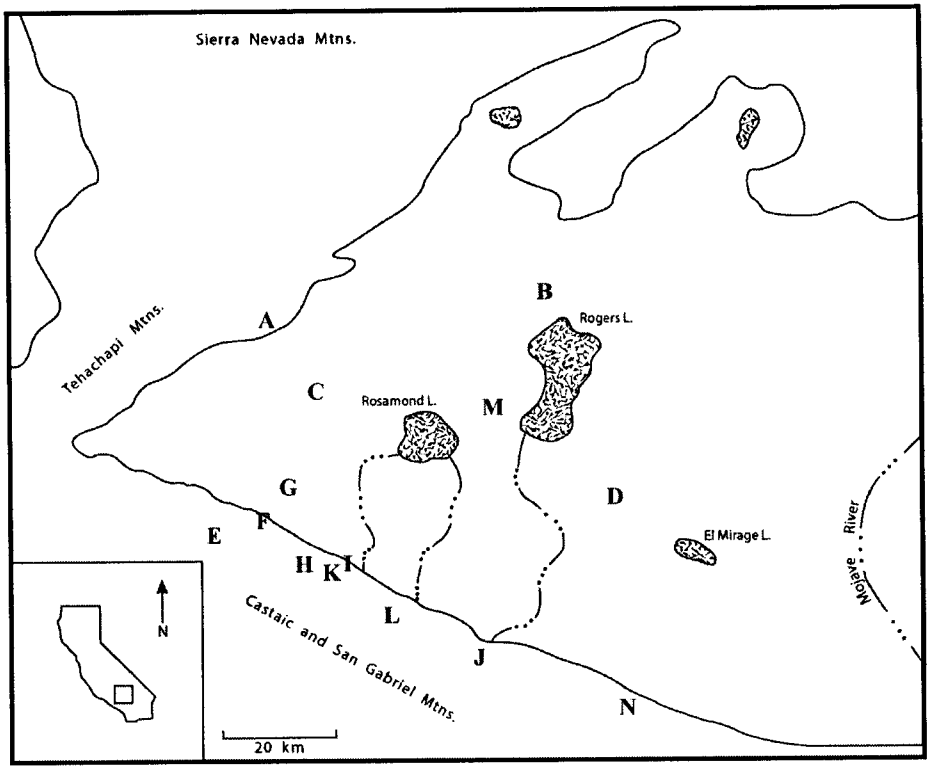

Figure 1. Rock art locations in the western Mojave Desert: (A) KER-273 and -1193; (B) KER-137; (C) KER-302; (D) LAN-192, -1731, -2368 and Hamil Ranch; (E) LAN-484; (F) LAN-721; (G) LAN-298; (H) LAN-947; (I) LAN-305; (J) LAN-447/723; (K) LAN-1767, -1768, and -3343; (L) LAN-1977; (M) LAN-2200; and (N) FS Nos. 05-01-54-236 and -237.

The Kitanemuk (also referred to as Kitanemuk Serranos) held territory in Tehachapi Mountains and the western Antelope Valley (Sutton 1988:19). The Kitanemuk spoke a Serran dialect of Takic that was related the dialects spoken by Serrano-Vanyume groups in the eastern Antelope Valley and, more distantly, to the language of Tataviam groups in the upper Santa Clara River watershed (Earle 1990; Earle et al. 1995; Johnson and Earle 1990:197). The Kitanemuk were greatly influenced by neighboring Interior Chumash and Yokuts groups and practiced a culture that contained many non-Serrano elements (Earle 2004), probably including painted rock art traditions.

The Tataviam (a Kitanemuk-derived name), also referred to as the *Alliklik* by the Ventureño Chumash, are a little known Takic language/culture group who occupied the entire upper Santa Clara River drainage from Piru on the west, San Fernando Pass on the south, and Soledad Pass on the east (Johnson and Earle 1990:199). Tataviam territory appears to have extended northward to encompass the middle segments of Piru Creek, Sierra Pelona Mountains, and southwestern fringe of the Antelope Valley (Earle 1990:94; Johnson and Earle 1990:192-197). Tataviam culture

appears to have been influenced by neighboring Chumash groups and pictographs found within their postulated territory contain a few motifs that are stylistically similar to Chumash painted rock art (see Whitley 1996, 2003). Pitted cupule boulders are also seemingly ubiquitous throughout much of Tataviam territory; however, ages and cultural associations of this particular rock art tradition remains unclear.

Closely related clans of the Serrano and Vanyume (*Beñeme),* the latter sometimes referred to as Desert Serranos, inhabited the southeastern Antelope Valley, Cajon Pass, upper Mojave River drainages, and San Bernardino Mountains (Earle 1990; Earle et al. 1995). The Serrano-Vanyume also controlled territory in desert foothills of the eastern San Gabriel Mountains, including Sheep, Deadman (Graveyard), Big Rock, and Littlerock Canyons (Earle 1990; Earle, et al. 1995; Kroeber 1925:602, 616). A localized Serran-speaking clan group known as the *Mamaviatam* is thought to have inhabited the Little Rock Creek area east of Soledad Pass while the another clan, the *Amútskajam,* controlled territory in the easterb San Gabriel Mountains and Cajon Pass corridor (Earle 1990; Earle et al. 1995:2.8-11). Serrano—Vanyume painted rock art traditions were shared with most other Takic groups in southwestern California (Whitley e.g., 1996, 2000).

The Numic-speaking Kawaiisu (or *Nuooah*) occupied the southern Sierra Nevada Mountains, northern Tehachapi Mountains, northerly portions of the Antelope Valley, southern half of the Panamint Valley, Death Valley, and the Searles Lake area (Underwood 2006; Zigmond 1986). Kroeber (1925:602, 616) reported that some Kawaiisu informants claimed to have been born at Sheep Creek and Deadman Creeks in the San Gabriel Mountains and speculated that much of the western Mojave Desert might have been within Kawaiisu territory. Kawaiisu painted rock art in the Sierras and Tehachapis are stylistically related to rock art traditions of the Yokuts and Chumash.

By the early 1800s, after removal of most Takic populations into the Spanish mission system, Numic-speaking Southern Piaute/Chemehuevi groups from interior desert areas began to move southward along the Mojave River and into the Antelope Valley. By the 1840s, Numic raiders had forced the abandonment of remnant Takic settlements at Cajon Pass and other desert corridors that led towards coastal California (Earle et al.1995:2.33-34). Historic period Numic populations may also have left rock art markings in the western Mojave Desert; however, these remain so far undefined.

THE ROCK ART

Rock Art Classifications

Painted Rock Art. Pictographic rock art in the western Mojave Desert is recorded (sometimes incorrectly) at CA-KER-129, -130, 137, -273, and -1193; CA-LAN-192, -305, -447/723, -484, -721, -947, -1731, -1789/H, -2200, and -2368. Sutton (1982:35, 1988:67, 70) suggests that all monochromatic (mostly red) paintings in the western Mojave Desert are indicative of the *Southern California Rectilinear Style* (see Hedges 1973) while all polychrome painted images, which are primarily located in the Tehachapi foothills, relate to the *Southern Sierra Curvilinear Painted Style* (see Heizer and Clewlow 1973). In 1993, Knight proposed an extension of the *Southern Sierra Painted Style* to a rocky butte area of northeastern Los Angeles County and also suggested that the *Southern California Rectilinear Style* did not reach north of the San Andreas Fault Zone (these are both views Knight no longer holds).

The *Southern California Rectilinear Abstract Painted Style* is described as predominantly comprised of rectilinear designs, including chevrons, zigzags, straight lines, diamond chains,

crosshatching, diamond "nets," crosses, as well as circle/dot designs and occasional handprints (Hedges 1973). The *Southern California Rectilinear Style* is characteristic of some, but not all, Takic groups in southwestern California and is also found, in diminished form, among the Yuman-speaking Tipai-Ipai and Kumeyaay (Whitley 2000). Geographically, the *Southern California Rectilinear Style* stretches from the southeastern Antelope Valley southward through portions of San Bernardino, Riverside, Los Angeles, Orange, and San Diego Counties; however, it is noted that Knight (1993:55-57) disagrees with Hedges' (1973) incorporation of the style into western and southern portions of Los Angeles County. The *Southern California Rectilinear Style* is typically found on large open boulders at or near later period villages and there is considerable ethnographic evidence to indicate that this rock art tradition was associated with boys' and girls' puberty initiation ceremonies (see Clewlow 1978:624; Earle 2004; Hedges 1973; cf. Whitley 1996:9-10, 2003).

By contrast, the *Southern Sierra Curvilinear Painted Style* found at northern margins of the western Mojave Desert is characterized by large complex polychrome paintings and smaller monochromatic (mostly red) panels dominated by circular and linear motifs and stylized anthropomorphic and zoomorphic forms. This rock art style is concentrated in the foothills of Kern, Fresno, and Tulare Counties and is generally thought to be connected to shamanistic practices of the Penution-speaking Yokuts and a number of neighboring Uto-Aztecan groups, including the Kawaiisu, Kitanemuk, and Tubatulabal (Clewlow 1978:625; Earle 2004; Heizer and Clewlow 1973; Whitley 1992). It has been long been recognized that the *Southern Sierra Painted Style* is stylistically quite similar to the painted rock art of Hokan-speaking Chumash groups at coastal and interior areas (see, as examples, Clewlow 1978; Grant 1965:110-11, 1971; Whitley e.g., 1992, 1996, 1997, 2000, 2003). Many researchers now accept the notion that the rock art paintings of the Chumash, Yokuts, and a series of smaller groups in between, including probably the Tataviam, comprise variants of a stylistically-connected tradition that stretches from the Santa Barbara Channel to the southern Sierra Nevada Mountains (see Grant 1971; Whitley 1992, 1996, 2003, and elsewhere). While this painted rock art tradition includes some of the most spectacular polychrome pictograph panels found in North America, it is important to recognize that the majority of the painted panels are quite small and comprised of simple monochromatic motifs (see Whitley 1996, 2003).

Pitted Rock Petroglyphs (Cupules). Cupule rock art found in the western Mojave Desert is connected to the *Far Western Pit and Groove Tradition* that is widespread throughout California, the Great Basin, and the Columbia Plateau (see True and Baumhoff 1981:226; Whitley e.g., 1996:10-11). Cupules are circular depressions that are carved, pecked, or ground into horizontal, vertical, or angled rock surfaces to create a pattern of pits. Cupules found in southern California are relatively shallow in relation to diameters, vary in size from a few centimeters to over 15 cm, range in number on any given boulder from few to dozens, and are sometimes associated with linear groves and, more rarely, petroglyph images (Earle 2004; cf. Payen 1968). Cupules may sometimes be confused with incipient or small-sized mortar holes, but can often be distinguished by locations on vertical or inclined surfaces, occurrence in multiple patterns, or association with distinct archaeological contexts (Earle 2004). As with other kinds of petroglyphs, it is generally difficult to ascertain ages of cupules because of significant resistance to weathering.

Sutton (1988:67) describes cupule boulders in the western Mojave Desert as "fairly common;" however, the majority of these sites are actually situated along southern foothill areas. Knight (1993, 1997) reports several cupule rock art concentrations that are found in association with other kinds of rock art. Pitted cupule (or cupule-like) images are specifically recorded at CA-KER-273 and 302, CA-LAN-447/723, 947, 1767, 1768, 1789/H, 1977, 2368, 3343, and 3486, and FS No. 05-01-54-236 and 237. Another cupule boulder, referred to as CT-10, is also known

for the westernmost Antelope Valley; however, information regarding this rock art site is not readily available.

With varying degrees of plausibility, a number of different origins and uses of cupule rock art have been reported for California, including foot trail markers, astronomical observations, weather control magic, indicators of territorial boundaries, and female fertility ceremonies (Earle 2004). In far northwestern California, pit-and-groove petroglyphs are associated with weather magic rituals of shamans while further south, in Pomo territory, cupules appear to be associated with female fertility rituals (see Payen 1968; Whitley 1996:10-11; 1997, 2000). In the west-central Sierra Nevada Mountains, cupules are sometimes found directly associated with vulva-form petroglyphs and these were made almost certainly to enhance female fertility (Payen 1968).

From the Yokuts region southwards, cupule rock art is generally reported as having been produced in an "abstract generalized girls' puberty ceremony undertaken at first menses and signaling the arrival of womanhood" (Whitley 1996:11). However, True and Baumhoff (1981) state that there is no ethnographic evidence from southern California to suggest that cupules are associated with coming-of-age initiation ceremonies, or with any other rituals for that matter. Due to scant ethnographic data, it should not be assumed that cupules found in southern California represent the products of historically known culture groups (Earle 2004:24-27).

Pecked Petroglyphs. Pecked petroglyph patterns appear to be quite scarce in the western Mojave Desert. Petroglyphs found at CA-KER-302 and the Hamil Ranch (no trinomial) are representative of the *Great Basin Abstract Pecked Style.* This style of rock art, which includes curvilinear and rectilinear subcategories, is comprised of spirals, concentric circles, meandering lines, rayed circles and similar images, with occasional zoomorphic or anthropomorphic figures (Heizer and Baumhoff 1962; see Grant 1971:232,237; Clewlow 1978:620-621). In contrast to previous reports, the faintly visible petroglyphs reported at LAN-947 have not yet been definitely related to the *Great Basin Pecked Style* or any other style (Beth Padon, personal communication 2008; cf. Knight 1993:46).

Perhaps relevant to western Mojave Desert rock art, some petroglyph images found at the Soledad Canyon corridor may have been manufactured coeval with spatially associated cupules. These rock art sites suggest that distinctions between cupules and petroglyphs in southern California may not be as great as once thought. As example, cupule rock art at CA-LAN-540 near southern foothills of the Sierra Pelona Ridge, which reportedly contains the largest concentration of cupule pits in south-central California, encompasses a few pecked petroglyphs, including a hollow circle; a zigzag; a "rake" terminating in cupules, an inverted "U" with a central bisecting line, and a set of parallel lines (Whitley 1996:30-31; 2003). Similarly, elaborate pecked curvilinear petroglyphs are directly associated with a significant number of cupules in the Shannon Valley near Acton/Escondido Canyon (Robinson 1987). Whitley (1996:10; 2003) associates these petroglyph patterns to the *California Engraved Variant* of the *California Tradition,* which includes pecked, incised, or scratched simple geometric petroglyph forms. The *California Engraved Variant* is most common in northern California but also occurs in small quantities to at least the Mexican border (Whitley 1996:10).

The Rock Art Sites

Subsequent to Knight's (1993) report, a number of additional rock art sites have been discovered in the western Mojave Desert and, conversely, some previously reported sites have been determined as non-existent or incorrectly described. This section provides updated descriptions of most known rock art sites found in the western Mojave Desert (see Table 1).

CA-KER-129 (Willow Springs Village Site). KER-129 was once the location of the largest native (i.e. Kitanemuk) community in the northwest Mojave Desert and is also considered an important place to early local history. Sutton (1982, 1988:67) states that there are elaborate polychrome pictographs present at KER-129; however, Knight (1993:41) reports that there is no rock art at Willow Springs, perhaps due to a lack of suitable rocks. Knight (1993:41) concludes that the rock art described for Willow Springs is actually found several miles away in Burnham Canyon at KER-273 and -1193.

CA-KER-130. KER-130 is described as containing pictographs in a rock shelter; however, no rock shelter exists at the recorded location and, in fact, there are no rock outcrops at all at the recorded location of this site (note that a lithic scatter IS present). Haensel (1964) refers to the site as "Desert Butte;" however, Desert Butte is actually located several miles to the west. Knight (1993:42) concludes that KER-130 represents a mis-mapped site (at least in terms of the "rock art" component) and the recorded rock art is actually located at KER-137.

CA-KER-137 (Desert Butte). KER-137 contains the shallow rock shelter originally described for KER-130. Monochromatic black pictographs were apparently once visible in the rock shelter; however, the paintings appear to be almost (or perhaps completely) weathered away (Knight 1993:43). The specific style of the black pigment pictographs remains uncertain. Unlike many rock art sites in the western Mojave Desert, KER-137 is considered quite accessible to visitors (Knight 1993:43).

CA-KER-273 and -KER-1193 (Burham Canyon Sites). The highly important pictograph panels KER-273 and KER-1193 are situated on granite bedrock outcrops in Burham Canyon a few miles northwest of Willow Springs. These pictograph loci are described as representing the "real" Willow Springs rock art (Knight 1993:43-44).

The still-impressive polychrome pictograph panel at KER-273, which is located in a rock shelter that overlooks KER-1193, is reported to be "one of the most elaborate and well-preserved pictograph panels in southern California" (Knight 1993:44). The main panel is comprised of a large fantastic polychrome abstract image in red, white, black, orange, and a small amount of blue. Smaller associated pictographs include a red so-called "teddy bear" motif (similar to those found in northeastern Tehachapi Valley at CA-KER-508). The polychromatic paintings at KER-273 are assigned to the *Southern Sierra Style* and are most likely associated with Kitanemuk habitation (cf. Knight 1993:44). Mortar-like depressions and cupule rock art are also reported at this site (Knight 1993:44; Sutton 1988:67). A less complex panel at nearby KER-1193 is comprised of a red sun-like symbol and about 30 short dashes (see Sutton 1982:30, Fig. 2). Speculatively, this panel may be associated with a possible winter solstice observation station (Knight 1993).

In 1990, Andy Greene, a Kawaiisu elder, reported that KER-273 was used as a "birthing cave" by Kitanemuk, Kawaiisu, and Tataviam women (Knight 1993:43-44). This significant ethnographic information may or may not be associated with the original origins and functions of the rock art. Charlie Cooke, a Chumash chief, has stated that the Burnham Canyon rock art sites, which are situated on public lands administered by the Bureau of Land Management, are sacred to local Native American people and should not be casually visited (Knight 1993:44, 57).

CA-KER-302 (Sweetser Site). KER-302, which is located in the Rosamond Hills, comprises the type-site for Glennan's hypothesized Pinto-age "Rhyolite Tradition" in the western Mojave Desert. KER-302 contains petroglyphs that are clearly classifiable within the *Great Basin Pecked Abstract Style* (Knight 1993). Glennan (1971:6) initially described the petroglyph rock art as

"...a large, roughly spherical boulder which is covered on two sides with pecked geometric design elements....the surface of the boulder is quite weathered....it is quite difficult to determine...the design elements originally present." In addition to the primary petroglyph panel, three small adjacent boulders also each exhibit one or two simple petroglyph images. Knight's (1993:44) statement about the absence of cupules at this site is revised in this paper due subsequent discovery of four or five cupule pits adjacent to one of the petroglyph patterns.

Table 1. Rock Art Sites in the Western Mojave Desert

Site Designation	Pictographs	Petroglyphs	Cupules	Classification/Comments
CA-KER-129	0	0	0	Mis-mapped: no rock art
CA-KER-130	0	0	0	Mis-mapped: no rock art
CA-KER-137	Black pigment (weathered away)	0	0	Classification not currently possible
CA-KER-273	Polychrome and Monochrome	0	Cupules are present (number uncertain).	SSP / Probable Kawaiisu origins. Spatially associated with CA-KER-1193
CA-KER-302	0	4 Petroglyph boulders	6-7 cupules are present	GBP; FWPG
CA-KER-1193	Red Monochrome	0	0	SSP / Probable Kawaiisu origins. Spatially associated with CA-KER-273
CA-LAN-192	Reportedly visible in 1920s –no longer extant	0	Nearby cupules recorded as CA-LAN-3486	Pictograph classification not possible/Should not now be considered as a pictograph site
CA-LAN-305	0	Petroglyphs reported	0	The reported petroglyphs do not appear to exist.
CA-LAN-447/723	Red Monochrome	0	7-8 ground depressions	SCRA - associated with *Mamaviatam* Serrano clan
CA-LAN-484	Red and black Monochrome	0	0	In mountains south of the desert
CA-LAN-721	Polychrome and Monochrome	0	0	Primarily SSP (probably associated with Kitanemuk and/or Tataviam groups)
CA-LAN-947	Red Monochrome	1 Petroglyph boulder	Present (number not reported)	SCRA -very weathered; Possible GBP
CA-LAN-1731	Polychrome and Monochrome	Vulva-like forms reported in vicinity	0	Associated with Kawaiisu - affiliated groups
CA-LAN-1767, 1768, 3343	0	0	Many cupule pits at each site	FWPG
CA-LAN-1789/H (encompasses CA-LAN-298	Red and black (at LAN-298) Monochrome	-	Many cupules at several loci	Pictographs possibly represent SCRA; FWPG
CA-LAN-1977	0	0	Cupules on at least five boulders	Associated with a habitation site in desert foothills
CA-LAN-2096	0	1 vulva-like form	0	Form is similar to other features at Piute Buttes and at CA-LAN-2368
CA-LAN-2200	Red Monochrome	0	0	SCRA associated with Serrano habitation

CA-LAN-2368	Red, black, white Monochrome	1 vulva-like form	7-8 small crude cupule pits.	SCRA pictographs associated with Serrano habitation
CA-LAN-3486	0	0	Many cupules	FWPG /probable Serrano territory
05-01-54-0236	0	1 pecked serpentine motif	26 cupule pits on single boulder	FWPG/ in Serrano territory
05-01-54-0237	0	0	20+ cupules on a single boulder	FWPG / in Serrano territory
Hamil Ranch	0	1	0	GBP curvilinear
CT-10 (western Antelope Valley)	0	0	Cupule panel in cleft of boulder	FWPG

SSP = Southern Sierra Painted Style; SCRA = Southern California Rectilinear Abstract Style; GBP = Great Basin Pecked Style = GBP; FWPG = Far Western Pit and Groove Style.

KER-302 is situated on private property and the occupants of an adjacent house are currently not happy with intrusive rock art "students" who keep invading their property, almost always quite uninvited. An elderly male occupant of the property, in fact, suggested to a writer of this paper (Knight) that his future research should be conducted in a very hot place – and he did not mean another place in the Mojave Desert! Rock art researchers are well advised to not trespass on the private property at KER-302.

CA-LAN-192 (Lovejoy Springs). According to the results of a recent archaeological study, this major desert spring site has supported human habitation for at least three thousand years (Price et al. 2004). Pictograph panels were reported in the 1920s; however, these apparently are no longer in existence (Earle 2004). Multiple cupule loci have recently been recorded in the general vicinity (see LAN-3486 below).

CA-LAN-298. LAN-298 is a habitation site at Fairmont Buttes that contains a red pigment pictograph. LAN-298 is now consolidated within the larger Fairmont/Antelope Buttes village complex (see CA-LAN-1789/H below).

CA-LAN-305. Based on available information, Knight (1993:46-47) reported the presence of petroglyph images and included an illustration of Becker's (1990) sketch. However, in March 2004, Knight conducted a field check and, even with a site record form in hand, was unable to relocate any petroglyphs. At this time, LAN-305 is not considered by the writers to represent a rock art site.

CA-LAN-447/723 (Big Rock Creek). This monochromatic pictograph site, which has been assigned two trinomials, is found on private property situated along Big Rock Creek in the San Gabriel Mountain foothills of the eastern Antelope Valley. The site consists of a single panel of pictographs located on an open exposure of a large east-facing sandstone bedrock outcrop, about four meters above the stream bed. The red pictograph elements, which generally correspond to the *Southern California Rectilinear Abstract Style*, are illustrated in Knight (1993:48, Figure 4) and Sutton (1988:69, Figure 26b); however, in the interest of accuracy, it is noted that Knight omits a "lizard" motif in his illustration and Sutton's sketch is depicted upside down. The site also contains several small shallow grinding depressions (cupule-like and mortar-like) that may be ritualistic rather than functional in origin.

In 1996, one of the writers of this report (Milburn) and Dr. David S. Whitley led a crew of Forest Service Passport-in-Time (PIT) volunteers to document the pictographs at LAN-447/723. This project resulted in the following description:

> *The single panel at the site is painted in red, and portrays ten motifs; however, two different colors are identifiable. The majority (horizontal rake, upper diamond chain, 4 circles and a zig-zag) are all Dusky Red (Munsell 10R3/4); the remainder (vertical rake, lower diamond chain and "lizard") are Dark Red (Munsell 10R3/6). Most likely, these two colors reflect two episodes of painting at this site as the color distinction is very subtle, itself reflecting what is most likely two elements of pigment rather than any effort at polychromatic painting.*
>
> *With the exception of the lizard, the motifs are all "geometric." The zig-zag and diamond chains, however, are entopic designs which may be interpreted as rattlesnake motifs, inasmuch as these motifs were universally identified ethnographically....Its age is unknown although it seems unlikely that the paintings would be preserved on this open, southeast-facing panel, for any great length of time. Based on preservation factors alone, it seems unlikely that it could be more than 1000 years old, and an age of less than half that time is probably most likely, especially given the relative lack of fading evident in most of these motifs* [Whitley 1996:17-18].

Figure 2. Pictograph at LAN-447/723.

LAN-447/723 is reported to be located within the territory of the *Mamaviatam* clan, a sub-group of the Serrano-Vanyume (Earle 1990; Earle et al. 1995). Due to the brightness of the rock art pigment, the site is assessed as "relatively recent in age, probably on the order of only a few hundred years" (Whitley 1996:29). The possibility that rock art relates to girls' puberty

ceremonies is conceded; however, the presence of the lizard-like motif, among other lines of reasoning, suggests the "…work of one or more shamans, responsible for two separate incidents of rock painting….A significant number of rattlesnake motifs at this site suggest that it was a vision quest location of one or more rattlesnake shamans" (Whitley (1996:16-17).

During a 2007 site visit, one of the authors (Tejada) observed that a water pipeline had recently been installed immediately adjacent to the bedrock outcrop containing the rock art panel. While the pipeline does not appear to have damaged the rock art, it has affected other aspects of the site's overall integrity.

CA-LAN-484 (Burnt Peak Pictograph Site). This site is situated on private property in the mountains somewhat south of the western end of the desert but is included in this paper because it has been previously discussed by Sutton (1982) and Knight (1993). This site consists of two red pigment pictographs, one or both of which may be sun-symbols; however, it is noted that a site record also refers to the presence of black pigment designs. The pictographs have not been assigned to a specific rock art style; however, the images are similar to those found at LAN-365 near Agua Dulce (Tataviam territory).

CA-LAN-721 (Temet Osraniek / Shea's Castle Site). LAN-721 is the best known and most significant concentrations of pictographs along southern margins of the western Mojave Desert. Smithsonian linguist and ethnologist John P. Harrington recorded the native name of this place as T*emet Osraniek,* which translates to *piedra pintada* in Spanish and "painted rock" in English (Earle 2004:22). The pictographs are situated on a large granitic outcrop above a spring. Bedrock mortars and a village site are found a short distance down canyon. A photograph and sketch of the site indicate that a spring house structure also once existed at the site (Pickus 1988).

William Blake, who had observed the pictographs in 1853, mentioned them in his 1858 *Report of a Geological Reconnaissance in California:* "Near a spring is a broad cliff of granite covered with Indian hieroglyphics…. This was near Elizabeth Lake towards Tejon…." (Benson 1997:147). In the late 1800s, Reverend Stephen Bowers, who was a notorious grave robber paid by the Smithsonian Institution to collect Indian artifacts and skulls, reportedly read Blake's report and attempted to find the pictographs but could not do so (Benson 1997).

The pictographs at LAN-721 are found in two primary groupings and a smaller secondary group. The paintings are highly exposed to weathering and most are now in poor condition. Many have clearly faded even since they were sketched by Bleitz and Sanberg (1976) (see Figure 3). In addition to mostly red pigment, faint traces of black and white paint are also present, and it is possible that the main panel was partially polychrome one time. Early photographs are reported to show remnants of polychrome painting at a protected area of the panel (Earle 2004:22). Motifs include simple and elongated stylized anthropomorphs, a large multi-circle sunburst with several rays, a set of four or five hand prints, a long chain of connected circles (now partially faded), individual circles, and abstract elements. Several paintings are grouped together and are vertically elongated above where the spring emerges from the base of the rock formation.

Based on the large size of some of the paintings and location in Kitanemuk territory, Knight (1993) reported that the rock art might be classifiable as *Southern Sierra Painted Style*. While Earle (2004:22, 24) indicates that some elements of the *Southern California Abstract Rectilinear Style* are present, he agrees with Knight (1993) that most of the pictographs appear similar to Chumash and Yokuts painted rock art. As result, Earle (2004) suggests that site inhabitants were probably from the Kitanemuk or Tataviam (or perhaps both) culture groups.

commonly perhaps on the Carrizo plain; but are most prominent as a motif in Ventura County, found in abundance at sites leading along the Piru/Sespe drainages such as Mutau, Alder Creek, and Piedra Blanca. Conversely, it is rarely seen in classic Yokuts Sierra Nevada foothill sites: for instance, not a single pinwheel element, as yet, has been identified at the intensely painted Yokuts site of Exeter Rocky Hill or the site of Tule River. The motif therefore seems at a general level to relate more closely to its immediate region of the San Emigdio Hills, and the region to the south occupied by the Ventureño Chumash, than any other.

The second representational motif is a 10.5 x 17 cm brush applied, monochrome red zoomorphic figure painted on a natural or smoke blackened background. Its slightly upturned appendages each end with three digits. It has a widened head, with antennae curving outward. The eyes appear to have been depicted in negative: the black background shows through the red outlining, this particular method of portraying eyes in negative is very unusual. While zoomorphic figures are common in the rock-art of South-Central California, the portrayal of eyes generally is a somewhat uncommon Chumash characteristic (an anthropomorph with red eyes is depicted at Three Springs). The portrayal of eyes appears to be rare in Yokuts rock-art: a row of red turtles have white eyes at Exeter Rocky Hill. The closest parallel so far identified is from the Ventureño site of Piedra Blanca and the Yokuts site of Carneros Rocks found in the Temblor Range foothills. At Piedra Blanca, a red zoomorph/anthropomorph painted on a black background, with slightly upturned appendages and five digits, has a similarly shaped head with negative eyes but with a single antennae. The Carneros Rocks is most closely associated with Valley and Lake Yokuts (see Robinson 2006: 86-89), Sanger (1987: 34, Figure 66) depicts a row of four oval-eyed zoomorphs, two with winged appendages, which Sanger thinks may represent owls. The zoomorphic element at Pinwheel therefore appears most closely related to Ventureño Chumash, but also is similar to Yokuts motifs on the western edge of the lower San Joaquin.

There are other, less obvious red elements on the ceiling within Pinwheel Cave. A circular, apparently finger applied element (Element 3) appears to have been painted around a large iridescent natural inclusion, thus outlining the inclusion. This attention to distinctive inclusions, particularly ones that are iridescent or reflective, is likely to be a widespread South-Central California rock-art practice that has yet to be studied in any comprehensive fashion (see Robinson 2006 for a discussion of such examples). Element 4, an unidentifiable red monochrome element, has been pecked over and partially destroyed, an event occurring some indeterminate time after it had been originally painted. Another element appears to end in a loop (Element 5), while fugitive line and patches of pigment in red hues can be found across much of the ceiling near many of the depressions containing the fibrous material. There are two implications for these applications of pigment: first is that the characteristics of the rock itself held some meaning or importance for at least the maker of Element 3 (and likely for all of the painters). The painter of Element 3 reacted to the iridescent quality of the inclusion, choosing to outline it. The second implication is that the paintings drew some subsequent attention as evidenced in the pecking away of an extant pictograph seen in Element 4. Perhaps this was done by subsequent users of the cave, or was part of the process of

from the north. Certainly, glass beads and metal items reflect acquisition of these objects from Europeans, most likely Spanish missions on the coast, but also possibly Russian or Mexican. Shell and fish also likely reflects connections either to the coastal Chumash or Yokuts lacustrine environments to the north. Pottery appears to be protohistoric or historic—it is unknown if it was locally produced or from further afield. Groundstone, bone, and wood/charcoal all probably represent the use of the local/immediate environs. The source for the tiny fragments of ochre remains unknown.

Chronology: The most striking finding from the excavations is the abundance of Protohistorical/Historical material (circa AD 1542 to 1769/AD 1769 and after). The metal artifacts, glass beads, needle-punctured beads, and wood probably altered by metal tools all clearly indicate a significant usage of the cave—specifically within the interior and at the northern entrance—by Historical indigenous populations. Pot fragments may be 'colonoware', i.e. imports from coastal Missions (AD 1769 to AD 1832), or be a variant of indigenous Owens Valley Brown Ware: a poorly understood pottery form found in the Great Basin, the San Joaquin Valley, and the Sierra Nevada (where it is known as Tule Plain Ware), possibly first introduced into California around AD 1700. The vast majority of other beads and projectile points appear to be diagnostic of Late Period prehistoric use of the site (approximately 650 to 200 BP); however, these await formal analysis and some may date to earlier periods. Groundstone material may date to the Terminal Middle Period, but artifact typology suggests a predominant Late Period/Historical (Dan Reeves, pers. com). Additionally, a leaf shaped projectile point may date as early as to the Late Middle Period (J. Johnson, pers com).

Rock Art: While red linear and fugitive elements can be found in a locus outside the main cave at Pinwheel, and similar fugitive elements are within the cave, there are two distinct representational pictographs allowing comparative analysis (see **Figure 5**). Additionally, certain geometric and unidentifiable elements are interesting as evidence for Pinwheel's past occupants engagement with the rock surface and with art itself. While no systematic work has been done on this particular motif and its distribution is poorly understood, Reeves (pers com) has noted it as particular to Chumash backcountry rock-art sites (Alder Creek; Organ Grinder; Pine Corral). Preliminary observations can be presented here based upon ongoing research by the authors' in the region. The key characteristic of this element is the 'S' shaped 'swirl' of its radiating appendages. 'True' Pinwheels, with the double-back swirl, can be seen as a specific subcategory in a larger class of motifs with similar morphological characteristics that appear to imply a 'pinwheeling' or 'swirling' effect. While detailed work has been performed on typologizing the Chumash 'aquatic' motif (see Hudson and Conti 1981) no such work has yet been performed on what might be termed *swirling radials*. This broader motif category has a restricted distribution within Emigdiano territory, so far being found only at Pinwheel Cave, Pleito, and Three Springs. It appears to be rarer in Chumash coastal zones: for instance, no such swirl/pinwheel motifs have been identified in the comprehensive rock-art survey recently performed in the Vandenberg regions (see Bury *et al* 2002; 2004) and they appear to be absent at the San Marcos Pass sites of Arrowhead Springs, Winchester gun club, and Painted Cave. Some swirls/pinwheels are found at sites in the Santa Barbara backcountry, the Sierra Madre ridge, and more

and laboratory work. It is clear from excavations at Pinwheel Cave that the site was occupied to a much higher degree than surface finds alone indicated. Occupational evidence was found in every TP, both inside the cave, at the entrances, and outside. Specific practices can be identified through the assemblage: burnt bone, some with cut marks, fire affected rocks, and high quantities of charcoal show that cooking and eating occurred on site, particularly as shown in TP3 at the cave's northern entrance. Unmodified sandstone and groundstone material indicates possible pounding (hopper mortar) and grinding activity (manos), probably in the preparation of seed foods for consumption (but other alternatives are possible, such as processing of the fibrous materials in the ceiling): some of these stone artifacts may have been cached for future use at the Pinwheel BRM complex. Pot shards may indicate storage. The lithic assemblage, with the overwhelming percentage of debitage seen as tiny flakes, clearly shows that the main reduction process was late stage manufacture or retouching. The small amount of large flakes, preforms, or cores highlights the specificity of this activity. While the pictographs themselves obviously indicate rock-art production, only a few tiny fragments of ochre were found, perhaps indicating the conservation of ochre or that other uses of pigment such as body painting may not have occurred on site, or at least in areas excavated, to any significant degree. The discovery of beads hints towards several possible activities, including accidental loss or even intentional deposition as offerings, particularly since some beads appear to have been burnt, a practice associated with fire deposition known in ethnographic instances (J. Johnson, pers com.). The 'wire-like' artifact and two smaller 'thimble' shaped metal artifacts are likely to have been indigenous reuse of historical objects, but the origin and purpose of these objects remains elusive. Finally, the fibrous materials in the cave ceiling indicates some kind of caching or intentional deposition: whether these are chews that were masticated to induce visions, remains of a food source such as yucca that was masticated for nutrients, stored material for basketry/fire making/other functional purposes, ritually deposited in the rock surface as an interaction with the rock/site itself, or some combination of any or all of these, awaits further analyses/consideration.

AREAL LINKAGES: Cursory examination of lithics shows the use of a range of sources: Franciscan chert, Temblor chert, obsidian, fused shale, quartz, and fine grained basalt. By far, the most abundant chert appears to be Temblor (J. Johnson, pers com), found in the Temblor Range towards the northwest. This is a border region between Chumash and Yokuts but generally considered Yokuts territory. Franciscan chert is found more generally towards the south and west in Chumash territory from just north of Santa Barbara, but also in formations further north (in fact Temblor chert is a form of Franciscan chert, J. Johnson pers com.). Obsidian likely comes from the Eastern Sierra from the Coso Volcanic Field, traded in through Mohave, Tubatalabal, Yokuts, and other eastern peoples: other potential sources of obsidian may include Mono Glass Mountain and Casa Diablo. Fused shale comes from the Happy Camp Canyon/Grimes Canyon area to the south in Ventura County, or in the Santa Ynez Valley further to the southwest: both southern Chumash territories. Quartz and the basalt are probably more locally available and therefore expedient material. Beads certainly reiterate the Chumash connection, particularly in examples made from olivella shell, most of which were manufactured on Santa Cruz Island. However, stone and other shell beads may come from Lake Yokuts

9, top centre and bottom right), along with nine beads, two of which were glass (see **Figure 9, top left**). Two small metal objects (see **Figure 9, bottom left**) and a wire-like object were also found, obviously indicating Historical Period presence.

Test Pit 4: This was a 1 x 1 meter unit, 80 cms deep. It was placed approximately 6 meters outside to the northeast of the cave entrance to investigate activities occurring immediately outside the cave in a relatively level natural terrace area. No features were identified. The upper levels were characterized by a brown silty-clay with varying degrees of compaction due to bioturbation. The lower levels were loose light-brown silty-clay overlaying conglomerate boulders. Finds included large quantities of debitage, burnt and unburnt bone (see **Figure 9, top right**), and charcoal. Shell was present in small quantities, along with six beast and three points.

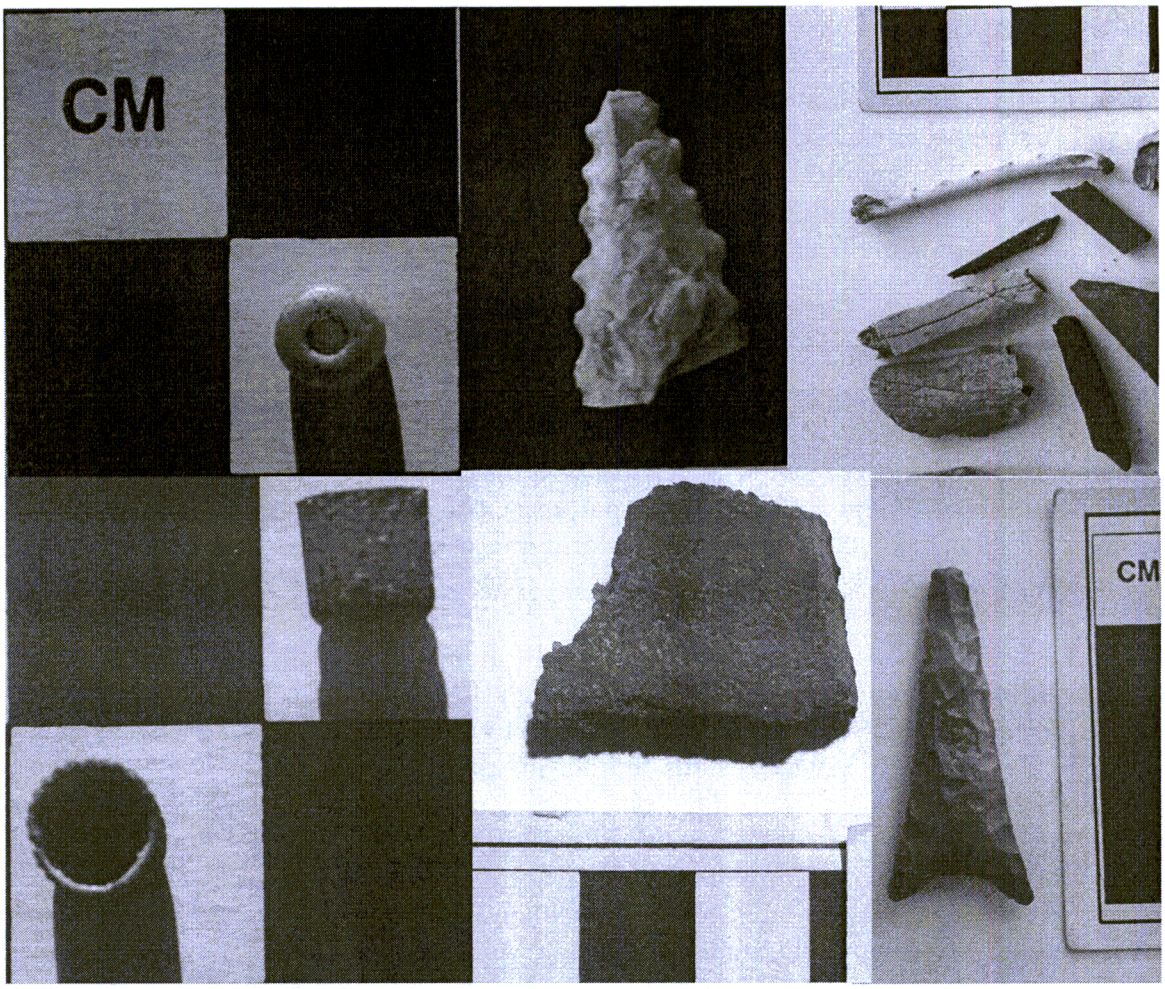

Figure 9: Finds from Pinwheel Cave excavations (KER-5836). Top left, blue glass bead; top centre, serrated broken point; top right, bone fragments; bottom left, metal objects; bottom centre, pot shard; bottom right, point with broken tip.

Discussion. Following is a preliminary discussion based upon the excavations and artifact assemblage. *As of yet, no formal analysis of any artifacts has taken place, so all interpretations must be considered as tentative, pending more thorough post-excavation*

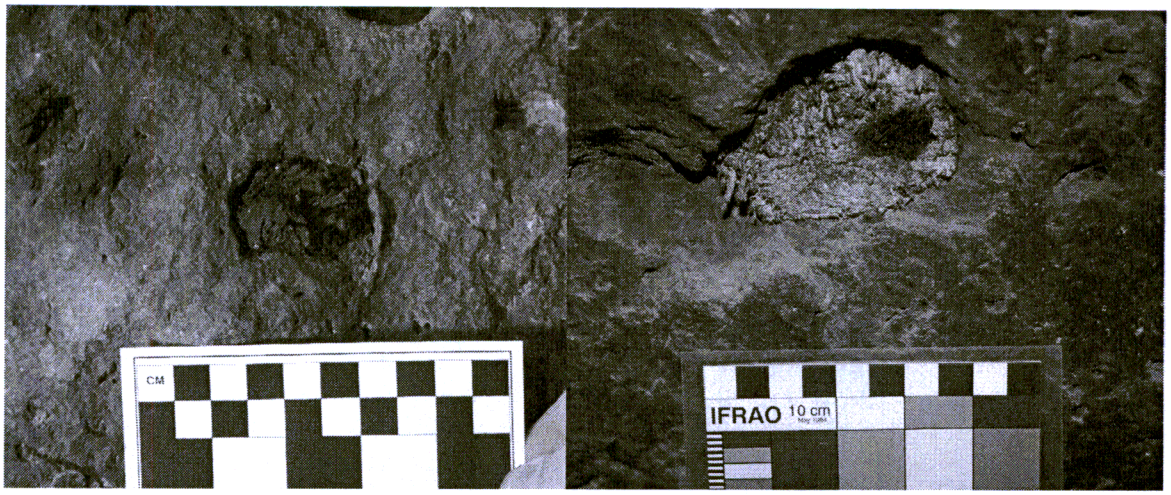

Figure 8: Fibrous materials, possible quids, sampled from ceiling of Pinwheel Cave (KER 5836). Right, sample 179; left, sample 180.

Excavations at Pinwheel Cave (KER-5836)

Test Pit 1: This was a 1 x 1 meter unit, 40 cms deep. It was placed at the southeastern portion of the cave below the two most prominent pictograph elements—a large Pinwheel and an Anthropomorph/zoomorph—to investigate possible activities directly under and in view of the art. No features were identified. The upper levels, consisting of leaf litter and loose brown soil, gave way to brown humic clayey silts overlying an irregular cave floor comprised of decomposing conglomerate bedrock. A range of material recovered include small amounts of debitage, burnt bone, groundstone, shell, 9 beads, one point, and a pot shard (see **Figure 9**, **bottom centre**). Wooden objects were also recovered, as well as moderate amounts of charcoal.

Test Pit 2: This was a 1 x .5 meter unit (aligned north-south along the long axis), 40 cms deep. It was placed at the western portion of the cave near the western entrance to investigate a rectangular formation of stones. A tan circular clayey feature (2004) was determined to be the upper portion of a natural clay deposit which underlay brown silty-clays. No finds came from this natural clay. Finds were sparse, including only small amounts of debitage, burnt bone, and charcoal.

Test Pit 3: This was a 1 x 1 meter unit, 60 cms deep. It was placed at the northern entrance to the cave to investigate activities at the mouth and to determine if soil buildup had occurred through downslope transport of soil and materials from the slightly raised southeast interior cave. A compact, friable lens was documented as a possible remnant *in situ* surface (3003). All spits evidenced significant bioturbation in the form of krotovina. The upper layer of brown silty-clay gave way to browning-grey between 12 to 40 cms, probably indicative of intermixed ash within the deposits. The lower levers consisted of light brown silty-clays and over an irregular decomposing conglomerate floor. Finds included large quantities of debitage, burnt bone, and charcoal. Shell, pottery fragments, steatite arrow straightener, lithic tools and seven points were also recovered (see **Figure**

This sand and clay also directly relates to a series of outcropping spring lines. The clay itself appeared to flow directly down the 'v' of the valley, as would be expected. Figure 6.2 provides an example of the borehole data gathered. Work is currently underway to link the topographic survey and borehole logs to create an interpolated isopachyte model for the valley. Copies of all borehole logs have been filed with the Santa Barbara Museum of Natural History.

Fieldwork at KER-5836, Pinwheel Cave and KER-5837, Pinwheel BRM complex. Four test-pits were excavated at Pinwheel Cave and five test-pits were excavated at the BRM complex (see **Figure 7**). At Pinwheel Cave, two test-pits (TP1 and TP2) were placed within the interior of the cave; TP3 was placed at the entrance under the drip-line of the overhang; TP4 was placed approximately 6 meters outside to the northeast of the cave entrance. At the BRM complex, units were placed amongst the highest concentration of BRMs. All units were excavated in 10 cm spits, with all deposits sieved in 1/8th inch screens. All finds are archived with the Santa Barbara Museum of Natural History.

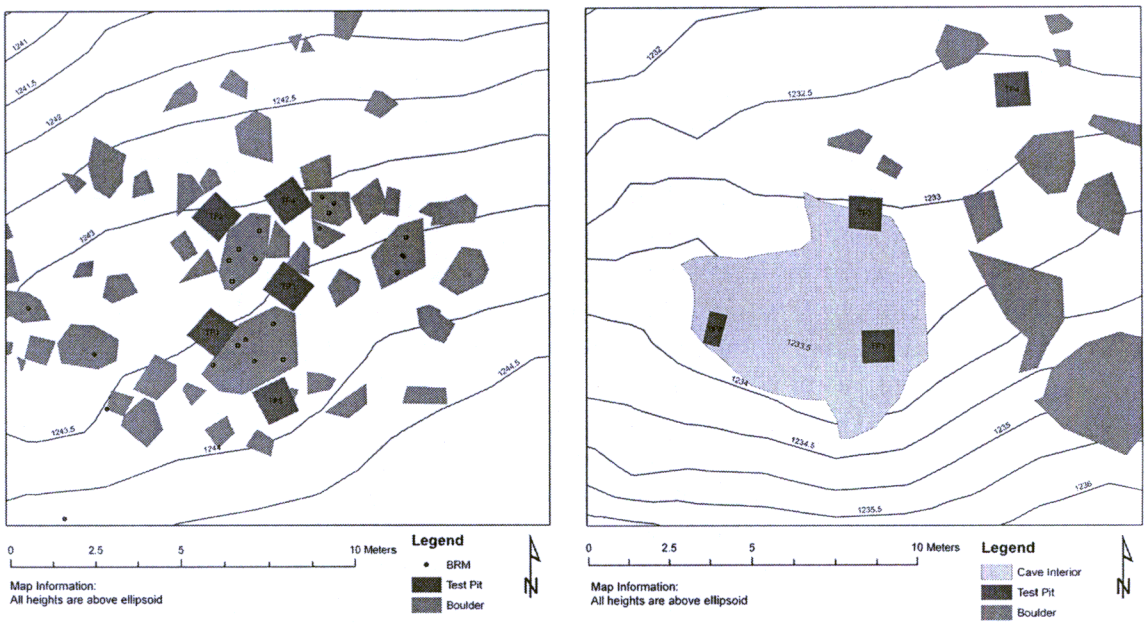

Figure 7: Location of excavated units. Left, excavations within Pinwheel BRMs (KER-5837); right, excavations within and outside of Pinwheel Cave (KER-5836).

Chew Sampling. Two of the packed fibrous materials—presumed to be 'chews' or 'quids'—found in natural pockets within the ceiling of the cave were sampled and given finds number of NA-CA-KER-5836-179 & 180 (**Figure 8**). 179 was a dark brown fibrous example taken from the ceiling immediately within the eastern entrance to the cave: 180 was a large tan pulpy with a discoloured dark patch located towards the northern entrance. The chews are currently stored at the University of Central Lancashire (UK) for both human and plant DNA analysis.

that this work might find instances of relatively intact buried soils at the toes of the two slopes of the valley. Initial analysis of the material recovered has in fact indicated two locations on the north slope where stratigraphy may still exist. However, at this early stage of analysis it is the broader picture gained from the boreholes that will be presented.

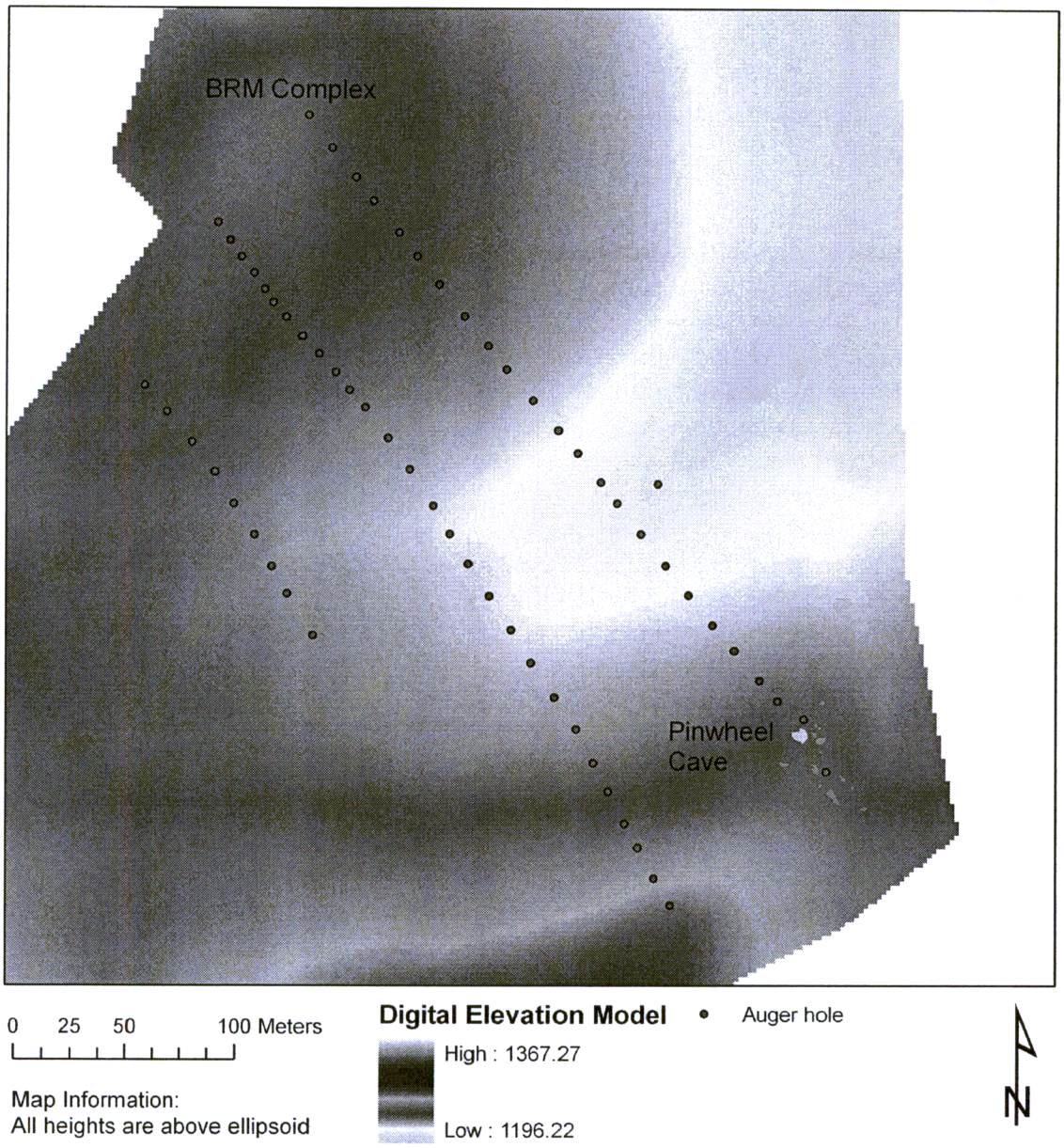

Figure 6: Digital terrain model showing location of augur survey.

The three survey transects revealed remarkably different soil characteristics between the two valley slopes. The southern slope (upon which pinwheel cave is located) was capped by over 80cm of developing woodland soil (a mix of clayey silts), with a high organic content. The northern slope had a thin skin of clayey silt over outcropping bedrock. Towards the bottom of the valley these deposits overlie a layer of clay and then sand.

The Pinwheel Project 2007: Fieldwork was designed to investigate an integrated set of research questions centered upon the rock-art, organic remains, and the surrounding environment of both the cave and the BRM complex (see Robinson and Sturt 2008 for detailed discussion of research questions). Thus, fieldwork was designed to determine the occupational *character* of the wider locale; determine the chronology of occupation at the BRM complex; determine the character of activities within the Main Cave, under the direct view of rock-art elements, as well as immediately outside the cave; identify the component species and dates of the possible quids inserted into interstices within the Main Cave. In this later regard, ethnohistoric and archaeological examples of quids include yucca, tule, agave, or ritual/trance inducing substances such as tobacco (sometimes mixed with lime) or even possibly datura (jimson weed) (Gayton 1948a-b; Meighen 1966; Salls 1985; Turner 1967). A final goal was to determine genetic mtDNA lineage represented by the fibrous quids. Results will be utilized to address more targeted and specific research questions, particularly *was rock-art imagery at Pinwheel Cave inspired by the use of visionary substances;* and, *through genetic analysis, what prehistoric lineage populations occupied the site?* The answers to these questions will address larger theoretical and interpretative issues concerning the nature of rock-art site occupation in general, its relationship to landscape and social setting, and the relationship between trance-experience and the derivation of rock-art imagery, plus genetic affiliations in prehistoric indigenous populations.

In addition, we want to understand the role of the locale in the San Emigdio landscape and its relation to land-use practices: was it a BRM and hidden rock-art site, a hunting camp, procurement site, or a seasonally occupied site, or even a village site? What practices occurred on site and what identities can be inferred (elite, craft specialist, gender, etc)? Perhaps most importantly, we want to understand its place in wider South-Central Californian contexts, particularly in the material culture present and the areal relationships the material culture suggests. Ultimately, we aimed towards understanding the site in multi spatial and temporal scales; spatially, from activities restricted within the cave or BRM environments, to across the locale and its topography, to the San Emigdio Hills, to South-Central California, in addition to its deep time chronology and temporalities such as seasonality and momentary acts such as flint knapping and rock-art application.

Topographic and Augur Survey. As part of the 2007 project an extended topographic survey was carried out to help create a digital terrain and geomorphological model. The preliminary results of this survey are shown in (see **Figure 6**). During this survey the absolute accuracy of the UTM coordinates referred to in this study was ascertained. The original survey datum was located with a handheld GPS unit accurate to within 8m in three-dimensions, with heights noted above ellipsoid rather than geoid. As such, all co-ordinates obtained from total station work and used in this study are internally accurate to within millimeters, but strictly geolocated within an 8m total tolerance.

In order to better understand site formation processes and the past environment at Pinwheel cave an auger survey was carried out. Sixty two boreholes were drilled as a part of this work, the locations of which are noted in figure 6 below. It had been hoped

Figure 3: View of a portion of Pinwheel BRM complex (KER-5837).

Figure 4: View of Pinwheel Cave (KER-5836) amongst oaks.

Figure 5: Rock art elements, Pinwheel Cave. Left, Element 1; right, Element 2, 10.5 x 17 cm. Both elements in shades of red. Drawings by Dan Reeves.

eyed anthropomorphic/zoomorphic figure, plus other circle and dots, and red fragments. A sandstone tablet with a ring of asphaltum on its surface indicating it may have been a hopper-mortar lies on the surface, while fibrous materials have been crammed into porous hollows that pepper the ceiling: it currently is not know what these fibrous materials may be comprised of, but the possibilities include tobacco or jimson weed and some may be chews (or 'quids'), the remains of activity that included masticating the material.

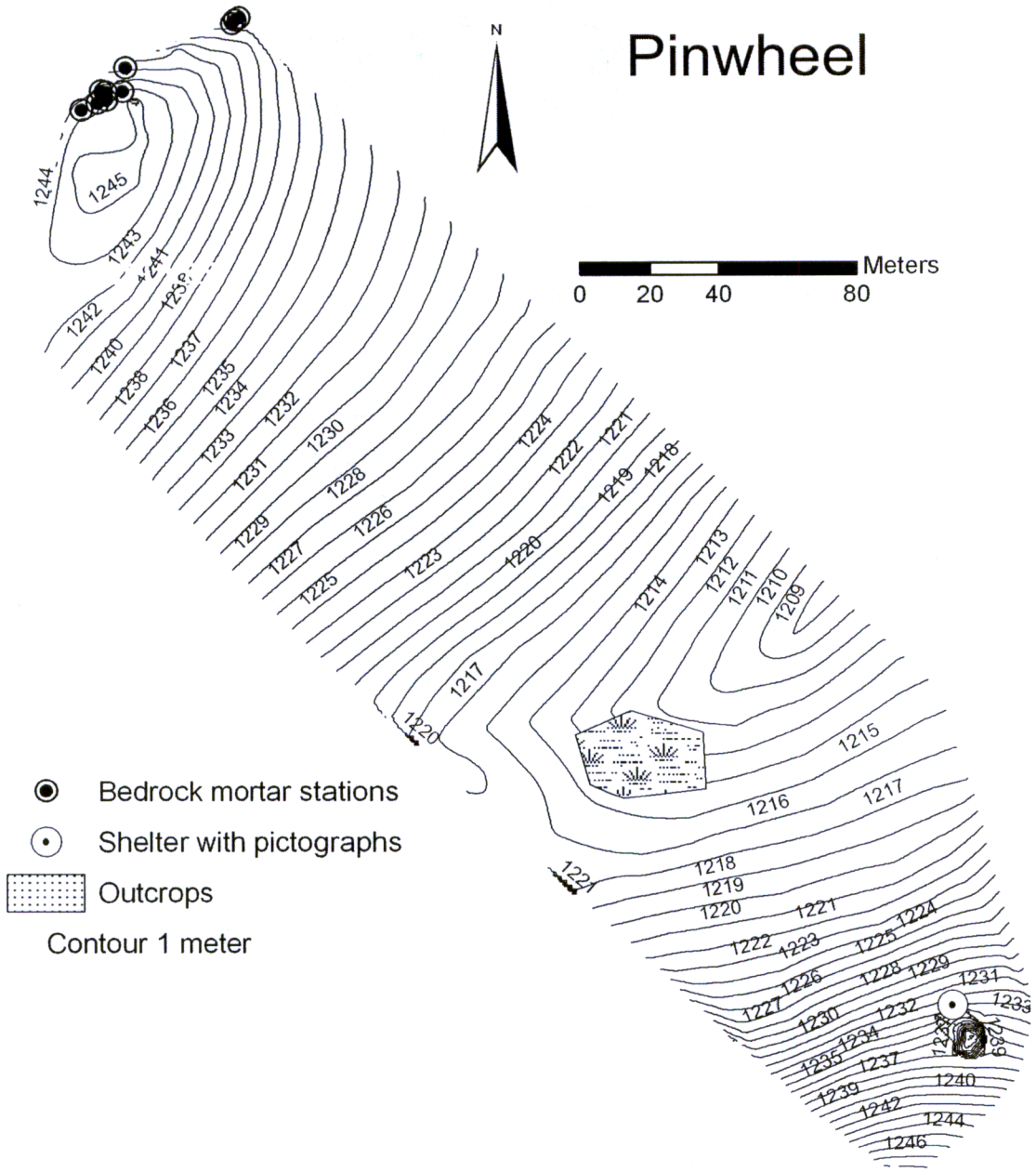

Figure 2: Map of Pinwheel Cave (KER-5836, bottom) and BRM complex (KER-5837, top). Intermittent spring occupies low ground between.

and environmental context is stymied by a dearth of modern excavations at interior California rock-art locales, some of which have the most spectacular examples of polychrome pictographs on the continent. Too often ethnographic and neuropsychological inferences stand as the only means to judge the art rather than taking into consideration the archaeological components found with or near the art. In this paper, we outline recent archaeological investigations at the rock-art locale called Pinwheel Cave and its associated bedrock mortar complex found in the San Emigdio Hills of Kern County (see **Figure 1**).

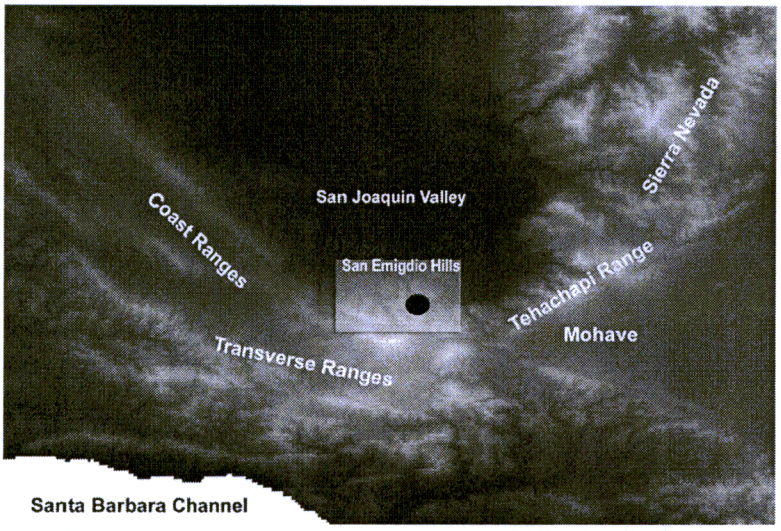

Figure 1: Location of Pinwheel site in the San Emigdio Hills.

The fieldwork at Pinwheel is part of a larger research project called *Enculturating Environments* that aims to test archaeological deposits associated with rock-art (c.f. Robinson 2008). In this paper, we present the initial results of this project as the starting point towards articulating the rock-art of South-Central California with the archaeological record.

The site: The complex of Pinwheel Cave and associated features (KER-5836, 5837) covers an area approximately 380 x120 meters (see **Figure 2**). The locale is characterized by open oak woodland on ridge lines and north facing slopes. On the northwest margin of the locale, nine bedrock mortar (BRM) stations with 19 BRMs and at least 12 cupules line the crest of the ridge (KER-5837) (see **Figure 3**), affording expansive views northwards of much of Southern San Joaquin Valley. Towards the south from the BRMs, a gentle open, grassy slope dips down to an intermittent spring, before the terrain then begins to elevate again into open oak woodland: Sprague and Grasse (2002) have documented a broken sandstone bowl near the tree-line. About 80 meters into the woods, a large conglomerate formation can be spotted amongst the trees (see **Figure 4**). This large formation is Pinwheel Cave (KER-5836). Outside the main shelter, just intervisible with some of the BRMs an overhang (Shelter 1) contains red fragments and traces. There are three openings into another area, the Main Cave—a conical, dome shaped hollow with room enough for two or three people to stand in the centre. Rock-art found on the ceiling is monochrome red (see **Figure 5**): these elements include Element 1, an impressive pinwheel (hence the site name); Element 2, an oval-

Towards Articulating Rock Art with Archaeology:

An interim report of the Pinwheel Cave rock art and bedrock mortar complex (CA-KER5836 & 5837), Kern Country, California.

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Introduction: The disarticulation of rock-art from the archaeological record remains the primary obstacle facing Californian rock-art research (Robinson 2008). A schism, so to speak, exists between the archaeological record and rock-art as well as between 'dirt' archaeologists and rock-art specialists. This is due largely to the fact that past rock-art research in California has not focused intently on investigating archaeological deposits found at rock-art sites (see Robinson *et. al* 2008 for discussion of previous rock-art excavations in California). This is perhaps surprising considering that in some parts of the world, the investigation of rock-art and archaeology has long well established traditions (for instance France, Australia, Southern Africa, and India). Recent trends in rock-art research, particularly in Europe, are beginning to explicitly theorize and further develop a slew of methods of deriving information directly from subsurface deposits associated with rock-art, showing the substantial value of excavating rock-art sites and their surrounding terrain (see O'Connor 2003; Jones 2005; 2007). A recent symposium called *Excavating Art* at the 2008 World Archaeological Congress by Blaze O'Connor and David Robinson highlighted this emergent trend in global rock-art research. Excavation, as the most powerful methodology available to archaeologists, enables the identification of associated practices that complements traditional analyses of the art itself as pictorial evidence (see Chippindale 2001). This archaeological approach thus adds new perspectives to and directions from, classic ethnographic and cognitive shamanic interpretations of the art (Lewis-Williams & Dowson 1988). Rock-art in the American Far West, in South-Central California, and in Kern County particularly, has long been interpreted as a classic example of trance-derived imagery (such as Whitley 1988; 1992; 2000 amongst others), in turn influencing global debates on the subject even though no direct association between trance experiences and rock-art has been identified archaeologically in this region famous for rock-art. Through extensive survey, digital mapping, and viewshed analyses, Robinson's recent research suggests that many Californian rock-art sites were far more than places simply where pigment was applied or carvings etched: the archaeology found near rock-art sites shows that a suite of activities took place in view of the rock-art or the features it occupies, calling into question the interpretation that they were places of shamanic exclusion (for full discussion, see Robinson 2006; 2007). However, furthering our understanding of rock-art, its possible association with use of trance substances, its associated archaeology, and indeed its social

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Five test-pits were excavated at the Pinwheel Cave BRM complex (CA-KER-5837) (see **Figure 7, left**). The units were arranged in order to gain data from all four sides of two large boulders upon which cupules and mortars were found. All units were excavated in 10 cm spits, with all deposits sieved in 1/8th inch screens.

Test Pit 1. This was a 1x1 meter unit, 0.75m deep. It was butted up against the northern edge of a BRM boulder decorated with cupules. The unit was placed here in the hope that material associated with processing activity at the BRM might be found with the soil matrix. No features were identified during excavation. Unlike the test pits in the cave, all pits at the BRM complex revealed a remarkably consistent colluvial profile of large to small rocks/cobbles with a fine clay silt in the interstices. Given this formation, a record of the quantity of soil removed from each spit was kept as it was felt that this could potentially help explain variance in artifact density more usefully than spit depth alone. Finds include debitage, burnt bone, a chert blade (**Figure 10, bottom left**), a point (**Figure 10, top right**), small amounts of shell, charcoal and one bead.

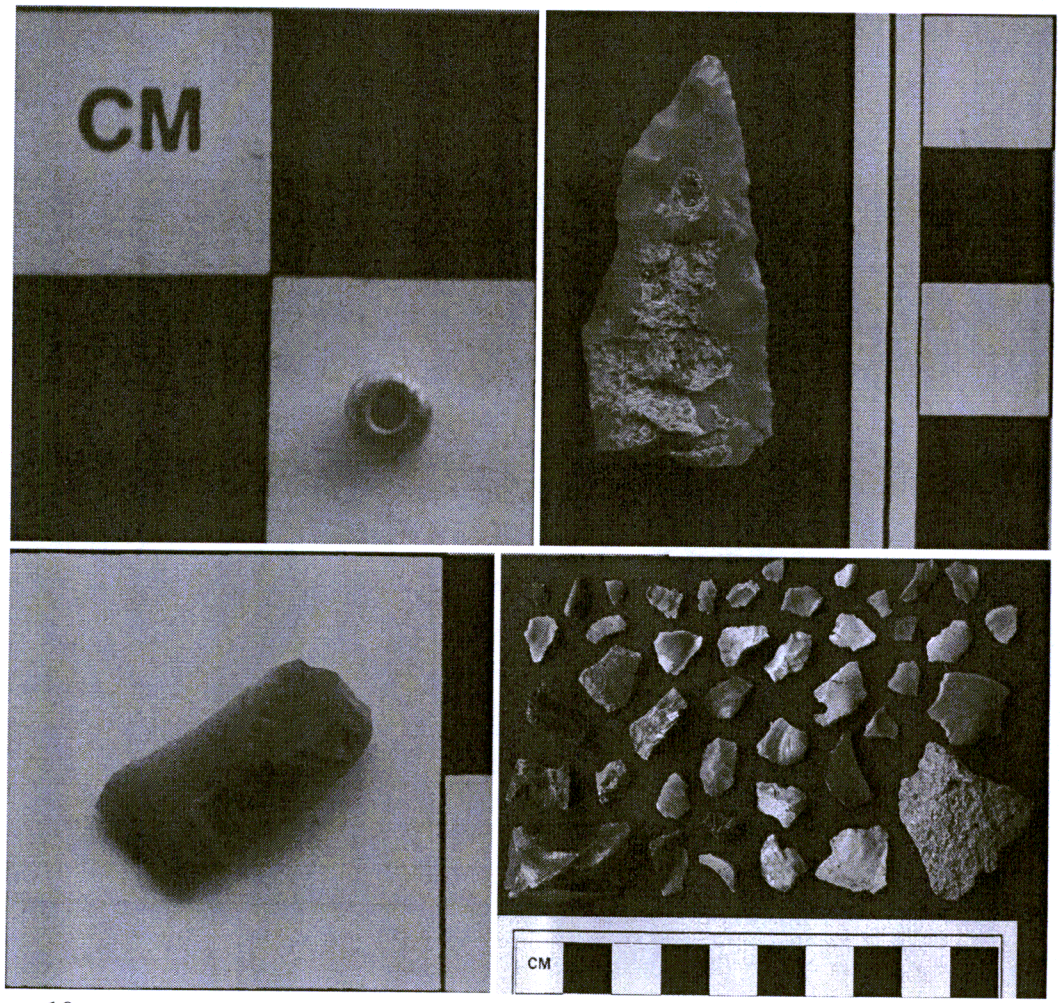

Figure 10: Finds from Pinwheel BRM complex excavations (KER-5837). Top left, blue glass bead; top right, unfinished point, Temblor chert; bottom left, chert blade; bottom right, debitage.

making/altering the painting by the original maker after the completion of the painting. Whatever the case, we can see that the rock ceiling, with its natural inclusions, and pocked mark surface, along with the art itself, provided far more than a neutral backdrop to the paintings: it was a medium that was actively engaged with in a number of manners. This practice reiterates that of the use of the natural depressions for the insertion of the fibrous material: it is impossible to say with certainty that these practices are contemporaneous, but their similarities imply some form of continuity in the attitudes and practices oriented towards the rock formation of Pinwheel Cave.

Laser Scanning: In an effort to provide comprehensive documentation of the cave site a combination of surveying methods was used. Firstly the interior and exterior of the cave was mapped using a Leica reflectorless total station. This provided a mesh of points with real world UTM coordinates. This data can be found in the electronic archive submitted to the Museum of Natural history in Santa Barbara.

Secondly, a Minolta Vivid 910 laser scanner was used to create a high-resolution model of the painted surfaces and chew locations within the cave. Multiple scans were taken of the cave interior and then stitched together within Konica Minolta's polygon editing tool. This data has been though a first processing phase and is now being joined to the total station data. At present all scan data is in a proprietary format, but at the end of processing it will be submitted with the rest of the final report in an open source x.y.z form.

The scanning carried out as part of the pinwheel project 2007 had two main aims. Of primary importance was to record the cave prior to any excavation. This collection of data now provides an accurate representation of the cave interior that can be used for heritage management purposes. There was also a research question behind the use of the scanner in that we wished to see if fugitive elements no longer visible to the naked eye could be picked out within the scan data. The scan data is currently archived at the University of Southampton in a .vxd format.

Excavations at CA-KER-5837, Pinwheel BRM Complex. KER-5837 is a linear, north-east to south-west oriented BRM complex with 10 stations, 19 individual BRM and at least 12 cupules. The orientation is due to a sandstone formations at the crest of sloping formation. Oak trees are found amongst the BRMs and on the northern slope. Water tanks indicate spring activity on the north sides, while south of the BRMs, in the direction of Pinwheel Cave, open grassland occupies the slope as it gives way to an intermittent spring at its base. The BRMs cluster in two loci: one on the eastern portion as it slopes down, and another on the western portion at crest of the hill. This second locus affords expansive views of the interior San Emigdio ranges and portions of the Southern San Joaquin and Temblor range in the far distant. A few steps towards the south and Pinwheel Cave can be seen.

Excavations concentrated on this second locus at the summit: no artifacts were visible on the surface before excavation.

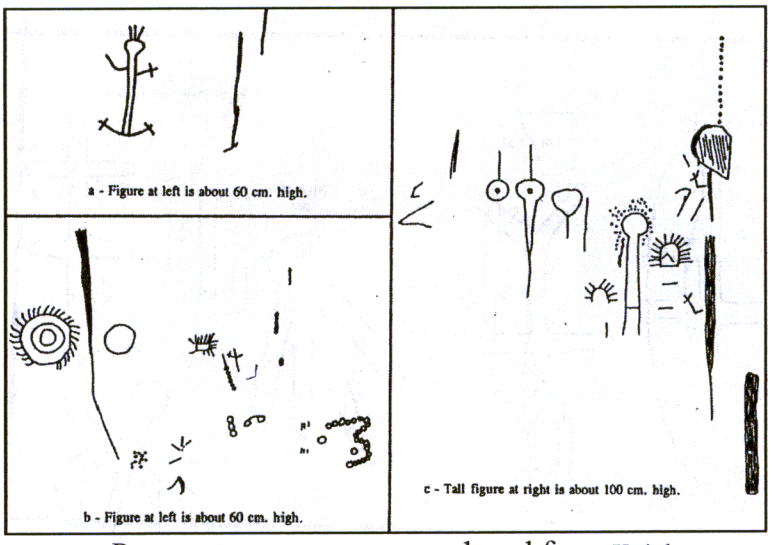

Figure 3. Pictographs at LAN-721 reproduced from Knight (1993:50, Fig. 6)

CA-LAN-947 (Ritter Ranch Pictograph Site). LAN-947 is situated to the west of Palmdale along the San Andreas Fault Rift Zone in the Anaverde Valley. Springs are present at the site and elsewhere in the immediate area. The site contains a few very faded red pictographs situated on a vertical face of a large basalt outcrop. These include "a diamond net, several zig-zag lines, a large dot surrounded by nine additional dots and three lines, and several areas of smeared red pigment," one of which is greater than one meter in size (Sutton 1982:31; 1988:68-69). The paintings appear to be representative of the *Southern California Rectilinear Abstract Painted Style*. Recent archaeological work related to the Ritter Ranch housing development has verified that a boulder with one weathered abstract curvilinear petroglyph with at least a couple of cupules is situated a few meters down slope from the pictograph panel (Beth Padon, personal communication, 2008).

CA-LAN-1731 (Piute Butte). This site is situated on a tall rock face within a natural granitic "amphitheatre" on the north slope of Piute Butte, which is administered by the Antelope Valley Indian Museum. The earliest sketches of the rock art at the amphitheatre were made by Gordon Redtfeldt, who worked from the mid-1950s to the 1960s with Charles La Monk and the Archaeological Survey Association of Southern California. Copies of Redtfeldt's (n.d.) sketches, which are curated at the UCLA Rock Art Archives, show relatively elaborate motifs, including a stylized anthropomorph with circular hands, feet and "antenna," a chain of diamonds, several circles with various appendages, an anthropomorph with a "eye of the needle" head, a cross within a circle, vertical lines with cross-bars, and a few other motifs that are difficult to describe. Redfeldt's (n.d.) sketches are reproduced by Knight (1993:51-55, Figs. 7-8, 10-11).

It is now known that Redtfeldt's sketches contain a number of painted elements that were not created by Native Californians (Edra Moore, personal communication 2008). The Antelope Valley Indian Museum has a 1932 photograph that shows a woman, identified as Laura Loomis, seated in front of a rather rich display of colorful pictographs on the amphitheatre wall (Moore 2004). These painted elements, most of which are not even faintly visible today, include rayed lines, a simple line-drawn anthropomorph, at least four "rattlesnake" elements, and an oval "mitochondrion" element. It has been suggested that the property's owner, H. Arden Edwards, who was an artist and avid collector of Native American artifacts, may have drawn these "pictographs" as a stage setting for a series of Indian plays he organized at the amphitheatre.

Redtfeldt may have not known about the dubious origins of this rock art; however, in fairness, we point out that Redfeldts's (n.d) field notes were not relocated for this study. Since Redtfeldt had plenty of experience dealing with rock art, he may actually have distinguished between authentic pictographs and the more recent paintings.

LAN-1731 was rerecorded in 1987 but only a red rayed "sun" image and a possible anthropomorph figure were still visible. The rayed disk sketched by Sampson (1987) represents a fragment of a larger element that was recorded 25 years earlier by Redtfeldt (n.d). Sampson's sketches, which are reproduced by Knight (1993:51-55, Figs. 9-10), indicate that much pigment has weathered away in a relatively short period of time.

Given the uncertainly surrounding the origins of some of the pictographs, the previous assignment of LAN-1731 to the *Southern Sierra Style* no longer seems sustainable. While the rock art remains stylistically unclassified, it is noted that *Southern California Abstract Rectilinear Style* paintings are found elsewhere in the general vicinity.

Interestingly, another type of rock art may also be present at the Piute Butte vicinity. A "vulva"-form petroglyph is recorded as LAN-2096 (see below). Edra Moore, a former curator of the Antelope Valley Indian Museum, reports that other vulva-like petroglyph images exist in the general area (personal communication 2008). At the present time, the rock art at Piute Butte is closed to public access until an assessment of significance can be completed by the California Department of Parks and Recreation.

CA-LAN-1767, -LAN-1768, and -LAN-3343 (Anaverde Hills Sites). CA-LAN-1767, 1768, and 3343 are pitted cupule sites located in the San Andreas Fault Rift Zone along the northern base of the Sierra Pelona Mountains. The bedrock of the Sierra Pelonas is comprised of hard and soft schists, which provide good surfaces for cupule manufacture but make poor surfaces for pictographs and most petroglyphs. It is therefore perhaps not surprising that at least 30 cupule sites have been recorded in the Sierra Pelona Mountains to the west.

LAN-1767, 1768, and 3343 each contain one or more small schist boulders or rock outcrops with roughly 20 to 50 cupules. LAN-3343 contains hard Pelona Schist outcrops and the cupules are about dime-sized and are very shallow. By contrast, small isolated cupule boulders at LAN-1767 and 1768 are comprised of soft talc schist and the cupule pits are correspondingly much larger (between 4 – 8 cm diameter and 1-2 cm deep).

The Anaverde Hills cupule sites are all located on small knolls at the mouths of fairly small canyons that contain much greater native plant density and diversity than found at nearby areas. The plant species, which include elderberry, desert plum, and mariposa lily, are more robust than plants growing even short distances away. Many bird species are also present, which suggests that other kinds of animals would likely be attracted to the thickets of plants. Since the sites are found at areas of relative resource abundance, one of the writers of this paper (Knight) speculates that the cupule boulders may mark spatial patterns of land-ownership or other systems of land-use, quite possibility the particular drainage each cupule rock is found in.

CA-LAN-1789/H (Fairmont/Antelope Buttes Complex). LAN-1789/H represents a large site complex located at the Fairmont/Antelope Buttes vicinity in the Antelope Valley. The site designation encompasses a number of previously recorded sites with extensive rhyolite quarry and workshop materials, habitation deposits, bedrock mortar facilities, and a small amount of rock art. Cupule petroglyphs are present at eight or nine different boulders located throughout the site area.

As mentioned earlier, LAN-298 is now considered to comprise a locus of LAN-1789/H. LAN-298 encompasses a dispersed concentration of approximately 400 bedrock mortars and contains a very faint red pigment pictograph panel. The painted elements are a rayed disk (illustrated by Sutton 1982:30, Fig. 3) and a set of three or four interconnected red circles. The pictograph panel is very exposed to the weather and it seems probable that additional painted elements were present in the past. Although difficult to categorize from limited data, Knight (1993:42, Fig. 1) suggests the pictograph panel represents the *Southern California Rectilinear Abstract Style*. The site is in private ownership but remains generally accessible.

CA-LAN-1977 (Santiago No. 4). LAN-1977 is a large multi-component prehistoric encampment site situated on a terrace along Santiago Creek. Santiago Creek is a primary contributor to Little Rock Creek, which is the largest drainage flowing into the western Mojave Desert. LAN-1977 contains at least five small schist boulders containing cupule rock art. Milburn (1998) conducted test-level excavations at LAN-1977 that yielded, among other data, 21 obsidian debitage pieces with rim hydration measurements ranging from 1.0 and 12.1 microns and charcoal from two rock-lined earth ovens that yielded near identical ^{14}C ages of 840 +/-60 RCYBP and 850 +/- 50 RCYBP. Upstream from LAN-1977 is a smaller encampment site (FS No 05-01-54-109) that contains an alignment of three cupule depressions situated on a narrow low-lying granitic boulder. LAN-1977 and FS No 05-01-54-109 are administered by the Angeles National Forest.

CA-LAN-2096 (Piute Butte "Yoni"). LAN-2096 consists of a large granitic boulder with naturally eroded fissures that may have been enhanced by pecking or grinding to create a vulva-form feature. The degree of purposeful human enhancement at LAN-2096 is unclear, however, this feature is similar in appearance to a smaller boulder located on the eastern flank of Piute Butte (a site record is reportedly in preparation by Tejada) and a boulder near a private residence at LAN-2368 (see below). All of these vulva-like images are situated in highly erodable quartz monzonite bedrock.

CA-LAN-2200 (Edward's Air Force Base). The pictograph rock art at LAN-2200 is comprised of a small panel on the ceiling of a rock shelter on Edwards Air Force Base. The red pigment elements include a fragment of a vertical diamond chain, irregular rectangular-rectilinear elements, an oblong circle, and several large red dots. These elements are clearly characteristic of the *Southern California Abstract Rectilinear Style* and suggest association with Takic groups from the southern side of the desert. This site does not seem associated with a habitation site, perhaps suggesting shamanistic activities rather than coming-of-age rituals.

CA-LAN-2368 ("Wolf's Rock Pile"). In 1982, Sutton suggested that *Southern California Rectilinear Style* pictographs would likely be found in the desert north of the San Andreas Fault; however, Knight (1993::41) stated that a northward extension of the style area was unsupported. Subsequently, during 1994, a local archaeological informant told Knight about an unrecorded rock art site situated in the vicinity of Folgate Butte near Lake Los Angeles. With permission of the landowner, Knight visited the site and determined that the pictographs clearly represent the *Southern California Rectilinear Style*. Knight recorded the site as LAN-2368 and then, as *mea culpa*, immediately called Sutton to inform him about the new site.

LAN-2368 contains a small east-facing rock shelter situated high on a rocky butte with a primary panel of 30 to 40 somewhat weathered red pictographs that also exhibit some traces of black and white pigment (Figure 4a). The uppermost portions of the panel are slightly faded but in mostly good condition. Most of the lower panel are subject to substantial weathering. The motifs include chains of diamonds, individual zig-zags, sets of two or more zig-zag lines (some parallel

and others randomly grouped), short lines, a possible avian image, segmented circles, and abstract images (Figure 4b). A small number of crudely executed cupules are located below the pictographs. The pictographs at this locus are almost certainly created by Serrano-affiliated groups.

Another small rock shelter at LAN-2368 is comprised of a set of about 15 red vertical lines, obviously made with the fingers, situated on the north side of the butte. A third very weathered red pictograph panel can be (barely) seen in a small rock shelter on an easterly flank of the butte. During a recent site visit, "Charlie," the matriarch of the family that has owned the property for four generations, recalled to Knight and Milburn that she remembers numerous paintings in this shelter when she was a young girl; however, someone subsequently built a "bonfire" in front of the shelter that blackened most of the paintings.

During that site visit, a possible vulva-form petroglyph was observed on a large boulder directly behind a residence on the property (Figure 4c). As is the case with similar features at nearby Piute Butte, the degree of natural erosion versus purposeful modification remains unclear; however, the form seems unmistakable. Numerous groundstone artifacts (mainly metates and manos) were also observed and it now appears that a significant prehistoric occupation component exists in conjunction with the rock art at LAN-2368.

CA-LAN-3486. Jay Lloyd of Applied Earthworks recently recorded the cupule rock art at LAN-3486 in conjunction with a large data recovery and monitoring project at Lovejoy Springs (CA-LAN-192). The site is situated within an alcove amongst a cluster of granitic boulders near the summit of a small unnamed butte. An obsidian flake was noted on the terrace just outside the alcove. Feature A contains at least 24 small circular cupules concentrated within an area measuring 110 cm by 90 cm. Feature B contains a series of at least 18 cupules on a weathered

a

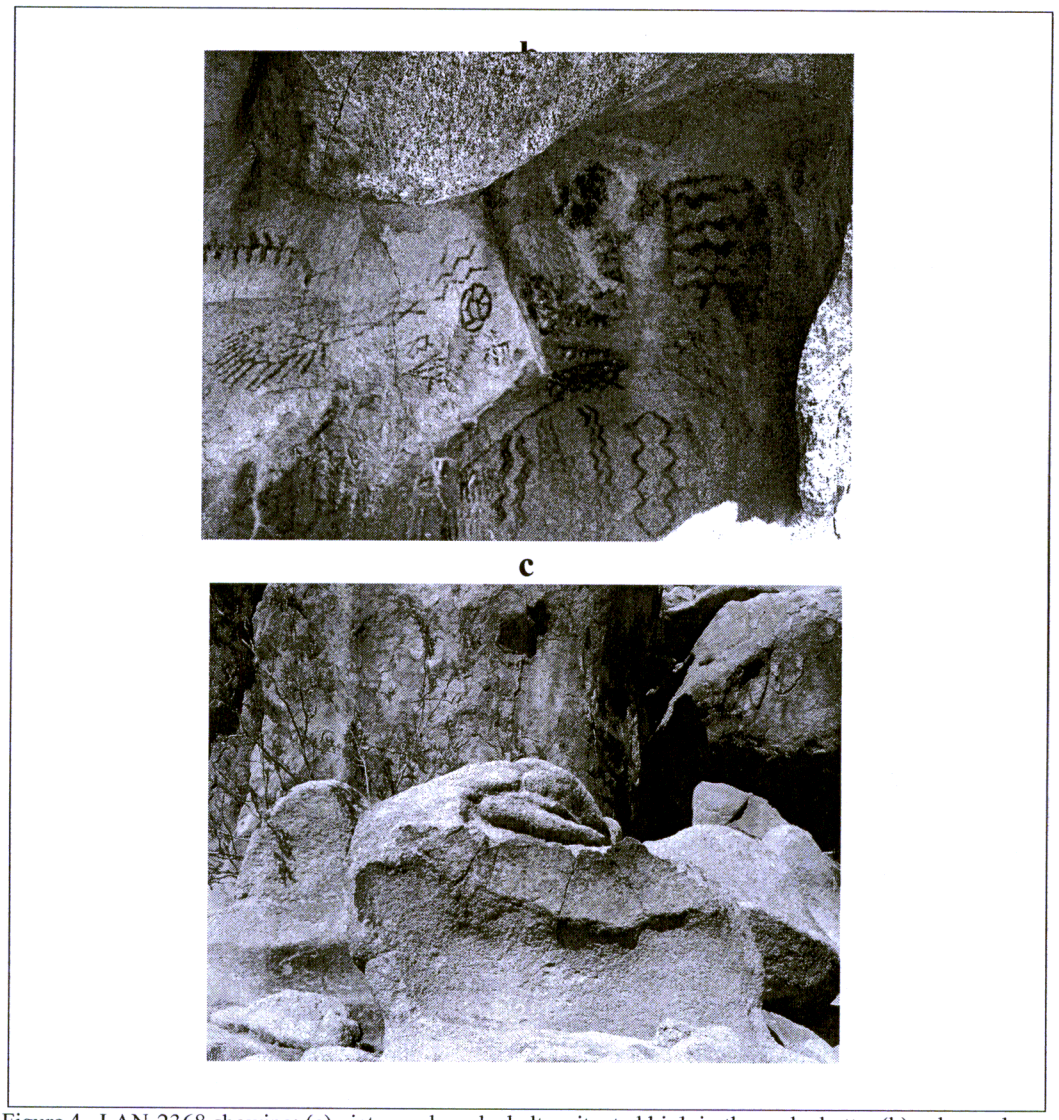

Figure 4. LAN-2368 showing: (a) pictograph rock shelter situated high in the rocky butte; (b) enhanced rectilinear pictographs at the primary panel; and (c) vulva-form petroglyph image (center of photo).

granite boulder (2.0 m long, 1.4m wide, and 0.9m high) that is located just outside of the alcove. The site itself is reportedly undisturbed, but the immediate area contains much trash and graffiti on near-by rocks.

Forest Service Nos. 05-01-54-0236 and -54-0237. Forest Service (FS) Site Nos. 05-01-54-0236 and -0237 each contain cupule/petroglyph boulders situated along Grandview Creek in the northern San Gabriel Mountains (Figure 5). Both of the sites are located within administrative boundaries of the Angeles National Forest (Milburn 2006).

FS No. 05-01-54-0236, or "Ron's Cupule Boulder," is comprised of approximately 26 ground cupule depressions and a curvilinear pecked chain-like petroglyph motif on a grayish-green metamorphic boulder. The cupules range from 3.4 cm to 8.0 cm in diameter. A pecked curvilinear motif runs horizontally around a portion of the boulder between several cupules and then forks into two branches. The rock art boulder is situated about 130 m southeast of a prehistoric encampment on a creek terrace that has yielded a Cottonwood-series projectile point, manos, metates, lithic debitage, burnt bone fragments, and darkened midden deposits.

FS No. 05-01-54-0237, or the "Pinnehah Site," is a seasonal food resource procurement and processing encampment site situated on a terrace at the junction of Grandview creek and an unnamed tributary. The site contains a single grayish-green boulder with a series of more than 20 ground cupule depressions. The site also contains rock ring features, midden deposits, lithic debitage/cores, bone fragments, and schist manos, metates, and a pestle.

Hamill Ranch Petroglyph (No trinomial). Moore (2004) has documented a petroglyph boulder on the privately-owned Hamill Ranch located approximately one mile directly east of Piute Butte. The boulder sits at the base of a granitic bedrock outcrop below a small east-facing rock shelter. The rockshelter was not investigated during Moore's (2004) field visit for further evidence of rock art panels. The petroglyph, which is rather faded, consists of several intersecting curvilinear loops, which is a signature of the *Great Basin Pecked Abstract Style*. The site has not been formally recorded and its current status is unknown.

CT-10 (Trinomial not known). This site, which is situated on private property in the westernmost end of the Antelope Valley, includes a patterned cupule rock art panel situated in the cleft of a 15 foot high boulder. More specific site information, including current status, was not readily available at the time this paper was prepared.

DISCUSSION

There are over 20 known rock art sites in the western Mojave Desert (cf. Sutton 1982; Knight 1993). Twelve of the sites contain polychrome or monochromatic pictograph panels: KER-137, -272, -1193, LAN-447/723, -484, -721, -947, -1731, -1789/H, -2200, and -2368. Pictographs are also reported to have once been visible at LAN-192 (Earle 2004). Most pictograph elements at the westerly portions of the study area are characteristic of Southern Sierra and Chumash rock art styles, which frequently includes the lavish use of multiple colors of pigment. This rock art tradition, which comprises part of Whitley's (e.g., 1998; 1997, 2003) *South-Central Variant of the Californian Tradition*, is also connected to Kawaiisu, Kitanemuk, and perhaps Tataviam cultural-linguistic groups. In marked contrast, most rock paintings found at southeasterly and central portions of the western Mojave Desert are related to the *Southern California Abstract Rectilinear Style,* which is characteristic of Serrano-Vanyume groups in the region.

Cupule rock art in the western Mojave Desert is found at LAN-1767,-1768, -1789/H, -1977, -3343, -3486, FS Nos. 05-01-54-236, -237, and, also, CT-10. Other cupule-like depressions are

a

b

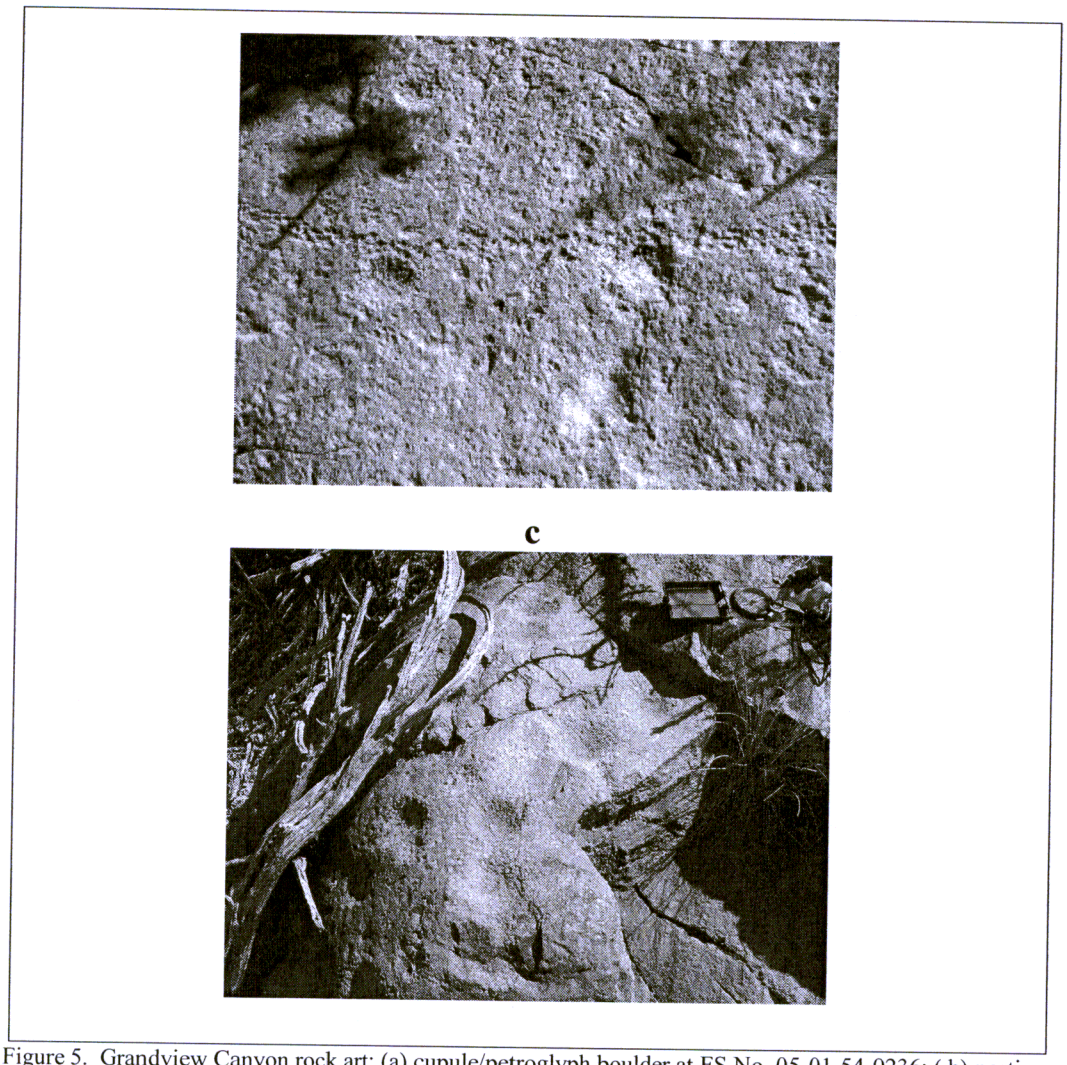

Figure 5. Grandview Canyon rock art: (a) cupule/petroglyph boulder at FS No. 05-01-54-0236; (b) portion of pecked linear motif with cupules at FS No. 05-01-54-0236; and (c) cupule pits at FS No. 05-01-54-0237.

found in association with pictographs at KER-273, LAN-447/723, 1789/H, and 2368. Cupule concentrations associated with pecked petroglyphs include CA-KER-302, LAN-947, and FS No. 05-01-54-236. Most cupule rock art is predominantly found on schist and other metamorphic boulders located along southern flanks of the Antelope Valley. As noted previously, cupule rock art in the western Mojave Desert spatially overlaps painted rock art and petroglyph traditions. However, it is not known whether the culture groups who made painted rock art also made petroglyphs and cupules. It may be hypothesized that that petroglyph and cupule making are older traditions that were partly or completely replaced with rock painting during later periods (cf. Whitley 1996:11-12).

Two pecked petroglyph sites, KER-302 and the Hamil Ranch Site, are representative of the *Great Basin Abstract Pecked Tradition*. While the ages of these ancient-looking petroglyphs have not yet been determined, it is thought they may have considerable time-depth. The styles of the petroglyph images at LAN-947 and FS No. 05-01-54-236 remain so far undetermined. A particularly distinct petroglyph type, comprised of vulva-like features ground or pecked in soft quartz monzonite rock, is situated within a highly localized geographical area near Piute and Folgate Buttes. These features probably represent examples of sexual symbolism in which the

rocks are depicted as symbolic vaginas. Much more research is required to determine the origins, characteristics, cultural affiliations, and geographical extent of this particular rock art tradition.

CONCLUSION

At least nine additional Native Californian rock art sites, including painted rock art, petroglyphs, and pitted cupule boulders, have been recorded in the western Mojave Desert since Knight (1993) last wrote about the subject. The northwestern and the southwestern flanks of the western desert region remain largely unexamined and it seems highly likely that additional rock art sites, particularly those containing cupule components, will be found at those areas. During the next few decades of the 21st century, it is expected that new rock art discoveries and continuing re-examinations of known rock art will contribute to better understanding of past culture concepts in the western Mojave Desert.

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Another surprising and highly significant finding of the project has been the identification of the use of this site that was particularly remote during Historical times. The glass beads found at both the BRMs and cave site show clearly that the site was used during the tumultuous times wrought through Spanish and Mexican incursions (perhaps even later?). The site is likely to have been a 'refuge', perhaps indicating the intensified occupation of locations hidden in more remote regions, away from the major route ways from the coast and through the Southern San Joaquin. But it was not an entirely newly created site: Pinwheel, previously utilized during seasonal transhumance movements, was within long established land-use patterns that underpinned the knowledgeable choices made by Historical populations. We can perhaps see in the archaeology at Pinwheel, with its attendant rock-art, an indigenous reinvestment into sites elaborated with visual media during the very times when they faced their greatest crisis (for another perspective on rock-art and crisis in Chumash contexts, see Lee 1979, 1997).

However, problems remain. While the excavations at Pinwheel more closely articulate the art with the archaeological record, we still do not know the chronology of the art. As an interim report, we have presented here the initial results of the project, but these interpretations presented will undoubtedly shift through formal analyses during the post-excavation process. Indeed, it remains a possibility that the art could have been made previous to any occupation, in which case some of the interpretations considered above would be doubtful. If this is the case, the presence of the art would certainly be of no less significant in relation to the archaeology. It may be that the art was there as a constant throughout the many visitations of the sites occupants, perceived within indigenous ideas of their own past, perhaps even mythologized along with the rock-formation it occupied (see Robinson 2006 for discussion of rock-art and mythology). Was rock art made early in the use of the San Emigdio hills as part of a process of enculturating the environment in its initial human colonization? It is because of questions such as this that the Pinwheel Cave Project is only the start of advancing towards more fully articulating the relationship between rock-art and archaeology in South-Central California. A single site approach will not be able to address that relationship in any comprehensive sense. Therefore, a new program of research to excavate a series of rock-art sites in South-Central California is under way. This project entitled *Enculturating Environments* will continue to test archaeological deposits associated with rock-art in order to move even closer to articulating rock-art and archaeology (c.f. Robinson 2008).

Acknowledgments: This project could not have taken place without the kindness and help of many people. First, we would like to thank the Wildlands Conservancy and the staff of the Wind Wolves Preserve, and D.C. Clendenen, Sheryl Clendenen, and Dan York. Not only did they make the project possible through facilitating access and accommodation, but they also showed an unwavering interest and enthusiasm for the work done. Similarly Jack Sprague and Gale Grasse-Sprague did a lot more than provide tools and advice; they also infected the entire team with their enthusiasm, sense of fun and commitment to good scholarship in archaeology.

amounts of bone found at the BRM complex when compared to cave site. This might indicate less cooking/food consumption at this location. However, it is hard to know how much the size of the area excavated limits what we can say and the parallels that we can draw between these two sites.

Overall it would appear that CA-KER-5837 represents more than just a food processing area. As people worked at the BRMs others knapped flint and possibly cooked or ate food prepared elsewhere. People working at this site either lost or deliberately deposited beads, just as they did at the cave. It is interesting to think that whilst today the site has a covering of invasive grass, in the past the sparser nature of bunch grass growth might have revealed more of this midden material, as well as the unstable nature of the hillslope.

Until further analysis is carried out the exact chronological range represented by this material, as well as the range of other activities is still unknown. It is hoped that macrobotanical work may help us identify more of what occurred here.

Conclusion. While still awaiting formal analyses, excavations on the Pinwheel Cave Project have drastically altered our view of the locale. Even if analysis of the chews do identify trance inducing plant material, in no way can the location be considered an isolated site of shamanic exclusion. Occupation within the cave environs occurred directly under and near to the pictographs. It also appears that cooking occurred at the cave entrance and that the cave was used to cache objects and perhaps for storage. The range of activities hints towards both male and female task-making. Whether the art was made during moments of individual or group activity is impossible to say; indeed, we do not know when in the history of the cave's usage that the pictographs were painted. But this in no way alters the significance that the cave, its immediate landform, and the associated BRM complex, show evidence of occupation. Certainly, the presence of similar material and practices from contemporaneous periods argues that both the BRM and cave site were occupied simultaneously, particularly in the Historical Period. However, the nature of this occupation does not argue that the site was a village (i.e. primary residence). The site appears (at least in its latter prehistoric/historic usage) more likely to have been a K-locale: that is, a seasonally occupied site associated with acorn harvesting (see Robinson 2006 and Jackson 1984, 1991 for discussion of K-locales and K-sites). Significantly the numbers of projectile points recovered may indicate that projectile retouch and preparation was a predominant activity occurring both at the cave and BRMs. The position of the art must be seen in relation to the usage of the site as seen in its associated archaeological record and surrounding environment. The oak tress, water supply, and access to local game made the site an ideal node in the landscape for temporary, but important visitation. The rock-art found at Pinwheel Cave can be seen as marking, and therefore enhancing, the importance of a site found away from major villages and visited during resource procurement forays into the environment. It therefore presents the possibility that the use of the art was employed as an ideological media that projected either a sense of group ownership of the local, or of an individual placing the art with full awareness that it would be seen by other members of the group (see Robinson 2006; 2007).

Test pit 2. This was a 1x1 meter unit, 0.45m deep. This unit was located on the north western edge of another large BRM boulder. No features were identified during excavation. Finds included debitage (**Figure 10, bottom right**), burnt bone, charcoal, two beads, and one point.

Test pit 3. This was a 1x1 meter unit, 0.55m deep. This unit was located between the two large BRM boulders in the hope that this flat area might yield waste material from work at both loci. Finds included large amounts of debitage, burnt bone, groundstone, two beads, and five points.

Test pit 4. This was a 1x1m unit, 0.80m deep. The unit was located in a slight hollow to the north east of a large BRM boulder. Finds included large quantities of debitage, burnt bone, charcoal, two flakes, groundstone material, shell, seven beads including two glass beads (**Figure 10, top left**), plus two points.

Test pit 5. This was a 1x1m unit, 0.75m deep. The unit was located on the south side of the largest BRM boulder at CA-KER-5837. There were particularly high hopes for this unit as the boulder itself was angled into the colluvium at this location, thus it was possible that a sealed context might exist. However, excavation revealed evidence for the same degree of relatively high mobility/slope movement in this area. Finds included debitage, burnt bone, possible groundstone material, one shell, one point, plus small amounts of charcoal.

SITE ACTIVITIES: Given that examination of the surface around the BRM complex revealed little evidence for midden material, the quantity and range of artifacts recovered was surprising.

Following is a preliminary discussion based upon the excavations and artifact assemblage. *As of yet, no formal analysis of any artifacts has taken place, so all interpretations must be considered as tentative, pending more thorough post-excavation and laboratory work.* Most surprising were the finds of both shell and glass beads along with evidence for different parts of the knapping process. A cursory examination of the lithic material revealed that the majority relate to pressure flaking and retouch activities. The raw material used included both Franciscan and Temblor chert as well as a small amount of obsidian and other material. This paints a picture of people working on finishing off tools that have already been started elsewhere, mirroring activity seen at Pinwheel cave. Some of the larger flakes do indicate secondary reduction, but no finds were made of any primary removals. The presence of shell and glass beads draws another parallel with the cave site, with the finds made representing a similar chronological spread.

Given the dynamic nature of colluvial contexts it is hard to know what to say of the amount of charcoal found. The discovery of a polystyreine fragment at 40cm within test pit three, and an eraser fragment at 30cm in test pit two, demonstrates that material still moves down profile with some ease at this location (despite the fact that there was little evidence for gopher activity at this particular site). What is worth noting is the smaller

Dating Aboriginal Occupation at *Tïheshtï-va'a-dï:*
Changing Land Use Patterns at a Kawaiisu Village, Tehachapi, California

Alan P. Garfinkel and John F. Romani

Introduction

CA-KER-2553 is a prehistoric and historic archaeological site located both north and south of Tehachapi Creek near the Southern Pacific Railroad line west of Tehachapi, California. Compass Rose Archaeological, Inc. conducted a test excavation at the site to mitigate adverse affects from a proposed Tehachapi Bicycle and Pedestrian Path (Romani 2007). That project was contracted by Kern County with oversight coming from the California Department of Transportation (Caltrans). The site measures about 600 m north-south x 550 m east-west and is at an elevation between 1161 and 1207 meters (3810-3960 feet) above mean sea level. There are basalt outcrops on site slopes and most of the vegetation on-site is grassy range land that includes rabbitbrush, Mormon tea, buckwheat, and a few examples of native oaks and junipers. Riparian vegetation is associated with the Tehachapi Creek drainage just below the site.

The site contains a series of milling stations, cupule rock boulders, dense lithic scatters (unmodified flakes, flake tools, cores, and projectile points), three human burials, and in places a well-developed midden. This large habitation site was originally recorded by Peggy Murphy and her associates (Murphy et al. 1989). According to that site record, there are more than 20 milling features, with 101 bedrock mortars and metates, along with 18 cupules. According to a slightly more recent site update Schiffman (1990:4-5) related that the site "has been suggested as the possible location of the historic Indian village of Tehachapi."

Figure 1. Milling Stones from CA-KER- 2553.
(photo by J. Sprague)

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Andy Greene (Garfinkel 1977), noted Kawaiisu elder, appears to have identified this place as the location of an historic aboriginal village site known as *Tïheshtï-va'a-dï or Tïheshtï-vidï.* This is a place that was said to have taken its name from a plant that grew there (Zigmond 1981:72; Zigmond et al. 1990:279;). Zigmond was unable to identify the taxonomy of this plant or ascertain anything else regarding its form or nature however the meaning of this place name in Kawaiisu is "plant place". Del Troy, a local Tehachapi historian, has studied the extant information on Kawaiisu village sites (specifically their names and locations) and believes that this prehistoric site location was the same location as this village. Greene mentioned that in the past there was a flowing stream here at the village site and this would seem to be a reference to Tehachapi Creek. The Kawaiisu knew this place as a traditional spot used for fishing (Garfinkel 1977; Williams and Garfinkel 2008).

Two hand excavated control units measured 1.0 m x 0.5 m were excavated in arbitrary 10 cm levels to depths of 70 cm and 140 cm below ground surface. Six 1.0 m x 0.5 m shovel test pits were also completed to provide a sample of the subsurface cultural constituents. All residual materials from the STPs and control units were pressure washed through 1/8-inch screen mesh.

Chronometrics

Archaeological investigations at CA-KER-2553 allow for temporal ordering of the cultural materials and a reconstruction of the site's occupational episodes. Dating is based on a single radiocarbon assay, source and temperature adjusted obsidian hydration measurements, and the dating of time-diagnostic artifacts (projectile points, shell and glass beads, and cut nails). This paper presents a chronological overview dating the site, providing the rationale for these interpretations, and addressing occupational trends over time.

Chronology

A chronological scheme for the far southern Sierra Nevada and Tehachapi Mountains was originally developed by Garfinkel et al. (1980) and has been further evaluated and refined in more recent studies (Gold 2005; Garfinkel 2007). That scheme has generally been retained here (Table 1), with some minor modifications (e.g., the addition of a Historic Period). The local cultural sequence was derived from the generally accepted temporal divisions for Great Basin projectile point types and the time periods originally developed by Bettinger and Taylor (1974) and further modified by Warren (1984) and others. Period names are mostly consistent with prior treatments (cf. Garfinkel et al. 1980; McGuire and Garfinkel 1980). The "hinge" points for these periods have been adjusted based on generally assigned age estimates of the point forms. The period divisions and associated calendar ages are: Kennedy (13,500-8500 B.P.); Lamont (8500-3500 B.P.); Canebrake (3150-1350 B.P.); Sawtooth (1350-650 B.P.); Chimney (650 -150 B.P.), and the Historic (less than 150 B.P.).

Obsidian Hydration Dating

Obsidian hydration analysis is one of the primary means for dating used to develop a time sequence at the site. Obsidian hydration studies rest on the principle that moisture penetrates volcanic glass at a predictable and quantifiable rate and hence the elapsed time since the glass was broken or artificially flaked can be calculated.

About 70 miles east of Tehachapi, within the confines of the Naval Ordinance Test Station, China Lake, in the vicinity of Sugarloaf Mountain in the Coso Range of eastern California, there exists a number of seams and outcrops of high-quality obsidian. Coso volcanic glass has been the focus of intensive study and may be one of the "most thoroughly investigated obsidians in North America" (Gilreath and Hildebrandt 1997:10). These studies have spawned a plethora of alternative views on the proper hydration rate for dating Coso obsidian artifacts (Basgall 1990; Basgall and Hall 2000; Drews and Elston 1983; Ericson 1977, 1978a, 1978b; Garfinkel 2006, 2007; Garfinkel et al. 1980, 1984; Gold 2005; Hildebrandt and Ruby 2003; King 2000; McGuire and Garfinkel 1980; McGuire et al. 1982; Meighan 1978, 1981; Pearson 1995; Rosenthal et al. 2001; Rogers 2006a, 2008; Schiffman and Garfinkel 1981).

Table 1: Chronological Periods.

Bettinger and Taylor 1974		Gilreath and Hildebrandt 1997		Present Study		Uncorrected Tehachapi Coso Hydration
Designation	Interval	Designation	Interval	Designation	Interval	
				Historic	150 BP-contact	<1.4 μ
Marana	650 BP-contact	Marana	650-200 BP	Chimney	650 - 150 BP	1.5-3.5 μ
Haiwee	1350-650 BP	Haiwee	1275-650 BP	Sawtooth	1350-650 BP	3.6-4.3 μ
Newberry	3150-1350 BP	Newberry	3500-1275 BP	Canebrake	3150-1350 BP	4.4-6.5 μ
Little Lake	6000-3150 BP	Little Lake	5500-3500 BP	Lamont	8500-3150 BP	6.6- ? μ
Mojave	pre-6000 BP	Early	pre-5500 BP	Kennedy	13500-8500 BP	?

Coso Obsidian Hydration Rate

Mark Basgall (1990) first introduced effective hydration temperature (EHT) into the Coso hydration equation and paired rims with associated radiocarbon dates to develop the most widely accepted hydration dating equation. This rate is derived from the extensive suite of radiocarbon dates and Coso obsidian hydration measurements from the Lubkin Creek site, INY-30 (Basgall and McGuire 1988). Basgall and Hall (2000) and King (2000) have proposed some minor refinements to that rate. Until recently, Basgall's 1990 hydration rate was one of the more widely used formulas, as it factors in mean annual

temperature in the area from which the archaeological remains were recovered, and does explain much of the variability in the Coso hydration measurements. Recent research by Rogers (2006a, 2008) has aided in further refinement of Coso obsidian dating. Additionally, Rogers has reevaluated the calculations and methods used for effective hydration temperature (EHT) adjustments (Rogers 2006b, 2007a, 2007b, 2008). The Rogers' method for surface EHT adjustment and his Coso dating equation were applied in the current study.

The Rogers' Coso Hydration rate equation is: Years B.P. = 44.9 X^2 , where years B.P. is radiocarbon years before present (present = A.D. 1950) and X is the hydration measurement in microns (Rogers 2006a, 2008).

Other factors affect the EHT and cause it to fluctuate through time. Among these are paleoclimatic change, pedoturbation (buried versus surface contexts), site aspect, vegetation cover, latitude, and elevation. Consequently, EHTs are simply estimates influenced by a wide variety of environmental factors. The preferred strategy is to develop obsidian hydration and radiocarbon pairs for each locality and period since a single formula rarely provides reasonable age estimates for all times and places. For the present study such data are absent and, consequently, Rogers dating method was used.

Rogers advocates using EHT depth corrections (Rogers 2007b, 2008) and in fact they may be desirable. However researchers vary in their opinions regarding the value and utility of such adjustments. In a paper authored by Rogers (2007c) for the site depth correction EHT adjustments are presented. Nevertheless, this discussion sidesteps this issue and only uses surface EHT adjustments for all dating and chronological interpretations (and does not apply the subsurface depth corrections). Chronological interpretations presented here do not vary significantly from those of Rogers (2007c) who included the depth and surface correction adjustments.

The reliability of Coso obsidian hydration data as a chronological index has been repeatedly shown by correlation of time-sensitive projectile point forms and hydration readings, and by radiocarbon dates and associated hydration cluster values (Gilreath and Hildebrandt 1997). Hydration measurements are not amenable to great precision and yield only a general indication of relative age and not an absolute date. In the interest of accuracy, hydration rims are therefore not normally reported with calendar-specific dates. Given our reticence to portray the hydration with greater accuracy than is generally accepted, rim readings are associated with particular time periods and then used as a basis for dating the site and its temporal components.

Obsidian Hydration Analysis and Results

Obsidian hydration measurements are discussed here in light of their relationship to various chronological periods. The current sample includes 40 artifacts with 37 individual hydration rim readings (Table 2). Included in this assemblage is a single obsidian projectile point midsection (n = 1), and a solitary biface fragment (n = 1). The remaining measurements resulted from the analysis of nearly all obsidian debitage (n =

38) recovered from excavation at the site. All of these obsidian specimens were further analyzed to determine their geological source.

X-ray fluorescence (XRF) analysis identified them as volcanic glass from the Coso Volcanic Field (Skinner and Thatcher 2007). To date, none of the obsidian artifacts from the Tehachapi area have been determined to come from any other known or unknown volcanic glass sources besides that of Coso. Source determinations now have recognized that the Coso Volcanic Field is not a single discrete chemical source. Four main subsources have been identified: Sugarloaf Mountain, West Sugarloaf Mountain, Joshua Ridge, and West Cactus Peak (Eerkens and Rosenthal 2004; Ericson 1977; Ericson and Glascock 2004; Hughes 1988). Other subsources may also be present. These subsources represent different chemically-distinct flows. Recently both Gilreath and Hildebrandt (1997) and Eerkens and Rosenthal (2004) have suggested that all four subsources produce hydration rims at a roughly similar rate and, further, they found no statistically significant differences when comparing hydration measurements from various subsources (See Rogers 2008 for a dissenting opinion on this matter). This allows us to date artifacts of Coso obsidian regardless of the particular Coso subsource represented. Given the very small size of most of the specimens of obsidian from CA-KER-2553 only five artifacts could be confidently identified to subsource. All of those were determined to have originated at the West Sugarloaf quarry, the remaining materials were identified as coming from the Coso Volcanic Field but were not given subsource provenience.

CHANGING PATTERNS OF OBSIDIAN USE

As summarized by Macko et al. (1993:20), and more recently by Garfinkel (2006), a synthesis of the Tehachapi Mountains region flaked stone tool data indicates a relatively restricted use of obsidian, limited to complex, formalized tools - such as projectile points. Obsidian trade and acquisition patterns indicate a distinctive trend toward movement of Coso obsidian to the west rather than south, north or east (Ericson 1977). This is especially evident with respect to the dramatic drop off of obsidian as a percentage of the flaked stone inventory when moving southward from the Coso quarries and into the ethnographic territory of the Kawaiisu (Garfinkel 2006; Gold 2005).

Obsidian stone tools were almost certainly imported in semi-finished or finished forms. Obsidian from the Tehachapi Mountains region is free of cortex and most commonly occurs in finished tools or very small thinning, resharpening, or rejuvenation flakes. Data from the present study documents that the Coso obsidian trade was initiated by at least 3000 B.P. beginning in the Canebrake Period (1500 BC - AD 600). Current evidence indicates that this earlier occupation (pre AD 600) existed in the Tehachapis, yet saw limited use of obsidian and exhibited a distinct preference for non-obsidian toolstone (Garfinkel 2006: Tables 3 and 8).

The only distinctively early material recognized from the Tehachapi Region is from the Sand Canyon area at Nettle Springs (Pruett 1987) and from the present work at CA-KER-2553. Most all other sites that have been investigated date to times postdating AD 600. Pruett indicates that from the entire collection of large dart points recovered from Nettle

Springs only two were made of obsidian. The regional Tehachapi Mountain dart point inventory is manufactured almost exclusively from cryptocrystalline materials.

Table 2. Obsidian hydration measurements for CA-KER-2553

Provenience			
Unit	Level	Source	Hydration Measurement
STP 1	20-40 cm	CVF	NVR
		CVF	1.1
		CVF	1.1
		WS	1.1
	60-80	CVF	2.2
		CVF	5.0
	90-110	CVF	2.0
		CVF	2.3
STP 2	20-40	CVF	2.4
STP 3	0-20	CVF	1.2
STP 6	0-20	CVF	6.9
	AUGER	WS	5.4
	AUGER	CVF	4.9
UNIT 1	0-10	CVF	5.1
		CVF	2.3
	10-20	CVF	2.3
		CVF	5.5
	20-30	CVF	2.2
		CVF	4.2
		CVF	5.9
UNIT 2	0-10	CVF	5.0
		CVF	6.1
	20-30	?	5.4*
	40-50	WS	1.3
		CVF	5.9
		WS	6.7
	50-60	CVF	2.8
	100-110	CVF	4.6
	110-120	CVF	4.6

	CVF	6.1
	CVF	NVR
120-130	CVF	NVR
	CVF	4.9
	CVF	6.0
	CVF	6.1
	CVF	6.4
130-140	WS	5.4
	WS	5.6
	CVF	4.1
	CVF	5.9

Key: CVF = Coso Volcanic Field, WS = West Sugarloaf, cm = centimeters. NVR = No visible rim, Asterisk = artifact too small to accurate place as to geological source, STP = Shovel Test Pit, Unit = Control Excavation Unit

Possible Component Definition

The obsidian hydration measurement data shows a strong bimodal distribution. Using Rogers' Coso hydration rate equation and adjusting for surface EHT, that distribution represents major site use during the Canebrake, Chimney, and Historic periods, with a noticeable gap during the Sawtooth era. Initial occupation at the site appears to have occurred ca. 3000/3500 rcybp at the beginning of the Canebrake Period, which is the earliest recorded relative date for the Tehachapi Mountains area. Occupation continues throughout the Canebrake Period (3150 – 1350 BP represented by Coso hydration rims from 4.1 to 6.7 microns), but abruptly declined and the site appears to have been abandoned (or was very sparsely used) during the entire Sawtooth Period (1350-650 BP). Such a gap, or hiatus in site occupation, is marked by an absence of obsidian hydration measurements (uncorrected rim thickness) for the interval from 2.9 to 4.0 microns or during a time span estimated at 1150 to 500 rcybp. Resurgence in occupation is marked by hydration measurements ranging from 2.8 to 1.1 microns and indicates a Chimney and Historic Period occupation beginning ca. AD 1500 and continues through Euroamerican contact. Using time adjusted metrics, the greatest number of obsidian hydration measurements per century at the site occurs during the historic era (cf. Rogers 2007). Corollary with that index, it appears that some of the most intensive site occupation dates to the last 150 years or from ca. AD 1800 to the modern historic era.

Examination of all other obsidian hydration measurements reported for the Tehachapi Mountains region indicates that no other hydration rim measurements of this small size range have been reported (Garfinkel 2006). The rim measurements reported for CA-KER-2553, those smaller than 2.1 microns (n = 6; 1.1, 1.1, 1.1, 1.2, 1.3, 2.0), have not been recognized at any other prehistoric site in the region.

Obsidian hydration measurements were obtained for 39 of the 50 obsidian artifacts recovered from the site. All of the analyzed materials were retrieved from subsurface contexts. Examination of the hydration measurements reveals some degree of mixing throughout most of the deposit. Large rims do occur near the surface and uppermost levels as well as deep within the deposit. Conversely, smaller rims were also occasionally recovered to a depth of 60 cm within the midden area. This is especially the case with respect to Unit 1.

Significantly the majority of readings (n = 16; 89%) from excavation Unit 2, including those recovered from the uppermost levels to the lowermost excavation depths, provided a range of measurements restricted to the period represented by 4.1 to 6.7 microns. Except for two outliers (1.3 and 2.8 microns) these readings represent a block of time from 1250 to 3300 rcybp (ca. AD 700-1350 BC) synchronous with the Canebrake Period, which is the earliest suite of obsidian dates from the Tehachapi Mountains.

Radiocarbon Determination

A single radiocarbon sample was analyzed from the site (Beta Analytic Lab Number 227810). That sample was retrieved from Unit 2 in the 70-80 cm level and was a long bone shaft fragment from a large mammal - most likely an artiodactyl (pronghorn antelope, deer, or bighorn sheep). The bone was spiral fractured in such a way that it appears to have been broken to remove the marrow. It was most likely introduced into the site as residue from butchering large game and breaking up the bones for "bone grease". The sample was extracted with alkali for bone collagen. It provided a radiocarbon age of 3120±40 years before present. When calibrated, the age was determined at two sigmas to be between 3260 and 3410 years before present or 1310 – 1460 B.C. Although there are only a few radiocarbon determinations from the region (n = 3), the CA-KER-2553 dates is currently the oldest for the Tehachapi Mountains.

Given the location of that sample within the depths of the midden deposit this date would be consistent with the age independently suggested by obsidian dating as the initial period of site occupation. Coso hydration rims, on the order of 6.4 to 6.9 microns within the deposit, attest to cultural activity commensurate with this age. Coincidentally, this date is nearly contemporaneous with the beginning of the Canebrake Period at 3150 BP.

Projectile Points

In total, four (4) projectile points, and fragments, were recovered. Only two (2) were complete enough to classify. Both were identified from surface collections. Using the metric attributes defined by Thomas (1981), these two points could be classified into a standard Great Basin type (cf. Gilreath and Hildebrandt 1997).

Cottonwood Series

The two points appear to be members of the Cottonwood Series. These are small (usually <1.5 g) triangular points lacking notches (Riddell 1951), with margins typically straight to slightly concave and bases that are straight to deeply concave or notched (Heizer and

Baumhoff 1961; Lanning 1963; Thomas 1981). Most evidence, including radiocarbon assays, suggests that these small arrow points date from 650 B.P. to the post contact era, making them time markers of both the Chimney and Historic periods.

One example (#160) made of chert was discovered in Unit 2 in the 30-40 cm level. That point was 35 mm long, 19 mm in width, 8 mm thick, and weighed 5.1 grams. A second point (#222) was retrieved from the surface of the site. This artifact is manufactured from basalt and was 15 mm long, 3 mm wide, 1 mm thick, and weighed 0.6 grams.

Projectile Point Midsection

An obsidian projectile point midsection was from Unit 2 at a depth of 40-50 cm. That artifact is pressure flaked on both the dorsal and ventral faces and in the final stage of manufacture. It is small, thin, and light weight (1.4 1.2 x 0.4 cm, 0.9 grams) and most likely derives from a small arrow point, perhaps broken during manufacture or repair. The artifact is manufactured from volcanic glass from the West Sugarloaf subsource within the Coso Volcanic Field. A band of hydration measuring 1.3 microns was reported for the object. Based on the rate equation provided by Rogers (2006a) and a surface adjusted EHT rim measurement, the age of the artifact is estimated at 124 radiocarbon years before present (rcybp) or ca. A.D. 1826. That date would indicate an association with the Historic Period represented at the site.

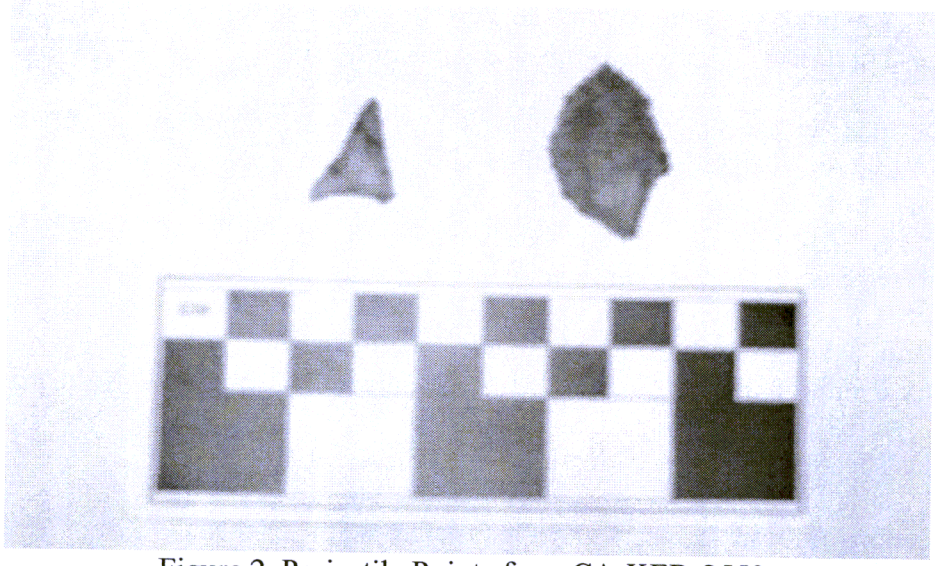

Figure 2. Projectile Points from CA-KER-2553.
(photo by J. Sprague)

Shell Beads

Two shell beads were recovered from CA-KER-2553. The beads were analyzed by Chester King (2007) and were identified as types common in southern California (King 1990). The first bead was an *Olivella biplicata* wall disc discovered in STP 5 at a depth of 0-20 cm. The bead was 4 mm in diameter, 0.5 mm in thickness, and had a conical hole

of 14 mm with edges that were mostly ground. The bead probably dates to Phase 2 of the Late Period in the southern California sequence, which would relate to an age of ca. AD 1500-1782.

The second shell bead was a *Dentalium pretiosum* tube recovered from STP 1 at 40 to 60 cm. This shell is commonly called a Tusk and these types of beads were most popular and typically associated with the Early Period (6000-1400 BC) or early Middle Period (1400-200 BC) dates. However, such beads or ornaments were also commonly used as money beads and are frequently noted in historic contexts. Beads of this form were identified in archaeological sites dating to the Historic Period from Tahquitz Canyon near Palm Springs, California (personal communication Chester King).

Glass Beads

Five (5) historic glass beads were recovered. Glass beads occur in many shapes, sizes and colors throughout California and the Great Basin. These European glass trade beads are hallmarks of the Historic Period. Many complex typological systems have been offered for the classification of glass beads (Bass and Andrews 1977; Gibson 1975; Kidd and Kidd 1970; Meighan 1955; Ross 1990; Titchenal 1994). Perhaps the most relevant study is that conducted by Titchenal (1994). Titchenal seriated 157 glass beads collected from 21 sites in the nearby Owens Valley. Milliken (1999), expanding on that research, incorporated additional data derived from the Alabama Gates study (Delacorte 1999). Titchenal's studies suggested six successive, time-sensitive, 19th-century bead assemblages comprised of various forms and types of beads.

Of the five glass beads recovered from the site, two were fragmentary and three were essentially complete. The three complete beads are: an opaque white on white cane bead and the other two are semi-translucent red on opaque white cane beads (red beads with white centers). All three of the latter beads were derived from STP 2. The solid white bead was recovered in the 0-10 cm level while the other two were identified in the 20-30 cm level. The other two fragmentary beads were a green semi-translucent oblate spheroid and a semi-translucent red oblate spheroid. The latter bead was in such fragmentary condition that it could not be discerned whether the center of the bead would have been white. The green glass bead was recovered in Unit 2 from the 20-30 cm level. The red glass bead fragment was identified in STP 1 at 40-60 cm.

This collection of beads appears most consistent with Titchenal's Complex D or E. Titchenal's tentative groupings are based on his seriation through time and based on the percentage representation of certain bead types. There is no complete type replacement from one time to another for these bead assemblages and single beads or small bead collections (such as we have in the present case) can rarely be assigned to a single limited time span. Nonetheless, his Complex D is suggested to date from A.D. 1859 to 1864 and Complex E runs from A.D. 1864 to 1880.

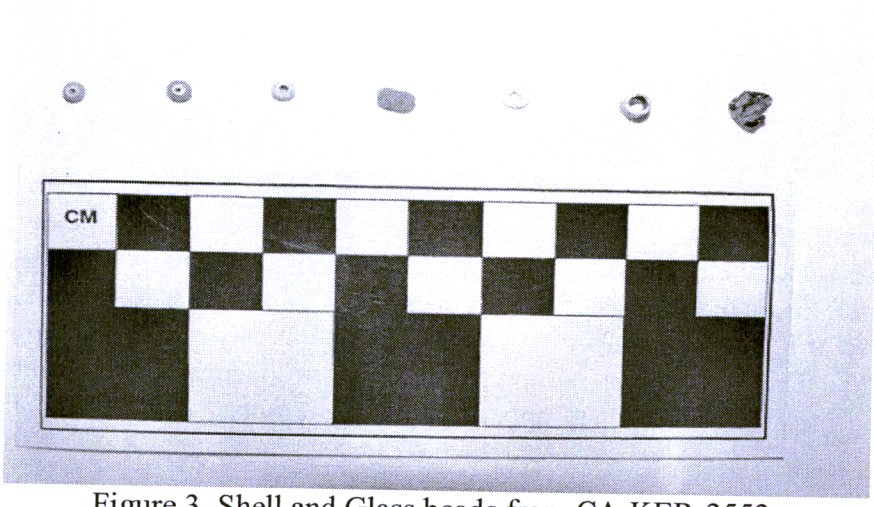

Figure 3. Shell and Glass beads from CA-KER-2553.
(photo by J. Sprague)

It was customary for California and Great Basin Native peoples to make offerings of beads in a variety of ritual contexts. The fragmentary nature and burned condition of some of these artifacts may owe to that activity (cf. Steward 1938; Zigmond 1972, 1977, 1980).

Cut Nails

Excavations produced 13 cut nails. These were found in STP 2 (0-20 cm), Unit 1 (0-10, 20-30, and 40-50), and Unit 2 (0-30). Nails are excellent dating indicators for the nineteenth century because their manufacturing methods evolved through a number of identifiable steps. The nails recovered were exclusively machine-headed cut nails and these were perfected by ca. AD 1835. These nails display longitudinal grain and square ends. Such nails dominated the construction industry until ca. 1890. After that date their popularity quickly waned when the Bessemer process for producing inexpensive soft steel wire nails were developed. Cut nails are still used today for certain very specialized uses because of their superior holding power and are employed for fastening hardwood flooring.

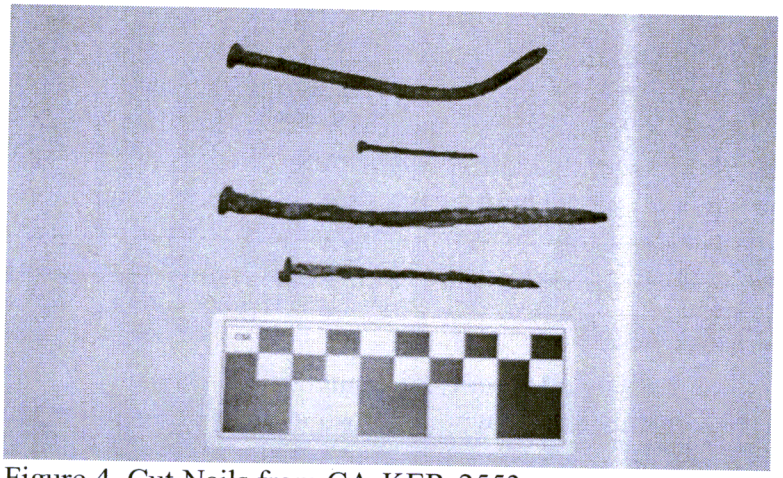

Figure 4. Cut Nails from CA-KER-2553. (photo by J. Sprague)

Summary and Chronological Implications

A variety of chronological data provide sufficient information to date the site. Obsidian hydration plays an important role. A total of 39 obsidian hydration readings greatly aid in site age determination. Analysis of the chronological data from the site revealed two relatively distinct components or occupational episodes. Perhaps the most intense occupation occurred during the late prehistoric and historic eras (Chimney and Historic periods). Glass and shell beads, Cottonwood Triangular projectile points, cut nails, and one or two shell beads date to this Historic occupation. Obsidian artifacts and flake waste were generated at a greater rate during the historic era than any time during prehistory (cf Rogers 2007c). The most recent late prehistoric/historic occupation began at about AD 1500 (based on obsidian dates) and apparently continued uninterrupted into the historic era.

An earlier occupation synchronous with the onset of the Canebrake Period is also attested, which is the earliest firmly dated occupation in the Tehachapi Mountains. Cultural activity associated with this occupation is manifested throughout the subsurface midden deposit and appears to have built up slowly over the course of a long time span, yet limited activities occurred during the period from about 1350 BC to AD 700. A single radiocarbon assay supports the beginning age for this activity and is further supported by a suite of the obsidian hydration measurements ranging from 6.7 to 4.1 microns.

Notably lacking is almost any indication of occupation during the Sawtooth Period, dating from ca. AD 700 to 1300, and this hiatus is indicated by the absence of obsidian hydration measurements with a range of values from 2.9 to 4.0 microns. Review of late Holocene paleoenvironmental data from the western United States suggests that during the time from ca. A.D. 900-1350 there was a period of excessively warm climate (Stine 1990, 1994). Two significantly dry intervals stand out as times of prolonged and severe drought. Stine (1994:549) provides persuasive data for what he terms "epic" droughts dating to ca. A.D. 892-1112 and 1209-1350.

Clear evidence of these warm and dry conditions is also noted for the far southern Sierra (Graumlich1993). Graumlich argues that the tree ring sequence, during the period from A.D. 911 to 1392, is highly unusual representing increased summer temperatures that peaked ca. A.D. 1150. Severe droughts are noted during the periods from ca. A.D. 911-960, 1021-1070, 1118-1167, 1245-1299 and 1315-1392. In summary, a wide variety of data suggests that the Sawtooth Period was a time of variable, yet exceptionally dry climates, and an interval of extraordinary drought. Such conditions undoubtedly contributed to a reduction of the aboriginal population size in the Tehachapi Mountains and perhaps a reason for the abandonment interval represented at the village site of CA-KER-2553.

More recent cultural activity is amply documented by smaller obsidian hydration measurements (1.1 to 2.0 microns), two Cottonwood style projectile points, and a small

number of European glass trade beads. This historic occupation most likely represents the manifestation of village life at *Tïheshtï-va'a-dï,* a Kawaiisu village.

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ROCK ART IN THE EL PASO MOUNTAINS, KERN COUNTY, CALIFORNIA

Albert Knight and Mark R. Faull

INTRODUCTION

The El Paso Mountains are located in east-central Kern County, California. The range is located east of the southeast end of the Sierra Nevada Mountains, south of Indian Wells Valley, north of Fremont Valley and west of State Highway 395. It is about 15 miles long (SSW-NNE) and about 7 miles wide (roughly N-S), at its widest point. Major geologic components include basalts (in the center, west and north part of the range), granites (mainly in the SW part of the range), Paleozoic marine slates (confined to the SE end of the range), and continental non-marine and alluvial deposits (throughout the range). Elevations range from about 2000ft (at the southern base of the range) to over 5200ft, at the pinnacle of Black Mountain. Topography is highly variable, with many steep peaks and hills, all of which are dissected by numerous canyons and arroyos, large and small, the most important of which is Last Chance Canyon, which drains down the south face of the range and empties into Koehn Dry Lake, in Fremont Valley.

The large expanses of volcanic rock on the west, northwest and northeast sides of the range provide many places that are suitable for the production of pecked petroglyphs and other types of rock art. Although there is no doubt that the native group known as the Kawaiisu (or *Nuooah)* were the tribe that inhabited and otherwise utilized the El Paso Mountains at the time of the arrival of Euro-Americans in the region, there is very little ethnographic evidence that mentions the El Paso Mountains- in fact there is almost none. Rock art is one of the most visible aspects of the archaeological record. While rock art in several forms exists in almost all parts of the range, it is the petroglyphs on the north side of the mountain that provide one of the most tangible links between the natives of the El Paso Mountains and the surrounding region. The individual rock art elements in general are not as large, nor is the rock art itself as elaborate as much of the rock art found to the north of Indian Wells Valley- in the Coso Range- but it is still of some interest, especially since a few sites in the El Paso's have petroglyphs of Bighorn Sheep, which have been made in the Coso Style, and there certainly must be some connections between the peoples or people that made the rock art in both mountain ranges.

The El Paso rock art sites are occasionally associated with rock rings, bedrock and portable metates, and lithic concentrations. According to Alex Apostolides (see below) there are at least dozens of rock rings on the mesas in different parts of the range. The authors are currently continuing to research the El Paso Mountains, an area that they have both been visiting since the late 1960s. The current paper is a first effort to collect, arrange and ponder what we know about various aspects of the archaeological record of one of the most beautiful mountain ranges in the United States. Let the reader beware! This paper is

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an in-depth overview, long on observation and short on conclusions. Our goal is to collect whatever we can gather on the subject of rock art in the El Paso's and to only mention or allude to the greater picture. Future efforts will endeavor to describe in full the history of research in the El Paso's, report on what we know in broader detail, delve into some of the particulars of what we know about individual sites, and describe more fully the importance of the range for the natives and for our understanding of their life-ways. The El Paso Mountains would have been a very import place for the inhabitants of the surrounding desert. Located between the southeastern end of the Sierra Nevada and the adjoining Mojave Desert, the El Paso Mountains represent an important and unique transition zone for plants and animals. The general climatic conditions and the biotic communities more closely parallel the neighboring Mojave Desert, while numerous canyons and the varying geology, exposed by the actions of the neighboring Garlock fault, provide many microhabitats where unique biotic communities flourish. The El Paso Mountains in general and Red Rock Canyon in particular, are known to harbor numerous endemic, rare and uncommon species. Other species are more common, and almost all were valued and utilized by the natives in some way.

BACKGROUND

As mentioned above, it is beyond the scope of this document to review the entire history of archaeological inquiry in the El Paso Mountains. Readers will see the names of the various institutions and individuals that spent time in the El Paso's in the text following. However, it is impossible to discuss our subject without first saying something about the University of California Los Angeles based archaeologist Alex Apostolides, who between 1961 and 1970 not only recorded numerous sites and discovered and described many more, but became the principal architect of a successful effort to place a 110 square mile area surrounding Black Mountain on the National Register of Historic Places. Apostolides (1923-2004), who led a storied, varied and interesting life (including being the "Staff Shaman" for the Los Angeles Free Press) was an individual of many talents. Anyone interested in knowing more about his life would benefit by examining www.zyworld.com/billgann/alexapostolides/htm . For our purposes here, it is his employment as a first class field archaeologist that is of interest.

Apostolides' documentation of what he termed the Saltdale Quadrangle Archaeological Survey (the quadrangle being one of the old 15 minute series) began in February of 1962, under a permit granted to the University of California Archaeological Survey (UCAS) by the United States Department of the Interior. In comparing the dates and locations of his site records and other notes, it is clear that he began the survey in the general area of upper Last Chance Canyon and gradually worked his way northwest and north. Most, if not all, of the sites located during the first 3-4 years of the survey were recorded and have State of California trinomial (and primary) numbers. Several sites located during the final year or so of survey are described in notes only, while other completed site records, bearing his temporary site identification numbers (e.g. 33aa, etc), were filled out, but the forms were lost in the early days of trinomial sequencing, thus the sites have no official State number. A few other sites again found towards the end of the survey project are referred to in varying degrees in his notes and on his maps (these include additional petroglyphs, a large

concentration of "house rings" and a rock possible rock alignment), but apparently no attempt was made to fill out site record forms. After Apostolides completed his research his site records, notes, etc. were unfortunately scattered and at least partially "lost" (see below). At present perhaps half of Apostolides detailed survey notes have been recovered and examined. The search of pertinent archives for the remainder of these invaluable records continues.

According to the web site mentioned above, Apostolides first visited the El Paso Mountains in 1958. He had been "working local surveys around Owen's Lake and Bishop" when he chanced to meet Walt Bickel, a colorful old-time miner who lived south of Black Mountain, in upper Last Chance Canyon. Like many of us, he was undoubtedly initially attracted to the area because of the interesting geologic history of the area; an interest in geology leads to looking at rocks, and in the El Paso Mountains many of the prettiest and most interesting rocks (at least the small ones) turn out to be artifacts, of one sort or another.

A letter from Alex Apostolides on UCLA letterhead (1 February 1969) states that he became interested in the area in 1961 because of "An unusually rich concentration of archaeological sites covering....the entire west face of the El Paso Mountains complex." The initial research was done at the time that the UCAS (i.e. the Archaeology Department at Berkeley) was the entity that assigned official State site numbers. This system quickly became unwieldy and the task was split between UC Berkeley (which unofficially became UCBARF- or University of California Bay Area Research Facility) and the UCLA Archaeology Survey (or UCLA-AS; note: this system too, soon became over-whelmed, and- eventually- the ancestor of the current State-wide Information Centers would be established). In a letter dated 13 April 1974 (and following several years of field work), Apostolides stated: "that the old UCAS-Berkeley site numbers have been entered on the Inyokern quad- I have no site information on them beyond the mere numbers....and none of the sites is where UCAS indicated 'em.... I've continued numbering 'my' sites in straight sequence, and they'll continue to carry the 'aa' superscript suffix on site reports, in the absence of any coordination with the now-UCBARF facility at Berkeley." Field crew was apparently supplied in the beginning by UCLA and later, at least some crew was supplied by Bakersfield Community College (Field Notes 22-23 April 1967); for example, Apostolides mentions that "Specimens are stored in my office, Rm 79, Haines Hall, pending completion of surface survey, and analysis and publication of final report" (Field Notes 1-2 January 1965). A Final Report" was never produced, unfortunately. However, Apostolides lobbying eventually did have a positive effect. In a letter dated February 1, 1969 he states: "The preservation of this area from exploitation, 'recreational' or otherwise, is a vital need. Properly protected, the El Paso Mountains can give us an archaeological picture probably unmatched in all of California. This is a vital and a precious 'primitive' resource, and the interests of present and future generations demand that it be protected from the type of destructive onslaught that so many once unique areas have suffered...." He continues in a page from his National Register of Historic Places nomination form: "The area described should be set aside as an educational and scientific reserve with limited- or controlled- public access to prevent further destruction of what is, legitimately, a 'national treasure.'" And so it was.

DESCRIPTION OF THE ROCK ART OF THE EL PASO MOUNTAINS

Most of the rock art in the El Paso Mountains consists of pecked or (occasionally) grooved petroglyphs, which are almost always found on basaltic bedrock or boulders. Steward (1929:74) noted early on this same propensity for material type associated with the petroglyphs of the Owens Valley. The famous petroglyphs of the Coso Range also follow this trait (Grant et al. 1968). A few very faint rubbed petroglyphs are present in Goler Gulch (on a beautiful outcrop of blue slate), which is located on the eastern perimeter of the range. Elsewhere in the SW extremity of the range a small number of relatively simple petroglyphs have been carved into sandstone surfaces, in a handful of places. Cupules are found at several sites (in different kinds of rock), both on their own and in association with other styles of rock art. Pictographs are not common in the El Paso Mountains, nor when found are they found on any particular kind of rock. Rounding out what we have included within the term rock "art" in the El Paso Mountains, is one rockshelter with small arranged rows of drilled holes, at least four rock alignments (all oriented SW-NE), and one small intaglio, which is associated with one of the alignments.

Without overstating the obvious, rock art in the El Paso Mountains is concentrated in areas where suitable preferred rock faces are available, which precludes much of the south central and southeastern portions of the range from hosting rock art. For the purposes of this inquiry, the most prominent rock art "zones" can be described as follows:

(1) The northwest, north and northeast part of the range, where the predominant art form is pecked petroglyphs on basalt bedrock or boulders.

There are numerous concentrations of petroglyphs found on suitable basaltic outcrops located within this zone. Many of these sites display only minimal numbers of petroglyphs, but some have numerous and/or complex petroglyphs. Both Great Basin Abstract and Great Basin Representational petroglyphs are present. Several sites include one to many Bighorn Sheep images, and at least two sites (i.e. CA-KER-193 and CA-KER-6188) have well-defined Bighorn Sheep images executed in the same style as seen in the Coso Mountains to the north. There are at least three rock alignments in this part of the range, although one is very short and may actually be a hunting blind. A large number of rock rings are reported for this area, but whatever is actually present in this regard remains too inadequately described or recorded for any broad summary statement to be made, at least at this time (the authors intend to direct much of their "research attention" to this area during the next few years). Faull's field survey in 2008 relocated certain previously recorded sites, while other sites which had not been described were also located. The sites located during Faull's 2008 survey are listed and described following previously recorded and/or described sites below.

(2) The southwest corner of the range, both close-in against the mountain, and at a short distance from the main mass of the mountains, where a wide variety of rock art types exists.

Occasional small concentrations of petroglyphs and isolated petroglyphs are found at many sites near the southwest corner of the range, as is CA-KER-2439, a ca.300m alignment of rock, with a parallel trail; both of these associated features have apparent archaeoastronomical indicator functions. It is most unfortunate that a considerable amount of intentional damage was done to the archaeological deposits and the environment of this area by "miners" and others. Alex Apostolides describes numerous documented episodes of "negative impact" in his notes. For example, in describing the destruction of one site in Last Chance Canyon he says: "If anything was there, it's long gone now, largely due to the efforts of indefatigable vandals like Frank Fish, now mercifully defunct, who roared unchecked through this countryside in the 1920s and 1930s, picking up everything his eyes could see and his hands carry" (Field Notes for 3-4 August, 1968). Apostolides comments on Last Chance Canyon (the main drainage on the south side of Black Mountain) as follows: "Scene of mining activities from the 1870s, this area nevertheless remained fairly untouched until the years following World War II. Since then, it's experienced increasingly heavy recreational use. Trouble with this is that many Americans seem to confuse recreation with destruction, and the area has suffered as a result. The damage has seen an increase in the past three years with the arrival....of a George Horn, who has a bull dozer and an unquenchable thirst for leveling everything within reach" (Field Notes 27-30 December 1966).

In describing the damage done by "miners" to another site in upper Last Chance Canyon, Apostolides states: "....the whole west slope and most of the occupational deposit has been destroyed within the last year by the bulldozing activities of ... Della Gerbracht ... who has bulldozed vast strips of land as her most recent 'evidence' of assessment work in an effort to hold, illegally, the more than 200 mining claims she has filed in the area" (Field Notes for 1-2 January 1965)....."Walt Bickel of Bickel's Camp, says that the late 1920s and 1930s were the scene of the heaviest potting and rock hound activity, slumping during the war years and rising again during the late 40's and extending to the present date" (Field Notes for 20-21 June 1964).

Apostolides also describes doing battle with numerous week-end pot-hunters, some of whom were interrupted while digging through a site which was in the process of being professionally excavated (during the work-week) by the Southwest Indian Museum; the pot-hunters had found out about the excavation and the "ancient Indian campsites" from an article in the Los Angeles Examiner newspaper, which had included much-too explicit directions to the area (an apology letter from one of the newspaper's writers was also present in his notes). The people mentioned above were apparently only the most destructive of the local population at that time; Apostolides reports that many of the local residents all-too frequently directed people from outside of the area to the local Indian sites, where many of them helped themselves to whatever they could find (we wonder what they would have thought about the general plundering and destruction of <u>their</u> now historic cabins, mines, etc., by subsequent "recreational enthusiasts"). His notes also observe that many "shooters" caused considerable damage in the area (both in terms of their shooting trash and some of their choices of targets), and that "Dune buggies and jeep types also contribute to make the land hideous with their clamor"; he also mentions motorcycles and the damage <u>they</u> can cause elsewhere in his notes.

Apostolides' notes include several comments about his efforts to persuade the powers-that-be to stop the intentional and unintentional vandalism; here is one example: "As far as observation of the antiquities laws is concerned, the local authorities show a vast disinterest in the whole matter" (Field Notes for 11 November, 1966). Apostoides efforts, however, were one of the major factors which led to the eventual creation of the Last Chance Canyon Archaeological District.

Several other rock art sites exist at a somewhat a mile or more further to the southwest. These include: a few pictographs in Last Chance Canyon (CA-KER-252) and in Red Rock Canyon (CA-KER-147); several petroglyphs in mid Last Chance Canyon (CA-KER-432); a short alignment and an associated small intaglio (CA-KER-244); numerous cupules at KER-5109.

(3) The southeast portion of the range bears limited evidence of prehistoric rock art, most likely due to the near-absence of suitable rock surfaces.

The geology in the southeast corner of the range is almost completely unsuitable for the creation of petroglyphic rock art. However, at the narrows of Goler Gulch, where repeated flash flooding has carved fairly flat vertical surfaces onto/into the rock in the narrows, a few petroglyphs have been rubbed onto a few faces (CA-KER-237). A few pictographs are mentioned in the site record (indeed, the rock faces would be good surfaces for pictographs), but they have never actually been described and they could not be relocated in the field. Unless they were placed fairly high up, flash flooding through the narrows would eventually have caused them to wash away. The only other two petroglyph sites in this area (CA-KER-235 and CA-KER-236) are located near the mouth of Goler Gulch, in an area marked "No Trespassing" multiple times, so they were not directly examined. However, the general area could be seen from a public road, and there are very few boulders, however small in this area, so if these two sites do have rock art, it must be very minor.

Information on the individual rock art sites is followed by Table 1 (Summary of Rock Art Features) and by the Discussion and Conclusions.

EL PASO MOUNTAIN ROCK ART SITES

CA-KER-78 (P-15-000078)

The site record (Meighan 1953) defines the site as consisting of numerous artifacts ("small obsidian point, pottery, many metates and manos, portable mortars") at and in a small cave, which had been pot-hunted; the site record also notes "faint evidence of petroglyphs" in the cave. The term "petroglyph" was misapplied as these rendering are actually faint pictographs (Kowta 1954). The site is on the south side of Black Mountain, in the upper most part of one of the small drainages that eventually drain to and through Goler Gulch. The site was unintentionally re-recorded as CA-KER-192; CA-KER-78 is the correct trinomial.

CA-KER-133 (P-15-000133)
Apostolides recorded this site in 1962; he notes a "campsite....house-rings, bedrock mortars" in addition to petroglyphs. Five petroglyphs are illustrated in Heizer and Clewlow (1973, Figure 82a, l-o); however, a field check of the site showed that only the element shown in illustration "a" is actually present. A detailed review of Apostolides' records has determined that elements "l-o" were actually misapplied to this site from the near-by petroglyph site CA-KER-136. Note that Heizer and Clewlow's illustration of the rock art at CA-KER-133, CA-KER-134, CA-KER-135 and CA-KER-136 are all taken from Apostolides field notes and/or site records.

CA-KER-134 (P-15-000134; AKA Mesa Spring and Owen's Camp)
The site record (Apostolides 1963) states that the site is located on a "rock littered hillside sloping SE from mesa top to drainage" and that "Petroglyphs occur on isolated boulders on this slope." The petroglyphs are described as "extremely weathered." They include an anthropomorph, an interesting circular motif (possibly depicting the division of the sun or year) and abstract curvilinear elements. Apostolides field notes for 11 November 1966 state that there are nine petroglyphs for sure, and possibly one more. House rings, numerous artifacts and grinding slicks re also present in the general area. Most of the rock art is described and illustrated in Giles (1979:8-11), who notes that one glyph is scratched. One of the author's (AK) has observed a few unrecorded glyphs in the general area. The ruins of a miner's cabin and associated broken glass, etc. are present near the spring itself. For sketches, see Heizer and Clewlow 1973, Figure 82b-j.

CA-KER-135 (P-15-000135)
The site record (Apostolides 1963) illustrates two elements, which are both illustrated in Heizer and Clewlow (1973, Figure 82k). One is an anthropomorph and one appears to be a Big Horn Sheep. A field check of the recorded location of the petroglyphs failed to locate any petroglyphs or other archaeological materials (or any large rocks on which rock art could have been made). In his field notes Alex Apostolides notes that a Tom Tait had a cabin adjacent to this site (some scattered debris still identify the area today). Other "miners" are reported to have caused a considerable amount of damage in this and other parts of Last Chance Canyon (see comments from Apostolides field notes, above). Cawley notes the former presence of many more petroglyph to the south, in the Bonanza Gulch area: "large basaltic boulders....at one time had multiple petroglyphs along their faces....These petroglyphs now have all been destroyed or removed for the purpose of the vandals and for people taking them to their homes for decorative purposes....Our information was given to us by Mrs. Gerbracht, who now runs Gerbracht Camp" (Cawley 1965, 1996:9-10; Knight 1997:192-194). The comments on the removal of local rock art may explain why KER-135 and KER-436 could not be re-located in the field.

CA-KER-136 (P-15-000136)
The site record (Apostolides 1963) notes the presence of "petroglyphs on isolated lava boulders....pecked into surfaces of isolated boulders which are strewn along the SE slope of the Bonanza Gulch drainage." These petroglyphs were illustrated by Apostolides in 1963, with one additional glyph being recorded in subsequent field notes in 1966. Elements "l-o" as shown in Heizer and Clewlow (1973: Figure 82) are identical to those

illustrated for KER-136 by Apostolides. Apostolides' field notes for 11 November 1966 state that there are "seven glyphs" at this site. House rings, bedrock grinding surfaces and lithic debris are also described as being not far distant from this site. CA-KER-369 was unintentionally re-recording of KER-136.

CA-KER-147 (P-15-000147)

The site was originally recorded by Apostolides (1963). Eleven polychrome or monochrome pictographs were sketched in outline by Gordon Redtfeldt in 1975, with the pertinent colors (white, black, orange red, dark red, orange and "pink") indicated (correspondence between Gordon Redtfeldt and Mark Faull 2004). The site was rerecorded by Sampson and Hines of California State Parks (December 10, 1987) and their site record contains a wealth of information about the site. The site has also been described by Sampson (1990), who states that "collective studies indicate that CA-KER-147 was intensively occupied in late prehistoric times, i.e., the last thousand years B.P. The bead data alone suggest that the site was primarily occupied after A.D.1500 and up to as late as the 1840s" (quoting Chester King's bead report); arrow-point types suggest a slightly earlier occupation. The site consists of three adjoining rock shelters; there are two small pictograph panels in the middle shelter (some elements are sketched in the site record). Condition ranges from OK to very poor and colors include reddish-brown, orange, black and pink. A couple of "elements or figures show use of multiple colors". Some of the pictographs "show a degree of similarity to certain rock art elements from San Bernardino County sites and Tulare County sites....there is no apparent similarity to Chumash pictographs depicted in Campbell Grant's definitive study" (ibid.:214). Bedrock mortars, grinding slicks and '"rich cultural deposits" (including dateable prehistoric shell beads and historic glass beads) were also present at the site. The site was excavated in 1973 by Antelope Valley College, with the collection now curated at California State University Bakersfield. Mark Sutton and his students are continuing to examine and analyze the collection (Michael Sampson, personal communication, July 9, 2007). There are several associated sites around this site, several of which have multiple BRMs. Note that the site is west of Highway 14, the western edge of the present study area, and therefore just outside of the study area; however since it is one of the few really well known "rock art sites" in the immediate vicinity of the El Paso Mountains, we thought it prudent that information on the site be included here.

CA-KER-193 (P-15-000193)

The Sheep Springs site was recorded by Meighan (1953). Cawley visited and described the rock at this site on November 19, 1963 and noted "very old petroglyphs" including "concentric circles, big horn sheep in profile and also in head on view", etc. (Cawley 1965, 1996; Knight 1997). Grant , Baird and Pringle briefly mention the site (1968:110-111) and illustrate one element (p. 110h). On 13 April 1974 Alex Apostolides wrote a letter to State Parks (in part) stated: "glyphs that were notes there as little as three years ago have disappeared." The site has also been described by Giles (1979:15-17), who thought it was one of the most important rock art sites in the El Paso Mountains. Sonin noted the presence of "Great Basin abstract curvilinear, concentric circles, sheep-like figures; crudely pecked, heavily patinated, on basalt boulders, for about one mile along the western edge of embankment, petroglyphs all facing east; overlooking Sheep Springs; house rings, arrow

points; south of Inyokern; petroglyphs stretch from the road to the top of the cliff, and they get heavier as you approach the pass to the south" (1995:62). Several bedrock milling surfaces are also present. The UCLA archaeological collection includes three artifacts from this site (under accession #A150). The BLM Ridgecrest Field Office has a report by Frank and A.J. Bock, which was not examined during this study.

CA-KER-196
See CA-KER-78.

CA-KER-235 (P-15-000235)
The site record (Ritter and Plotnicov 1958) notes "petroglyphs on one boulder...previous designation Mingus Museum" and nothing else; most of the site record is blank. Neither descriptions nor illustrations are provided. A field check of the area where KER-235 and KER-236 are recorded was inconclusive. A long established mining camp exists here, and although occupied it appears that nothing, except perhaps a couple of the vehicles, have changed or moved since circa 1960. Rope barriers and numerous "no trespassing" and "keep out" signs are posted around an area of perhaps 2 acres. The general area is barren of rocks, although numerous mostly quite small basalt boulders are seen in the general area, especially to the immediate south of the "camp." It is quite possible that a few petroglyphs exist here (as stated in the site record), but we must note that NO rocks large enough to make rock art on were visible from outside of the exclusion zone, and that essentially NO rocks were present in the area immediately around the "camp." Given the long history of mining in the area, and the lack of obvious suitable boulders or other rock surfaces, we suggest that small boulders with glyphs may have been moved to the spots where they were later recorded. In any even, if rock art is present, it cannot amount to too much.

CA-KER-236 (P-15-000236)
The site record (Ritter and Plotnicov 1958) notes "petroglyphs on two boulders....ca. 400 yards SW of KER-235" and nothing else; most of the site record is blank. Neither descriptions nor illustrations are provided. See comments above, for KER-235.

CA-KER-237 (P-15-000237)
The site record (Ritter and Plotnicov 1958) notes the presence of petroglyphs and pictographs. The site was visited by Jack Cawley (see Annotated Bibliography) on November 23, 1963 and described as follows: "These petroglyphs are pecked on the wall just before arriving at the narrows and in the wall at the narrows on the upper portion of Goler Creek. The narrows are composed of an outcropping of blue slate. The pictures on this consist of a big horn sheep, a bird, and what apparently could have been a thunderbird; however, because of the eastern exposure and the exposure to the wind and rain they are somewhat faded. The pecking into this very hard rock was not deep and they are being turned back into the color of the slate so that they will soon be indiscernible. On the west side of the creek approximately 100 feet above the narrows there are 3 or 4 large basaltic rocks which also have extensive petroglyphs pecked into them. These do not depict the big horn sheep but do depict circum-linear features and 5 toed large birdlike figures. There are also small stick figures depicting human beings" (Knight 1997:196-197). This site was field checked and most of the petroglyphs were located. No pigment of any kind was

observed, but the rock art is in a narrows where flash floods occasionally scour the canyon clean, therefore, it is possible that paintings were present in the past, but no longer exist. The site seems, in fact, like it would have been a much better place for paintings than for petroglyphs. This is because the slate bedrock here is a very hard and is definitely not a good type of rock to try to peck into. The lack of indentations caused by pecking and the general appearance of the surface of the petroglyphs suggests that they were made by abrading alone, and not by pecking. There is a small, but very nice flowing spring in a side canyon, about ¼ miles north of the site. The petroglyph appears to be a bighorn sheep, while another may represent a deer (the rest were too difficult to see to describe).

CA-KER-244 (P-15-00244)

The original site record was by Emma Lou Davis (1962) and she published an article on it in 1965 (see Proceedings of the American Philosophical Society 109(1)). Sampson published a short article on the site in 1990 and Sampson, Hines and Faull of State of California Department Parks and Recreation re-recorded the site in December 1987. This site consists of two features: 1- the only known intaglio in Kern County, and 2- An associated SW-NE oriented rock alignment (Sampson 1990:207). The intaglio appears to be abstract and does not appear to represent a person or an animal, etc. The alignment is SW-NE, with the SW end pointing at the intaglio. The alignment is 6.5m long; the intaglio is 7.7m x 4.2m, and they are separated by 13.65m. No artifacts have been observed at the site but they are present in the general area. The site is believed to be an authentic Native American ceremonial site; however, the intaglio is definitely known to have been modified by recent historic activities sometime in the early 1970s (since a passing helicopter pilot first noticed it and it was subsequently field checked and recorded). Both features are well illustrated by sketches in the 1990 site record.

CA-KER-252 (P-15-000252)

The Site Record (Apostolides 1965) notes the presence of a few simple red pictographs on one side of a large andesitic boulder; the pictographs are in poor condition. The site was re-recorded by Sampson, Mealey, and Faull of California State Parks on April 25, 1995. Several previously unrecorded faint red pictographs have recently been noted on the lower flanks of this boulder. Two metates, a few flakes and one small piece of Owens Valley Brownware pottery have also been observed adjacent to the boulder (Mark Faull, personal communication 2007). Apostolides described the recovery of one "Lake Mojave/Silver Lake" point from the slopes across the wash from KER-252 (see Field Notes dated 1-2 January 1965).

CA-KER-348 (P-15-000348)

The Site Record (Chapman 1972), which primarily discusses a rockshelter and associated midden, also notes "numerous house rings", metates, artifacts and petroglyphs. The petroglyphs are neither described nor illustrated. The site was unintentionally re-recorded as CA-KER-1124. CA-KER-348 is the correct trinomial. The site was relocated during 2008 surveys, being found one canyon south of its previously mapped location. No petroglyphs occur adjacent to the actual rockshelter in question. Per the site record the petroglyphs are said to be on the canyon walls.

CA-KER-371 (P-15-000371)
Sonin (1995, following the State of California 1988) cites the site record by Apostolides (1963) and lists this as a site with petroglyphs. The actual 1963 site record, however, does not mention or illustrate any rock art. This site is therefore not listed or discussed elsewhere in this paper.

CA-KER-375 (P-15-000375)
The site was recorded by Apostolides in 1964, when he noted the presence of one "simple rake" and one "double rake design" petroglyph design on two different faces of the same boulder. The site record and additional field notes from 11-12 March 1967 also describe at least one additional abstract curvilinear petroglyph at the site, as well as a couple of bedrock grinding slicks and lithic debris (sketches are included with the site record and with the subsequent notes). Burnt rocks and ash were discovered at a depth of about a foot when Apostolides performed a small test excavation. A historic mining camp was also once located nearby.

CA-KER-432/H (P-15-000432)
This site was originally recorded by Apostolides in April of 1967, when he noted the presence of "petroglyphs on scattered basalt boulders." Modest line sketches of the rock art accompany his field notes for both 13-14 May, 1967 and from 1-2 July, 1967, when he revisited the site to gather additional data. The site was re-recorded by Sampson, Mealey, and Faull of California State Parks on March 28, 1995. The 1995 site record describes 19 mostly prehistoric, but also some historic features. Individual rocks with one, or occasionally two, petroglyphs make up the majority of the features at the site. Motifs include a cross like element, a serpentine element, a short chain of circles and several abstract curvilinear elements. A few Great Basin Scratched elements can be seen as well. A native trail, probably also used by miners, runs through the site. Chiseled historic initials are present on some rocks. The site overlooks central Last Chance Canyon. Apostolides notes from 13-14 May 1967 illustrate a "mountain goat" and state: "Glyph 9", the "mountain goat" seems to date later in time than the rest of the signs at this site. It is removed from the main grouping, higher up on the ridge, and is much less weathered than the rest. The design approach is completely different, resembling the figure at Tom Tait's cabin." This is an interesting statement because Tait's cabin was close-by KER-135, which had a bighorn sheep motif petroglyph and it is probable that Apostolides "mountain goat" at KER-432/H was actually a bighorn sheep motif.

CA-KER-436 (P-15-000436)
The site record (Apostolides 1970) describes one large petroglyphs pecked into top, flat surface of vesicular boulder that lies just above foot trail and also provides a sketch of the 25 x 17" petroglyph. When the mapped location of this site was field checked, however, it was not possible to relocate the rock art. There were, in fact, no rocks, boulders or bedrock outcrops of any kind. It is possible that the site is mapped a bit too far south, and that it is actually located in the hills ¼ mile or more to the north. Given the comments (see above) about bull-dozing large areas of hillside in this part of Last Chance Canyon, it is also possible that the site has been destroyed. Apostolides believed that the petroglyph was a directional marker.

CA-KER-449 (P-15-000449)
Three petroglyphs are reported at KER-449 and Apostolides notes for the site, which he called "34aa" (1967) say: "Glyph 2 is of interest, in that it is pecked ladder-like on the flat face of a boulder, with the upper boundary pecked along the sharp edge at the boulder's top. A similar representation has been seen by the writer in Little Petroglyph Canyon, where a definite ladder form climbs up and over a huge boulder from water's edge...." This is one of the most explicit mentions of the similarity of some of the rock art in the El Paso's with some of the rock art in the Coso's in Apostolides notes. Apostolides (1976:102-103) also discusses the presence of other Traditional Coso Style elements in the El Paso Mountains in his 1976 presentation to the American Rock Art Research Association. Rogers and Rogers (2004:64, 65; see also Rogers 2006:20) further document Coso style petroglyphs within the El Paso range at the Terese site northeast of Black Mountain. In addition, Rogers and Rogers (2004:61 figure 4) note similar edge modification as Apostolides notes for this site.

Apostolides Site Ker-33aa
This site is just east of "34aa", or KER-449. It was apparently noticed during surveying activities sometime in early to mid 1967. Apostolides and a field class from Bakersfield Community College returned to the site on the weekends of 28-29 October and 4-5 November, 1967, when they took notes on the site and traced most of the rock art. An Archaeological Site Survey Record was filled out, but for some reason was lost in transit and never received an official trinomial. Apostolides noted at least 32 petroglyphs at this site; Khalil (1973:7) mentions 31 petroglyphs and states that "The sheep depicted at Ker-33 are similar to the Coso Range Early Transitional Period sheep." She goes on to say that there are more abstract than representational petroglyphs at the site and that the patination on some of the petroglyphs suggests that they are at least three thousand years old. The motifs she lists include ladders, parallel wavy lines, rectilinear meanders, loops, circles (bisected, spoked, linked and tailed), wavy lines, three atlatls, and bighorn sheep and one possible bighorn sheep, and she includes individual sketches of all of the petroglyphs. A note included with a "Site Record Index Sheet" from Apostolides says: "On 21 July 1977, we found two more petroglyph sites, associated with house rings, to the south of Ker-33aa. Rock ring, bedrock milling features, flake concentrations and midden are present. These have been given temporary designations of 33aa(A) and 33aa(B) and await a full field-note report." Khalil notes the presence of four house rings (1973). Lithic debris is also present at this site.

CA-KER-895 (P-15-000895)
The site record (Ritter 1975) states that there are reportedly between "26-50" petroglyphs here. A small field sketch of two of the petroglyphs is included with the site record. The petroglyphs are associated with one rock ring.

CA-KER-898 (P-15-000898)
The site record (Hanks and Garfinkel 1975) states that there is one petroglyph at this site and a field sketch of this petroglyph accompanies the site record, which also notes the presence of house rings, bedrock mortars, grinding slicks and habitation debris.

CA-KER-900 (P-15-000900)
There are apparently some six petroglyphs associated with two rock rings at this site. None of the rock art is described or illustrated in the site record. This site is recorded as being located just below the western most peak on Black Mountain. Rock "sleeping rings", bedrock grinding slicks and other evidence of utilization of the high peaks plateau is evident across a large area from this location towards the west.

CA-KER-936 (P-15-000936)
The Site Record from 1975 lists between "0-25" petroglyphs, and "BRM/milling features, habitation debris" but provides no particulars. The site was re-recorded by the BLM in 1990; the record illustrates a fairly elaborate pecked abstract panel, but provides no scale.

CA-KER-938 (P-15-000938)
The Site Record from 1975 is very minimal and lists between "0-25" petroglyphs, a rock ring, and milling stones. Field sketches show both representational and abstract petroglyphs.

CA-KER-972 (P-15-000972)
The Site Record from 1974 is very minimal and lists bedrock metates, flakes and between "0 to 25" "petroglyphs on many rocks?"

CA-KER-1124 (P-15-001124)
This is a re-recording of CA-KER-348. See CA-KER-348.

CA-KER-2035/H (P-15-002035)
This site was recorded by the BLM in 1985. It consists of the site of a historic mining camp and camp artifacts, mixed with prehistoric artifacts and including a boulder with about 20 cupules.

CA-KER-2036 (P-15-002036)
A 1985 Site Record by the BLM notes "a cupule rock" and other archaeological remains at this site (including grinding slicks and bedrock mortars), which has been damaged to some degree by historic activities (e.g. mining, grazing, off-roading), but the record does not elaborate on any of the things mentioned, including the cupules.

CA-KER-2277 (P-15-002277)
This site was first recorded by Sampson, Hines and Faull in 1987 and rerecorded by Sampson, Mealey and Faull in 1995. The site includes a small rockshelter with a series of 55 finger-width drilled holes low on the rear wall....These conical holes cluster in a panel approximately 15cm in height by 70cm wide. The circular indentations vary from shallow 'starts' (approximately 5mm in diameter by 2mm deep) to better developed indentations (approximately 23mm in diameter by 2mm deep). These indentations were manifested upon vertical surfaces of the rear wall....and appear to represent important ritualistic behavior.

CA-KER-2439 (P-15-002439)
The site record (Knight 1989) describes a rock alignment ca. 875ft. in length, an adjoining and parallel native trail and a ca. 15ft wide circle of rocks in the middle of the alignment/trail. The alignment is oriented roughly SW-NE and field observations at the Summer Solstice seem to indicate that the alignment is archaeoastronomical in nature (at least in part). The NE end of the alignment points at a hill located at the SE end of the El Paso Mountains; the SE end points at the Tehachapi Mountains. The Summer Solstice sunrise lights up the first (before the sun comes up and after), while the Summer Solstice sunset occurs behind the Tehachapi Mountains. The site was visited with a Kawaiisu Elder (AG) who referred to the feature as a "Spirit Trail." The site was originally noted by Apostolides, who mentioned and mapped this feature with his site record for "Ker-56aa", now CA-KER-604, also referencing the alignment as a possible trail. Apostolides also mapped another alignment, some three miles to the north of this site, but we have not yet determined if it has been formally recorded.

CA-KER-2544 (P-15-002544)
The Site Record (Knight 1989) describes three petroglyphs on a single small boulder, which points towards the peaks of Black Mountain (when standing in front of and looking at the panel), a couple of miles to the northeast. The motifs include a rayed disk, an anthropomorph and a possible Big Horn Sheep, the last quite crudely made. The fresh appearance of the petroglyphs and the complete lack of patination, lichen growth, etc., suggests that the petroglyphs may be of historic Native American manufacture.

CA-KER-2870 (P-15-002870)
The Site Record (BLM 1990) lists five bedrock metates, a 5m long rock alignment, and other site components. The alignment is relatively short, but its SW-NE orientation suggests a possible archaeoastronomical function.

CA-KER-2974 (P-15-002974)
This Site Record (BLM in 1990) states that the site consists of multiple rock rings, a quarry area and one associated "snake-like" petroglyph.

CA-KER-3061 (P-15-003061)
This site record (BLM 1991) states that the site is located near the well-known Sheep Springs site (CA-KER-192). Components include several bedrock grinding slicks, a few bedrock mortars, 6 boulders with mostly abstract, but also some representational, petroglyphs, etc. Motifs include a rayed-disk and bighorn sheep.

CA-KER-3787 (P-15-003787)
This site record (BLM 1993) states that site components include several bedrock grinding slicks, a possible hunting blind (or very short rock alignment), and "nine panels of petroglyphs." The Site Record included several good field sketches of the rock art.

CA-KER-3788 (P-15-003788)
The Site Record (BLM 1993) notes boulders with grinding slicks and "1 petroglyph", but it also illustrates three adjacent petroglyphs, one of which is pecked and two which appear to be scratched.

CA-KER-3825 (P-15-003825)
This Site Record (Baldwin for BLM 1993) describes two possible house rings, three bedrock milling stations, evidence of a sparse lithic scatter and "five locations of petroglyphs." The petroglyph motifs are pecked or abraded into basalt boulders. Two of the three milling stations are said to be "superimposed over existing petroglyph panels."

CA-KER-5109 (P-15-006140)
This site was discovered by Mark Faull and was subsequently recorded by Faull, Sampson, and Mealey of California State Parks, on April 28, 1995. The site had been mentioned in a *Touring Topics* magazine article in 1926 and in a local newspaper article in 1927 and parks personal used the descriptions in those articles to locate the site. The site was discussed by Faull in 2000 at the Society for California Archaeology annual meeting. The site consists of at least 110 cupules in groups of rows etched into the walls in a narrow, small canyon; it is also obvious that more cupules had once existed, which are now being concealed by erosional deposition.

CA-KER-5516 (P-15-007175)
"At least five boulders with petroglyphs" are mentioned in the 1993 Site Record, for what the discoverer dubbed "Bison Rock Shelter", even though many of the petroglyphs here depict Bighorn Sheep (one element does resemble a Bison or possibly a Longhorn Steer, to a certain degree). Rock rings, bedrock mortars and other archaeological remains are also present. Three short reddish polychrome pictographs are present on the ceiling of the actual rockshelter. The petroglyphs primarily occur on basaltic boulders located between the shelter and the rock rings.

CA-KER-6188 (P-15-010608)
The site record (Rogers, Rogers, Reed and Kaldenburg 2001) notes multiple loci of petroglyphs, rock rings, grinding slicks and artifacts. Several Bighorn Sheep are depicted here, although most of the petroglyphs are abstract; two of the Bighorn Sheep reach the artistic level of much of the rock art in the Coso range, some 30 miles to the north. The site has been investigated and described in detail by Garfinkel (2003), and by Rogers and Rogers (2004); several illustrations of the rock art can be seen in these articles. The most current information on the site can be found in Gardner (2007), who summarizes information from Rogers and Rogers, and from her own research on the site. She notes "an extensive midden, 117 rock art panels (including petroglyphs and cupules), multiple lithic scatters, 24 rock rings, 60 bedrock mortars and slicks, and three check dams" (ibid. 140-142). 13 obsidian samples all came from the Coso Volcanic Field and were dated "primarily to the Rose Springs Complex," while 2 *Olivella* beads (both Type F2a) are "regarded as a Middle Period marker artifact," although they continue to be found into the late period (ibid. 141; 179). Following Rogers and Rogers, Gardner states that "The Terese Site, which has both Gypsum and Rose Spring components, was interpreted as a long-term

occupation site with numerous boulders containing Coso style rock art depicting mountain sheep (as well as other elements)" (ibid. 239).

CA-KER-6303 (P-15-010838)
This site record (Rogers and Rogers 2003) documents a complex of rock rings associated with ground stone milling slicks and one rock alignment. The rock alignment is to be 4 meters long and oriented general north/south.

CA-KER-6345 (P-15-010956)
This site record (Rogers and Rogers 2004) discusses a complex of nine petroglyph boulders in general association with one large rock ring. The petroglyphs are said to include abstract curvilinear designs, random pecking, an image of a "tortoise," both Coso and non-Coso style Bighorn Sheep and one scratched style grid pattern.

CA-KER-6485/H (P-15-011108)
This site record (Rogers and Rogers 2004) documents multiple rock rings, rock cairns, slicks, lithic debitage and petroglyphs. The loci maps display six petroglyphs (five of which are represented in photographs). The most complex petroglyph portrayal appears to be a panel of "sunburst" like images.

CA-KER-6566 (P-15-011282)
This site record (Rogers and Rogers 2004) references rock rings, bedrock slicks, lithic debitage, rock cairns, pecked cupules and "a complex of petroglyphs" as occurring onsite. The site mapping data sheet lists 14 petroglyphs, one of which is a Coso style Bighorn Sheep.

P-15-010957
Rogers and Rogers recorded this isolated petroglyph boulder in 2003. A photograph included with the report portrays multiple patinated circular and to a lesser extent linear petroglyphs gathered in a substantive panel located on one boulder.

Apostolides Site Ker-71aa
Recorded only upon his Saltdale 15 minute quadrangle map, Apostolides indicates that unrecorded petroglyphs should be located approximately $1/4^{th}$ of a mile southwest of the mapped location for the Sheep Springs water source. No details are known as to the number of petroglyphs or their stylistic elements.

Apostolides Site Ker-75aa
Noted only on a "Site Record Index Sheet" prepared by Apostolides on or around 1977, the coordinates for this site place it within House Ring Canyon on the western slopes of Black Mountain. The petroglyph images are noted as representational, involving a medicine bag, goats (i.e. bighorn sheep) and a plant form. Apostolides (1976:102) refers to these same images elsewhere in his American Rock Art Research Association paper, where he elaborates that the plant form possibly represents a corn plant and that the bighorn images illustrate "a baby and its mother." Rogers and Rogers (2004:64, figure 7) also identify a possible "cornstalk" image from the Terese site northeast of Black

Mountain. As an alternative they suggest the image might depict stacked sheep horns similar to images found in the Coso Range not far north (Rogers and Rogers 2004:64).

Unrecorded Sites West of Sheep Springs

During 2007 field surveys discovered an unrecorded sequence of bedrock mortars occurring in four adjacent sandstone outcrops approximately 1/4th of a mile west of the Sheep Springs petroglyphs. In the western most sandstone outcrop a vulva-form petroglyph was incised into the slightly sloping horizontal rock surface near several mortar cups. This sandstone exposure also contained numerous shallow cupules. On the eastern margin of this same sequence of sandstone outcrops a short disturbed two meter long rock alignment was apparent. The series of accumulated volcanic rocks contrasted sharply with the local exposure of sandstone and the surrounding soil matrix. The direction of alignment was generally east-northeast by west-southwest. This particular sandstone outcrop contained no bedrock mortars. The accumulated rocks had obviously been transported a short distance from favorable terrain for placement upon the perimeter of this sandstone outcrop. Most of the remaining sandstone outcrops with associated mortars also portrayed unnatural collections of volcanic rock, which were of obvious human origin. None of the other collections displayed a linear nature.

Slightly north of these sandstone occurrences the landscape ascends towards a modest knoll. Several unrecorded well-patinated petroglyph were observed near the crest of this knoll. The styles were all abstract in character. This knoll appears to be 3466 feet in elevation.

South of the previously mentioned sandstone outcrops and north of the KER-78 rockshelter another large sandstone outcrop displayed a large vulvaform concretion with a row of six aligned vertical rocks. The outcrop, which was highly suitable for food processing, only possessed three widely spaced mortars. The selected vertically aligned rocks were all of concretion origin. The back or east side of the raised vulva form concretion bore a striking resemblance to a human skull. The vertically aligned rocks were vandalized and toppled during the spring of 2008.

Unrecorded rock alignment WNW of Black Mountain

One unnumbered Apostolides rock alignment appears upon his plotted Saltdale 15 minute quadrangle. This rock alignment of unknown length or character is plotted at the base of the Black Hills slightly west-northwest of the peak of Black Mountain. The alignment appears to be ½ mile north of Apostolides' unrecorded secondary inhumation site labeled "Ker-74aa" and only slightly northeast of a BLM human cremation discovery recorded as KER-891. A preliminary survey during 2008 was not able to relocate this feature.

The Black Mountain Sites Reported by Leslie E. West II

In 1983 Leslie West recorded three rock rings on the pyramidal rise atop the western Black Mountains crest, as well as six additional individual rock rings on a terrace below the

western crest of Black Mountain. West (1983) recorded petroglyphs in association with two of his terrace based rock rings (Ring #1 and Ring #2). Field surveys conducted during the spring of 2008 relocated all of West's recorded rock rings, including the associated petroglyphs. The 2008 survey identified additional unrecorded rock rings associated with all of the West sites, sometimes partially concealed by vegetation. It is possible that some of the West sites are co-equal to BLM recorded rock rings with rock art such as KER-900. The images depicted by BLM at KER-895 and KER-898 do not match the observed petroglyphs at West's Ring #1 and Ring #2. Other inconsistencies appear to negate KER-900 as being co-equal to either West Ring #1 or Ring #2. Due to discrepancies observed in the field, none of the BLM recorded rock ring sites numbered between KER-895 and KER-905 could be properly aligned with any of the 36 rock rings discovered during 2008 surveys along the crest of Black Mountain or those portions of the western or southern terraces surveyed.

The following sites were discovered during 2008 (by Faull) during our (his) attempts to relocate various sites originally reported on by Apostolides:

2008 Survey Site #2

One isolated boulder on the western fringes of a house ring complex displays a single lightly pecked petroglyph. Located south of the Apostolides Ker-33aa site complex, the solitary petroglyph depicts a faintly etched bighorn sheep image with horns swept to the rear.

2008 Survey Site #33

On the saddle between House Ring Canyon and a second watershed incised into the western portion of Black Mountain, several pictograph panels and isolated boulders were discovered in relatively close proximity during the spring of 2008. The primarily abstract images were pecked into basaltic boulders and most were oriented in either a westerly or southerly direction. One possible bighorn sheep glyph was noted.

2008 Survey Sites #42 and #45

Two single isolated petroglyph boulders were discovered in Traverse Canyon to the west of Black Mountain proper. Site #42 consisted of several modestly faint images pecked into a basaltic boulder along the spine of a ridge. Site #45 consists of a single "rake-like" image carved into an isolated boulder slightly above one fork in the canyon and not far downstream from the KER-348 rockshelter. The rock art in question likely relates to that discussed by Chapman in his 1972 site record.

2008 Survey Site #46

One basaltic boulder involving four or more faintly pecked petroglyphs was found 30m north of a concentrated complex of five rock rings below the mouth of an unnamed western tributary eroding Black Mountain. This tributary lies south of Traverse Canyon.

Abstract imagery is combined with perhaps one faint atlatl glyph visible on the lower right portion of the panel. It is also possible to interpret the glyphs as representing three faint atlatls.

2008 Survey Site #68

One vertical boulder with multiple petroglyphs was found on the crest of Black Mountain east of the prominent pyramidal peak in association with three well defined rock rings. The vertical basalt boulder was heavily decorated with pecked abstract images primarily on the southern face of the rock.

Possible Pictographs atop Black Mountain Peak

One newspaper article, written by a former Director of the Kern County Museum, noted the 1959 discovery of several "crudely painted pictographs" on or near the top of Black Mountain (Bailey 1990:28). The author stated, "One figure appeared to be astride a horse. Another seemed to be holding a bow." These pictographs have not been relocated (much of the top of the mountain remains unexplored, however).

DISCUSSION and CONCLUSION

After spending several collective decades studying (and plain old enjoying) the El Paso Mountains, including in company with several local Native American Elders, both authors have no doubt that the entire El Paso Mountain range is without question a "Sacred Land" (see below). The extent and numbers of known rock art sites is only one indicator of the special nature and power of this landscape. New rock art locales have (esp. in 2008) and will continue to be identified as more areas are adequately surveyed within and surrounding the National Historical Landmark District.

An summary of our knowledge concerning the significance of the peak of Black Mountain proper includes a couple of versions of what certain Native Americans reportedly told early miners and settlers about these peaks and mesas (Greene, Garfinkel, Knight and Faull 2007). One version of this story (Cawley 1996:9) reads, "Black Mountain is alleged to be an ancient ground of worship and of peace making for the ancient Indians and its legends date back beyond 10,000 years. The legend is that this was used as a mountain for worship and that the Indians would travel for miles in order to join forces each time of the year in order to pray and to promote peace. It was not owned by any specific tribe, but all of the tribes in that area used the region for their peaceful worshiping purposes. All who came provided their own food, as very little food was available; however, in those days probably water was available from Koehn Dry Lake, from Cuddyback Lake, also from numerous springs that were scattered around the base of the mountain, and also from a water storage area in the crater of the mountain. The top of the mountain has a summit of 5,259 feet on the western end of the summit, on the top of the mountain is a large pyramid composed of a natural piling of large basaltic boulders. It was stated that this pyramid was the point of worship and was used as their worshiping grounds. At the top of the pyramid there are six well-defined ringed enclosures which were probably made for ceremonial purposes as they

do not show any evidence of having been utilized as living sites or village sites....The living quarters were on the mesa below the peak...." Unfortunately, this popularized legend is not supported by ethnographic accounts or by certain of the mentioned archaeological features (for example, no one has ever documented the "water storage area in the crater of the mountain," and a basalt metate was observed in one of the large "house rings," suggesting that even Medicine Men or whoever else may have visited the peaks area- had to eat too). In fact, none of the published literature on the Kawaiisu or any of the other tribes reportedly involved in the above-mentioned important ceremonial gathering report any annual meeting in the El Paso Mountains. Apostolides (Field Notes for 25 Oct – 5 Nov 1967 p.3), who was almost certainly the most important expert on the range-referenced this legend and characterized the story as follows, "Lacking more positive evidence ... this view is still in the wild dream area." Apostolides wrote this caveat despite being a close friend of one of the miners who helped to popularize this legend, and the other El Paso miner, who communicated this story even more voraciously, was spoken of by Apostolides only in terms of great distrust and contempt (see Field Notes for 1-2 Jan 1965). Having said this, we must again state that the presence and volume of rock art within the El Paso Mountains does attest to strong ceremonial and spiritual practices performed within and upon this landscape. Some of these practices are being continued by people of native descent today. These contemporary practices may or may not echo the profound multi-tribal event reported "in legend", nevertheless, this was and is an important sacred and spiritual landscape for native people.

As noted above, the rock art of the El Paso Mountains, for the most part, is dominated by abstract imagery with lesser amounts of representational motifs (the exceptions being mainly at Sheep Springs and the Terese sites). Pictographs exist, but are far less numerous than petroglyphs, which can be described as Great Basin Pecked, and include both abstract curvilinear and abstract rectilinear motifs (See Heizer and Baumhoff 1962 and Steward 1929). Analysis conducted at both the Sheep Springs and at the Terese sites (for example) noted the presence of patinated elements, with patination varying from very little to considerable, and this attests to the very long term use of at least parts of the range for ceremonial purposes (Giles 1979:16; Rogers 2006a:20). Rogers (2006a:20; see also Roger and Rogers 2004:65) states that the rock art within Locus A at the Terese site "is entirely Mojave Desert in style", while the rock art at Locus C displays "more Coso or Great Basin characteristics." Superimposition of elements at these two sites was also noted, which suggests more than one period of usage. And, importantly, the El Paso Mountains contain the greatest concentration of Coso Style petroglyphs known outside of the Coso Range and its immediate environs.

Bighorn sheep images of one kind or another, are known from multiple sites in the El Paso range, and based upon stylistic differences and varying levels of patination, probably date from several periods of origin. Such images, while never numerous, are found at sites in almost all parts of the range, with the noted exception of the peaks on the eastern slopes and flanks (but which is the steepest and most accessible parts of the range, and is subsequently the part of the range that has received the least attention by archaeologists). Unquestionable Coso Style bighorn sheep with front or rear facing horns and boat-shaped bodies are definitively known from both the Terese and Sheep Springs sites northeast of

Black Mountain (Rogers and Rogers 2004). These images normally display less patination than most petroglyphs known from the rest of the El Paso range.

As mentioned above, the production of rock art within the El Paso Mountains portrays a long tradition spanning multiple temporal phases and periods. The Lake Mojave, Gypsum, Rose Spring and Late Periods appear well substantiated by varying levels of artifactual evidence. Based upon the current understandings and interpretations of the archaeological pattern within the El Paso range the Rose Spring period portrays the most concentrated focused attention. Work by McGuire, et al. (1982), Gardner (1998, 2002) and Rogers (2006a, 2006b) all document a strong Rose Spring presence and imprint upon the El Paso Mountains region. More recent preliminary studies by Faull (2008) appear to suggest the principal time period for rock ring construction and utilization (involving several hundreds of rings) aligns best within the Rose Spring Period, as well. However, the majority of the confirmed Rose Spring sites, such as the rock ring complexes, tend to deemphasize significant rock art production. The vast majority of rock ring complexes possess no associated rock art and when rock art is present it tends to be minimal in nature.

It is our preliminary observation that the rock art of the El Paso Mountains appears to originate early within the Holocene, have increased substantially during the Gypsum Period (involving primarily abstract imagery and occasional representational motifs), have decreased during the early Rose Spring and perhaps accelerated late within the Rose Spring (in part involving the introduction of classic Coso elements) and finally continued into the Late Period where both pictograph and petroglyph imagery were produced in modest to moderate volume. The late Rose Spring pulse or resurgence appears stronger northeast of Black Mountain in the realms of Sheep Springs and the Terese site. Such an overview is offered herein not as a definitive description, but as a starting point for further needed inquiry and clarification.

TABLE 1. SUMMARY OF ROCK ART FEATURES

Site Number	Great Basin Pecked, etc. Petroglyphs	Cupules	Pictographs	Comments
78	0	?	Red pigment stains on ceiling	A diffuse but concentrated stain on one portion of the shelter ceiling
133	1 GBP	0	0	House-rings in area
134	8 GBP	0	0	1 additional GB scratched petroglyph
135	2 GBP	0	0	Possible Lost to Vandals?
136	7 or more GBP	0	0	
147	0	0	3 Monochrome 8 Polychrome	Now in very poor condition
192	-	-	-	A re-recording of KER-78
193	+100 (1 deeply grooved) GBP	?	0	Sheep Spring site

235	1?	0	0	
236	2?	0	0	
237	Ca. 10-12 GBP	0	Reported	
244	0	0	0	1 intaglio; 1 short rock alignment
252	0	0	Simple red monochrome, ca. 5 elements	
348	Reported as present at or near the site, the number and style remain unknown	0	0	
369	-	-	-	A re-recording of CA-KER-136
375	3 GBP	0	0	
432/H	20-30 GBP	0	0	Native trail here also
436	1, large GBP	0	0	Native trail here also
449	3 GBP	0	0	Pos. associated hunting blinds, rock rings
895	"25-50" GBP	0	0	1 Assoc. Rock ring
898	<25	0	0	3 Assoc. Rock rings 20m to east
900	6 GBP	0	0	2 Assoc. Rock rings
936	Abstract GBP petroglyph panels, 1 somewhat elaborate	0	0	
938	"0-25" GBP	0	0	
972	"26-50?" GBP	0	0	
1124	-	-	-	A re-recording of CA-KER-348
2035/H	0	Ca. 20 Cupules	0	
2036	0	Yes, #?	0	"a cupule rock", acc. to the site record
2277	0	0	0	55 drilled holes
2439	0	0	0	Long rock alignment; pointed rock; native trail here also
2544	3 GBP	0	0	Historic native panel
2870	0	0	0	A 5m long rock alignment assoc. with bedrock grinding slicks, etc.

2974	1 "snake-like figure" GBP	0	0	
3061	Mostly abstract, but also some representational GBP petroglyphs	0	0	
3787	9 panels of simple GBP	0	0	2-3 GB Scratched petros
3788	1 pecked GBP	0		
5109	Absent	+110	0	+Probably more cups covered by sand
6188	+400 GBP	0	0	
7175	Several representational, inc. BHS GBP	0	3 Monochrome red-orange abbreviated renderings in rockshelter	A combination of several representational quadrupeds and abstract images. One image interpreted as a "bison." Three quadrupeds with indistinct heads and somewhat boat-shaped bodies reminiscent of Coso styles.
33aa	"32" GBP	0	0	Has no trinomial at this time
West of Sheep Springs	1 incised Yoni	Numerous, #?	0	A recently discovered site, with many BRMs, many Cupules, 2 Petroglyphs, a rock alignment
Unknown rock alignment 1	0	0	0	Found by AA NW side mtn.
Leslie West Sites on Black Mountain	4 GBP, 1GB Scratched	0	0	Per report written in 1983
2008 Survey Site #2	1 GBP	0	0	No current trinomial, one bighorn sheep image
2008 Survey Site #33	Minimum 52 GBP images on 6 boulders	0	0	No current trinomial, primarily abstract designs, one bighorn sheep
2008 Survey Site #42	4 GBP	0	0	No current trinomial, primarily abstract designs, possible depiction of bighorn sheep horns
2008 Survey Site #45	1 GBP	0	0	No current trinomial, a rake-like design possible related to rainfall and lightning

2008 Survey Site #46	4 GBP	0	0	Possible 1 to 3 faint atlatls are represented
2008 Survey Site #68	19 GBP	0	0	Adjacent to three rock rings and multiple slicks and metates, primarily circular abstract imagery
Pictographs on crest of Black Mountain	2 + Pictographs	0	0	At least two apparently representational glyphs, one possible of a horse and rider, the other of a person with a bow, colors unknown

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Dating *palakuč* (CA-Ker-17): A Tubatulabal Pictograph and Fishing Site on the Kern River, Lake Isabella, California

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Introduction

Several prominent polychrome pictograph panels adorn the near vertical granite rock face situated on the northern bank of the Kern River just east of its junction with Erskine Creek and near Lake Isabella, California. The paintings are so large and well defined that they can be readily seen from Highway 178 that skirts the route of the Kern River as it winds its way through the South Fork Valley. The paintings are notable because of their large size (over 5 feet in height and width) and due to the profusion of elements in a number of different colors (black, white, and red).

These pictographs have been known for many years. Their first mention, in a formal publication, appears to be that of Julian Steward in his compendium on rock art of California and adjacent states (Steward 1929:110, Figure 39, Plates 52c and d). Erminie Voegelin (1938:40, 58; Figure 14) in her ethnographic treatment of the Tubatulabal briefly describes the site and depicts the pictograph panel identifying it with a native place name (*palakuč*) that she describes as a good fishing site. She further notes that the site was associated with "an Indian mound, now leveled". Various brief mentions of the site have appeared over the years but the site itself has rarely been the subject of any in-depth study or detailed analysis (Andrews 1977:38-40; Cawley 1965; Fenenga 1948; Grant et al. 1968:109, Figures a and b; Heizer and Clewlow 1973; Hoover et al. 1966:128; Hudson et al. 1979:57, Figure 8a; Sonin 1993:53). A notable exception to this rather superficial treatment is that of Harper-Slaboszewicz and Cooper (1980). They provide a detailed argument and test evaluating the proposition that the site may have served as a winter solstice sunrise observatory. They indicate that the sun rises, on that date, within a distinctive notch on the southerly horizon - as can be seen from a vantage point at the site. They further posit that the single bedrock mortar hole found at the site may have been the locus of a vertical pole used to orient the viewers towards the proper location to see the sunrise on the horizon.

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Site Description

Three groups of pictograph elements occur at the site. The paintings are rendered in red, white, and black. There are two major sections of the composition separated by a prominent fold in the granite face. At least 70 identifiable elements occur on the panels. Most of the current elements are painted in red and embellish the rock face. A few elements are on the ceiling of the rock shelter or on a separate boulder below the heavily adorned panels (see Andrews 1977:38-40). Some elements have been painted in a color combinations including red with white internal detailing. There are at least six elements that might be classified as zoomorphic figures: one resembling an insect (perhaps a butterfly), two serpentine (snake-like) creatures, perhaps a ring-tailed cat, and surprisingly only one quadruped.

Figure 1. Left side of main pictograph panel at KER-17.
(photo by J. Sprague)

Quadrupedal, zoomorphic creatures are common in the pictographs located just slightly to the east in the aboriginal territories of people who spoke Numic languages - the Kawaiisu and Panamint Shoshone (Garfinkel 1978, 2005). Other notable elements include four peltate figures, five anthropomorphic figures, and twelve circular images – some of the latter have concentric rings of varying color.

Figure 2. Right side of main pictographs panel at KER-17.
(photo by J. Sprague)

The elements painted in black are the most infrequent and seem to have suffered the greatest effects from the ravages of time including damage and erosion by wind, water, and sun. The next most affected elements were those painted in white and those have often seen a great deal of destruction. However the white pigment appears in some instances to have retained its form and is still smeared or caked on the rock. The best preserved pigment is the red or red-orange. It has been noted that this red pigment apparently saturates the rock and is no longer simply a surface constituent but penetrates into the granite canvas being absorbed by the stone and is a relatively permanent stain.

Research Design

The purpose of the study was a straight forward one: to date the paintings. Rock art dating is often difficult and the Erskine Creek paintings were to be evaluated from several perspectives. The senior author in the past has used trace element analysis of white paint to evaluate the authenticity and age of rock painting pigment (Garfinkel 1978). Titanium is a significant component in white paint manufactured by Euroamericans since the 1930's. Prior to that date lead was a substantive element within white paint of non-aboriginal origin. It was expected that pigment of native origin would exhibit neither element when evaluated for its constituents. Therefore we could first support the position that the pigment was of native origin and most likely antedated substantial Euroamerican incursions and contacts.

The second perspective that could help in suggesting an age was the degree of weathering and eradication of the elements as a function of time. Fortunately a number of photographs exist of the panel documenting its character over the course of the last 80 years.

Finally, and perhaps most significantly, it was posited that it might be possible to date the painting directly through the analysis of a sample of the pigment using AMS radiocarbon dating. That technique of course would assume that there was a sufficient quantity of organic material (perhaps used as a binder) in the pigment and that this material would provide a potentially useful determination of the painting's age. A number of problems with using this method have been identified and some analyses have obtained determinations that are suspect or clearly in error (Rowe 2005). However, some researchers have applied the technique to rock art with good results with independent corroboration from other dating methods (Keyser and Klassen 2001).

Field Methodology

Alan Garfinkel and Joseph Scott visited *palakuč* on Saturday, June 28th, 2008, inspected the panel, and spent several hours on site. The associated soil near the paintings was reviewed to identify if any items of prehistoric origin could be discovered. Also the soil near and below the site was screened in an attempt to recover any toolstone materials of obsidian that could be dated via the obsidian hydration method. Unfortunately, no prehistoric artifactual material was identified. Several areas where the pigment was eroding and the granite face was exfoliating were identified. Chips of both white and red

pigment were extracted from the painting. It was possible to scrape off a small amount of white pigment from the rock and to flake off several small pieces of exfoliated granite with red paint adhering to it. These were collected for subsequent analysis.

Analytical Methods

Trace Element Analysis

Each of the pigment samples was measured using a portable x-ray fluorescence (XRF) instrument at the laboratory facilities of Farrel Lytle in Pioche, Nevada. The XRF instrument was a Niton XLi that emits Ag Kα x-rays from the radioactive decay of a 40 mCi 109Cd source (See the Niton web site, http://www.niton.com/). The x-rays, incident upon the sample, excite fluorescent x-rays from the sample material. The fluorescent x-rays are detected and their energy analyzed with a Peltier-cooled, Si-PIN solid state detector that achieves 250 eV FWHM resolution that is sufficient to separate the spectra of the constituent elements. One typical measurement requires about one minute.

Examples of measured spectra for the white and red pigment are shown in the two figures accompanying this article. The x-ray source and detector are located behind a thin window in the faceplate that is held lightly against the sample during the measurement. Around the thin window, the data are stored in an onboard computer for later download and analysis. The energy in the incident x-ray beam is less than full sunlight so there is no heating, creation of radioactivity, or removal of material from the sample. The pigment samples were analyzed with the XRF instrument while contained in a 1" diameter nylon cup with a thin plastic window (5 μm polypropylene) to minimize absorption of x-rays between the sample and the detector.

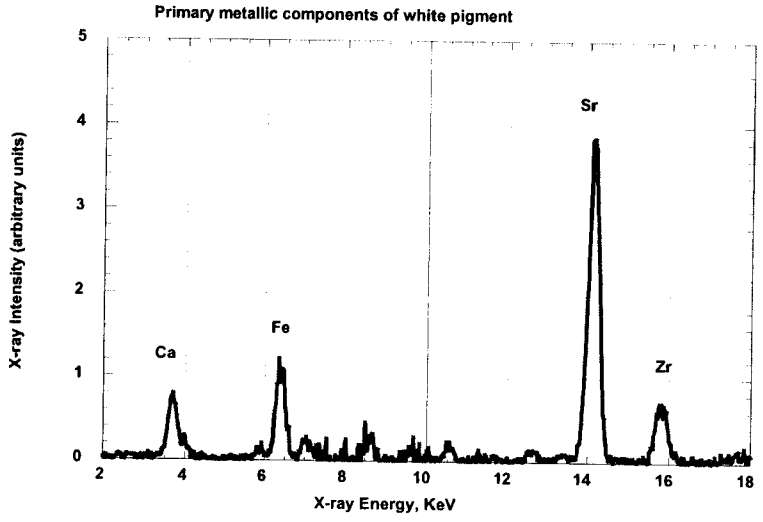

Figure 3. Trace Element Analysis of White Pigment.

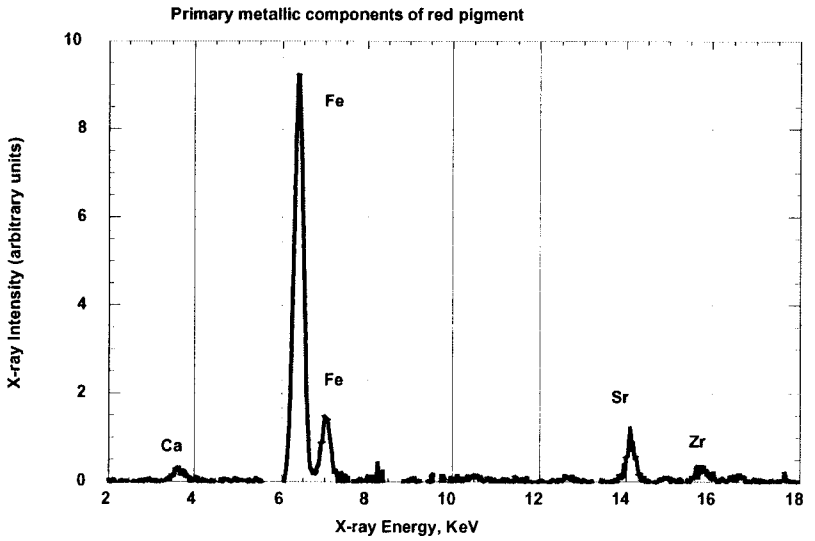

Figure 4. Trace Element Analysis of Red Pigment

The red pigment sample was placed in the cup with the sample side up facing away from the x-ray beam.

The sample was run in this position and the spectrum subtracted from the spectrum when the red pigment was toward the beam. This procedure minimized the contribution of the underlying rock to the final spectrum. The primary metallic element in the red pigment is iron (Fe), probably Fe2O3 (Figure 3). The calcium (Ca), strontium (Sr) and zirconium (Zr) components are probably from the underlying rock but could be in the Fe oxide.

The white pigment sample was placed in the cup. Two different geometries were measured, one where the sample was heaped up in the middle and the other where the pigment was uniformly scattered over the bottom of the cup. Both gave similar spectra but the peaks of the major elements were more intense in the first case where more of the sample was in the x-ray beam. The thin sample spectrum was subtracted from the thicker one with the result shown in Fig. 4. There was a reddish tinge to the sample. This is evidence of Fe impurity.

The white pigment has considerable iron content. This iron (Fe) impurity is obvious. Zr is found in many substances, particularly in common soil. Although the Ca peak looks quite small it is a rather large component because the instrument is insensitive at its low energy. Sr is also a major component. Ca and Sr occur together in many marine materials, including limestone or marine seashells. The white pigment could therefore be ground up materials that had been heated to break up the carbonate and make (Ca, Sr) oxide which would be whiter than just grinding it up. CaO is common lime much used in plaster. No

evidence that this white pigment was of Euroamerican origin was discerned and the element constituents derived from XRF analysis did not identify either significant quantities of lead (Pb) or titanium (Ti).

Repeat Photography

Photographs of *palakuč* were identified that recorded the same panel of pictographs in 1929, 1955, 1977, and in the past few years. The earliest photo appears in Julian Steward's publication on rock art (Steward 1929). The 1955 photo was supplied by Tom and Debbie Teofilo from a postcard they had discovered. The 1977 image was from a number of color slides taken by Alan Garfinkel at the site. The most recent photos were taken by the Teofilos. The painted figures appear surprisingly resilient with little change over the last 80 years. Some of the black may have eroded away and the internal spokes of one large wheel-like element may have faded, otherwise the designs are remarkably similar with no dramatic change in element composition or visibility.

Radiocarbon Dating

The radiocarbon laboratories of INSTAAR, the Laboratory for Accelerator Mass Spectrometry (AMS) Radiocarbon Preparation and Research, University of Colorado, Boulder agreed to conduct assays of two samples of pigment acquired from *palakuč*. The white pigment proved to have too little in the way of organics and could not be dated. The red pigment sample was sufficiently large and contained adequate organics to provide a radiocarbon date. The sample of red pigment from *palakuč* was analyzed through AMS radiocarbon dating and returned a resulting age of 1010 $\pm$ 20 radiocarbon years before present (rcybp) with a delta C13 isotopic fractionation correction of -17.3% (CURL-10017). Using an online calibration utility, the radiocarbon date is revised to an age of 939 $\pm$ 10 rcybp with an age range approximating the period from 928 to 949 years bp with the present equivalent to AD 1950. Those dates would provide an age equivalent translation into calendar dates that range from ca. AD 1001 to 1022.

Results and Interpretations

Aboriginal red pigment was often manufactured from red ochre (hematite) and white pigment was routinely made from ground shell, diatomaceous earth, or perhaps bird lime. Analytical studies using trace element analysis confirmed that the red pigment from *palakuč* is hematite and that the white was either limestone or ground shell. Comparison of repeat photographs of *palakuč* reveals surprisingly little change in the character of the site during the last century. AMS radiocarbon dating of the red pigment provided a date of about 1000 years ago or ca. AD 1000 for the age of the site.

The date of 1000 BP is in good agreement with other estimates for the age range of pictograph sites found in the vicinity of *palakuč* throughout the far southern Sierra Nevada. Additionally, a number of researchers have argued that pictographs in the general region have much in common with one another and are part of an area tradition known as the Southern Sierra Painted Style. Based on contextual associations and dates of other

researchers (Heizer and Clewlow 1973), one of us has argued that paintings of this style found in the region date as early as 2000 B.P. and were produced continuously until the historic era (Garfinkel 2007).

Acknowledgements

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Rock Art of the Tehachapi Area

Albert Knight and Jack Sprague

INTRODUCTION

The Kawaiisu (or *Nuooah)* inhabited both the southern most end of the Sierra Nevada Mountains and the adjacent northwest Mojave Desert, to as far to the northeast as southern Death Valley. The Kawaiisu are members of the Numic branch of the Uto-Azetcan linguistic stock, or are as they themselves often say, "Paiutes." The available type of rock surface was apparently the primary factor for the Kawaiisu in deciding what type of rock art to produce. In short, where granite was present as it is through out most of the area discussed here, they produced pictographs, and where basalt was present, they produced petroglyphs (with a few exceptions). In should not come as a surprise that given the large and geographically diverse area occupied by the Kawaiisu there were differences in rock art styles and motif distribution, probably due to cultural distinctions between Mountain and Desert Kawaiisu populations, although there were certainly variations in motifs and styles over time, due to changes in culture and population, but we currently lack a sufficient data base to make a single all encompassing definitive statement as to the particulars (the authors hope that this paper will be one more step in the creation of a data base that will eventually address this issue). In any event, the mostly pictographic rock art in the western mountain part of Kawaiisu territory, including in the Tehachapi area, can be considered part of the wide spread California Tradition, with two sites being classifiable within the South-Central Painted variation of the California Tradition (Whitley 2000:48, 50, 52-54).

The California Tradition "consists of small sites, usually in rock overhangs or shelters, containing monochrome rock paintings that depict simple geometric shapes such as circles, dots, disk like forms, rakes and ladders, sets of short "tick marks" or parallel lines, diamonds, zigzags.... Handprints, stick figure humans and lizard or lizard like motifs are also common" (Whitley 2000:50). While the first part of that description clearly describes most of the pictographic rock art in the Tehachapi area, it is clearly the South Central Painted variation that is present at CA-KER-508, in the eastern end of the valley, and at CA-KER-273, on the southwest side of the Tehachapi Mountains (there are also polychrome paintings at CA-KER-93, but they are not very colorful or elaborate). Of this variation Whitley says: "This variant of the California Tradition is found in the Coast Ranges, in the vicinity of Santa Barbara, and in the southern Sierra Nevada, with an occasional example found in the desert region immediately east of these mountains. It contains the most elaborate and spectacular examples of Native California rock art, and thus has received considerable amount of attention in both professional literature and the popular press. It includes the widely renowned Chumash rock paintings....those made by the....Yokuts in the southern Sierra, and the paintings of a series of smaller cultural groups on the margins and in between....The most widely recognized characteristic of this

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regional variant is the presence of complex polychrome images, painted in some combination of red, black, white, yellow, and occasionally blue or green" (ibid.:52).

This paper is mostly descriptive and intended as a detailed catalogue of the known rock art sites in the Tehachapi area. The paper assumes that readers already know about the Kawaiisu, at least in general, and it will not address issues such as the origins of the Kawaiisu, the length of time that they have inhabited the Tehachapi area, who might have occupied the region before their arrival, or make a generic attempt to interpret the rock art itself, although where particulars are known in some relation to the sites we discuss we have attempted to include any pertinent information. The sites we discuss include both recorded and unrecorded sites. Recorded sites are listed by their State of California trinomial # (i.e. CA-KER-XXXX), while unrecorded sites are listed by the junior author's field # (i.e. WJS-XX). Two sites appear to have neither a trinomial, nor a field number. No number is assigned to these sites here (see Table 1).

The first researcher to mention rock art in the Tehachapi area was apparently Julian Steward, who noted rock art "Thirty miles west of Mojave, in a canyon, two painted rocks" (1929:110). This may refer to the Burham Canyon sites (see below), or it may refer to a pictograph site on the Tejon Ranch, since Burham Canyon is less than "30 miles" from Mojave.

The first person to make a detailed study of the rock art of Kawaiisu country, including the "Phillips Ranch" sites (i.e. CA-KER-230 and CA-KER-508, later TKSHP) was John W. (or Jack) Cawley, who was doing continuing and active rock art research during most of the 1960s. Although it is probable that a few researchers conducted field visits to a limited number of Kawaiisu rock art sites before he did (note: Steward and Heizer and Clewlow had visited only a few of the sites which they reported on, most of their research was based on information from other people who had actually seen the sites themselves) every researcher active in the southern Sierras (at least) since the late 1970s, is quite literally following in his footsteps. Cawley, possibly because he was not a professional, is not well known, and has received little recognition. Campbell Grant in his *Rock Paintings of the Chumash*, for example, acknowledges "particularly....my good friends....the Jack Cawley's, who have led me to many new sites" (1965: xii), and in the Introduction to *Rock Drawings of the Coso Range*, Grant, et al, give thanks to "especially John Cawley for his enthusiasm and companionship during our Coso trips" (1968:x).

Cawley not only visited and photographed numerous sites (his work includes some 10,000 well-organized slides) his notes show that he often sought out and was accompanied by people that were familiar with the sites. For example, in the Kawaiisu area, Cawley mentions visiting sites with Vic and Albert Phillips (the old Phillips Ranch became the core for what is now Tomo-Kahni State Historic Park), Campbell Grant and Charles LaMonk (well known rock art researchers) and Henry Weldon and Jack Leiva (both Kawaiisu Elders, at that time), also traveled with him. Although Cawley's papers clearly show that he was using Julian Steward's *Petroglyphs of California and Adjoining States* as a basic guide for his rock art inquiries, Steward mentions very few rock art sites in Kawaiisu territory, and Cawley's summary notes, line drawings and numerous color slides

are often the first or some of the first records we have for many sites. In Kern County Cawley visited and photographed (at least): the "Tropico Mine" site (i.e. the Sweetzer site), the Lone Tree Canyon site, the Sage Canyon site, the Toll House site, the Toll Gate Canyon site, the Back Canyon site, several sites in the Jawbone Canyon and Kelso Valley areas, a few sites on Breckenridge Mountain, the Indian Wells Canyon sites, and the Sand Canyon (TKSHP) sites (Knight 1997a).

It was not until 1973, when *Prehistoric Rock Art of California* by Heizer and Clewlow was published, that any substantial information about rock art in Kawaiisu country appeared in print. As told by the authors, research on California rock art had continued after Steward's pioneering 1929 study: "Beginning in 1948 data and site records on California rock art were accumulated".... (by the University of California Berkeley)...."with the air of ultimately publishing a general survey of the subject which would continue from the point where Julian Steward left off twenty years earlier...." (1973:1). In Volume 1, the authors discussed the subject of rock art in California in detail and listed the sites they had information for; illustrations of some of the rock art from the listed sites is found in Volume 2. Heizer and Clewlow list CA-KER-93 and CA-KER-230, in northeast Tehachapi Valley, and CA-KER-133, 134 and 135, in the El Paso Mountains (ibid.: Vol. 1:99-100; Vol. 2 Figs. 82a-k, 89k, 90a-d & h). Included in their discussion of the subject Heizer and Clewlow also describe four petroglyph and five pictograph styles for California. In the Kawaiisu tribal area much of the far southern Sierra Nevada and Tehachapi Mountains area was included with their Southern Sierra Painted Style (ibid.: 43-46), while the majority of the adjacent desert area was included in their Great Basin Petroglyph Style (ibid.:23-25). Interestingly, Heizer and Clewlow seem to have not been aware of Cawley's Ms #386, for they do not mention most of the sites he had described.

Several other researchers have studied and/or described the rock art of the Tehachapi area. These include, but are not limited to: Barras (1984), Johnson (1996), Knight (1997a), Krupp (1998), Price (1954), Sutton (1982), and Whitley (1996, 2000). In writing this paper we have drawn liberally from Georgia Lee's 1999 detailed study of the rock art in Tomo-Kahni State Historic Park (TKSHP). No serious student of rock art in California can be without Bill Sonin's 1995 comprehensive *California Rock Art*, which we have repeatedly mined for pertinent information.

THE ROCK ART OF THE TEHACHAPI AREA

The Tehachapi area, as discussed here, includes Tehachapi Valley and the surrounding southern Sierra Nevada Mountains, to the north, and the Tehachapi Mountain's to the south; this entire region was occupied by the Kawaiisu (or *Nuooah*). Although their closest ethno-linguist relatives (the Coso and the Chemehuevi) lived in the desert to the northeast and southeast, the rock art of the Tehachapi area was clearly influenced by the Kawaiisu's western neighbors, for the most common form of rock art in the Tehachapi area is painted, although a few petroglyphs and cupules are also present. The largest concentration of rock art in the Tehachapi area is found in Sand Canyon, in the northeast end of the valley.

The main reason then, for the presence of relatively many pictographs vs. petroglyphs is the nature of much of the bedrock in the Tehachapi area, which sometimes has flat faces that made a good canvas for pictographs, but a poor one for petroglyphs. Indeed, at two (here rare) small outcrops of basalt in Sand Canyon, we find the only petroglyphs in the Tehachapi area.

In Kawaiisu territory, it seems that there was a greater repetition and variation of certain motifs in petroglyphs in the desert part of their territory (e.g. bighorn sheep in the El Paso Mountains) than there was in pictographs. For example, the most important Kawaiisu pictograph sites in the Tehachapi area and the immediately surrounding region are significantly different in general appearance (i.e. CA-KER-93, CA-KER-230, CA-KER-273, CA-KER-508, CA-KER-1446, and CA-KER-2412). The fairly good condition of many of the paintings testifies that they cannot be many centuries old, so they were probably made by the same tribe, and therefore the reason for the differences was that different ritual activities were practiced at these places, with different, or varying, participants, and that different symbolism was appropriate for each place or ceremony. This is not to say that there is no repetition of pictograph motifs, but only that most of the pictograph sites in the Tehachapi area and surrounding mountains have their own individual signature or "feel." The mountain pictographs also seem to have a higher ratio of representational elements, although we cannot always say for sure what is being represented. As mentioned above, the Bighorn Sheep motif is seen at several sites in the El Paso Mountains, as are a few other representational designs, but abstract figures are far more common (Knight and Faull 2008),

The focus here is on rock art sites in the immediate Tehachapi area. Many other pictograph sites exist not-too-far beyond the Tehachapi area, also in areas occupied by the Kawaiisu, however, no comprehensive study of Kawaiisu rock art exist at this time. Kawaiisu rock art sites in this broader region include those found in Back Canyon, Landers Meadow and Walker Basin (north of the Tehachapi area) and in Sage Canyon, Kelso Valley, and Lone Tree Canyon (east of the Tehachapi area). The El Paso Mountains to the northeast were also occupied by the Kawaiisu and petroglyphs and other rock art is not uncommon (Knight and Faull, 2008). The rock art of the Western Mojave Desert (to the south), at least parts of which were occupied and/or seasonally visited by the Kawaiisu, has been described by Knight, Milburn and Tejada (2008). It is hoped that the following discussion of rock art in the Tehachapi area portion of Kawaiisu territory will contribute to our understanding of the most important native culture in the southern Sierra Nevada area.

Rock Art Sites in Tomo-Kahni State Historic Park (TKSHP)

This beautiful California State Park was initially created to protect extensive archaeological sites which are part of a village now referred to as Tomo-Kahni (or "Winter House", in Kawaiisu) and as much of the surrounding environment as possible. What is now TKSHP was once part of the Victor Phillip's Ranch and early researchers knew the area as the Phillip's Ranch Site. Kawaiisu Elder Bertha Willie Goings told Judy Barras that the name of the main locus of the village could be translated as "Nettle Springs" (Barras 1984:39). Nettle Springs itself is recorded as CA-KER-230, but all of the various sites at

TKSHP, including those discussed here, were centered on Nettle Springs, due to the (once) good supply of water. State Parks has also been able to add additional acreage, most importantly a parcel to the south of Nettle Springs which includes a second village complex, known as "Maa'puts." Although there are still several gaps that need to be filled in to round out the park, many of the most important archaeological features are now within the park. TKSHP is only accessible to the public via docent-led guided tours.

The sites in the park are as follows:

CA-KER-230

The rock art at this site consists of numerous, deeply incised mostly vertical grooves, in several separate "panels" sometimes accompanied by smears of mostly faded red and black pigment. The pigment is found both in grooves and it is also obvious that grooves have been incised into bedrock that had been covered with pigments. According to Lee (1999:30-34), at least few of the grooves are clearly vulva form in appearance, and it may be that the entire presentation of sets of parallel notches is symbolic of female fertility. At least one small pictograph can also be seen at the edge of one of the panels. The rock art is located on various semi-vertical faces of a low rock outcrop, adjacent to Nettle Springs, once a main source of water for the surrounding village complex. These relatively deep grooves have been (e.g. ibid.:32-34) compared to the finely scratched (or incised) pictograph/petroglyphs seen at Vasquez Rocks in Los Angeles County (i.e. at CA-LAN-363 and CA-LAN-375). However, the Vasquez Rocks and the TKSHP sites seem quite different to this author. The scratches at Vasquez Rocks include artistic motifs like circles, ladders and sun-bursts that are finely made, and they have been finely incised into mostly red pictographs that have the very same motifs as the incisions (L. King 1989; Knight 1997b:28, 39, 61, 66). In comparison, the grooves at Nettle Springs are crude and consist almost entirely of short banks of mostly vertical cuts, as much as 2-3cm wide and 1-2cm deep.

Some of the natives reported that the grooves were used to "sharpen awls" but this simple explanation has been dismissed by recent researchers (Lee.:30-32). Lee, however, may have misinterpreted certain of a native consultants comments: AG, for example, did not say that the grooves were made because of awls being sharpened, but instead said that the grooves were first made, and awls were sharpened in them (Andy Greene, personal communication, n.d.). The mostly compact spacing and general appearance of the grooves is certainly not completely random, and the pigment on and in them strongly suggests some form of ritual activity; Lee suggests that the site "perhaps....dealt....with fertility concerns and coming-of-age ceremonies" (1999:42). A group of over 450 bedrock mortars was once present across the drainage from the petroglyphs (some have been moved to in front of the local High School, some have removed period); this is one of the largest concentrations of bedrock mortars in California. Numerous house rings, many still intact, are also associated with the Nettle Springs site.

The Nettle Springs site has been investigated by the Archaeological Survey of Southern California, by California State University Bakersfield, by the University of California Los

Angeles, by Antelope Valley College, and by Catherine Pruett in 1987, for her Master's Thesis; Pruett's Thesis contains a considerable amount of useful information on the various Sand Canyon sites and their relationship(s) with each other. Collections from the site are housed at California State University Bakersfield and the University of California Riverside. Sutton considers the site to be protohistoric (1982:148). CA-KER-230 is referenced in Heizer and Clewlow (1973: Fig. 86e), although it is a single small pictograph that is illustrated, and not the numerous grooves. Illustrations of the site are also found in Price (1954). Note that bighorn sheep (etc.) petroglyphs described here by previous researchers are actually recorded as part of adjacent site CA-KER-769 (see below).

CA-KER-508

The largest of the Tomo-Kahni Park rock art sites is CA-KER-508. This is a very large rock shelter/cave, with perhaps 100 monochrome and several polychrome paintings. Anthropomorphic and Zoomorphic motifs are most common. Although many of the paintings are in poor condition and some are said to have been destroyed or removed, the site as a whole is still quite impressive. Images range from as small as 10-15cm to as large as 60-70cm long or wide. The name "Teddy Bear Cave" is due to the presence of three fairly well preserved polychrome images; these have black bodies and are outlined in red or by red and white. One small red bighorn sheep motif is present, as is a bright red serpentine motif with white dots along most of its length. A set of several concentric black circles is found near the back of the shelter, at the entrance to the small back cave with the bedrock mortar, where *The People* entered this world (see below). Several figures, in addition to the "Teddy Bears" are other anthropomorphic motifs (one is a three color polychrome, not to unlike the "Teddy Bears"); others motifs cannot be objectively described.

The religious significance of this site and the CA-KER-93 site is described by Zigmond in *The Supernatural World of the Kawaiisu*, as follows: "In mythological times the animal-people held celebrations at both of these locations. It may be that each of the participants painted his own picture. In any case, it was at the rock shelter" (i.e. 508) "that the world was created. A mortar hole marks the spot. It was Grizzly Bear who called the animals together, although....he was not the chief. He still lives in the rock and there is a fissure through which he can come and go. Here the animals decided what they wanted to be" (Zigmond 1977:76). After the celebration, the animal-people went to the "Hidden Valley" outside of the cave and sat down and turned to rock (no one that has seen him can deny that "Rabbit" still sits just outside of the cave). A large vertical fissure in the center of the rock shelter and main pictograph area as told in other Kawaiisu stories is an "underground" connection (used by Grizzly Bear and by other powerful Shamen) that connects this site and the Back Canyon site (CA-KER-2412), which was known to the natives as "*Yahwera's House*" (Whitley 2000:78-79).

A very interesting collection of artifacts was recovered from the cave by the Archaeological Survey Association of Southern California (ASASC), who excavated at the site in 1956. Artifacts recovered include: "including a rare bundle of painted arrow-shafts, 47 blue glass hexagonal beads, 34 red glass beads, 4 white glass beads, 8 shell beads, and 2

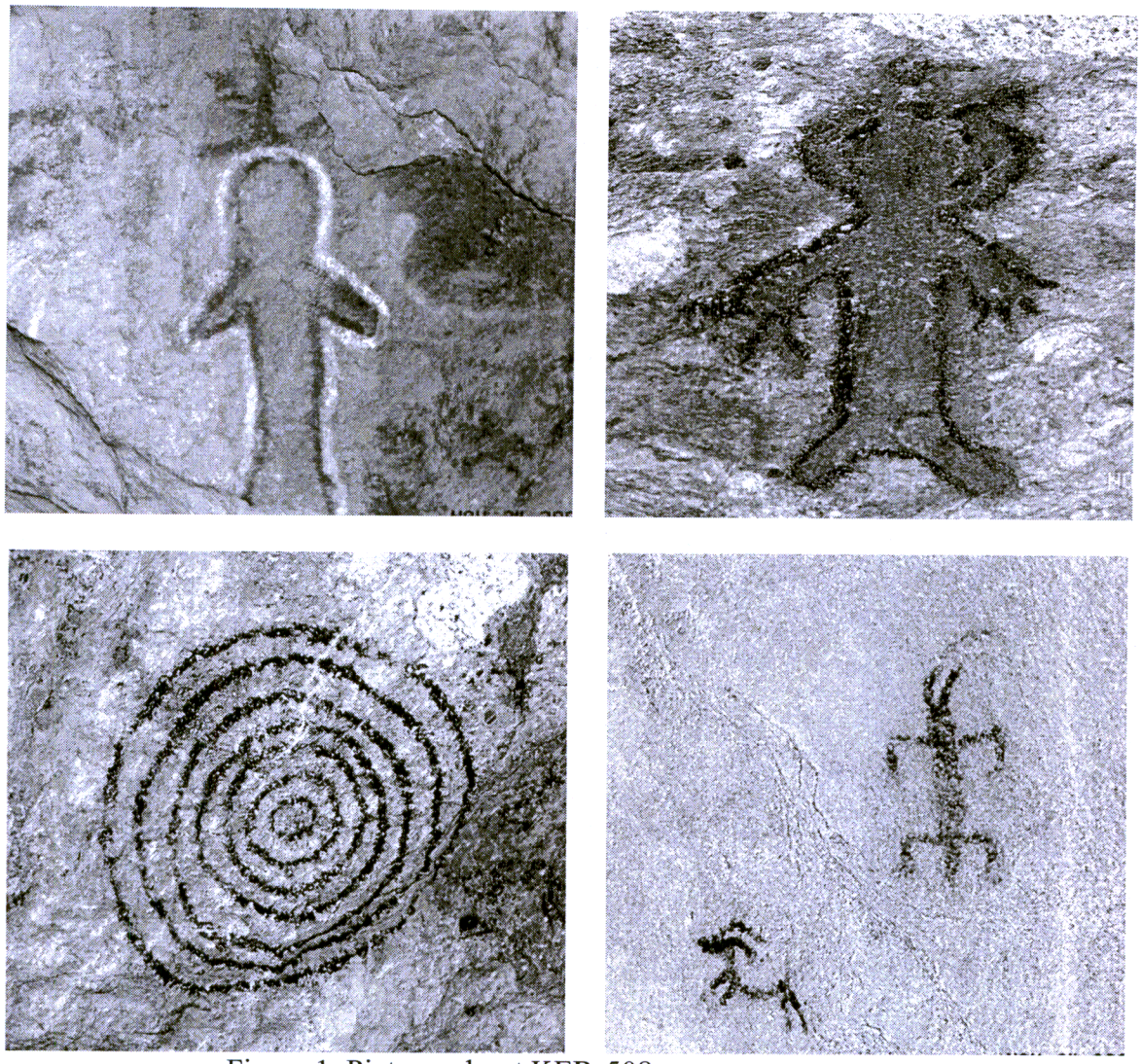

Figure 1. Pictographs at KER-508. (photos by J. Sprague)

steatite beads. A single *Haliotis* sp. ornament was also recovered. Other artifacts recovered include 89 flakes, an obsidian projectile point, a drill tip, a slate artifact, a bone tool, and 93 small pieces of bone…perishables recovered include 11 fragments of cordage, 4 arrow-shafts, 2 basket fragments and a wooden pin….some historical material was also recovered." Also, in 1971 Sutton excavated a Wood-Rat's nest in the cave and recovered "7 pieces of basketry, 5 arrow mainshafts, an arrow foreshaft, a chalcedony blade, and a mano….all of the basketry was twined" (Sutton 1982:150). Sutton suggests that many of the artifacts may have been left as offerings; it is interesting that modern Kawaiisu (and others) often leave offerings when they visit today, although the offerings are now usually juniper berries, sage, or tobacco. Observations made by the authors, Andy Greene, and Griffith Park Observatory Director Edwin Krupp (1998) showed that only at the Summer Solstice will the sun rise far enough to the north, so that first morning light will shine into the back of the cave and illuminate the "emergence" mortar. The site is described and information about tours of the site is found in Whitley (1996:162-164); Whitley also includes a nice color photograph of one of the "Teddy Bears" and a couple of the other

adjacent paintings. The ASASC also created "rock art" on the outside edge of the cave, where "ASA 1956" in a burnt orange colored pigment can still be seen today.

As to the reasons for different names for the site, Lee notes that an earlier rock art researcher (Charles LaMonk) thought that the three polychrome Grizzly Bear paintings resembled "Teddy Bears" (1999:12), and the site is still often called "Teddy Bear Cave." Although this sounds silly at first, given that "Grizzly Bear….called the animals together" and "each participant painted his own picture", the idea that Grizzly Bear was the animal shown in some of the painting still came through, however imperfectly. The site is also known as "Creation Cave", but the Creation was not out of nothing, in the Judeo-Christian sense, but an Emergence and Ordering of the Way, as *Cosmos* is ordered (or "created") out of *Chaos*, in the Greek sense. Andy Greene preferred "Teddy Bear Cave" to "Creation Cave", but perhaps the name "Grizzly Bear Cave", or "Sand Canyon Cave" (the name used in Table 1) would be even better. Some people familiar with the site report that the site is still watched over and visited by a certain native spirit, who perhaps still uses it to move back and forth between Tehachapi Valley and Walker Basin.

CA-KER-769

There are at least three abraded petroglyphs still visible at this hill-top site (although they are faint and difficult to see); they appear to depict a bighorn sheep, a hunter with a bow and arrow, and a dog. These three visible figures are on the left side of the rock; the right side of the rock appears to have once held additional images, but Cawley reported that by 1963 they had faded to the point where no detail could be made out. This site is immediately above and east of Nettle Springs (CA-KER-230) and has sometimes been described as being part of that site, but it is actually recorded separately; these comments apparently follow Pruett 1987:25, who also states that the rock art shows "a bighorn sheep and three hunters" (the time of day and moisture level make a considerable amount of difference when viewing these petroglyphs). Of this site Lee says "Petroglyphs are rare in the southern Sierra Nevada, according to Sutton (1981:15), who states 'These figures appear to be an example of the Great Basin pecked representational style…. This is probably the westernmost example of the style and is not in the Great Basin. The specific style of the bighorn sheep figure would place them into Grant, Baird, and Pringle's (1968) early period, dating to roughly 1000 B.C. – 200 B.C. The faded appearance of the elements would suggest a later origin, closer to A.D. 1000.'" Lee also notes that the CA-KER-769 petroglyphs are "closest in style to some from Argus Range site, INY-34", which-according to Grant, et al (1968) have "straight line legs, and the head is a line extension from the body, horns barely curved back over the body" (1999:35). Note that CA-KER-6109, which includes two bighorn sheep petroglyphs, is located somewhat less than one mile to the west.

CA-KER-4445-E (formerly CA-KER-1471)

This site consists of a small cave with several cupules on the floor and traces of red pigment in the back of the cave. Lee cites Jerry Cowan of the Tehachapi Heritage League in saying that: "Andy Greene said this cave is where sick people went to recover; he called

it Wizard Cave" (1999:36); Mrs. Cowan has been a friend of the Greene family her entire life.

CA-KER-4445-H (formerly CA-KER-1473)

This site consists of "a rock outcrop with a slight overhang, located in an occupation area that contains bedrock mortars, cupules, slicks and a partial rock ring.... One face of the rock contains lines in red and black. The short lines are rather like tally marks; above are faint images, including a 'T' shaped form." Due to the generally open location of the site Lee suggests that it was a "public shrine." (Lee 1999:37).

CA-KER-4445-J

This small rock shelter has "two red anthropomorphic figures plus another red shape" and a few additional traces of red pigment (Lee 1999:36).

CA-KER-339

A second large village site, known as "Maa'puts" (KER-339) is located just south of the already established Tomo-Kahni State Historic Park. The parcel where this village complex is located (various loci of which are recorded under a variety of site numbers) was acquired a few years ago by the Archaeology Conservancy and in 2006 the parcel was sold to California State Parks with the intention of adding it to Toko-Kahni Park. There is a small rock shelter in the large rock face just to the north of the house rings and BRM's. This site is about 100 meters to the north of Maa'puts main village site. The rock art site consists of a small abstract red and black pictograph. There is no recorded site number for the rock art and shelter. Identifier is WJS-12.

Rock Art Sites in Sand Canyon, outside of Tomo-Kahni Park

CA-KER-6109

There are two sets of two faint petroglyphs at this site. One set consists of two adjacent Bighorn Sheep and one set consists of two Roman numeral like "IIII" elements. All four petroglyphs are about 10-15cm in length. Both sets of petroglyphs have one fairly visible image and a second very faint "ghost" image. The petroglyphs are associated with numerous bedrock grinding slicks (perhaps 30 in number). If the numerous bedrock mortars at close by CA-KER-230 were the "pounding station" for the village, then this was the main "grinding station." The tops of several flat faces seems to have been struck or scratched, but these marks do not seem to be "art"; perhaps these random appearing marks are evidence of those surfaces being used as anvils or for other types of work. The Bighorn Sheep petroglyphs are similar to those seen at CA-KER-769, just to the east (see above).

CA-KER-93

This site consists of two large east facing caves, in massive rock formations, over looking a small creek. The lower shelter is about 30 ft. wide and 20 ft. deep and has a very uneven floor and ceiling; it is almost entirely smoke-blackened. There are 4-5 red circle-like pictographs on the outer upper lip of the shelter, at least two of which are divided into interior "slices" or segments. There is one bedrock mortar on a boulder in front of the cave. Although the hillside is fairly steep from the creek bed up to the cave, there is a small flat area in front of the cave, adequate for 8-10 people to stand comfortably. That many or more people could climb up onto the uneven floor of the lower cave (during a downpour, for example), but they would not be comfortable and could not lay down and sleep, the floor slopes up to the back and down to the front too steeply.

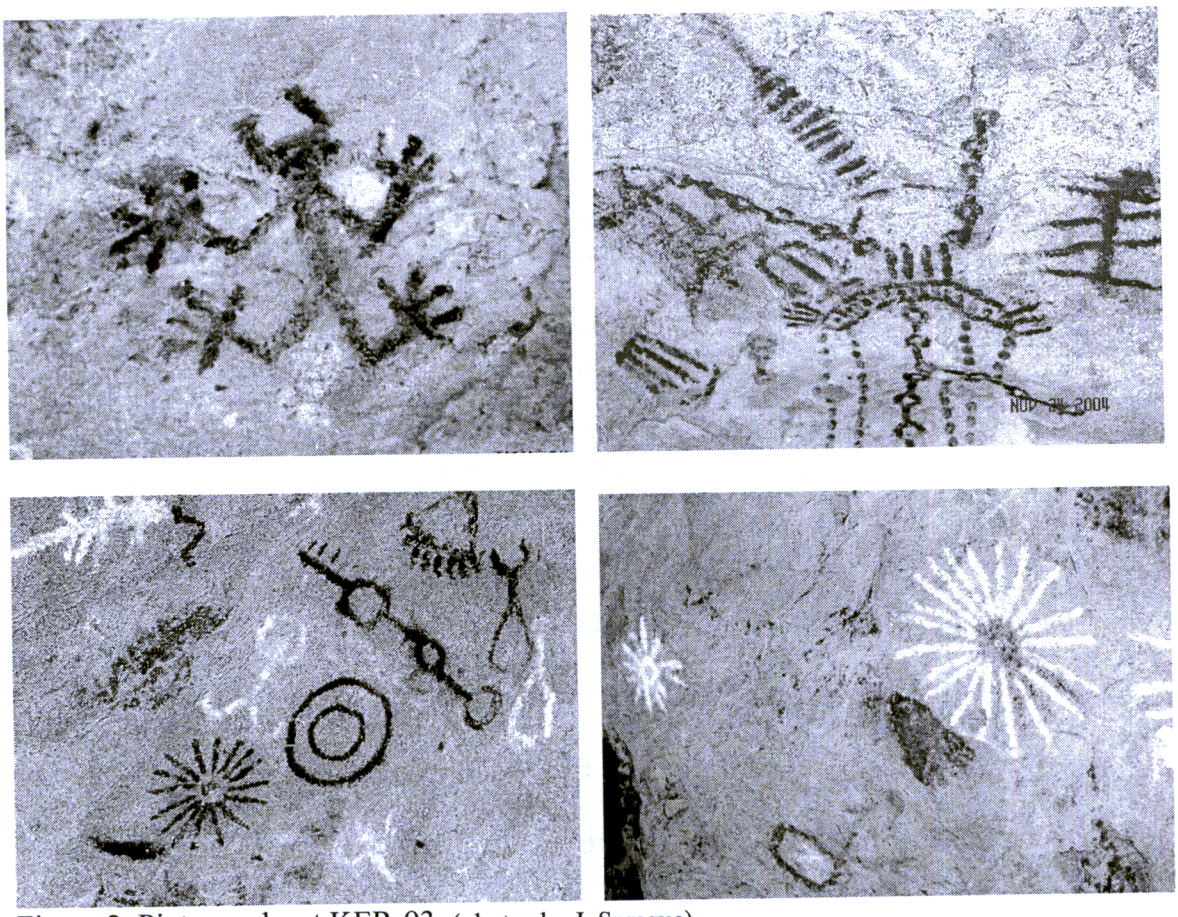

Figure 2. Pictographs at KER-93. (photos by J. Sprague)

It was the upper cave that is also mentioned in the "Creation Myth" which was told to anthropologist Maurice Zigmond by native informants (Zigmond 1977:76; see CA-KER-508, above), and a circular group of red dancers confirms that *The People* celebrated here. The upper cave is about 20 ft. wide and 15 ft. deep. The overhanging lip of the cave has helped protect perhaps 100 nicely painted red, black, white, green and yellow images. Almost all of the paintings show evidence of fading, but with few exceptions, all of the paintings that are still present are clearly visible. The overall impression of the panel, to an

observer lying on the polished floor of the cave, always impresses viewers. There are only a few polychrome elements: one is the "Candy Man", made up alternating red and white stripes; more unusual are two simple abstract figures in green and yellow. Although limonite based yellow pictographs are not uncommon, green is very unusual; Campbell Grant's brief 1962 Site Record for CA-KER-93 notes "Only known use of true green" (i.e. in Southern California). There is also a green and white element, a red and black element, and a red and green element. Most of the monochrome paintings are red, but there are also a couple of black and a couple of white elements. Motifs include several circular motifs, including several small circles connected by lines, a set of lines radiating out from the center, what appears to be Condor (or perhaps Eagle) and an anthropomorph, with horns and wide-spread digits. This was the last "native occupied site" in Tehachapi Valley, for the Greene family lived in the flats in the canyon bottom below the caves until 1943.

There are at least eight bedrock mortars in the cave, only two of which are very large; most of the floor of the cave is quite smooth and polished from being sat upon and otherwise used for a long period of time. Two small "alcoves" outside of the upper cave seems to have been artificially enlarged somewhat, probably by the natives, and a few traces of red pigment can be seen outside of the cave; these are obviously weathered pictographs and one may represent the moon, considering its shape, but as for the rest, the details have faded away with the wind and the weather. Observations made by the current property owner, made over a period of several years, strongly suggests that only at the Winter Solstice does the morning sun rise at a particular angle, whereby the first rays of light shine into the alcoves, and the floor, but not the ceiling of the cave (note: the hills east of the caves are very high relative to the caves; the only low point in the hills is to the southeast, exactly at the point of the Winter Solstice sunrise).

Please also note that this site and the entire area where it is located is on private land and it is NOT accessible to the public. Trespassers are not welcome and anyone entering the area where the site is located is subject to arrest. Please take this seriously, the owner is a police officer and, unfortunately, due to repeated trespassing, only invited guests are allowed to visit the canyon (Native Americans of local ancestry and legitimate researchers are welcome to visit the site by appointment).

CA-KER-131

There are or were at least three small rockshelter immediately southeast of CA-KER-93. At least one of these rockshelter is known to have had at least a few red pictographs within. This rockshelter apparently caved in, or finished caving in, during the 1952 Tehachapi earthquake. There is no record of what the pictographs depicted. Andy Greene said that even when he was a child the paintings were faded and indistinct (he and his family lived just up-canyon for some years, before World War II). With the exception of the very minimal CA-KER-131 Site Record, the archaeological remains on the east side of the creek remain unrecorded. This area is subject to the same access restrictions as is CA-KER-93.

CA-KER-4198

This site is sometimes called Witch Cave, it is located just to the north of TKSHP. The site is associated with a large milling station, which is to the northwest of the cave. Inside the cave is what is left of a red and black pictograph. There is also large BRM's inside the cave. Andy Greene called this the women's cave (Personal Communication A. Greene).

Sand Canyon #3

This site is an unrecorded rock art site located in northern Sand Canyon. It is in the drainage on the southwest flank of Sugarloaf Mountain. There is an unnamed spring at the base of the of the rock face that the shelter is in. The shelter/cave is about 65 ft above the spring in the rock cliff. The rock art consists of three red lines and one black line on one wall and a red and black line on the other wall. There are BRM's in the floor of the shelter. Identifier is WJS-11.

Rock Art to the West and North of Tehachapi Valley

CA-KER-2687

This site is located on a hillside at the west end of Tehachapi Valley. The site is located east of and below Black Mountain (a Sacred Place). The site is now nestled in a ravine between houses in Golden Hills. We will refer to this as the "Golden Hills Pictograph site". There are a few red pictographs in four panels on the face of a small rock outcrop, which faces a small fairly level area, which is on a steep hillside. Motifs include: a zig-zag next to four circles in a vertical column (Panel A), a line forked at each end (Panel B), two sets of three parallel rows of dots (in each of the two figures) in "X" patterns, next to each other and with a L-R painted line both above and below the right figure and above only the left figure (Panel C) and a faint zig-zag, next to 12 vertical dots, next to a serpentine line, next to 12 small circle vertical circles (Panel D).

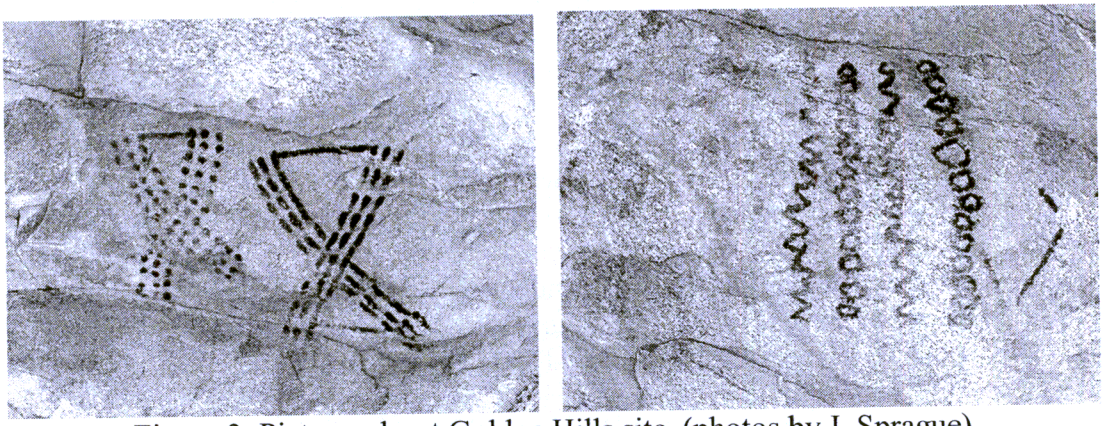

Figure 3. Pictographs at Golden Hills site. (photos by J. Sprague)

There is no sign of an archaeological deposit directly in front of the rock shelter, but a small knoll just below the rock shelter would be a good place for a camp/work site. A fairly large village site existed in the "Old Town" Tehachapi area, which is a mile or so to

the S/SE of this site, which was undoubtedly utilized by the people of that village. This site is accessible to the public for viewing; there is an excellent view of Tehachapi Valley and the surrounding mountains from in front of the site.

Oak Flat Site

The Oak Flat Site (also known as the "Above Tehachapi" site) was described by Jack Cawley (1997:187-188; Sonin 1995:60, #137) as having "numerous geometric designs similar to those found in the Cummings Mountains area", with red the most common color, but also with traces of black and white. There are several BRMs associated with the pictographs, which is located a few miles north of Tehachapi Valley, at about 4500 ft. Cawley says that there is a fine view to the south, towards Tehachapi and Cummings Valleys, etc. He also notes that there are lichens growing over parts of the pictographs, showing that they have been there for a long time. There is no recorded site number for this rock art site. Identifier is Cawley's Oak Flat.

Capital Hills Site

This site is located at the base of Capital Hills on the N/NW side of Tehachapi valley. This site consists of two rock shelters. The lower shelter has a number of small circles and a one element possibly representing a sun-burst, all painted in red. The upper shelter has small circles and a few other faded elements also all in red. The small circles in red look very much like the ones at the Golden hills site (KER-2687) and the Cummings Valley #1 site (KER-1446). This site is on private property and public access is denied. There is no recorded site number for this rock art site. Identifier is WJS-72.

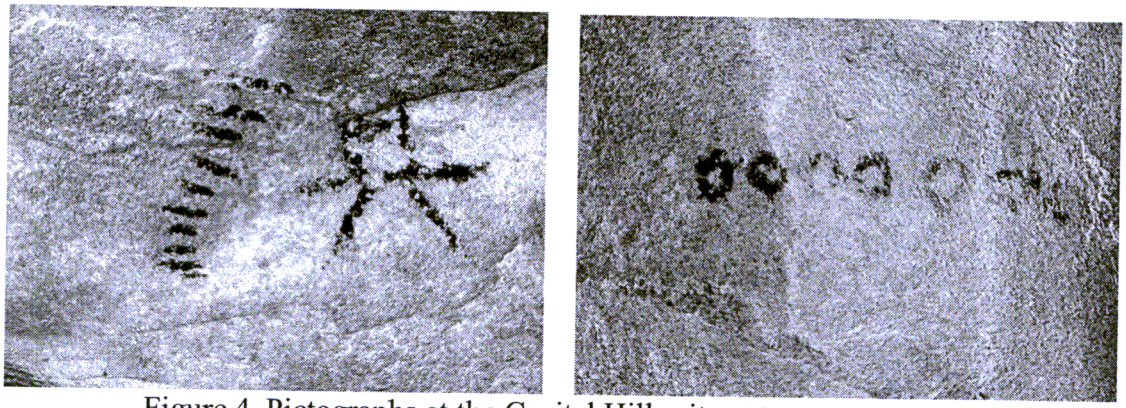

Figure 4. Pictographs at the Capital Hills site. (photos by J. Sprague)

Rock Art to the South and West of Tehachapi Valley

CA-KER-1446

The Cummings #1 Site (CA-KER-1446) is located on the SW side of Cummings Mountain just above the valley floor. This site consists of one large rock shelter with at least four pictograph panels. Pictographs are in red, black and white. The pictographs both inside and

outside of shelter, consist of 40 plus elements with many geometric elements, mostly in red. This site is on private property and public access is denied.

Figure 5. Cummings # 1 main pictograph panel. Figure 6. Cummings # 2 main pictograph panel. (photos by J. Sprague)

Cummings #2 Site

The Cummings #2 site is located at the west end of Cummings Valley. This site consists of a small rock shelter located in a side yard of one of the Stallion Springs homes. It is located just above an unnamed creek, with a large BRM complex about 200 feet to the east. The BRM's are also in the back yard of a home. The pictographs are in red and black, the motifs include geometric and abstract elements. There is no recorded site number for the rock art site or the associated BRM's. This site is on private property and public access is denied. Identifier is WJS-50

Alpine Forest Site

The Alpine Forest Site is located between Cummings and Brite Valleys. The site sits in a dry wash about 100 yards to the northeast of Cummings Creek. The site consists of a large south facing rock outcrop with red pictographs depicting two large elements, with one being a possible anthropomorphic figure. There is no recorded site number for this rock art site. This site is on private property and access is denied. Identifier is WJS-71.

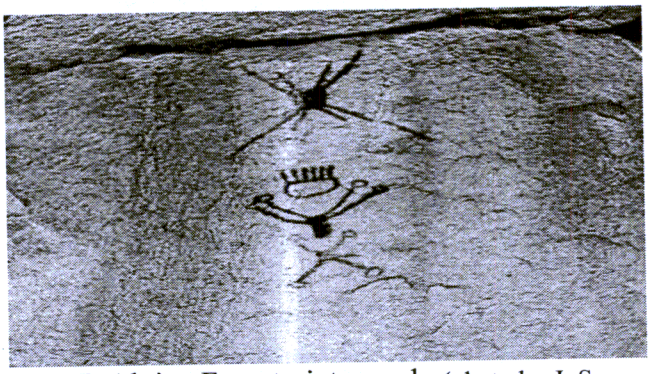

Figure 7. Alpine Forest pictograph. (photo by J. Sprague)

CA-KER-273 and CA-KER-1193

CA-KER-273 and CA-KER-1193 are important pictograph panels on granite bedrock outcrops found a few miles northwest of Willow Springs. Now recorded as separate sites, these pictograph loci are described as representing the "real" Willow Springs rock art (Knight 1993:43-44).

The still impressive polychrome pictograph panel at CA-KER-273, which is located in a rock shelter that overlooks CA-KER-1193, has been described as "one of the most elaborate and well preserved pictograph panels in southern California" (ibid.: 44). The main panel is comprised of a large fantastic polychrome abstract image in red, white, black, orange, and a small amount of blue. Smaller associated pictographs include a red so called "teddy bear" motif (similar to those found in northeastern Tehachapi Valley at CA-KER-508). The polychromatic paintings at CA-KER 273 are assigned to the *Southern Sierra Style* and are most likely associated with Kitanemuk and possibly Kawaiisu habitation (ibid.: 44). A less complex panel at nearby CA-KER-1193, which is thought by the senior author to be a winter solstice observation station, has a red sun-like symbol and a so-called "count" of about 30 short dashes.

In 1990, Andy Greene, a Kawaiisu elder, reported that CA-KER-273 was used as a "birthing cave" by Kitanemuk, Kawaiisu, and Tataviam women (ibid.: 43-44). Charlie Cooke, a Chumash chief, has stated that these rock art sites, which are situated on public lands administered by the Bureau of Land Management, are sacred to local Native American people and should not be casually visited (Knight ibid.: 44, 57).

Figure 8. Pictograph panel at KER-273.
(photos by J. Sprague)

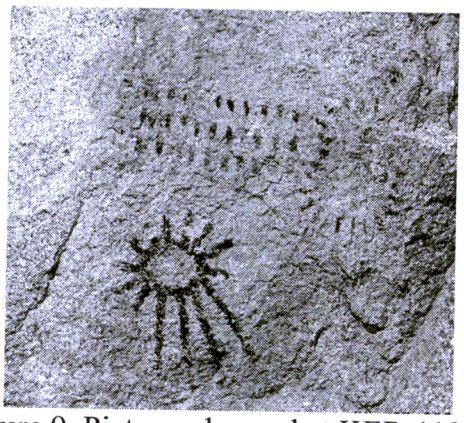

Figure 9. Pictograph panel at KER-1193.

Rock Art in the South and East of Tehachapi Valley

Oak Creek #1

Oak Creek #1 is located about 100 feet above Oak Creek, in a large rock outcropping on the south side of the creek. In the center of the outcropping there is a small north facing cave with pictographs in red and black. The pictographs are badly weathered; there are four panels in this small cave. What is left appears to be abstract designs and red linear

lines. The red linear lines appear to be very much like the ones at Sand Canyon #3 (WJS-11). There are BRM's about 200 feet to the east and down stream of the large rock outcropping. There is no recorded site number for this rock art site or the associated BRM's. Identifier is WJS-74.

Figure 10. Pictograph at Oak Creek #1.
(photos by J. Sprague)

Figure 11. Pictograph at Oak Creek #2.

Oak Creek #2

Oak Creek #2 is located about 100 feet to the west of Oak Creek #1 (WJS-74). It is in the same large rock outcropping, but on the extreme west edge. Site consists of a west facing rock shelf with faded red pictographs. The pictographs are almost impossible to see when the sun is shining on the panel. Even without the sun on the panel they are very faded. After taking photos and using a computer program called "DStrech" there appears to be one small panel with approximately 7 elements. Two elements possibly representing sun bursts, one is an anthropomorph and the others are too faded to determine what they represent. The sunburst elements appear to be very much like the sunburst elements in Sage Canyon at KER- 225 and KER 226. There are also similar types of sunbursts at KER-93 and at the Capital Hills site (WJS-72). There is no recorded site number for this rock art site or the associated BRM's. Identifier is WJS-74A.

TABLE 1 TEHACHAPI AREA ROCK ART SITES

SITE #	SITE NAME	TYPE OF ROCK ART	NOTES
CA-KER-93	Cache Creek	Many representational pictographs; mostly monochrome but also some simple polychrome	Colors mostly red; plus black, white, orange and green
CA-KER-131	Cache Creek	Red pictographs	Possibly destroyed by 1952 earthquake
CA-KER-230	Nettle Springs	Numerous grooves directly associated with red and black pigment	
CA-KER-273	Burham Springs #1	Red, black and white pictographs. Many geometric elements	Large rock outcrop associated with lager milling stations

CA-KER-508	Hidden Valley (AKA "Teddy Bear Cave" and "Creation Cave")	50+ pictographs, most monochrome but also some polychrome	Colors mostly red, black, white; plus orange and gray
CA-KER-769		3+ petroglyphs on basalt rocks	Located just east of CA-KER-230
CA-KER-1193	Burham Springs #2	Red pictograph and cupules	On boulders below CA-Ker-273
CA-KER-1446	Cummings #1	Red, black and white pictographs. 40 plus elements. Many geometric elements mostly in red.	Large rock shelter with pictographs inside and out side of shelter. In hills SW of Cummings valley
CA-KER-1498	"Witch Cave", Sand Canyon #4	Red and black pictographs	North of TKSHP
CA-KER-2687	Golden Hills	12 or so abstract red pictographs on main panel and many small connecting circles and a sun-burst in the small shelter	Great view of Tehachapi Valley to the east
CA-KER-4445E	Wizard Cave	Cupules on floor; traces of pigment in back	
CA-KER-4445H	Blue Oak site	Simple red and black lines; cupules	
CA-KER-4445J		Two red anthropomorphs, 1 other "red shape"	
CA-KER-6109		Four petroglyphs on basalt rocks	On hill SW of Nettle Springs
WJS-11	Sand Canyon #3	Red and black pictographs	North end of Sand Canyon
WJS-12	Near KER-339 "Maa'puts"	Red and black pictograph	Small shelter in large rock face just to the north of house rings and BRM's above Maa'puts village site.
WJS-50	Cummings #2	Red and black pictographs	Small cave in side yard of Stallion Springs home.
WJS-71	Alpine Forest	Red pictographs	On large rock outcrop just SW of Alpine Forest in drainage.
WJS-72	Lower Capital Hills	Red pictographs (many small circles and a possible sunburst)	Rock shelter at the base of Capital Hills

WJS-74	Oak Creek #1	Red and Black Pictographs	Small cave above Oak Creek
WJS-74 A	Oak Creek #2	Faded Red Pictographs	Small panel in rocks to the west of Oak Cr #1
None	"Monolith"	Cupules, #?	Described by Andy Greene, but never recorded
Above Tehachapi site	Oak Flat	Red, black and white geometric motifs	Cawley says these pictographs are similar to those at Cummings Mountain

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LOOKING BEYOND THE ROCK ART AT A POSSIBLE SOLSTICE ALIGNMENT

ARCHAEOLOGICAL INVESTIGATIONS AT CA-KER-226 BOULDER SPRINGS

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INTRODUCTION

In the midst of an off-road vehicle park in the middle of the Mojave Desert, lies an archaeological treasure, Boulder Springs. This site, CA-KER-226, is cleverly hidden amongst a boulder strewn field, with a 90 degree view of the Mohave Desert. Surrounded with milling stations, historical artifacts, and a plethora of rock art panels, Boulder Springs is obviously an extremely complex site. Because of the complexity of the rock art elements contained in the main cave, we shall only be focusing on the possible archaeoastronomy influence.

SITE DESCRIPTION

Boulder Springs (CA-KER-226) is located in Sage Canyon, approximately 35 miles north of the town of Mojave. Just north of the Jawbone and Dove Springs Off Road Vehicle (OHV) areas, the Boulder Springs area also allows, actually encourages, all forms of cross-country motorized vehicle use. Every weekend this part of the Mohave Desert is a collage of motor homes, dune buggies, motorcycles and quads. Managed by the Bureau of Land Management (BLM), Boulder Springs has had its share of vandalism, but has remarkably remained relatively intact throughout the years. The site contains the remains of the historical period when the area was heavily mined, entangled with the pre-historic component that represents itself in the rock art, substantial lithic scatter, and the multitude of milling stations encompassing the site. For this paper, we are going to do a brief overview of the site, review the prior archaeological investigations, and ultimately focus on the rock art in the main cave and the potential therein for a solstice alignment.

SITE OVERVIEW

Located where the western edge of the Mojave Desert meets the eastern edge of the Sierra Nevada Mountains, Boulder Springs is a very complex site, containing both historic and pre-historic components, along with a heavy display of rock art. While the Boulder Springs area does not attract the heavy throngs of OHV visitors as its neighbors, Dove

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Springs and Jawbone Canyon, we can assume by the graffiti permanently inscribed in the rocks that this site has been visited for at least the past 107 years. The text on the rocks range from W. Tipton, April 5, 1901, to J.M. 1905, J.W. 1908, A.M. 1908, and M.M. in 77, 79, 87. On 11/26/47, June and Len marked their visit by placing their graffiti on the lower edge of an independent rock art panel located on an exposed rock face just to the east of the main cave, essentially destroying the rock art underneath.

The site consist of 8 different rock art loci, 5 areas representing milling activity, a scattering of historic artifacts, consisting mainly of cans and spent ammunition, and a large distribution of lithic debitage, consisting of mostly obsidian with a smattering of chert and jasper scattered about. Based on previous ethnographic investigations, this area has been assigned to the Kawaiisu culture group. It is also important to note that there is an active spring located on the north-east side of the site complex, a fact attributed to the site name of Boulder Springs.

FIELD METHODS

The field methods for this project consisted entirely of survey, including documentation and photography for recordation purposes. This site was visited several times during the time period of 2001 thru 2008 in an attempt to verify the occurrence of a solstice alignment in the main cave. No collections or excavations were conducted during this investigation.

PREVIOUS SITE INVESTIGATIONS

On February 4, 1951, G. Guthrie submitted an archaeological site survey record for the Boulder Springs site. While sparse in details, this document does give us a base line for professional investigations at this site. Guthrie noted only "2 sets of petroglyphs", and the debris of campers, recommending further investigation of the site. On the site record, Guthrie noted that he located lots of lithic debris, fragments of a shallow basin metate, pestles, pot sherds, and mano fragments. In addition, he did document the many milling stations, but did not denote between bedrock mortars, cupules and slicks.

April 25, 1954, found Frank Davis submitting an updated site report wherein he noted only the bedrock mortars and the lithic debitage at the site, along with a pestle, part of a blade and a drill. He does not make any mention of the rock art, but did note that there was a picnic shelter in a grove of trees on the creek bank.

On Saturday, February 23, 1963, Dr. John Cawley, a prolific avocational archaeologist and rock art investigator, visited Boulder Springs and published the most comprehensive site record to date. In his notes, he mentions the large granite boulders and numerous bedrock mortars covering the site. His notes on the rock art mention only four (4) loci. The first locus he observed was badly weathered and contained black, red and white linear elements, with vandal's initials covering the remaining rock art. The second locus he investigated appears to be the "main cave" and he notes that it contains "the rays of the sun in cogwheel fashion, painted in black and white with white outlines, also painted in red, and in one area

there is a figure of an animal painted in white" (Cawley 1963: 163). The other two rock art loci are too weathered to document.

In May of 1963, Campbell Grant submitted a site record to the Santa Barbara Museum of Natural History for Boulder Springs. He called it the Sage Canyon site, numbered it CGK-20, and noted that there were red, black and white pictographs and mortar holes at this location.

As part of their quest to document the rock art of California, Robert F. Heizer and C.W. Clewlow, Jr. published the results of their work in 1973, entitled *Prehistoric Rock Art of California.* In that publication, they presented two panel of drawings from Ker-0226, noting that it included the colors of red, black and white (Heizer and Clewlow 1973; Figure 85b and 87a).

During the years of 1981-1982, J. Baldwin submitted a site survey record for the U.S. Forest Service. This is the most extensive site report yet for this site, not to mention the last one the authors were able to locate. In his report he noted that there has not been any professional excavation at this site, but he has had personal communication with an individual who stated that he has done some digging at this site. This site report documents the milling stations, the rock art and the historic and pre-historic artifacts contained at the site. Interestingly enough, Baldwin does mention in his report that "several of the pictographs have elements associated with solar observation and may show evidence of being used for such observations" (Baldwin 1982).

In August of 1993, R. DuBall submitted a Cultural Resources Surveillance record and noted that the site was in good condition and it appeared the "NO CAMPING" sign was being observed.

In his 1995 publication, *California Rock Art; An Annotated Site Inventory and Bibliography*, Bill Sonin notes two trinomials for the Sage Canyon Sites, Ker-0225 "Cawley's Sage Canyon", and Ker-0226, "Boulder Springs", "Cawley's Sage Canyon", while referencing the early archaeological work of John Cawley and Heizer and Clewlow. Sonin's interpretation of Cawley's notes gives a description of Ker-225 that seems to more accurately represent Ker-226. In specific, he mentions red, white and black pictographs and a low semi-circle wall at Ker-225. In fact, red pictographs do appear at Ker-225, but the entire description of red, white and black pictographs and a semi-circle wall could not be located at Ker-225. Red, white and black pictographs and a semicircle wall do exist at KER-226. At KER-226 here is also an absence of mention regarding the main cave and the spoked wheel and several sun burst elements contained within the cave (1995:56-57).

July 2004 found the cultural resource firm of URS submitting a report to the Bureau of Land Management entitled an *Archaeological Inventory within the Jawbone Area of Critical Environmental Concern (ACEC).* This comprehensive report was focused on the area south of Boulder Springs, specifically the Jawbone Canyon OHV complex, but the report does make note of the Boulder Springs archaeological site and its previous archaeological investigations. They noted in their report that within the OHV areas

"massive surface disturbance is evident, as well as denuded vegetation". Although Sage Canyon is not technically a designated open area, they noted that 35 percent of the sites found in the vicinity of Sage Canyon showed evidence of OHV trails.

In the summer of 2008, Dr. Mark Allen conducted an archeological investigation at the Boulder Springs site, combining it with a field school for his students from California State University, Pomona. The results of their research have not yet been published. Dr. Allen has also partnered with the BLM in an effort to protect and conserve this site for future generations.

MATERIAL CULTURE

Historic Period: Although nothing was collected, the authors did observe a stone wall constructed to possibly contain animals, a fire hearth and the resulting smoke blackened cave ceiling and walls (covering pictographs), glass, cans, wire, nails, pottery and spent ammunition cartridges, evidence of mining, and graffiti indicating visitors to the site in 1901, 1905, 1908, 1947, 77, 79 and 87. The authors are assuming that the last three dates inscribe at the site was during the 1900's.

Pre-Historic Period: The authors also observed an extensive lithic scatter consisting of obsidian, chert and chalcedony. There was ample evidence of several midden locations, along with a broken metate and a large, broken clam shell bead, with all the pieces *in situ.* The authors noted that there are 5 loci containing bedrock mortars and milling slicks, and 8 loci containing rock art, 7 representing pictographs and 1 representing petroglyphs.

FIELD INVESTIGATION

The initial results of our multi-year investigation into a possible solstice alignment in the main cave at the Boulder Springs site led us to hypothesize that the alignment of the sun with the main panel of pictographs does not occur at any other time of the year. At the time of publication we have only documented the main cave, noting the solar significance of the light entering the cave thru the opening in the rocks, and ultimately producing a defined interaction with the main panel on the northwest wall of the cave. We theorize that there is an indirect solar alignment within this cave during the winter solstice involving a possible sun symbol contained within the pictograph panel.

The result of several visits to the site over a number of years led the authors to note that the only obvious indirect solar alignment was during the winter solstice. There is a possibility that two additional locations within the main cave could possibly produce an indirect archeoastronomical relationship and one area that could possibly be a direct solar observation point. The cave has two additional entrances, one at the northeast and one at the southwest ends of the cave. It is from these two areas that the sunlight enters the cave and interacts with the pictograph panel at many different points throughout the year, but no obvious pattern could be discerned by the authors.

The other possible direct solar observation point is from the inside of the cave looking out thru the main entrance. Looking out of the rock entrance, it is obvious that there is a large, but very faded, red pictograph resembling a sunburst on the left cave wall. The aforementioned sunburst and the edge of the rock looking out thru the entrance to the cave in an east/southeasterly direction can easily be aligned with the horizon and sunrise during different times of the year. The result would be that different seasons could be visually marked on the horizon and corresponding points could be noted on the pictograph panel, approximately in the location of the faded sunburst. There are many more elements on this panel to investigate, but at this time they are too faded to make any responsible interpretations.

MAIN CAVE

To enter the main cave, one must walk thru two large boulders flanking the cave entrance, a distance of approximately 10 feet (see Figure 1). Upon reaching the main cave, the first visual experience is of the back wall of the cave which contains the main panel. The colors on this panel consist of predominately red with black accents, and a little white. The elements are consistent with the sunburst/spoked wheel pattern, interspersed with a series of linear lines running vertically and horizontally across the back wall of the cave.

The complexity of the elements contained within this panel is overwhelming, and there appears to be an overriding theme amongst the elements, a sunburst motif both in black and red. There are also a number of linear lines (in red and white) and tick marks (mostly in red) drawn in various place in and around the main panel. The red liner lines are similar to those previously investigated at the Lizard Cave site (CA-KER-5525) and could possibly have a similar archaeoastromical value. (Sprague and Grasse 2001:232-233)

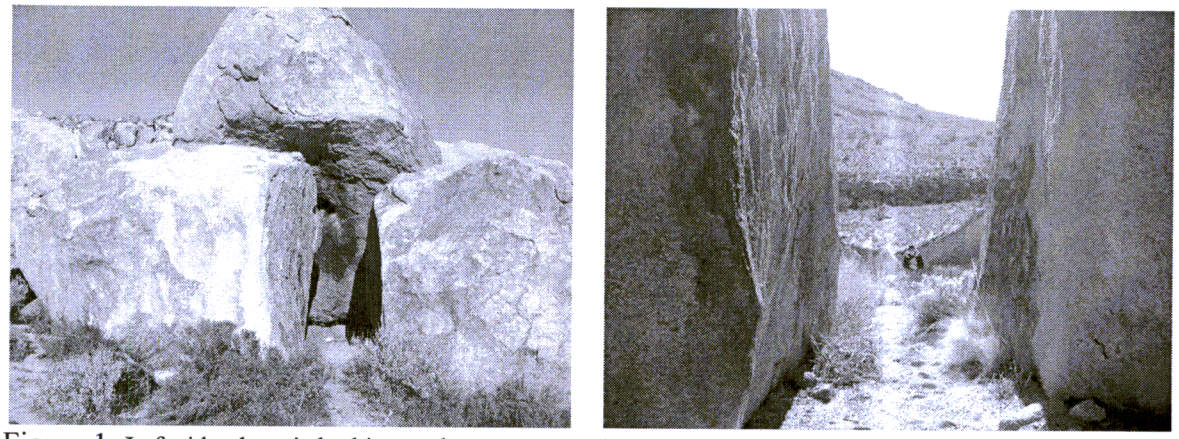

Figure 1. Left side photo is looking at the entrance to the main cave. Right side photo is looking out from the inside of the main cave. (photos by J. Sprague)

With the author focusing on investigating only the winter solstice, this paper will detail the events that appear to be a winter solstice alignment on the morning of December 23, 2007. When the sun initially enters the cave at 7:54 am from the east/southeast (see Figure 2), it illuminates the middle of the main panel on the back/north wall. This light represents itself by splitting the main panel into three parts, shadowed on the left side, illuminated in the

center, and shadowed on the right side. In the center, sunlit area, there is a white vertical linear element, a white horizontal linear element, and a small red pictograph representing a sunburst.

Figure 2. Sunlight entering the main cave at KER 226. (photo by J. Sprague)

As the sun moves to the west, the shadows and the illuminated area on the pictograph panel begin to move to the east, crossing the main pictograph panel on the back/north wall of the cave. The results of this cosmic dance manifests itself in the shadowed and the sunlit areas dancing from left to right across the main panel of the cave, as the day progresses into night. At approximately 8:12 am, the shadow-sun line on the left side of the cave intersects with the two (2) white lines which just a few minutes previously, were totally illuminated by the sunlight. This interaction causes the white lines to appear to be moving from the sunlit areas to the shadowed area. When the shadow-sun line crosses the white pictograph lines, the two lines overlap as if the white lines were drawn to the shadow-sun line. The shadow-sun line then continues to move towards the right, crossing the small red sunburst. What the relevance of this particular interaction means is currently not known, but we do know that it only happens during the winter solstice, and only during the first approximate 15 minutes after the sun enters the cave. As the sun continues to move towards the west, the shadows get larger and the illuminated portion of the pictograph panel becomes smaller. This development is caused by the traveling dagger of sunlight bumping against the stationary entrance to the main cave. As the sun continues to move to the west, it is unable to project as much sunlight onto the back/north wall of the cave, causing the dagger of sunlight to shrink as it moves to the right. It takes approximately 2 hours for the dagger of sunlight to march across the back/north wall of the cave in an easterly direction and to enter the area where the spoked wheel and other sun symbols are clustered on the far right hand side.

At approximately 10:03 am, the sunlit area is transforming into a large dagger of light that encompasses the spoked wheel and three (3) other elements on the right side of the back/north wall of the cave. Two of these elements, possibly representing sunbursts and the spoked wheel, could possible represent the winter solstice sun (see Figure 3). At this time the shadowed left side is becoming larger and the sunlit area to the right is shrinking

and moving in a downward direction, forming a smaller dagger of light. The right side of the shadow is blending into the darkness and covering the east walls with murkiness.

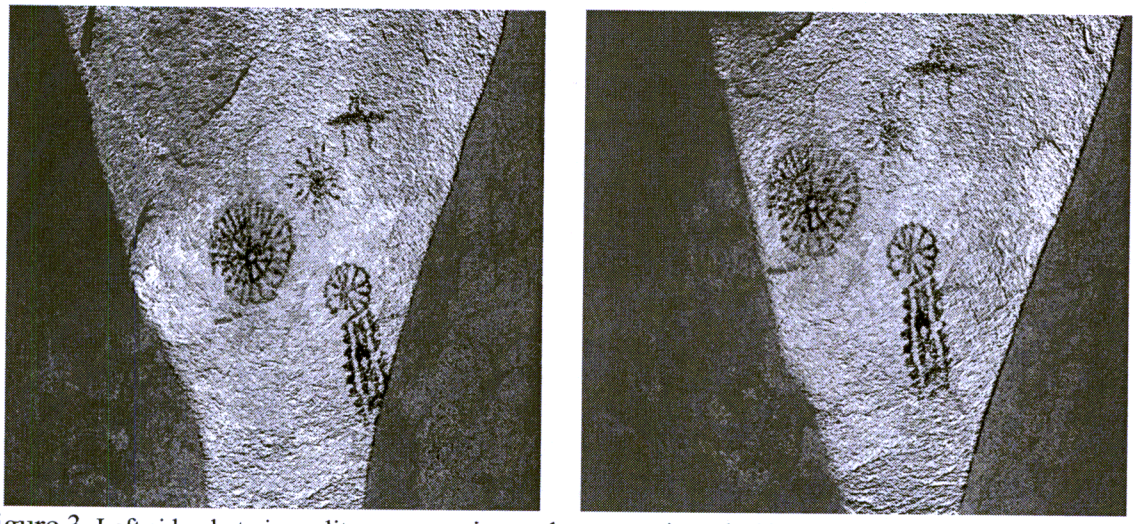

Figure 3. Left side photo is sunlit area on main panel at approximately 10:03 am. Right side photo is sunlit area on main panel at approximately 10:20 am. (photos by J. Sprague)

At 10:47 am, the dagger of light has formed a sharp point which then intersects with the largest element on the back/north wall of the cave, the spoked wheel (see figure 4).

Figure 4. Sunlight on the main panel's spoked wheel and possible sun symbols at 10:47 am. (photo by J. Sprague)

In the next few minutes, the dagger of light will continue to shrink and move to the right, while coincidently the pointed end of the dagger of light pierces the outside edge of the spoked wheel. At 10:54 am the dagger of light moves into the center of the spoked wheel (see figure 5).

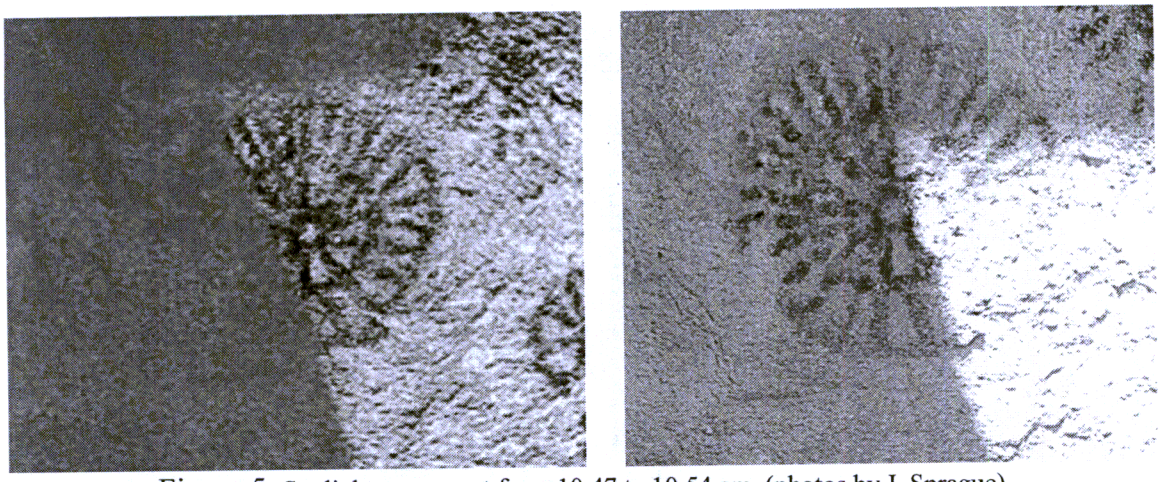

Figure 5. Sunlight movement from 10:47 to 10:54 am. (photos by J. Sprague)

The dagger of light then continues to move thru the spoked wheel and at 11:02 am, the dagger of light exits the outer edge of the spoked wheel (see figure 6). After exiting the spoked wheel, the dagger of light continues to rapidly shrink and move down the back wall and disappear.

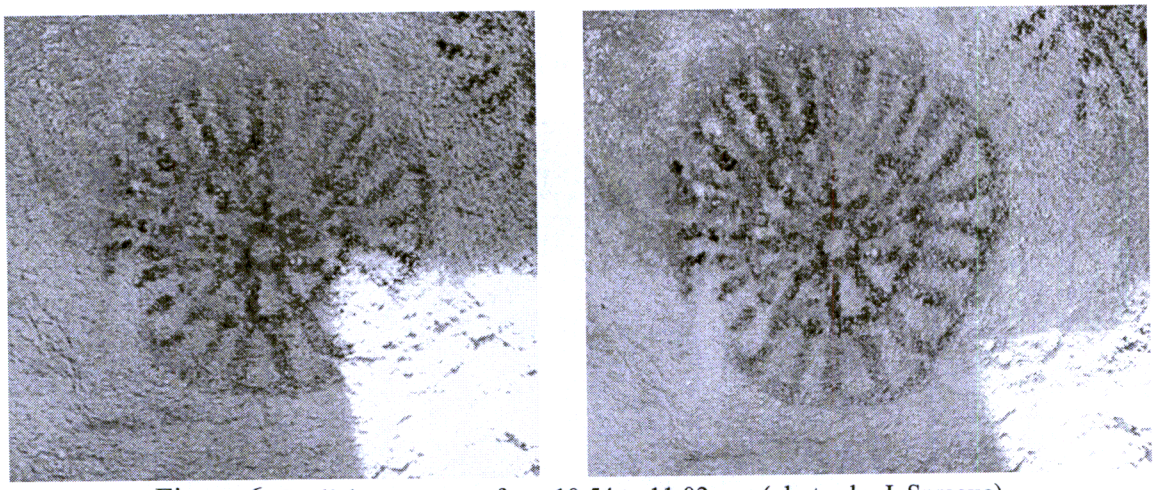

Figure 6. Sunlight movement from 10:54 to 11:02 am. (photos by J. Sprague)

Conclusion

CA-KER-226, is a unique and complex archaeological site, containing evidence of past occupation by both pre-historic and historic culture groups. This paper is intended to document the probable archaeastronomical interaction between the sun and the spoked wheel/sunburst elements on the back/north wall of the main cave. The events that the authors observed during the winter solstice of 2007 are consistent with similar styles of solstice alignments documented in the surrounding Kern County area, and in the Southwest section of the United States.

In 1977, Robert Schiffman published a paper entitled *A Possible Tabatulabal Calendar* at CA-KER-15. This site is located west of the Boulder Springs site by approximately 20 miles. In his publication, Schiffman suggests that the main "wheel" on the pictograph

panel is actually a calendar, in the form of a wheel with thirteen (13) designated sections. He concludes by stating that "The existence of a pictograph calendar is significant, as it could provide additional insight into California prehistory and the field of archaeo-astronomy" (Schiffman 1977:28).

Further west of CA-KER-15, on the banks of the Kern River, is another site (CA-KER-17) that has been designated as a "possible Tubatulabal winter solstice observatory" by Harper-Slaboszewicz and Cooper in 1988. The authors note that the same band of Palagewan Tubatulabal occupied both CA-KER-15 and CA-KER-17, with only a distance of approximately 5 miles between the sites. Using the rock art symbols of a "zigzag line" and a "spoked wheel-like element" the authors observed the sun interacting with the elements during the winter solstice of 1979. They conclude by stating that "it is a simple type of solstice observation from CA-KER-17, where the point of apparent sunrise makes a sudden large jump near the solstice, has not been previously reported in California archaeoastronomy" (Harper-Slaboszewicz and Copper 1988:141).

Approximately 20 miles east up the Kern River from CA-KER-17, lays the archaeoastronomical site of CA-KER-317. In 1988, Robert Schiffman completed a research project at this site that describes the interaction between the rock art elements of the spoked wheels, the linear and horizontal lines, and the sun to produce a relationship during both the winter and summer solstice. In his conclusion, Schiffman states that "the interpretation of the CA-KER-317 pictograph as a solar observatory to predict, and record, the summer and winter solstices is valid" (1988:150). He submits further evidence to solidify the aforementioned statement by discussing the fact that "by the winter solstice, they (Tubatulabal) were residing in their permanent villages and that winter was the season for telling myths and...the summer solstice was probably associated with various food procurement activities" (Schiffman 1988:150).

The three archaeoastronomical sites discussed above are all within 20-30 miles of the Boulder Springs site and sit along the Kern River in Kern County. However, it is important to note that the elements described in the aforementioned four (4) Kern County archaeoastronomical sites are very similar to sites in the Southwest, which are also noted to have significant solstice alignments (i.e. Chaco Canyon). This coincidence should not be surprising since the four (4) Kern County sites rest on the western edge of the Great Basin, which contains Chaco Canyon, and many other solstice observation sites.

Although relatively recent under the archaeology umbrella, archaeoastronomy is gaining a momentum of its own with a recent spate of publications. The authors believe that further investigation into the relationship between the rock art elements, and the cosmos, is imperative. This paper is intended to contribute to the archaeoastronomical data base, with the hope that it will assist researchers in the future.

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Above photo is the full main pictograph panel at CA-KER-17
(photo by R. Anderson)

Back cover photos: Top photo is one of the pictograph panels at CA-KER-17 without any enhancement. Bottom photo is the same photo enhanced with DStretch (photo by J. Sprague, DStretch program to enhance photo was compliments of Jon Harman).