UNIVERSITY OF CALIFORNIA, MERCED

Rock Art, Ritual, and the Cosmos:

A Landscape Investigation of CA-MRP-402

A thesis submitted in satisfaction of the

requirements for the degree of

Master of Arts

in the Individual Graduate Program

with an emphasis in

World Cultures

by

Christine A. Grimaldi Clarkson

Committee Members:
Professor Kathleen L. Hull, Chair
Professor Holley Moyes
Professor Willem Van Breugel

2014

The thesis of Christine A. Grimaldi Clarkson is approved.

_____

Professor Holley Moyes

_____

Professor Willem Van Breugel

_____

Professor Kathleen L. Hull, Chair

University of California, Merced

2014

DEDICATION

This thesis is dedicated to my husband Joel and daughter Nicole who endured this long process with me. I am forever grateful for your encouragement, support, help, and love.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

I am tremendously grateful for the opportunity to pursue my Master degree at the University of California, Merced, and for the guidance, support, and encouragement of my committee including my Advisor and Chair Dr. Kathleen L. Hull, Dr. Holley Moyes, and Dr. Willem Van Breugel.

I wish to express my gratitude to the owner of the property on which CA-MRP-402 is located for sharing his observations with me and allowing me access to this site. His cooperation and kindness are appreciated. I would also like to thank others who permitted me access to rock art sites on their property. The property owners have agreed to remain anonymous in order to avoid revealing the locations of these archaeological sites, and to protect and preserve the sites.

Many thanks to Robert Davies for his essential support on this project. Thank you also to my field crew, John Almand, Marieka Arksey, Robert Borchard, Sarah Clendenin, Karen Deeming, Nikolas Eissinger, Kristen Ferguson, Jerry Fieldsted, Chris Geier, Tory Guthrie, Jessica Kostecky, Tamara Maxey, Abel Medina, Nick Miscione, Casey Morris, Kyle Rankin, Tara Tramontin, Rachel Wheeler, Patrick Wilkinson, and Crystal Zaragoza, and my apologies to any one I may have inadvertently omitted.

Thank you to Michael Eissinger, the other half of my two-person cohort, for your support, encouragement, good cheer, friendship, and for volunteering as my Field Supervisor after I broke my foot.

Many others have also contributed to my research, including the staff of the Central California History Center, Dr. David Whitley, Dr. John Johnson, Dr. Karen Steelman, Dr. David Freidel, Dr. Paul Taçon, and Dr. Anthony Aveni.

Special thanks to all of my family and friends for their encouragement and support.

Finally, I am grateful for the funding through Graduate Student Fellowships from the University of California, Merced, and Member Career Grants from the California School Employees Association.

ABSTRACT OF THE THESIS

Rock Art, Ritual, and the Cosmos:
A Landscape Investigation of CA-MRP-402

by

Christine A. Grimaldi Clarkson

Master of Arts in the Individual Graduate Program
with an emphasis in World Cultures

University of California, Merced, 2014
Professor Kathleen L. Hull, Chair

This thesis interprets the role the rock art at CA-MRP-402 played in the cultural landscape for the people who created the images. Located in Mariposa County, California, this site exhibits 103 rock art panels. By combining formal landscape methods, ritual theory, ethnography, field research, and excavation, this thesis explores the activities that took place at CA-MRP-402, how this site fits into the broader cultural landscape, and why the cultural landscape of this site attracted people to mark this place. These efforts reveal that ancient Native Americans intentionally altered the landscape of CA-MRP-402 to create an astronomical observation area and generate consistent equinoctial solar and shadow alignments. This area may have afforded a type of calendar that allowed shaman astronomers to know when it was time to perform necessary rituals. Most of the rock art at CA-MRP-402 was likely created by shaman astronomers as part of their ritual interactions with the celestial beings. This study also serves to validate this multifaceted contextual approach.

Chapter 1

Introduction

Rock art imagery can be regarded as a visual connection to the past conveying an intentional social expression as influenced by the culture of the people living at that time. This social expression offers a unique record of the artist's perception of their world.

Rock art was integrated with and recorded aspects of ancient life including hunting activities, spiritual powers, mental experiences, mortuary commemoration, ceremonies and rituals, astronomical events, clan or boundary markers, history, and daily life (Meighan 1981:16). Rock art panels contain information about the ancient artists and the societies in which they lived. The images portrayed on rock art panels are as the artist meant them to be viewed. Through rock art, we can see how different peoples at various times in the past experienced and represented their world. Like all archaeological features, rock art panels are a significant form of material culture and, therefore, are valuable to archaeologists. Rock art studies provide archaeologists with the opportunity to see elements of culture as they were constructed and understood by people within those ancient cultures.

Context is crucial for rock art. Throughout the world, rock art sites are consistently defined as culturally significant areas. This reflects how human beings conceptualize their surroundings, whereby space becomes "place" by attaching importance to it. Through the creation of rock art, humans have symbolically marked and ordered landscapes. As Christopher Chippendale and Paul Taçon state, this is "one of the ways we socialize landscapes" (Chippendale and Taçon 1998b:1).

Overview of Research

Despite the significance of the ancient images, most archaeologists in California have avoided studying rock art (Clelow 1998:20; Gilreath 2007:273; Quinlan 2007:1; Whitley 2011:21). Of the rock art research that has been completed, much has attempted to simply classify or type rock art sites or elements (e.g., Heizer and Baumhoff 1962; Payen 1966; Steward 1929; Whitley 2000). Few efforts have been made to interpret the meaning or purpose of the images. Yet rock art is not found everywhere on the landscape, it is created in particular places and often on specific rocks. It is common to find a rock exhibiting numerous images while an adjacent rock of the same material is devoid of any cultural markings. This implies the places where rock art was created held some significance for past peoples. The significance of each place likely varied depending on social beliefs and the

desired outcome for the creation of the images. Recognizing the importance different places may have held for past peoples will help archaeologists interpret the possible meaning or function of the rock art created in those places.

Acknowledging this, some California archaeologists more recently have advocated exploring the landscape context of rock art (e.g., Button 2009; Gillette 2011; Quinlan 2007; Whitley 2011). This post-processual approach brings together both the "natural" and "cultural" dynamic landscapes (see David and Thomas 2008) in a unifying concept to understand how past people viewed their surroundings and engaged with significant places over time. Landscape studies are divided into "formal" and "informal" methods (Chippindale and Taçon 1998b:6-7). Formal approaches are those that offer outsider interpretations of the rock art, usually through quantitative data, while informal approaches employ insider information, typically through ethnography or ethnohistory. "In practice, much good rock art research combines elements of both approaches" (Whitley 2011:101).

This thesis joins formal landscape methods and ritual theory informed by ethnography to interpret the role that rock art at CA-MRP-402 played in the cultural landscape for the people who created the images. Located in Mariposa County, California, this site exhibits 68 recorded petroglyph panels, 57 bedrock mortars on 17 outcrops, and a modest scatter of quartz debitage. Few archaeologists have used the landscape approach to rock art in California (Button 2009), so this work marks one of the first attempts to use this approach.

Although the primary focus of this thesis is the rock art at CA-MRP-402, a survey of the surrounding rock art sites is included to provide a contextual understanding of the cultural landscape and the place of CA-MRP-402 within it. The existence of rock art is not well known or documented within the current study area, which includes the western Sierra Nevada foothills of central California (Figure 1).

The rock art sites discussed in this thesis, with the exception of one, were all previously located and recorded to some extent. A few researchers also classified the rock art in this area (e.g., Heizer and Clelow 1973; Payen 1966; Whitley 2000), but none of them surveyed CA-MRP-402 before presenting their conclusions about regional rock art. This thesis represents the first attempt to interpret the significance and function of the rock art located in this region.

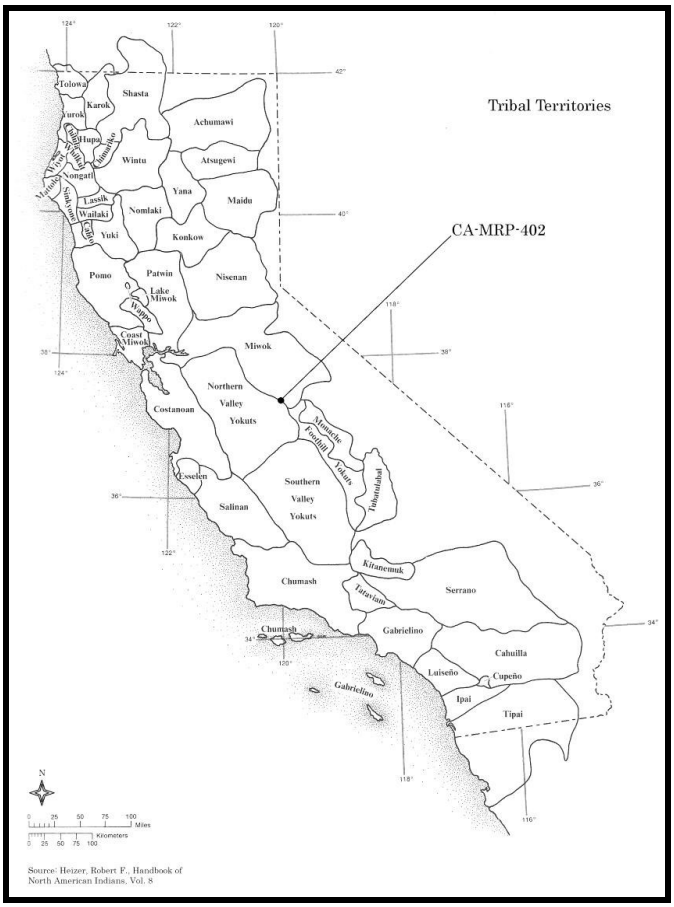


Figure 1. A map of California ethnolinguistic groups (Heizer 1978) showing the location of CA-MRP-402.

Most of the recorded sites in the study area contain fewer than 10 rock art panels. CA-MRP-402 was chosen for this research because it is distinct, with 68 recorded abstract petroglyph panels, as well as a possible astronomical observation area as first postulated by the Property Owner. Rerecordation of this site was also necessary, as it has been 30 years since the rock art at CA-MRP-402 was first recorded (Peak and Associates 1982a). Similar to Donna Gillette (2011:2), my research aims to provide information on the role that astronomy and ritual played in the lives of the people who created the rock art, and how people interacted with special places in the landscape.

Research Questions

It is my hypothesis that the rock art at CA-MRP-402 involved astronomy and ritual acts, and such acts have been identified ethnographically as a cultural practice surrounding quests for interaction

with the supernatural. To test this hypothesis, the following research questions are addressed in this thesis:

- What activities took place at CA-MRP-402?
- How does CA-MRP-402 fit into the broader cultural landscape?
- Why did the cultural landscape of CA-MRP-402 attract people to mark and transform this place?

Organization of Thesis

This thesis examines the rock art at CA-MRP-402 through a multifaceted contextual approach. The following chapters present background information on the site, review methods and theory utilized for the study, and discuss the results of the research. Chapter 2 discusses the debate regarding rock art terminology, reviews the theoretical approaches that have been used in rock art studies, and offers a historical review of rock art studies in California before going into further detail on the landscape and ritual approaches. This chapter discusses past research and emphasizes conclusions applicable to this study. A review of the relevant ethnographic information is also included. Chapter 3 details the methods used in this research, including archaeological surveys and a test pit excavation. Chapter 4 provides descriptions of the natural and cultural landscapes of CA-MRP-402, a review of rock art styles previously assigned to this site, and ethnographic and archaeological context information. Chapter 5 presents the results and discussion of the research and answers the research questions. This chapter also includes an overview of the conclusions of the study, a discussion of the significance of the research, suggestions for future research, and the contributions that this study has made to archaeological research.

Chapter 2: Theoretical Approach and Ethnographic Context

Introduction

Two theoretical approaches are used in this study of CA-MRP-402. The first theoretical approach informing this research is landscape theory. A landscape approach is one in which objects of archaeological inquiry—in this case the rock art and other possible features at CA-MRP-402—are considered within the broader "natural" and "cultural" landscapes (see David and Thomas 2008), archaeological evidence of human activity and culture, and the connections between rock art and other signs of human activity (Gillette 2011:11). This contextual approach aids in understanding the activities that took place at CA-MRP-402.

Second, this study draws on ritual theory. It is my hypothesis that the repeated production of rock art at CA-MRP-402 on the same boulders can be best understood as ritual acts, and may be identified via ethnographic analogy as cultural practices surrounding the quest for communication with the supernatural. Ritual behavior has long been a topic of interest for anthropologists and archaeologists (e.g., Bell 1992, 1997; Joyce 2001; Rappaport 1979, 1999; Richards and Thomas 1984; Ross and Davidson 2006; Turner 1973; Zedeño 2008), yet there is no universal definition or singular theory of ritual. Humans engage in what anthropologists and archaeologists have defined as ritual practices in various settings and for diverse reasons. An equally wide assortment of anthropological and archaeological literature on ritual behavior has been produced. The ritual theories influencing this research are reviewed below. Combining landscape and ritual theory assists in interpreting the role rock art at CA-MRP-402 played in the cultural landscape of this region at the time it was created. This research is further informed through reference to the ethnography of native ethnolinguistic groups of the area.

This chapter discusses the theoretical perspective of this research, but first, some background information on the development of rock art studies in North America is provided. After the theoretical concepts and their application are introduced in more detail, relevant ethnographic information on rock art, landscape, rituals, and astronomy is also presented.

The Development of Rock Art Studies

A great deal of attention has been given to the term *rock art* and the question of whether it is appropriate. Some researchers have objected to calling the images *art*, arguing that this term denotes a modern, Western concept of art that should not be applied to the ancient images. The

argument appears to begin with Campbell Grant who stated that images could not have been created as "art for art's sake" (Grant 1965:89), and instead most likely had religious and ceremonial purposes. This sentiment has been echoed by Polly Schaafsma who contended that images are part of "social activities necessary to life" (Schaafsma 1995:12).

Rock art's defining characteristic is its placement on natural rock surfaces. This includes pictographs that are painted or drawn on the rock surface and petroglyphs that are pecked or carved into the rock, while figures such as intaglios and geoglyphs may be placed on the ground surface (Whitley 2011:23). Pictographs and petroglyphs are typically found on rock art panels, which are the fracture or weathering planes of a natural rock outcrop. Panels may exhibit one or several rock art elements. Individual elements and images are often difficult to identify due to overlap; therefore, rock art sites are often described by the number of panels rather than elements or images.

Given these attributes of rock art, David Whitley proposed that rock art could also be called "landscape art" (Whitley 2011:23). Gillette (2011:49) referred to pecked curvilinear nucleated (PCN) rock art as "cultural markings," stating that she believes this term correctly identifies this element. She also proposed that PCN should be accepted as its own "tradition" (Gillette 2011:37). I believe the term *rock art* is appropriate enough, and agree with Reinaldo Morales' argument that the use of the term does not "deny the art's communicative, functional or spiritual significance" (Morales 2005:71). Furthermore, the use of the term is an understood tradition among archaeologists, and its worldwide acceptance has been demonstrated by the creation of the International Federation of Rock Art Organizations (IFRAO). Therefore, the term *rock art* is used in this thesis as the inclusive term for ancient marks or images produced on natural rock surfaces.

Despite a great deal of public interest in the subject, many archaeologists in North America have avoided studying rock art (Clelow 1998:20; Gilreath 2007:273; Quinlan 2007:1; Whitley 2011:21). There seems to be a history of "reluctance of … mainstream anthropologists to fully accept the inherent cultural heritage of rock art investigation" (Clelow 1998:20). This is "both peculiar and regrettable" because rock art provides "direct evidence of prehistoric artistic expression, spirituality, values, and emotions" (Gilreath 2007:273). More recently, however, the number and complexity of studies has increased, indicating that archaeologists are gaining a greater appreciation for the value rock art studies hold to archaeological interpretation.

In many ways, the development of rock art studies in North America mirrors that of the field of archaeology. The earliest studies of rock art, such as Garrick Mallery's (1893) synthesis of North American rock art,

concentrated on the documentation of rock art sites. Rock art was typically recorded by documenting elements that could be measured such as panel size, dimensions, and the number of designs.

Later studies utilized the processual approach introduced by Lewis Binford (1962). This approach was more systematic, with problem-oriented research designs and the formulation and testing of hypotheses. During this phase, Robert Heizer and Martin Baumhoff (1962:11) proposed the hypothesis that rock art in the Great Basin had "magico-religious significance" and was created in shamanistic rituals connected with hunting. Such "hunting magic" theories were reiterated by others (Grant 1968), and corresponded with a growing anthropological interest in anthropology in hunter-gatherers (Gillette 2011).

Prior to the mid-1960s, many archaeological resources in California, including rock art sites, were destroyed or threatened with destruction from increasing population and the inception of the California State Water Project. Salvage archaeology became an accepted approach, with much of the work done by volunteers and avocationalists. Many of the salvage projects failed to produce written reports or produced reports of low quality. New environmental laws enacted in the mid-1960s and 1970s, and their implementing regulations, specified how government agencies were to manage cultural resources. Cultural resource management (CRM) businesses developed as a result of the new regulations, and State Information Centers became dedicated clearinghouses for regional site information. Several rock art studies were completed during this period (Gillette 2011:32).

Theories that proposed connections between rock art and ancient astronomical observation emerged in North America in the 1970s. An article published by Brandt et al. (2008) built "a circumstantial case" (Aveni 2008:644) that a "star-moon" (Aveni 2008:643) pictograph located in Chaco Canyon, New Mexico, depicts the Crab Nebula supernova that occurred on July 4, 1054. Similarly, Ann Sofaer (1979) recorded solar alignments associated with rock art on top of Fajada Butte in Chaco Canyon. Based largely on the ethnographic research of John P. Harrington, archaeoastronomical interpretations of Chumash rock art in California were proposed by Travis Hudson and Ernest Underhay (1978).

In the 1980s, South African researchers David Lewis-Williams and Thomas Dowson (1988) proposed a relationship between altered states of consciousness (ASC) and entoptic geometric images generated within the human nervous and optical system. Lewis-Williams and Dowson's (1988) neuropsychological (N-P) model posits that geometric and representational rock art elements embody subjective entoptic phenomena that were perceived in an ASC or trance state, which accounts for the universality of many rock art elements (Lewis-Williams and Dowson 1988:202; Whitley 2000:106,

2011:139). Whitley espoused this approach in the United States. According to Whitley, the N-P model is best understood "as a formal analytical tool whose purpose is to determine whether a corpus of rock art portrays hallucinatory imagery" (Whitley 2011:138). The N-P model is concerned with the origin of the art and not its meaning (Whitley 2011:138).

In the last two decades, rock art studies in California have incorporated a more post-processual approach, also known as interpretive archaeology. Arguing that theoretical reinterpretations of ethnographic material alone are less useful, Angus Quinlan (2007:5, 7) advocated also exploring the landscape context of rock art. Rock art studies such as that completed by Jeffrey Fentress (1999) in Alameda County increasingly embrace a contextual approach that includes multiple lines of inquiry. New dating and research methods including Accelerator Mass Spectrometry (AMS) radiocarbon and cation-ratio (CR) dating, Geographic Information Systems (GIS), and 3-D imaging have been developed, tested, and used. Currently, it is argued that the best research comes from rock art studies that include both formal (outsider, quantitative) and informal (insider, qualitative) approaches, such as those that combine both systematic research and ethnographic analysis (Whitley 2011:101, 179).

Historical View of Rock Art Studies in California

The first extensive report on the rock art of the western United States was compiled by Julian Steward in 1929. His survey was meticulous and wide-ranging, covering California, Nevada, Utah, Arizona, and part of northern Mexico. Steward did not personally visit many of the sites listed in his report, but instead relied on site records filed with the Department of Anthropology at the University of California, Berkeley, and on correspondence with public contributors (Steward 1929:54). Noting the designs tended to group themselves according to general stylistic characteristics, Steward (1929:56) divided the region into seven areas: (1) Northwestern California; (2) Northeastern California; (3) Tulare; (4) Owens Valley; (5) Santa Barbara; (6) Mojave; and (7) Southern California. He further analyzed and divided the petroglyphs into four areas he called A, B, C, and D based on groupings of elements (Steward 1929:219).

Heizer and Baumhoff (1962) were among the first to take a more theoretical approach, linking rock art sites by content, location, and presumed social function. Directing their attention to the rock art of the Great Basin, they noticed a high proportion of depictions of game animals, depictions of hunters shooting animals, and stone walls they interpreted as hunting blinds along game trails. They hypothesized that the petroglyphs of eastern California and Nevada were "part of the magical or ritual aspect of taking large game" (Heizer and Baumhoff 1962:239).

Louis Payen (1966) conducted what remains the only survey concentrating on the petroglyph sites in the northern half of the Sierra Nevada. His research focused on the form of the imagery, the combination and association of elements, and the design type in order to define seven different rock art styles located within his study area.

Attempting to pick up from where Steward left off, Heizer and Clelow (1973:1) analyzed years of data collected by the University of California, Berkeley, and published a general survey of the rock art of California. They divided California into 11 geographical regions and determined there were four different styles of rock art within the various geographical provinces: (1) the Great Basin; (2) Central Sierran; (3) Southwest Coast; and (4) North Coast petroglyph styles (Heizer and Clelow 1973:3).

More recently, Whitley shifted away from the view of rock art styles to a concept of "tradition," stating "tradition recognizes making and using rock art was a widespread practice that was shared by many peoples, with continuities in purpose and meaning that often transcended cultural boundaries (and, presumably, chronological periods)" (Whitley 2000:47). The concept of tradition attempted to accommodate substantial variability even within cultures at a particular time. Whitley divided California into five traditions: (1) Far Western Pit and Groove; (2) California; (3) Great Basin; (4) Earth Figure; and (5) Plateau (Whitley 2000:47).

Other notable contributors to California rock art research include Campbell Grant and Bill Sonin. Grant was a naturalist who published several works, including *The Rock Paintings of the Chumash* (1965) and *Rock Art of the American Indian* (1967). Most of his initial work focused on Chumash rock art, but he later expanded his studies throughout California. Sonin was a rock art aficionado who compiled a 1,300-page annotated rock art site inventory and bibliography for California meant to pick up where Heizer and Clelow left off (Sonin 1995). The works of Grant and Sonin have contributed much to our knowledge of rock art in the American West.

Landscape Theory

"Perhaps the most important use of landscape theory in archaeology is that it permits us to reconstruct the intangibles of culture and ideology that otherwise are invisible in the archaeological record" (Whittlesey 1997:27). Rock art was created in or on the surface of the earth, or landscape, and holds many of these "intangibles of culture and ideology." By applying landscape approaches to rock art studies, along with knowledge gained through ethnography of the close relationship native people had with the land and the symbolism the land held, archaeologists can come closer to understanding past cultures (Gillette 2011:18).

Dutch artists first used the term *landscape* at the end of the 16th century (David and Thomas 2008:27). Since that time, several disciplines have dealt with the subject of landscape. Artists, historians, archaeologists, and others have explored various perspectives and engaged diverse concepts, such as tension, transformation, and memory (Ashmore and Knapp 1999; David and Thomas 2008; DeLue and Elkins 2008; Ingold 1993; Schama 1995; Tilley 1994; Wylie 2007). Given the physical nature of landscape, it is not surprising that geographers found it a subject of much interest over the last century. Carl Sauer, Professor of Geography at the University of California, Berkeley in the 1920s, is credited with formulating the concept of cultural landscape studies in America (Ashmore and Knapp 1999; Wylie 2007). In Sauer's view, the landscape is the result of the modification of nature by a cultural group. Culture is the shaping force, the geographical landscape is the subject, and the cultural landscape is the result (Wylie 2007). Similar to Sauer's perspective, historian William Hoskins (1985) also placed emphasis on the role of culture in shaping the landscape, but in his conception, the cultural landscape consists of "vertical layers of use and inhabitation," and "to understand it we have to excavate as much as gaze" (Wylie 2007:32). John Jackson's (1997) understanding of landscape had elements in common with that of Hoskins and Sauer, except he explored the landscape as both a source and repository of symbolic value and cultural meaning. Jackson insisted humans are not just spectators in their world, but are participants in it. His focus on the landscape as a representation of cultural meaning helped to inform the research presented herein. Jackson's view also foreshadowed the shift to "new cultural geographies" that occurred in the late 1980s and early 1990s (Wylie 2007:44, 50-51). During this time, cultural geographers increasingly adopted the notion of landscape as the history of a "way of seeing" or representing (Wylie 2007:69).

The shift in the perception of landscape from something to be seen to a way of seeing led some researchers to embrace phenomenological notions of "being-in-the-world" (Tilley 1994:12; Wylie 2007:147). For example, philosopher Maurice Merleau-Ponty's (1962) studies of cultural landscape focused on the entwined topics of vision and embodiment. Arguing that the body is the basis and conduit of knowledge and that the body is "intertwined" with the landscape, Merleau-Ponty concluded that "the embodied vision of the individual subject is thus precisely a particular point of view from within the world" (Wylie 2007:148-152). Similarly, anthropologist Tim Ingold (1993:43) developed a unique phenomenological approach to landscape studies that he referred to as the "dwelling perspective", in which both the environment and culture are simultaneously part of the complete embodied experience of dwelling in the world. Dwelling is closely entwined with temporality. For Ingold, landscape is an ongoing practice and process of dwelling (Wylie 2007:162).

Other geographical studies investigated how landscape is perceived and contextualized. For example, geographer Yi-Fu Tuan (1977, 1990) explored how nearly every culture attaches symbolic meanings to certain directions associated with either the body or the cardinal directions, as well as to sacred places that represent the center, or axis, of the world.

For the current research, geographical and cultural landscapes are entwined, and the resulting cultural landscape is considered to be both a dynamic source of, and place for, symbolic value and meaning. This study identifies the activities that took place at CA-MRP-402, how this site fits into the broader cultural landscape of which it was a part, and why the cultural landscape of CA-MRP-402 attracted people to mark and transform this place.

Landscape and Archaeology

Landscape studies did not become widely employed in archaeology until the 1980s, but in the last two decades great strides have been made in understanding the role of landscape. This is evidenced by the publication of *The Handbook of Landscape Archaeology* (David and Thomas 2008), the first in a series of "handbooks" produced by the World Archaeology Congress (WAC). The editors consider landscape studies to be an "aspect of archaeology" (David and Thomas 2008:19) suitable to all major theoretical frameworks, whether they be evolutionary theory, cultural ecology, Marxism, phenomenology, and other approaches. This handbook was intended as an extensive "manual" (David and Thomas 2008:19) of the diverse and varied approaches to landscape archaeology.

As noted above, landscape is an interaction of both the geographical and the cultural landscape, with the cultural landscape "created by human activity and with human activity being framed by the landscape" (Gillette 2011:13). Landscape in archaeology can be viewed as a unifying concept that serves to draw together not only the geographical environment "onto" which people live out their lives, but also the meaningful location "in" which lives are lived. "This includes the trees and the rocks and the stars, not as abstract objects but as meaningful things that are located ontologically and experimentally in people's live and social practices (praxis)" (David and Thomas 2008:38). Landscape approaches are a study of how people visualized the world, how they chose to manipulate their surroundings, and/or how they were subconsciously affected to do things by way of their surroundings (David and Thomas 2008:38).

Landscape approaches have been a fundamental part of much archaeological research conducted in the last two decades. One of the well-known proponents of landscape archaeology is Barbara Bender (1993), who employed this approach in her research on Stonehenge. Much of Bender's work focused on understanding the contestation and appropriation of

landscape by various stakeholders. This was achieved through careful historic contextualization of the landscape. Layton and Ucko (1995) contended that landscape archaeology differs from other disciplinary perspectives in its "practical aspects (laboratory and field techniques, instruction in the recognition of elements of ancient activity in the landscape), its theoretical aspects (which include a history of the 'sub-discipline') and its philosophy and politics" (Layton and Ucko 1999:15). They also postulated the advance of landscape studies coincided with a desire to "humanize" (Layton and Ucko 1995:16) the past, and led to a more interdisciplinary approach.

Other archaeological studies emphasized the way landscape was perceived, experienced, and contextualized. Richard Bradley (2000) directed his attention to natural and unaltered features in the landscape, focusing on why caves, mountains, springs and rivers held a sacred place in European prehistory. Christopher Tilley (1994) introduced an entirely different way of approaching landscape studies in archaeology with the publication of *A Phenomenology of Landscape.* Phenomenological archaeologists use contemporary experience to interpret how people living in the past may have understood and described the world. Tilley explored the relationship between "Being and Being-in-the-world" following on concepts introduced by Martin Heidegger (Tilley 1994:12). George Children and George Nash built upon this perspective, and theorized that landscape "embodies the principles of organization and categorization within the human experience" (Children and Nash 1997:3). They contended that landscape "is an archaeology site" (Children and Nash 1997:2).

A significant aid to archaeological landscape studies has been the development and application of GIS software. "GIS is concerned with geographic concepts, the primitive elements used to describe, analyze, model, reason about, and make decisions on phenomena distributed on the surface of the earth" (Wright et al. 1997:357). In the field of archaeology, GIS is used to digitize maps and layer data, determine least cost trail routes, and provide other graphical representations. It is used to manipulate, analyze and portray spatial information. GIS studies add a new dimension to landscape archaeology studies.

Landscape and Rock Art

Rock art is created in or on the surface of the earth, and therefore possesses an innate "security in place" (Chippindale and Nash 2004:7) that provides a stable basis for the application of landscape concepts in formal rock art studies. Some of the earliest works linking landscape epistemology to rock art studies were compiled in *The Archaeology of Rock Art* (Chippindale and Taçon 1998a). Included in this volume is the research of

Sven Ouzman (1998), who considered forager's perceptions of the landscape in southern Africa, and the work of Whitley (1998), who examined rock art and landscape symbolism.

In a collection of papers on Pleistocene art published in 1997, Margaret Conkey argued for a contextual approach that literally looked "'between the caves'" (Conkey 1997:360). She and her team looked on the landscape for open-air evidence left by those who painted the Pleistocene images in the caves of southern France. The project used digital terrain models and "new geopetrographic analyses of flint raw materials that were moved around the region, with the goals of generating various lines of evidence from which to infer why the 'marked' caves might have been significant and how connectivity's were generated between people and places" (Gillette 2011:16).

A second compilation of research employing landscape approaches to rock art studies was published in 2004. This publication included Daniel Arsenault's (2004) research investigating whether landscape approaches can be applied to locate and reconstruct native sacred sites, as well as Tilman Lenssen-Erz's paper that introduced his idea of *Gestaltung,* defined as the "physical acts which bring about tangible change on a landscape endowed with meaning" (Lenssen-Erz 2004:131). Lenssen-Erz employed this approach at the Brandberg rock art region of Namibia to understand what "human decisions" (Lenssen-Erz 2004:131) led people to create certain images in this particular place in the landscape. He concluded that "painters" went to Brandberg to satisfy their basic material needs, but once they were there, they used this place for ritual activities. "The landscape had to be influenced in interactive processes in order to maintain it as a functioning organism" (Lenssen-Erz 2004:148).

Chippindale and Taçon (1998b:6-7) separated rock art studies into "formal" and "informal" or informed methods. Formal approaches are those that utilize spatial analysis and quantitative data and offer an etic, or outsider's, interpretation of the rock art. Informal approaches are those that employ emic, or insider, information typically acquired through ethnography or ethnohistory.

According to Whitley (2011:153), formal landscape approaches to rock art studies may be divided into three groups: (1) archaeoastronomical and acoustic; (2) communication studies; and (3) ethnicity and territoriality studies. Archaeoastronomy, or what is now referred to as "cultural astronomy" (Aveni 2008:6), is invoked in this study to test the hypothesis that CA-MRP-402 encompasses an ancient observatory. This approach is concerned with the orientation and layout of sites—and how they relate to the earth and sky—and it is one of the more common forms of landscape approaches to rock art studies (Whitley 2011:154). Another example is Lionel Sims' (2009) research on Silbury Hill in Wiltshire, England. Sims combined cultural astronomy with phenomenology to "reconstitute a reality which

exists both through the individual agency of embodied experience ... [and] on the social-structural level of collective representations" (Sims 2009:389). His research combined these two "cohesive" data sets to "display an emergent property at a higher, ethnographic, scale of meaning". Sims suggested that if the definition of landscape were changed to include the skyscape, "we can transcend the nominalist barrier of structural interpretations". For the current research, the skyscape is included in the cultural landscape.

Many advances in rock art studies have also been tied to informal approaches. Ethnographies are important because they offer an informed, or insider's, view on the origins and significance of rock art. More simply stated, "ethnography gives us a context within which the plausibility of any particular rock art interpretations can be assessed" (Whitley 2011:108-109). Based on ethnographic information, Anna Gayton (1948) demonstrated that rock art was often located at the site of a shaman's cache among the Yokuts and Western Mono (Monache) of the southern Sierra Nevada. The inclusion of ethnography in archaeological rock art investigations has also resulted in proposed connections between rock art, ancient astronomy, and ritual (Hudson and Underhay 1978; Saint-Onge et al. 2009; Schiffman 1988). Moreover, ethnographic information was the basis for several papers focused on the interactions between shamanism, sacred spaces, entoptic visions, and rock art (e.g., Lewis-Williams 1995; Lewis-Williams and Dowson 1988; Whitley 2000, 2011). Whitley stated that enough ethnographic information has been collected in California to "justify a synthesis of the tradition as a whole" (Whitley 2000:74). He identified two patterns in the production of rock art in California. The first pattern, restricted to southwestern California, involved puberty initiation rituals. The second, and more prevalent, pattern was the production of rock art at a sacred place by shamans at the conclusion of a vision quest.

More robust rock art studies are those that include both formal and informal approaches (Whitley 2011:179). For example, by incorporating ethnography into his study on the acoustical properties of Horseshoe Canyon, Utah, Steve Waller (2000) illustrated the general importance of the acoustical properties of rock art sites to Native Americans (Whitley 2011:156-157). Whitley et al.'s (2004) research on the rock art of the Modoc Plateau combined landscape symbolism and ethnography to explore the creation and significance of shamanistic landscapes. Similarly, Gillette's dissertation explored the archaeological context of the PCN (Pecked Curvilinear Nucleated) tradition of "marking" (Gillette 2011:1) boulders in the landscape of the Coastal Ranges of Northern California by using a landscape archaeology and ritual theory framework combined with ethnography. She joined archaeological excavations, artifact and ecofact analyses (obsidian hydration, geochemical sourcing, AMS dating, and soil testing techniques), and ethnographic perspectives to interpret the significance that ritual held

for past people and how those people interacted with special places in the landscape. The current research is similar Gillette's, using landscape archaeology and ritual theories in addition to ethnography to interpret what activities took place on-site and how those activities related to the cultural landscape. The ethnographic accounts that inform this research are reviewed following the discussion on ritual studies.

Ritual Theory

Anthropologist Catherine Bell (2007) was an expert in the field of ritual studies, and her "main contribution" was "in developing a new framework defining relational aspects of ritual" (Gillette 2011:19). Bell believed a simple definition of ritual was best, and utilized Colin Renfrew's "very adequate" description that "rituals are those activities that address the gods or other supernatural forces" (Bell 2007:278). Similarly, Victor Turner defined ritual as "a stereotyped sequence of activities … performed in a sequestered place, and designed to influence preternatural entities or forces on behalf of the actors' goals and interests" (Turner 1973:1100). The sequenced activities may be performed seasonally or in response to a crisis. Roy Rappaport examined ritual as a "form of structure" with "more or less invariant sequences of formal acts" (Rappaport 1979:175; 1999:35). He also contended that rituals tend to be repetitive and occur at special places and times (Rappaport 1979:175-176). These definitions fit well with my research hypothesis that people responsible for creating the images at CA-MRP-402 were performing activities in this particular place at specific times in order to interact with supernatural forces and request specific actions.

Numerous archaeological studies have focused on the structure and repetition of ritual. The following authors in particular have prompted the formulation of the hypotheses for the current study. Rosemary Joyce identified ritual as "repetitive sequences of actions related to beliefs" (Joyce 2001:13371). Colin Richards and Julian Thomas (1984) identified calendrical rites as initiating ritual events, as well as the formal regulation and recurrence of ritual activity that results in structured deposition in the archaeological record. These premises are applicable to the current research in that the concentration and overlap of rock art images in this particular place on the landscape are posited to represent the repetitiveness of ritual activity. A recurrence of ritual activity may also be visible in cultural deposits within proximity to the rock art.

Building on an ethnographic model proposed by Rappaport (1999), June Ross and Iain Davidson (2006:312) developed an analytical approach to studying rock art that is concerned with identifying the structural form of ritual. Their model has seven elements: (1) invariance; (2) repetition; (3) scheduling linked to special times; (4) locational selectivity employing

specialized places; (5) formal or stylized behavior; (6) performance by a ritual actor and audience participation; and (7) persistent use of canonical messages. Similarly, Zedeño (2008:267) argued that there are four components common to Native American practices that can be used to define ritual landscapes, sites, and artifacts: (1) the intrinsic qualities of an object and its relationship to properties of power; (2) an object's spatial association with other objects of power; (3) an object's spatial association with powerful landscape features; and (4) an object's spatial association with anything used ritually. These approaches were employed in the current research.

Additional archaeological studies encompassing ritual theory that were significant to the formulation of my hypothesis include works by Lewis-Williams and Dowson (1990), Whitley (2000), and Lisa Huckell and Christine VanPool (2006). Their studies considered the role of shamanic rituals in the creation of rock art. Lewis-Williams and Dowson's (1990) study on San rock art in South Africa led them to conclude that the images were created by shamans in ASC who would enter and leave the spirit world at the walls of rockshelters. They determined that the rock art at these places depicts visions the shaman received from the spirit world, and that "the rock was as meaningful a ritual element" as the image (Lewis-Williams and Dowson 1990:5). Similarly, Whitley (2000) concluded that the majority of the rock art of the California Tradition throughout the non-desert portions of California originated in shaman vision quests, with a Southwestern variant involving puberty rituals. In both cases, the rock art was "fundamentally shamanistic, in that it was based on beliefs and practices concerning the supernatural world, and portrayed images experienced during altered states of consciousness" (Whitley 2000:74). Focusing on the acquisition of ASC, Huckell and VanPool (2006) defined the cultural and ritual use of *Datura* in the prehistoric Southwestern U.S. They noted that the deadly potential of the plant may have "placed the hallucinogen in the realm of specialists (shamans)," but "the plant's ability to mediate between worlds would have made it invaluable to practitioners" (Huckell and VanPool 2006:157-158).

Regional Ethnography of Rock Art, Landscape, Ritual, and Astronomy

Archaeological investigation of the cultural landscape can be informed by the oral history of the Native groups (Gillette 2011:18). An examination of ethnographic records provides a range of information with which to explain the origin, function, and meaning of the rock art at CA-MRP-402 (Whitley 2011:135). Existing ethnographic information that supports the plausibility of my hypothesis was compiled.

Before the collected data are presented, some potential concerns with this approach must be addressed. First, CA-MRP-402 is located on the apparent border between the traditional territories of the Northern Valley

Yokuts and Southern Sierra Miwok, and in an area for which little direct, relevant ethnographic information exists. While there is comparatively more information available on the Yokuts, there is very little pertinent ethnographic information available for either group. The work of Frank Latta (1977), Alfred Kroeber (1925), Gayton (1948), and Stephen Powers (1877) represent most if the available ethnographic information pertaining to the Yokuts, while the efforts of Kroeber (1925), Samuel Barrett and Edward Gifford (1933), C. Hart Merriam (1993), and Powers (1877) provided much of the ethnographic information that exists regarding the Miwok.

The second caution is that that few of the sources/ethnographers personally observed the social, cultural, and religious organization on which they reported (e.g., they elicited "memory culture" from informants), and some information was not obtained directly from the native people. In the case of Powers' (1877) investigations, "information was provided by White settlers who claimed to have 'expert' knowledge" (Gillette 2011:81). A third caution is that typically only a few select members from few ethnolinguistic groups were interviewed. The result was often a broad generalization about groups that failed to document the individuality of villages and communities and the complex social interactions within and between such communities.

Alternatively, the validity and utility of ethnographic information has been argued to be of "little question" by Heizer and Nissen (1973:23). They reasoned that informants who were born before 1850 could have grown to adulthood without seeing a white man. They also asserted that even though Native American people had all been somewhat "acculturated" (Heizer and Nissen 1973:23) by 1910, they had carried on their cultural practices in various ways including language and some daily activities. Thus, the information obtained by the ethnographers was either directly from the Native American personal experiences or that of their parents. The resulting ethnographic literature should, therefore, be considered a significant source of cultural knowledge (Heizer and Nissen 1973:23).

Given the concern regarding the small amount of relevant ethnographic information available and scholarly disagreement about the reliability of that information, I determined that incorporation of additional ethnographic accounts from surrounding native groups in this research might provide a greater data set in which to look for patterns of behavior. If multiple ethnographers recorded the same or similar accounts, it may strengthen our confidence in the reporting. Some anthropological research has already identified similarities between Yokuts and Chumash traditions with respect to rock art (e.g., Hudson and Underhay 1978; Kroeber 1907; Lee 1997:16-17), and as mentioned previously, some researchers (e.g., Moratto 1984:314; Payen 1966:73; Steward 1929:223) noted possible associations between the rock art in the west-central Sierra foothills and the rock art of the Great Basin. Therefore, early ethnographic accounts from the Miwok and

Yokuts of central California, the Chumash of southern California, and the Northern Paiute and Chemehuevi of the Great Basin were included in this research (see Figure 1). The ethnographic data presented below are reports on the creation or meaning of rock art; sacred, special or significant places; rituals, ceremonies and dances; and time keeping, calendars and astronomical observations.

Ethnographic research revealed only a few accounts relating to the creation or meaning of rock art among the Yokuts and Chumash. Interestingly, no mention of rock art was uncovered in Miwok ethnographies. Although Latta's *Handbook of Yokuts Indians* was not published until 1977, he gathered the majority of his ethnographic information during the 1920s, conducting interviews with more than 200 Yokuts people who had settled east of Visalia (Latta 1977:xx). Latta stated that he "discussed these paintings with pioneer white settlers, [and] with parties who claimed to have solved their meanings and with the Indians, themselves," and found the images "were no great phenomena" (Latta 1977:598). After all, the native people painted on other items such as bows, arrows, and buckskins, as well. Yet he went on to state:

> The Wukchumne said that the paintings generally were placed at an important village site, one which was inhabited permanently or at some place where ceremonies were performed. They stated that tribal equipment such as symmetrical bowls or mortars and pestles used for mashing and cooking jimson weed (Datura) roots, and for grinding Yokuts tobacco, or costumes for tribal ceremonies, often were concealed near these paintings. The idea furnished was that the paintings added prestige to the spot, indicated that it was tripne (supernatural) [Latta 1977:600].

The following information pertaining to the significance of rock art sites among the Yokuts and Western Mono was related by Gayton (1948):

> It was believed that most shamans had private caches (pa 'čki) where they kept not only their sacred outfits of talismans, but their wealth, and even the stuffed skins of dead women adorned with beads and other valuable ornaments. The cache would be in a cliff or rock pile; cracks indicated the door, which opened at the owner's command. The rocks were usually painted; in fact, any rock with pictographs was thought to be a cache [Gayton 1948:113].

According to Kroeber (1925:938-939), it was a local custom for Luiseño girls to paint granite boulders at the end of their adolescent rites, but he offered little further interpretation other than noting the possibility that many of the pictures were made by shamans. Much of the ethnographic information on the Chumash was gathered by J. P. Harrington, who began working with Chumash informants in 1912 and collected over 400 large boxes of notes during his lifetime (Hudson et al. 1977:2). Harrington's notes reference two old men at Santa Ynez (San Luis Obispo County) who "painted designs on the walls of a cave in the hills at Christmas-time" (Hudson et al. 1977:6). Hudson et al. (1977:6) later compiled many of Harrington's records, and concluded that the rock art paintings of the Chumash were created by shamans or by people acting under the direction of shamans.

Certain places apparently held more significance than others for the Yokuts. Tachi-Yokuts informant Clarence Atwell reported being "told about the powerful places in the land" (Cummins 1978:67). As noted above, Latta's informants asserted that the presence of rock art indicated a place was "*tripne,"* or supernatural (Latta 1977:600). Another *tripne* place for the Yokuts was the *Lonewis*, or place where the mourning ceremony was held (Latta 1977:684).

Chumash sacred spaces included the *Siliyik,* or ritual enclosure (Hudson et al. 1977:39). Caves were sacred to the Chemehuevi and associated with the acquisition of heredity songs, shamanistic songs and power (Laird 1976:38). The cave itself is an entity, but there are also spirits in the cave; "they were places of great power and mystery" (Laird 1976:38).

The native people of California understood the world to be animated and viewed everything as having life, intelligence, and supernatural power. Shamans were fundamental in this world, as they had the power to perform rituals and communicate with and influence the animate supernatural world. Dancing and singing were part of nearly every public ceremony or ritual (Kroeber 1907:319). However, the ceremonies and traditions observed varied within and between groups.

Nearly every native Californian group participated in some type of mourning ceremony (Kroeber 1907:322, 334). Typically, various villages or groups participated in these ceremonies that lasted one or more nights (Kroeber 1907:335). During this time, various dances and rituals were held, often culminating in the burning of offerings or personal items belonging of the deceased (Cummins 1978:31; Gayton 1948:124; Hudson et al. 1977:47; Kelly 1969:179; Kroeber 1907:335; Laird 1976:41; Latta 1977:216, 226-227; Powers 1877:355). Latta reported learning of "an ancient Sunrise – Sunset Tribe of Yokuts," and visiting an old village where they "hosted the southern Yokuts tribes and met the Rising Sun at the end of five days and nights of dancing, singing, and crying – crying toward the Setting (Dying) Sun during

their annual Mourning Ceremony (Lonewis)" (Latta 1977:216). Powers (1877:355-356) recorded a similar mourning ceremony among the Miwok, wherein people of one or more villages gathered annually and participated in dances, crying, and self-flagellation. This was said to occur in autumn.

Bennyhoff (1977:14) reported first acorn and harvest dances held by the Miwok, and a H*utash* or harvest ceremony was recorded among the Chumash (Hudson et al. 1977:53). "It is the duty of rain to bathe H*utash*, for from this the harvest is born again. Remember! The fiesta of H*utash* is your obligation, and we are going to harvest that which is born again" (Hudson et al. 1977:53). The mourning ceremony was held on the last day of the H*utash* ceremony. A large fire was built, and banners "were burned for those who had already died and for the living who must die" (Hudson et al. 1977:47). The people gathered in silence around the fire and threw in items such as beads and money (Hudson et al. 1977:49).

Other rituals included female adolescent rites among the Miwok (Bennyhoff 1977:14; Kroeber 1907:336), while the Yokuts held male initiation ceremonies involving the use of *Datura* (Kroeber 1907:336; Kroeber 1925:502; Latta 1977:627). Barrett and Gifford (1933:169) and Gayton (1948:118) reported that *Datura* was in general use among the Yokuts, while all groups reported the use of *Datura* by shamans for various rites (Barrett and Gifford 1933:169; Hudson et al. 1977:6; Hudson and Underhay 1978:57, 127; Laird 1976:39; Latta 1977:600; Powers 1877:380). The visions produced by *Datura* were regarded as the source of supernatural power (Kroeber 1907:366; Kroeber 1925:503).

Yokuts and Chumash shamans conducted rituals to make rain (Cummins 1978:31-34, 38; Gayton 1948:112; Hudson and Underhay 1978:57; Latta 1977:637; Powers 1877:372). One account of this practice was recorded among the Tachi-Yokuts:

> Someone in the tribe would take the thunder-rock in his hand and dip it a little way into the water. (He must take care not to dip it all the way into the water as that would surely bring a flood.) He would whirl it around and around over his head, and throw it along the ground toward the west. It would make a rumble and a boom, just like thunder. Then all the tribe would sing the Rain Song, and the Rain Dancer (shaman), in his feather-fringed skirt, would dance. It was very important to have enough rain then, just as it is today [Cummins 1978:48].

Yokuts and Chemehuevi shamans are also said to have conducted ritual rattlesnake dances (Gayton 1948:115, 122; Kroeber 1907:350; Kroeber

1925:504, 517; Laird 1976:37; Latta 1977:647-651; Powers 1877:380), while bear dances were observed by both the Miwok and Yokuts (Bennyhoff 1977:14; Kroeber 1925:516). Barrett and Gifford (1933:224) cited the use of pigments in ceremonies conducted by the Miwok of the Yosemite area.

Other than a brief mention that the Miwok had astronomers (Hudson 1988:24), no accounts of calendars or observance of the sky were found in ethnographic accounts of the Miwok. However, as early as 1910, Merriam began recording many Miwok myths that had been passed down through families, and these provide some insight into the knowledge and beliefs of the Miwok before European contact. From these stories we see how their world was ordered geographically; with a middle world, an upper world, and a lower world (Merriam 1993:11). Each of these worlds was inhabited by the "First People," who had transformed into animals, trees, rocks, stars, and other celestial bodies (Merriam 1993:18). The sky was viewed as a "dome-shaped, canopy resting on the earth and perforated, on the sides corresponding to the cardinal points, with four holes which are continually opening and closing" (Merriam 1993:19). We also know how *W ut'*-too, the Sun, came to set on its path from the east to the west by *Ah-hā'-le*, Coyote-man. According to a tale told by the Southern Sierra Miwok, Coyote-man lived in a valley that was cold and full of fog. One day he walked from the valley to the foothills and saw the Sun and felt its warmth for the first time (Merriam 1993:35). He decided he wanted to have the Sun, so he put the Sun's Keeper, *Ah-wahn'-dah*, the Turtle, to sleep so he could steal the Sun (Merriam 1993:39-40). When Coyote-man took the Sun to the Valley People he was disappointed because they said it was too bright for them to sleep and they did not want it (Merriam 1993:40):

> So he carried the Sun west to the place where the sky comes down to the earth, and found the west hole in the sky, and told the Sun to go through the hole and down under the earth and come up in the east side and climb up through the east hole in the sky, and work in two places – to make light over the Foothills People first, then come on down and make light over the Valley People, and then go through the west hole again and back under the earth so the people could sleep, and to keep on doing this, travelling all the time [Merriam 1993:40-43].

The Yokuts believed *Oop*, the Sun, was a person and that the rising Sun brought new life (Latta 1977:216-217). The offerings thrown into the fire at the mourning ceremony were meant to be payment for the spirits of their departed to cross the last river on their way to the other world "located somewhere in the direction of the setting sun" (Latta 1977:227). We know

that some observance of the sky took place, as the last appearance of Pleiades signaled the time the first salmon would appear (Hudson and Underhay 1978:130). Hudson and Underhay stated that the Yokuts had a calendar similar to the Chumash, in that it was divided into twelve months and ended in a ceremony at the time of the winter solstice "in which members of the intelligentsia drank *Datura*" (Hudson and Underhay 1978:127). The Yokuts and Chumash are also reported to have believed the celestial beings played a gambling game each night, and at the end of the year the winners of each game for the year were tallied to see who had won most often. The winner was said to determine if the upcoming year would bring an abundance of rain and food, or if it meant a year of death and famine (Hudson and Underhay 1978:32-33).

Powers recorded a myth told to him by a Palligawonap man—a native group related to the Paiute—that tells of coyote riding the sun; coyote got on and "started up a path in the sky which was marked off into steps like a ladder" (Powers 1877:393,396). Northern Paiute stories compiled by Kroeber and W. L. Marsden in the second half of the nineteenth century speak of the Sun as the father and creator of everything (Heizer and Hester 1972:40). The Sun gave the Moon an important responsibility:

> The Sun said to Moon, 'You should predict all things.' At that time the Moon caused our people to see things by herself. 'You should cause these plants to be shown; you should show the plant season and when the seeds come. You should show them the kowse and the camas. Then after awhile the people will eat them.' She showed them when all of the good berries came ripe. She showed them all the plants and things by herself, appearing in the sky to show the children of our people, and our people saw her [Heizer and Hester 1972:44].

Months were counted by the moon, "summer months were unnamed; 'the real months they count are winter and spring; they don't care about counting Summer'" (Kelly 1932:152). The Surprise Valley Paiute stated that January was called *Tamü'ni-taba*, or "return of the sun" (Kelly 1932:152). Several of the winter constellations were named as well, and the Milky Way was thought to be a trail for the dead to the south (Kelly 1932:153).

For the Chumash, the Moon, or *'alah tin*, was known for its cleansing powers (Hudson et al. 1977:37) and was connected to cycles relating to the months, the seasons, the tides, menstruation, and pregnancy (Hudson et al. 1977:102). The Sun was their "chief god" who, after his journey from east to west, "goes to rest in the hole in the sand dollar, and leaves its rays outside while the sun rests within" (Hudson et al. 1977:37). Hudson et al. (1977:105)

also noted frequent references to the "shadow of the sun" in Harington's notes.

The Chumash had *'alchuklash*, shaman astronomers, who were the only people who "had the ritual knowledge to use power for maintaining, directing, and controlling man's interactions with his celestial, physical, and social environments" (Hudson and Underhay 1978:29). The *'alchuklash* were responsible or observing and interacting with the celestial beings. Observations on the eastern horizon just before dawn or on the western horizon just after sunset could be used to determine the sun's position on the ecliptic and predict the seasons (Hudson et al. 1977:103). A much more accurate observational method would be required for determining the actual date of the solstice; "this might involve use of a fixed observing point, noting the sun's daily position in relationship to local landmarks" (Hudson et al. 1977:105). Either way, the observations of the *'alchuklash* afforded a celestial calendar by which the Chumash could determine the seasons and know when it was the proper and necessary time to perform certain rituals that involved interaction with the celestial beings and ensured balance (Hudson and Underhay 1978:143-144), such as the winter solstice ceremony and the H*utash* festival. As a part of these rituals, the *'alchuklash* created rock art (Hudson and Underhay 1978:58).

The winter solstice ceremony was typically held around December 24, and marked the start of the New Year (Hudson et al. 1977:56, 60). The *'alchuklash* took *Datura* to observe the solstice (Hudson and Underhay 1978:57). This allowed them to see the future (Hudson and Underhay 1978:57) and manipulate cosmic forces so that they could pull Sun back to the north solstice (Hudson et al. 1977:105), possibly through the creation of rock art (Hudson and Underhay 1978:58). After the solstice had been observed, the event was celebrated by the public. One of the first ceremonial events was the erection of the sun stick (Hudson et al. 1977:56).

The sun stick was a round stone with a hole through the center mounted on a stick. The stone represented the earth and was typically painted green-blue like a fresh sand dollar, with a crescent shape to represent the moon. The stick on which it was placed represented the center of the earth. The sun stick was erected "in the center of the earth" (Hudson et al. 1977:57), "under the four cardinal directions which are instruments of the H*utash*" (Hudson et al. 1977:56).

"H*utash* is the mirror of the Sun, and the Sun is the mirror of H*utash*" (Latta 1977:53). H*utash* is Venus, the Earth, and the center of the Earth (Hudson et al. 1977:36, 57). The H*utash* ceremony was held at the end of the harvest season, toward the end of September; because the skies were clear then (Hudson et al. 1977:43; Hudson and Underhay 1978:46). This would have been about the time of the autumnal equinox, although no direct connections between the H*utash* ceremony and this day were found in the

ethnography. At the closing of the H*utash* ceremony, a sun stick was erected where the mourning goods had been burned (Hudson et al. 1977:48). According to Hudson et al. (1977:24), the Chumash played a game of *pi* to predict if it would rain five days before or after the equinox, and Hudson and Underhay (1978:126) state the equinox may have also been the start of a New Year.

Hudson and Underhay's research led them to conclude some rock art was created by shamans who were "astronomer / astrologers," and that "it is possible a few of the paintings were done during their ritual interactions with celestial beings, including Sun" (Hudson and Underhay 1978:58).

Chapter Summary

The current research applies landscape and ritual approaches — combined with regional ethnographic information on rock art, special places, ritual, and the cosmos — to gain insight into the activities that took place and where at CA-MRP-402, what attracted people to mark and transform this place, and the purpose or meaning of the rock art. It is my hypothesis that this cultural landscape "brings together the social and material worlds, observing, also, that peoples 'engagement with place over time have [sic] created a material record' that is meaningful to landscape studies" (Gillette 2011:18). The posited ritual creation of rock art and possible astronomical practices were the "engagement with place" that formed this "material record" consisting of at least 68 petroglyph panels and a posited astronomical observatory at CA-MRP-402. The following chapter reviews the field, laboratory, and archival methods used in this contextual landscape analysis of CA-MRP-402.

Given that CA-MRP-402 is a fairly undisturbed native site containing a high concentration of rock art and few other archaeological remains, it is ideal for a landscape analysis. This approach places this site in the context of other rock art sites in the surrounding area and identifies what ancient activities took place and where, the significance of this particular place to those who created the images, and the role of the rock art in the cultural landscape.

Chapter 3: Research Methods

Introduction

This chapter reviews the previous archaeological research at CA-MRP-402, presents the methods employed in the current research, and discusses how those methods relate to the theoretical orientation of this study. This study included archival research, rerecordation of the site, survey, and excavation.

Previous Archaeological Research at CA-MRP-402

Little archaeological work was undertaken in the western Sierra Nevada foothills until the 1970s, and then the vast majority of the fieldwork concentrated on simply locating and recording sites. Much of this work was completed by CRM companies, which labored to record sites before the sites were destroyed by impending developments such as the construction of dams and hydroelectric generation facilities.

Portions of the property on which CA-MRP-402 is located were first surveyed by Mohr and Freed (1951) for River Basin Surveys, Smithsonian Institution in 1950. The survey was conducted in order to determine the archaeological resources of several proposed reservoir areas. CA-MRP-402 is adjacent to a creek in one of these reservoir areas, but was not observed by Mohr. A dam was subsequently constructed southeast of CA-MRP-402, and the site is now within the maximum pool level of the reservoir created by this dam.

A proposal was made to increase the height of this dam in 1975, and a second archaeological survey of the reservoir area encompassing CA-MRP-402 was completed. Clelow (1976) examined 100 percent of the total reservoir area, or roughly 380 acres, and recorded 12 archaeological sites, including CA-MRP-402. Clelow noted CA-MRP-402 consisted of bedrock mortars (BRMs), a cluster of pestles, and a vertical petroglyph panel on the west side of the creek (Clelow 1976:37). Subsurface tests and precise documentation of sites were recommended. The dam was not altered at that time, but in 1981 the proposal once again gained interest and a third archaeological survey was required.

The subsequent intensive five-day cultural resource survey was undertaken by Peak and Associates (1982a:30), who assessed 836 acres within the boundaries of the proposed reservoir enlargement area. At CA-MRP-402, they documented 68 petroglyph panels, 57 BRMs on 17 outcrops, and three lithic scatter areas. A sketch map of the site was prepared, illustrations were made of the petroglyph panels and, and three auger tests

were completed. One auger test revealed the southeast lithic deposit measured 55 cm in depth and contained debitage, ground stone tool fragments, and fire-cracked rock (Peak and Associates 1982a:65). Thirty sites within this survey area were recommended as eligible to the National Register of Historic Places as an archaeological district, and the proposed dam alteration was deferred (Clay 1993:1; Peak and Associates 1982b:25).

Clay was hired in 1992 by the U.S. Army Corps of Engineers to inspect the sites in this area and assess impacts that had occurred after 10 years of probable damage caused by impounded waters. The final report included an updated sketch map documenting a small amount of erosion to the west bank and a few photographs of CA-MRP-402. Clay (1993:15) concluded the site had not changed significantly since 1982. No further archaeological investigations were undertaken at this site in the last 20 years. Therefore, a more recent assessment of this site was necessary as part of this research.

Records Search

In order to place CA-MRP-402 within a cultural landscape, it was necessary to put the site within the context of other rock art sites in the surrounding area. To locate neighboring documented rock art sites, a methodical search of the state historic resource records at the Central California Information Center at California State University, Stanislaus, was completed. The Information Center provides record logs of all the site records and reports on file, organized by county. The major features at each site such as a village, house pit, and rock art are noted in the log. The individual site records are divided by topographic quadrangle or map sheet location, and filed numerically. The record logs for all of Merced and Mariposa counties were searched for any note of rock art (i.e., rock art, petroglyphs, pictographs, or cupules), and the corresponding site records were located and examined.

Determining if cupules should be included in this rock art survey proved to be a challenge. Some site records recorded small and shallow depressions created in rocks as cupule mortars, while others recorded them as rock art, and still others merely noted the presence of cupules. Drawings and photographs were not included in many of these records. Therefore, this research included cupules recorded as rock art and cupules documented on vertical rock surfaces. Vague notes of cupules that offered no additional context, reports of cupule mortars, and cupules recorded on horizontal surfaces that may have had milling purposes were disregarded.

Furthermore, every site record filed within the 12 topographic sheet areas including and surrounding CA-MRP-402—or a 1790 km² area—was searched for documentation or records of rock art. It is worth noting that only 19 percent of this entire area has been subject to archaeological survey, and this attests to how little archaeological work has been done in this

region. Unpublished site records provided the majority of the information on the rock art sites included in this study.

The library at the University of California, Berkeley was also visited specifically to access a copy of Payen's (1966) thesis, which provided a good—and the only—review of the rock art sites and styles located in the northern Sierra Nevada.

Finally, an attempt was made to locate additional rock art sites through knowledge of local landowners. Unfortunately, inquiries made of residents of the local community provided very little new information. Only a single pictograph that had not been previously documented or archaeologically recorded was reported to exist within the study area.

Field Research

To identify the actions that took place at CA-MRP-402, to understand how this site fit into the cultural landscape of which it was a part, and to examine how the cultural landscape attracted people to utilize this landscape, field research included survey of the site and surrounding cultural landscape, recordation of the rock art and possible cultural astronomy feature at the site, and excavation of a test pit.

Mapping. Field studies began with the surface inspection of CA-MRP-402 to define the extent of the cultural deposits and features and update the previous site record. Data was recorded on artifacts, ecofacts, soil and midden deposits, vegetation, and disturbances. Site overview photographs were also taken. The previous sketch map of the site generated by Peak and Associates (1982a) was drawn to scale and documented the location of archaeological features, watersheds, and site boundaries, but did not include elevations. Therefore, a Sokkia SET530R3 Total Station was used to record the topography of the site and generate a detailed contour map including cultural and natural features and site boundaries. Points were recorded in a grid pattern approximately every three meters and at prominent site features.

A Garmin eTrex Vista Global Positioning System (GPS) was also used to record significant data points and elevations at CA-MRP-402. The GPS data were uploaded into a private Google Earth file along with locational data of the other rock art sites in eastern Merced and western Mariposa counties. This provided a broad view of site locations, possible associations, and lines of sight. Although this application has its limitations, it proved useful for gaining a tangible understanding of the geographical landscape and site context.

Photodocumentation. Since the rock art at this site had already been drawn, photography was chosen as the primary means to record all the images. The use of a Nikon D60 digital camera permitted the quick and

accurate recording of a large number of images from various perspectives and angles. Following recommendations of Whitley (2011), close-up shots of individual elements and symbols were taken, as well as photographs of entire panels and groups of panels both with and without a scale.

The visibility of the petroglyphs is greatly affected by light and atmospheric conditions, which can make the act of locating and recording them quite challenging. Therefore, the photographs were taken over many days at various times; this allowed for recording images when they were most visible. In fact, some photographs were even taken at night with the use of a Celestron Powertank portable light with a 4.8V / 0.5A krypton bulb. Shining a light at an angle over the petroglyphs created shadows that accentuated some of the images. This technique was more useful with the images that were pecked deeper into the stone, and it appeared to "wash out" the shallower images. However, use of the lights did create some challenges: someone had to hold the bulky light at the appropriate angle while the photographs were taken, the luminosity faded quickly, and the battery died in less than two hours. Any previously unrecorded petroglyph panels were numbered in a continuous sequence and added to the site map, and the drawings were updated, as necessary. An updated site record has been prepared for submittal to the Central California Information Center. Photographs of each panel are included in Appendix A.

Recording the Skyscape. Between 2009 and 2013, numerous trips were taken to CA-MRP-402 on the morning of and around the autumnal and vernal equinoxes, the summer and winter solstices, and additional random mornings to record the position of the sunrise with respect to cultural features and rock art panels, any possible cultural features associated with astronomical events, and the potential relation of astronomical events to the rock art panels. During these visits, compass readings, digital videos, and copious high-resolution digital photographs of the site were taken from various points to record the petroglyphs and any visual phenomena from multiple perspectives. The results of these efforts are presented in Chapter 5.

Excavation. A 1-x-0.5-m test pit was placed at CA-MRP-402 in a clearing under a wall of rock art panels. It was anticipated that data obtained from the test pit would provide information on the activities undertaken here and the age of the deposit. The test pit was excavated in 10-cm arbitrary levels since there was no visible natural or cultural stratigraphy. When a depth of 30 cm was reached in the unit, the pit was expanded to 1-x-1-m in order to gain a better understanding of the site formation. The previously unexcavated portion was excavated down to 30 cm, as well, at which point the unit was reduced back to the original 1-x-0.5-m to focus on recovering temporally diagnostic artifacts or datable material at greater depth. The first 30 cm of excavated sediments were dry screened

through a 1.5-mm (1/16-inch) screen and then through a 3-mm (1/8-inch) screen, but the 1.5-mm (1/16-inch) screen was found to be unnecessary and its use was suspended when the unit was expanded in size. The rest of the excavated sediments were dry screened through a 3-mm (1/8-inch) screen, and 5-x-10-cm soil samples were taken from the west wall at 2-cm intervals. The unit was terminated at a depth of 50-54 cm in the uneven, tightly packed layer of cobble rocks at this depth. The results of the excavation are presented in Chapter 4.

Survey of Surrounding Landscape. In order to gain a contextual understanding of how CA-MRP-402 fit into the cultural landscape, a 2 km^2 judgmental survey was conducted in the area surrounding the site. This survey concentrated on prehistoric sites; historic components indicative likely of non-native use were only documented if they disturbed prehistoric sites. Additionally, in order to acquire an even greater contextual understanding of how CA-MRP-402 fit into the greater cultural landscape, survey of some nearby rock art sites in the Sierra Nevada foothills was also conducted. At rock art sites, the overall orientation of the rock art panels was noted, as well as the general elements and styles present. Other physical attributes considered were erosional processes, type of rock, and damage (natural or otherwise). As at CA-MRP-402, a Nikon D60 digital camera was used to record the images. Associated cultural features such as BRMs, possible housepit depressions, surface artifacts, ecofacts, and middens were documented.

Physically accessing other rock art sites in eastern Merced and western Mariposa counties presented a challenge as they are all located on private property and some sites have been impacted by dam construction. Determining who owns the land and finding a way to contact the landowner proved difficult in some cases, and some attempts to contact property owners were unsuccessful. Site records were utilized for the analysis of the sites that could not be accessed personally. Google Earth was also used to explore the context of sites that could not be accessed. Google Earth provided a fairly good understanding of the general landscape and views of the horizon, but it was not good for detailed analysis.

Analysis Methods

Artifact Analysis. Artifacts found on the surface can help define past activities. However, consideration should also be given to the fact that surface finds likely represent the most recent activity that occurred at the site. The artifact or ecofact class and basic metrics such as length, width, thickness, and weight of surface finds were recorded. Few surface finds were observed. They are discussed further in the following chapters.

DStretch. The use of digital photographs for image documentation also allowed for numerous editing options for enhancing the rock art images. Several photographs of the rock art were analyzed using DStretch, a computer program created by Jon Harman for the digital enhancement of rock art images. For example, this program can accentuate pictographs that are nearly invisible to the naked eye. DStretch enhances hue differences, so it works best on pictographs, but it can be applied to any color RGB image and such images are the format used by consumer digital cameras. The program was used in the current study to search for traces of pigment around the petroglyphs. The DStretch program also proved to be a useful tool for accentuating some of detail of the petroglyphs and making them easier to view.

Chapter Summary

The methods employed in this research included archival research, field survey of both MRP-402 and the surrounding area, photodocumentation of images and site-specific effects of astronomical events, and limited excavation that provided a greater contextual understanding of the cultural landscape of the site. These efforts resulted in a compilation of the documented rock art sites located in Merced and Mariposa counties, an updated site record of CA-MRP-402, a detailed contour map, detailed image records, and a small subsurface collection.

Chapter 4: CA-MRP-402: Background, Data and Observations

Figure 2. CA-MRP-402: view from the east bank.

Introduction

Site CA-MRP-402 site is located on private property in Mariposa County, in the Sierra Nevada foothills of central California. The site measures 84 m by 132 m, and is situated in a narrow canyon at an elevation of 124 to135 m. A seasonal creek flows north to south through the middle of the site. This is one of the few areas where the creek bends and flows in a general north-south direction through a low canyon, and the only place within at least 6 km where one is afforded with an unobstructed view of the eastern horizon.

This chapter presents the environmental background, ethnographic background, regional archaeological background, and a detailed description of the cultural features at CA-MRP-402. The focus of this chapter is description, with interpretation of the data presented in the next chapter.

Geologic and Environmental Context

A natural geologic fold at the north end of the site creates an area where the creek is significantly narrowed by exposed bedrock before widening into a perennial pool in the center of the site, and this fold affords a physical and visible change in geology from the softer shale and slate rocks typical to this region (Davies 2013). On the east bank, a low, rolling hill (140 m elevation) curves around the pool to create a natural, though steep, amphitheater. To the south, the creek continues to flow through the canyon about 0.5 km before meandering again to the west and disappearing from view. Steep hills rise to an elevation of 185 m from the west bank (Figure 2). Looking north from CA-MRP-402, the canyon opens into a small valley (120 to 140 m elevation) in the foothills.

Millions of years of geologic history have resulted in the varied topography of the foothill woodland of the Sierra Nevada. Subduction created the batholithic and granitic rock that comprises much of the Sierra Nevada. Uplift of this rock slowly created the Sierra Nevada. The Sierra lifted and tilted west, resulting in the steeper slopes characteristic of the eastern side and the gradual slope of the western side. Over time, the older layers of sedimentary rock that lay over the mountains eroded away and deposited in the Central Valley. More recent glaciation resulted in further erosion and deposition (Storer and Usinger 1963).

Some remnants of older prebatholithic rocks can be found on the highest peaks of the southern Sierra Nevada, but more are found in lower elevations of the western front, including within the current study area. These ancient rocks include metavolcanic rocks and metasediments such as marble, quartzite, slates, and schists containing pyrite (Hull 2007; Storer and Usinger 1963). Other mineral resources of archaeological interest found in the Sierra foothills include steatite, basalt, clay, hematite, and chert (Moratto 1984). The geology in the area of CA-MRP-402 has been mapped as Upper Jurassic-Lower Cretaceous marine sandstone and shale, minor conglomerate, chert, slate, limestone, and minor pyroclastics (Jennings 1977). The valley where the site is located is a complex folding structure that trends 310 degrees and had a dip of foliations that ranges from 80 to 90 degrees off the vertical. Chiastolite associated with meta-greenstone and metamorphosed augite-andesite tuff comprises the margins of the folds, and meta-granite comprises the cores of the folds (Davies 2013:1).

The Sierra Nevada extends approximately 640 km (400 miles) in length and varies from 80 to 130 km (50 to 80 miles) in width. Summits increase in elevation from north to south, reaching nearly 2,740 m (9,000 ft) in the north, about 3,960 m (13,000 ft) in the Yosemite region, and more than 4,267 m (14,000 ft) in the south around Mt. Whitney. The eastern slope of the Sierra, particularly in the south, exhibits a steep escarpment, while the

western slopes are dissected by deep stream valleys with steep slopes, and the lower foothills slope gradually into the flat Central Valley (Storer and Usinger 1963).

Eleven large river systems have cut deep canyons into the western slope of the Sierra, most flowing southwest. The rivers originate as streams from snowmelt in the high elevations and drain into the Central Valley. North-south travel was and is hampered by the deep and rugged river canyons, with the intervening ridges easing travel east and west. The rivers of the western slope of the Sierra served to define traditional territories of Native people in the area (Hull 2007:178).

Before the construction of California's flood control and aqueduct systems, the annual snow melt turned much of the Central Valley into wetland areas and fed Tulare and Buena Vista Lakes. The seasonal flooding produced wetland vegetation including coarse grasses, tules, and cattails, valued by native people as food and building material (Moratto 1984; Storer and Usinger 1963).

Temperatures in the Sierra Nevada foothills and Central Valley are cooler in the winter and hotter in the summer, with winter averages between 4 to 10˚C (40 to 50˚F) and summer temperatures typically higher than 38˚C (100˚F). Precipitation is received from air masses flowing east off of the Pacific Ocean and rising over the Sierra Nevada. The mean annual precipitation is 50 cm and snowfall is negligible (Moratto 1984).

The varying topography and slope of the Sierra are responsible for the development of diverse biotic zones. Today, six major vegetation communities are identified on the western slope of the Sierra Nevada, including the foothill woodland, chaparral, yellow pine forest, lodgepole-red fir forest, subalpine forest, and alpine zone (Hull 2007; Schoenherr 1992). Research revealed that the majority of rock art sites in Mariposa County fall within the foothill woodland zone where California oaks, buckeye, willow, and grasses are most common. In the past, native annual and perennial plants and grasses would have been found throughout this zone, but these have been almost completely overtaken by non-native species (Storer and Usinger 1963). The foothill woodland zone lies below snowline in the mountains and above the fog and floods typical in the Central Valley, offering a more hospitable environment during the winter months. As the temperatures rise and the snow melts during the spring and summer, different vegetal resources become available to people and animals within each biotic zone, likely prompting movement into the higher elevations in the spring and summer and a return to the lower elevations in the fall (Hull 2007:178). Movement in and out of the Central Valley would have also been easier during the drier summer seasons.

Pollen stratigraphic records indicate that by the middle of the Holocene (ca. 1000 cal B.C.), current climate patterns and vegetation

communities were similar to those of today. However, the frequency and abundance of various plant species within biotic zones has continued to change (Hull 2007; West et. al. 2007). Additional data suggest droughts affected the Sierra Nevada at ca. A.D. 892 to 1112 and A.D. 1210 to 1350 (Hull 2007).

Biotic and non-biotic resources that would have been readily accessible at CA-MRP-402 include quartz, oak, buckeye, willow, grasses, oats, tarweed, soaproot, and *Datura*. Animal life included deer, bobcat, cougar, coyote, rabbit, beaver, ground squirrel, lizards, rattlesnake, and fish, and there would have been fall and spring salmon runs before the construction of several dams and canals downstream from this site.

Ethnographic and Cultural Context

CA-MRP-402 is situated on the border of the Northern Valley Yokuts and Southern Sierra Miwok traditional territories, in an area for which very little direct ethnographic or archaeological information exists. Wallace (1978) assigned this area to the Northern Valley Yokuts. Similarly, Latta (1977) determined that Yokuts occupied the San Joaquin Valley and the adjoining foothills (also see Rosenthal et al. 2007). However, according to Kroeber (1925), the foothills were inhabited by the Southern Sierra Miwok and the Northern Valley Yokuts occupied the San Joaquin Valley, while the first foothills marked the dividing line between the two groups. While the published ethnographic data alone appear conflicting, today it is generally understood that there were no boundaries in any fixed sense (Hull 2007:180); thus, it stands to reason that people of both ethnolinguistic groups may have occupied this area at coeval or different times.

Peak and Associates (1982a) consulted eight Native American representatives for information to include in their archaeological survey of CA-MRP-402 and the surrounding area. All eight representatives consulted stated they were unaware of the ethnic identity of the original inhabitants of the area. Furthermore, they stated they did not know of any village sites, gathering sites, or sacred sites in this area (Peak and Associates 1982a:137-138).

Although they spoke in different dialects, the languages of both the Miwok and the Yokuts belong to the Yok-Utian subfamily (Golla 2007) of the Penutian family (Golla 2007). Both groups had similar subsistence practices and a nearly identical material culture and social structure (Clelow 1976). The settlement patterns of both groups were based on environmental variables and resource availability; individuals or groups are believed to have moved as the seasons changed in order to collect various resources as they became available (Barrett and Gifford 1933:137). Where springs and

perennial pools are found, however, some sites in the foothill woodland zone may have been inhabited permanently (Latta 1977:600; Lee 1997:16).

Acorns were a primary food staple supplemented by hunting, fishing, and gathering seeds, berries, grains, nuts, and edible roots. Deer, elk and antelope were plentiful (Hull 2007; Moratto 1984), and the watercourses, including the creek flowing through CA-MRP-402, were crowded with Chinook salmon in the fall and spring (Yoshiyama et al. 2001). Plant foods were processed using pestles in bedrock or cobble mortars, and baskets served for cooking and storage. Resources not available locally, such as obsidian and marine shells, were evidently acquired through trade with neighboring groups (Hull 2007; Moratto 1984). The recent archaeological records of Miwok and Yokuts groups are very similar, and their patterns have not yet been fully defined (Moratto 1984).

The northern Kuksu and southern Toloache religious cults also overlapped in this region. It is unlikely that both religions were practiced simultaneously; it may be that only parts of each religion were preserved, or one may have been reduced to a lesser rank (Kroeber 1922:304). In any event, certain ceremonies are reported to have been celebrated by both the Miwok and Yokuts. Each ceremony afforded its own purpose and associated traditions, with some variation from group to group.

Shamanism was practiced by most native societies of California (Kroeber 1922:299; Levy 1978; Wallace 1978), and the shamanistic practices were "fairly uniform" (Kroeber 1922:39). Shamans took a leading role in many rituals and ceremonies, and they possessed the power to heal or cause sickness (Kroeber 1922:299), keep peace, and preserve culture (Cummins 1978). The ritual and ceremonial use of *Datura*, also known as *Toloache* or Jimson Weed, has been documented among both the Yokuts and Miwok (Levy 1978; Wallace 1978).

In the Yokuts ethnographies, rock art was attributed to supernatural places, important village sites that were inhabited permanently, places where ceremonies were performed, or locations where equipment and costumes for ceremonies were stored or a shaman's cache was hidden (Gayton 1930, 1948; Latta 1977). Similarly, Chumash rock art is most frequently reported to have been made by shamans or as a part of adolescent rites ceremonies (Hudson et al. 1977; Kroeber 1925).

Although rock art is found in areas traditionally considered to be inhabited by the Miwok, as Payen (1966:80-81) noted and as my own research has confirmed, no mention or recognition of petroglyphs was found in any of the ethnographic materials reviewed for this study. This absence could be due to the fact that "the civilization of the Miwok is imperfectly known" (Kroeber 1925:445), or there may be misinterpretations of the ethnography. Alternately, it is possible that the petroglyphs were not made by the Miwok (Moratto 1984:314).

Archaeological Context and Site Chronology

Limited archaeological research has been completed in the western foothills of the Sierra Nevada and the archaeological record for this area has not been fully defined. Only two excavations have been completed relatively close to CA-MRP-402. The first was approximately 6.5 km southeast at CA-MER-92. According to the site record, the excavation was completed by Merced College archaeology students under the supervision of Instructor Charles Ostrander in 1968. The excavation uncovered two portable mortars, manos, fire affected rock, "worked chips and flakes," and "obsidian and seeds" (Cowper 1968a:1). Petroglyphs were reported 0.8 km (0.5 mile) away, but no drawings or photographs were included with the report. The second excavation was approximately 4 km south at CA-MRP-892/H. According to the site record, the excavation was completed by Merced College archaeology students in 1987 under the direction of Instructor Marcus Arguelles and supervised by Les Harville. This site contained historic materials and prehistoric house pits, lithic debitage, ground stone, quartz crystals, chopping and scraping tools, and fire-cracked rock (Harville and Lucas 1987). The prehistoric artifacts unearthed at these two sites are of similar types as those reported at other archaeological sites in traditional Miwok and Yokuts territory, and no absolute dates were established for either site. Therefore, these excavations did not yet yield any definitive information on the ethnolinguistic group(s) who occupied this area or their cultural activities. Nonetheless, these studies are discussed here as they represent the rare of archaeological data that are available for the area.

Based on excavations at Buchanan Reservoir and Hidden Reservoir, which are located more than 25 km south of the current study area, Moratto (1984:315-326) identified three phases of Chowchilla River prehistory for the south-central foothills. The oldest is the Chowchilla Phase dating from 300 B.C.-A.D. 300 which has been identified as a period of opulence, while the Raymond Phase (A.D. 300-1500) reflects a time of instability and change. The ancestral Southern Sierra Miwok appear to have spread and flourished during the Madera Phase (A.D. 1500-1850). It is possible these same phases may be present at CA-MRP-402, but a temporal association between CA-MRP-402 and these neighboring archaeological sites has not been confirmed in this or previous research. It is also possible that the CA-MRP-402 and these neighboring sites embody different phases of occupation.

Site Description

Not much has changed at CA-MRP-402 since Clay's (1993) assessment of the site in 1992. There is additional lichen growth on some of the petroglyph panels, and unfortunately, between the spring and fall of 2010, an

unknown individual committed an act of vandalism and scratched an additional mark onto one of the panels. This newer mark obliterated small parts of what appear to be, given the amount of patina they exhibit, some of the older petroglyphs at the site (Figure 3). This damage, apparently done by trespassers, attests to the need to record and protect this and other archaeological sites in the area.

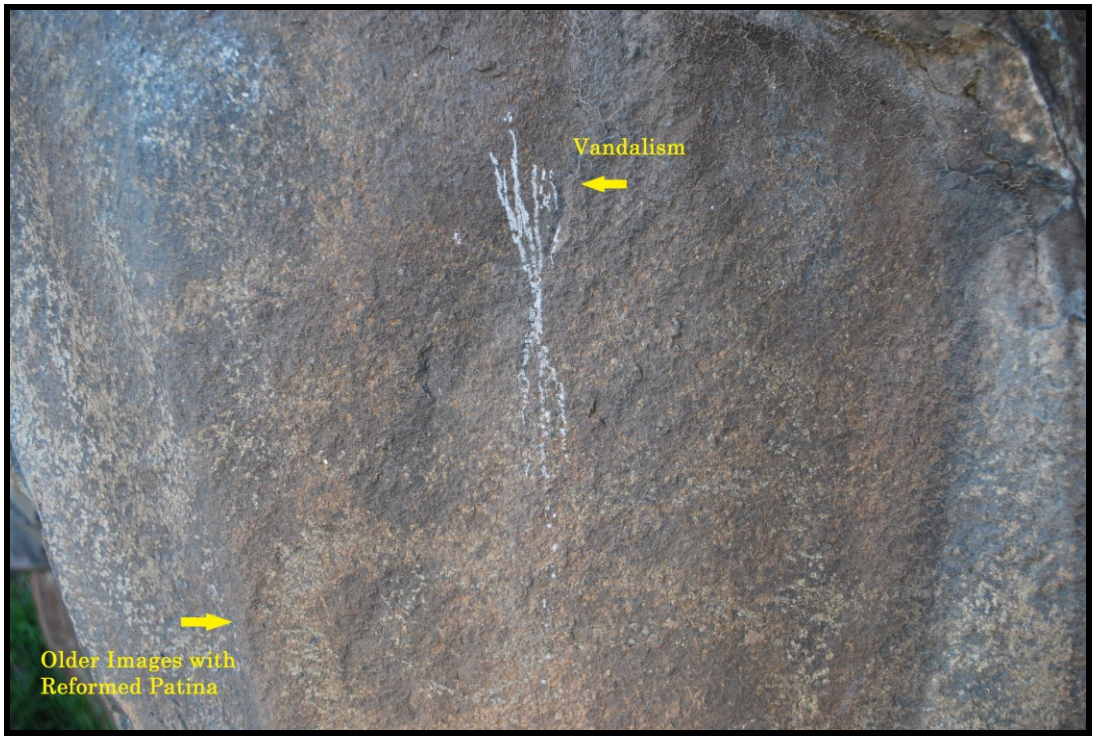


Figure 3. A newer mark apparently added by a trespasser.

Site investigations completed for the current research revealed a high concentration of white quartz cobbles and debitage on the surface in three lithic scatters in the northeast site area, and several pestles scattered along the east bank. These artifacts were left in situ. The presence of three lithic scatters indicates that stone tool production took place at the northeast end of the site. However, while there are natural quartz veins at this site, the concentration of quartz debitage is unusual and its basis is unknown as quartz was not typically the preferred material for the production of stone tools.

There are 33 BRMs on eight outcrops on the east bank, with mortar cups ranging from 2 to 34 cm in depth; half of the cups measure greater than 10 cm in depth and some still hold pestles (Figure 4). There are 24 additional BRMs on nine outcrops on the west bank that measure from 2 to 12 cm in depth; 10 measure less than or equal to 4 cm in depth. Even though there are plenty of boulders that appear suited to this purpose on the west bank,

the majority of the deeper mortars are located on the east bank. The different mortar depths may be indicative of different functions (Barrett and Gifford 1933:208; McCarthy et al. 1985).

Figure 4. Some of the bedrock mortars on the east bank.

It appears the rock art was pecked into the rock surface, and the images are dispersed across the bedrock boulders that line both sides of the creek. Some of the rock art was pecked through a natural red patina that has formed on the surface of many of the rocks. The petroglyphs demonstrate varying degrees of weathering, and lichen has grown over some, making it challenging or impossible to discern all or portions of some images. There is overlap of some of the designs, though it is not possible to determine how much time passed in between the creation of the overlapping elements. There is no visible pigment on or around any of the rock art and the use of DStretch did not reveal any pigments. The potentially significant age of some images is evident by the patina that has formed over them. There also appear to be at least two distinct methods used to create images within the site. The first is indicated by fine, deep lines and appears more controlled and deliberate, exhibiting effort in their construction (Figure 5). The second form is more haphazard, with less definitive lines and more obvious peck marks (Figure 6). The elements created by both methods include straight, curved and wavy lines, circles, connecting circles, divided circles, rayed disks,

parallel lines, grids, and amorphous elements. The design elements are too abstract to state whether or not there are any definitive anthropomorphic or zoomorphic images (see Appendix A).

Figure 5. Fine, deep lines.

Figure 6. Obvious peck marks.

Five of the petroglyph panels recorded by Peak and Associates (1982a) were not relocated, yet an additional 35 previously unrecorded petroglyph panels were discovered during the current research, establishing a total of 103 petroglyph panels at CA-MRP-402, the majority encompassing multiple images. There were also several elements discovered that were not observed in the previous panel drawings. To facilitate the discussion, the archaeological features of the west and east bank are described separately below.

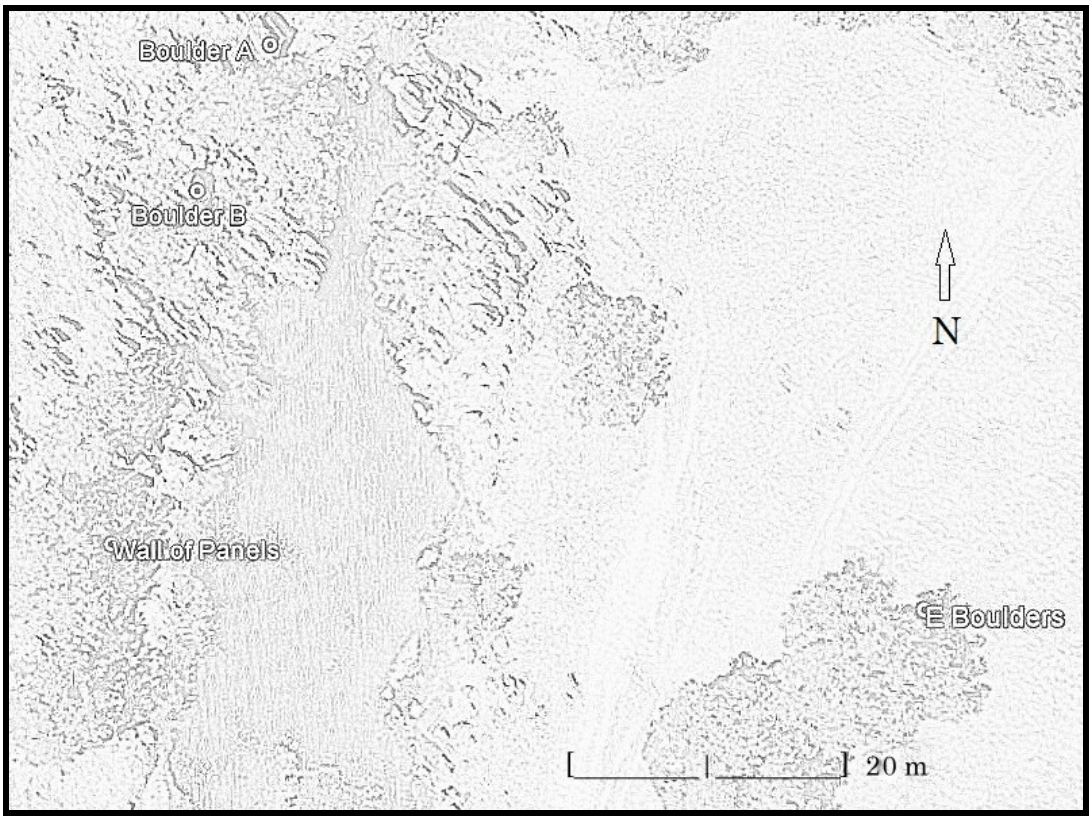


Figure 7. An aerial sketch of CA-MRP-402 depicting the location of the prominent cultural features.

West Bank. The most prominent features on the west bank are two large boulders at the north end of the site that exhibit numerous petroglyphs, and a rectangular clearing in the middle of a cluster of large boulders that appears of cultural rather than natural origin (Figure 7). The first large boulder (Boulder A) is located at the north end of the site and measures approximately 3 m in height by 4 m in width. On the boulder is a northeast-facing circle with a cross in the center that measures 35 cm in diameter, another 11-cm-diameter circle with a cross in the center of the boulder under an overhang on the northeast face, and several geometric designs including grid patterns on the southeast and southwest faces of the boulder. A patina has formed over the circle designs so that they are barely discernible, attesting to their relative age (Figure 8).

The second large boulder (Boulder B), roughly 2.5 m in height by 2 m wide is also located on the north end of the site 11 m south of Boulder A. Boulder B has petroglyphs on every face, especially the top surface that is entirely covered in abstract designs, including one unique 30-cm-diameter circle with an abstract design in the center. Both the more controlled and more haphazard methods of creation are represented. Lichen has covered some of the petroglyphs on the top, horizontal surface (Figure 9).

Figure 8. A patina has formed over this circle design on Boulder A.

Figure 9. Lichen has grown over some of the images on top of Boulder B.

A 3-x-5-m clearing located in the middle of a cluster of large boulders on the west bank is the most unusual feature at CA-MRP-402. The clearing is 30 m south of Boulder B and 41 m south of Boulder A. Along the west edge of the clearing are four large east-facing boulders that form a wall of rock panels. The wall of rock panels measures approximately 3 m in height by 3 m in width and has four triangular shaped niches spaced 50 cm apart along the base. The first niche to the south measures 50 cm wide, 50 cm tall, and 50 cm deep; the second niche to the north is 50 cm wide, 50 cm tall, and 1 m deep; the third niche is 50 cm wide, 1 m tall, and 1 m deep; and the fourth, smaller niche to the north is 25 cm wide, 25 cm tall, and 30 cm deep. The niches are clear of any rocks or debris. Numerous, varied abstract petroglyphs are dispersed across the entire wall of rock panels. This includes three vertical "ladder" designs and a 23-cm-diameter circle with an abstract "star" design in the center that are found only on this wall. There are also smaller boulders lining the north and south sides of this clearing that display various abstract petroglyphs. The space in front of the wall of rock art panels is open and fairly level except for three boulders protruding from the floor in an east-pointing triangle formation (Figure 10).

Figure 10. The wall of rock art panels and clearing in front.

Figure 11. A pestle exhibiting red mineral pigment found on the surface in the clearing in front of the wall of rock art panels.

In the clearing in front of the rock art wall panel, one piece of quartz debitage and one quartz crystalline stone were found on the surface, as well as one granite pestle with red ochre on the end (Figure 11). These artifacts were collected and catalogued, and will be returned to the property owner. The test pit excavation at the base of the rock art wall panel uncovered pebbles of red, yellow and white mineral pigment; one piece of clear quartz debitage, five pieces of white quartz debitage, one small white quartz crystal, one white quartz crystalline pebble, a couple pieces of greenstone debitage, two charred pine cone spines thought to be *P. sabineana* (gray pine), and two "limonite over pyrite" pseudomorphs (Robert Davies, personal communication 2013). A compact 1-cm-thick soil layer containing abundant chiastolite was recorded at a depth of 20 cm. Small pieces of charcoal (< 1 cm) were also found scattered throughout the unit to a depth of 43 cm (Table 1).

Excavation ceased at an uneven layer of cobbles, as well as two angular pieces of white mineral pigment, at a maximum depth of 54 cm. The intent was to send some of the charcoal recovered from the excavation for AMS radiocarbon dating, but this was not completed in time to be included in this thesis. The artifacts were catalogued and will be returned to the property owner. The absence of some items is also noteworthy as this information can help define the activities that likely did not take place at CA-MRP-402: no hunting or fishing tools; faunal remains; shell, stone, or glass beads; or obsidian debitage has been found in the current or previous research at the site.

Table 1. CA-MRP-402 Excavation Data.

Level	Carbon	#	Mineral Pigment	#	Quartz Crystal	#	Floral	#	Faunal	#	Ground-stone	#	Debitage	#	FCR	#	Rock	#	Other	#
0-10 cm	X	X	Red / Yellow	13 / 1	White Crystal	1	Bark	18+	Shell	1	X	X	Slate / Quartz	2 / 4	River Cobble	1	Quartz	1	Cloth	4
10-20 cm	Charcoal	75+	Red / Yellow / White	15 / 62+ / 5	X	X	Pine Cone Point / Charred Wood	2 / 6	X	X	Abraded Disk	1	Slate / Quartz / Green-stone	1 / 1 / 1	River Cobble	9	Slate with Mica / Quartz	1 / 10	Limonite Pseudo-morph	1
20-30 cm	Charcoal	58+	Red / Yellow /White	39 / 46 / 3	Clear Crystal, Debitage	1	X	X	Shell	2	Abraded Rock	1	Red Chert / Quartz	1 / 4	River Cobble	3	Green-stone / Quartz / Slate with Mica	1 / 12 / 2	Limonite Pseudo-morph	1
30-40 cm	Charcoal	14	Red / Yellow / White	12 / 12 / 6	White Quartz with Crystals	1	X	X	Acorn Shell	1	Green-stone Core	1	X	X	River Cobble	2	X	X	X	X
40-50 cm	Charcoal	1	Yellow	1	X	X	X	X	X	X	Rock with Red Mineral Pigment	2	X	X	X	X	Slate	1	X	X

The clearing and wall of rock art panels on the west bank are visually unusual among the surrounding boulder-strewn landscape. They can easily be seen from almost any position on the east bank, except when standing at the lithic scatters or at the deeper BRMs. The clearing and wall of rock art panels cannot be viewed from the west bank unless one is positioned within a few meters of them. However, when standing in the clearing, some of the south-facing rock art on Boulders A and B can be seen from the west bank (Figure 12).

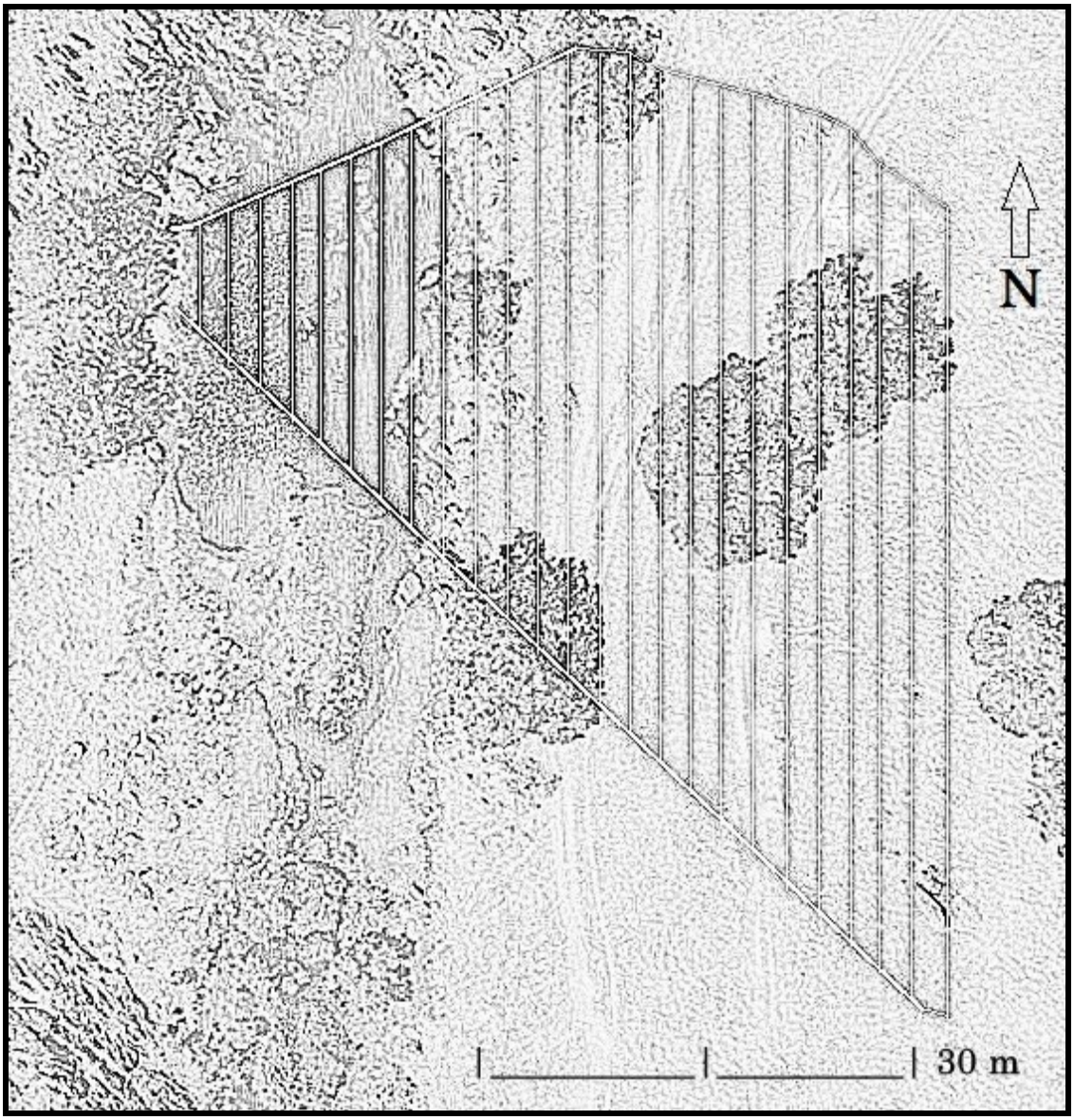


Figure 12. An aerial sketch of CA-MRP-402 depicting the viewshed both of and from the clearing and wall of rock art panels.

Also on the west bank is a large bedrock formation overhanging the perennial pool. Its natural concave shape enables it to act as an acoustic amplifier that generates a clear echo when a loud noise is made from inside the clearing on the west bank (Figure 13).

Figure 13. The natural acoustic amplifying feature.

East Bank. The prominent features of the east bank are two boulders located on top of the bank, due east of the wall of rock art panels and the clearing. The two boulders (E Boulders) measure 1-m wide and 1.5-m high, and are a grey-blue mica, chiastolite schist with phenocrysts of foliated muscovite, and chiastolite. They are an outcrop of the meta-argillaceous bedrock, and have a general structural trend oriented at approximately 310 degrees, with dips ranging from 70-90 degrees. This pattern appears consistent with the overall structure of the folded bedrock of the site formation (Davies 2013:2).

When viewed from the clearing, the two boulders look to be one boulder and are a prominent feature on the east bank, standing taller and appearing more angular than the neighboring outcrop 3 m to the northwest (Figure 14).

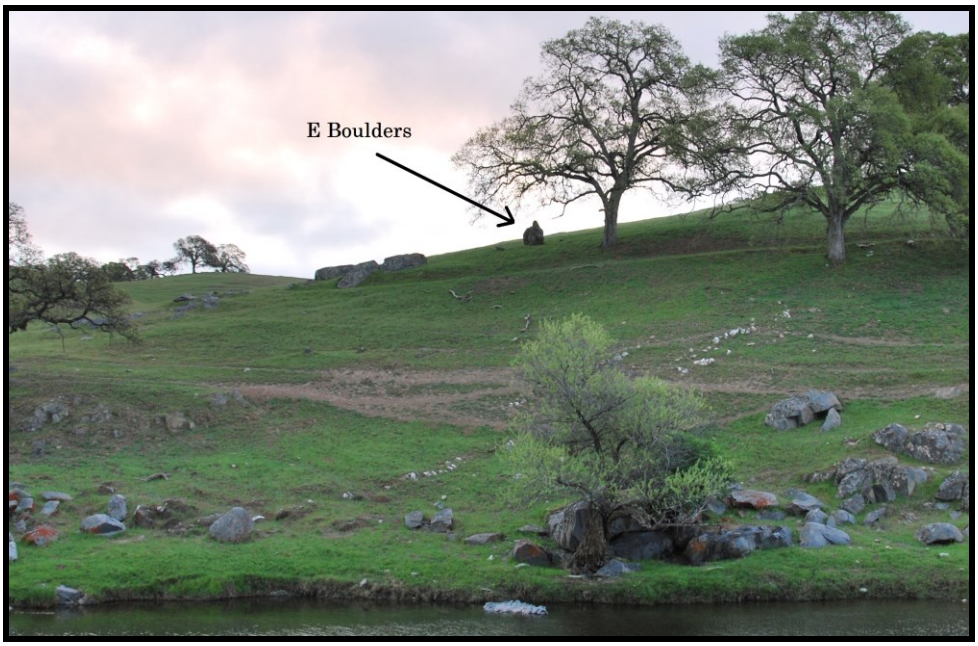


Figure 14. The E Boulders on the east bank.

These boulders are not in their natural position (Davies 2013). The adjacent bedrock boulders are visibly lower to the ground with naturally flat top surfaces, while the E Boulders are angular on the top and vertically flat on their south face. Furthermore, the top of westernmost boulder (E Boulder) forms a peak and, given the fluted shape and angle of the fracture planes, it appears that some of the boulder's cortex may have been intentionally removed to achieve this shape. These boulders are devoid of any visible rock art (Figure 15).

Figure 15. The E Boulders on the east bank.

Rock Art Styles at CA-MRP-402

Relatively few archaeologists have researched the rock art found in the western Sierra Nevada of central California. Notable works include those by Steward (1929), Payen (1966), Heizer and Clelow (1973), and Whitley (2000), but none of these researchers personally surveyed CA-MRP-402 before offering their analysis and classification of the rock art in this area.

Steward's research led him to conclude that the Sierra Nevada had "been an effective barrier to the westward spread of petroglyphs" (Steward 1929:219) and he identified the area where CA-MRP-402 is located as "totally devoid of any examples of petrography" (Steward 1929:219). The closest identified style area is Steward's Area D, which encompassed the Santa Barbara and Tulare regions. Steward generalized Area D as predominantly composed of geometric pictographs and noted the documented petroglyphs contain many elements also found in the Owens Valley region (Steward 1929:223).

While CA-MRP-402 was not included in his survey, Payen (1966) did examine nine rock art sites documented within the current study region. He assigned the majority of these sites to Style 6—the Valley-Sierran Abstract style—which he defined as including a variety of circle elements with few line and grid elements. Payen noted Style 6 is the most widespread of the rock art styles showing close associations with the Great Basin Abstract Curvilinear Style, and he credited it "with some antiquity" (Payen 1966:73). Payen also noted that variation in the style may be represented in Mariposa County, but too few sites were available for him to confirm his hypothesis (Payen 1966:63).

The current study area also falls into Heizer and Clelow's (1973:6) geographical area VII, which they called the Sierra Nevada province. They defined the rock art of the Sierra Nevada as the Central Sierra style. Noting strong affinities with the rock art of the Great Basin, they determined that within the Central Sierra style either angular or curvilinear elements are typically present with curvilinear elements occurring at least twice as often as angular ones, circle and dot elements occurring most frequently in Merced County, and human and animal figures being scarce (Heizer and Clelow 1973:6). Based on the stylistic similarities they observed with the Great Basin style, they estimated the age of the rock art to be between 3000 and 500 years B.P. (Heizer and Clelow 1973:25-28).

Whitley (2000:50) classified the rock art of the CA-MRP-402 area as the California Tradition. The typical pattern for this tradition consists of small sites, usually in rock overhangs or shelters, containing monochrome rock paintings that depict simple geometric shapes. Some local regional variants found in this tradition include the South-Central Painted, Southwest Painted, Maze, Peninsular Painted, and California Engraved

variants. According to Whitley (2000:50), the California Engraved variant occurs most frequently in the northern end of the state. "These relatively rare sites are typically pecked or incised, and are dominated by simple geometric forms" (Whitley 2000:50).

Given the elements observed at CA-MRP-402 during the current research (see Appendix A), Payen's (1966) Style 6 and Heizer and Clelow's (1973) Central Sierra style best describe the rock art present. This thesis represents the first attempt to interpret the significance or purpose of the abstract rock art in this geographic area.

Chapter Summary

This chapter reviewed the observations and background information pertaining to CA-MRP-402. Recording of the site indicates that is consists of 103 rock art panels, 57 BRMs on 17 outcrops, three scatters of quartz debitage, and a natural acoustic amplifying feature. The site is relatively undisturbed. The age and cultural affiliation are unknown, but the style of the rock art best matches Payen's (1966) Style 6 and Heizer and Clelow's (1973) Central Sierra style. As geological evidence proves, the E Boulders are not in their natural position and, thus, may have been moved by native people for some specific purpose. The next chapter will further explore this possibility and present analysis, discussion and interpretation of the collected data.

Chapter 5: Interpretation and Discussion

Introduction

This research applies landscape and ritual theory and draws on regional ethnography to study CA-MRP-402. As discussed in Chapter 2, the landscape approach chosen merges the geographical and social landscapes, recognizing that the resulting cultural landscape is a dynamic source of, and place for, symbolic value and meaning. Ritual theories are applied to test the hypothesis that the people responsible for creating the images at this site were performing activities in this particular place at specific times of the year in order to interact with supernatural forces and request specific actions. Ethnographic data provides additional context for the rock art interpretation.

CA-MRP-402 is ideal for this approach as it is a reasonably undisturbed rock art site containing a high concentration of ancient abstract images and few other archaeological remains. Furthermore, no attempts have been made to interpret the meaning, significance, or function of the rock art in this region of California. Three decades ago, CA-MRP-402 was surveyed, mapped, and the rock art was drawn. This and 29 other archaeological sites in the surrounding area were recommended as eligible to the National Register of Historic Places as an archaeological district. The last archaeological investigation of CA-MRP-402 was a survey completed two decades ago to reassess the condition of the site; therefore, a rerecordation of the site was also necessary.

The current contextual study included surveys of the site, the broader geographical and cultural landscape, and other rock art sites in the surrounding area; photography of the rock art and other archaeological features; and excavation of a test pit. These approaches combined with landscape and ritual theory and ethnography, are useful for identifying the activities that took place at CA-MRP-402, how this site fit into the broader cultural landscape of which it was a part, why the cultural landscape of CA-MRP-402 attracted people to mark and transform this place, and the role the rock art played in the cultural landscape in this area.

The Use of CA-MRP-402 as an Astronomical Observation Site

Geologic Analysis of the Landscape. Geologist Robert Davies (Merced College) was invited to examine the geological formation of CA-MRP-402 and provide his own analysis of the wall of rock art panels, niches and clearing on the west bank, and the two E Boulders on the east bank. His task was to determine if the formation of these features was natural or part of the cultural landscape.

West Bank. Davies' (2013) verified that the fractured bedrock forming the wall of rock art panels has an orientation of 310 degrees, which is consistent with the general geologic structure of the area. Davies (2013:4) stated that the niches and clearing are morphologically unusual because the creek makes a bend to the east just upstream to go around a large bedrock boulder. As a stream flows, it tends to erode from the outer bank and deposit on the inner bank where energy is lower. Naturally, the niches and clearing would have been filled in with sediment and would have the same appearance as the immediately surrounding terrain. Yet the niches and clearing are unusual because they are an open area

Furthermore, the fractures in the bedrock of the clearing and the blocks that are exposed are angular, massive, and show little signs of natural weathering, which would not be the case if the creek had been actively eroding this area. "This makes it likely that the clearing is an [intentional] excavation because larger, fractured bedrock would not have been transported by the stream, and if anything, the niches and clearing would be covered in sediment during times of increased flow in the creek" (Davies 2013:4). Therefore, it is plausible that the area in front of the wall of rock panels was intentionally cleared and shaped to expose the rock panels and the niches at the back of the clearing. This effort must have been completed before or around the same time the first petroglyphs were created on the exposed rocks in the back of the clearing.

Confirming my own compass measurements, Davies (2013:4) determined the orientation of the clearing on the west bank and the E Boulders on the east bank are in line, west to east, to within 1 degree.

East Bank. In order to determine if the E Boulders had been intentionally moved from their original structural orientation, Davies collected data on the structural attitudes (i.e., orientation) of the outcrop, focusing on crystal faces and foliations. He used a Brunton pocket transit to measure the strike and dip of the foliation surfaces of the E Boulders and the surrounding outcrops. To determine if the differences were significant, the measurements from the E Boulders were compared to two sets of means from other outcrops in the immediate area. If the E Boulders are in their original position there should be little difference in the strike and dip measurements between the E Boulders and the surrounding boulders.

These values were compared using analysis of variance (ANOVA). The ANOVA is a linear regression statistic that partitions the total variation of a sample into components. The ANOVA is a t-test that tests the null hypothesis that all the population means are equal (H_0: $\mu 1 = \mu 2 = ... = \mu a$). The ANOVA assumes normal distributions and homogeneity of variance. The advantage of the ANOVA test is that it is robust to violations of its assumptions, and it is conservative in its results, even when the assumptions about the distribution and homogeneity are other than normal. If

measurements for an "unknown" outcrop, in this case the E Boulders, is within two standard deviations of the mean of the other two outcrop sets , it is statistically unlikely that the E Boulders were moved from their original orientation. For the strike and dip tests, Davies chose the null hypothesis that there is no difference in the strikes and dips of the outcrops, and that the rocks are in their original, natural, structural orientation. The alternate hypothesis is that the rocks were moved from their original orientation (Davies 2013:2).

The ANOVA allows one to place a numeric value on the probability of the null hypothesis being confirmed or rejected. This method can statistically discern different orientations within two groups. The standard deviation of the group means (the "known" outcrops, i.e., outcrops assumed to be in their original orientation) is found, and if the unknown sample mean (the orientations of E Boulders) is significantly larger or smaller than the true mean, we have evidence that does not confirm the null hypothesis, and instead, the orientation of E Boulders is not in its original orientation (Davies 2013:2). If the "f" value is close to 1, then there is little significant difference between the means of the sets and the null hypothesis that the rocks were not moved cannot be rejected. If the "f" value is larger or smaller than 1, then it is statistically unlikely that the means of the orientations of the E Boulders and the means of the orientations of the surrounding outcrop rocks were the same, and the null hypothesis is rejected (Davies 2013:2). With the assistance of ANOVA, Davies was able to analyze the data and place a numeric value on the probability of the null hypothesis being confirmed or rejected. The results of his findings are below.

> Strike of E Boulders. If the significance level is less than 0.05, we can reject the null hypothesis that the means are all within a statistically normal distribution, but because the significance level is high (0.979) we cannot reject the null hypothesis that there is no difference in strikes. Within a 97.7% confidence level, the E Boulders were not moved from their natural orientation [Davies 2013:3].

> Dip of E Boulders. The significance level is below the 0.05 threshold; therefore, we can reject the null hypothesis that the dip orientation is natural and not moved. This rejection of the null hypothesis is a strong numeric backing for the proposition that the E Boulders were moved from their original orientation in the direction of the dip, and that although the rocks were not moved along the line of strike, they do appear to have been moved from their expected orientation of dip [Davies 2013:3].

That is, the E Boulders were evidently lifted into their current position, but were not moved east or west. Davies (2013:2) also confirmed the two E Boulders were once one rock that broke apart along a natural plane. Given their matching strike, it appears they likely split after the boulder was lifted. It was not possible to definitively determine if the peaked shape of the top of the boulders is natural or culturally modified, although given the way the shadow cast by these rocks on the equinox perfectly fits the niches on the west bank, it may be that their shape was created.

Davies was able to determine it is statistically probable the top of the E Boulders were to the north and were deliberately arced up to the south roughly 90 degrees into their current position. Moreover, the clearing on the opposite bank is likely the result of an excavation. As Davies (2013:3) stated, "the outcrop was likely in a fortuitous location for measuring the position of an equinox [on the rock wall], and it was subsequently modified, in a purposeful way [,] to better project the shadow into the niche." Therefore, it seems the E Boulders and the clearing were intentionally altered by native peoples to create the solar and shadow alignments that occur during the time of the equinoxes and are part of the cultural landscape.

Cultural Astronomy: The Skyscape. Equinoxes. More than five years of methodical research completed at CA-MRP-402 have confirmed there are certain consistent solar and shadow alignments that can be observed at sunrise during the time of the equinox. When standing in the clearing in front of the wall of rock art panels, the following occurrences can be viewed for at least four days immediately around the time of the vernal and autumnal equinoxes. Digital video cameras and high resolution digital photography were used to record the visual alignments from multiple perspectives.

At sunrise, before the sun is visible over the eastern horizon, the sunlight shines on the west bank. As the sun rises, the sunlight makes its way down over the wall of rock art panels (Figure 16 a), highlighting the various petroglyphs as it moves down until the top two-thirds of the wall of panels is in sunlight and the bottom one-third is in darkness. At this point, the sunlight shines from behind the E Boulders that rest on top of the hill above the east bank, and a shadow in the form of a triangular peak appears on the wall of rock art panels on the west bank (Figure 16 b). This shadow then moves downward over the wall of panels and covers one of the niches at the bottom, leaving that niche shadowed in darkness for anywhere between one to three minutes while the rest of the wall of rock art panels is illuminated by the sunlight (Figure 16 c). As the sunlight reaches the ground in front of the wall of rock art panels, the sun becomes visible on the south side of the E Boulders. The sun then rises along the south edge of the E

Boulders (Figure 17). On several occasions it has also been observed that as the sun rises, the shadow covering the niche continues moving downward until the peak of it touches the peak of the northernmost of the three boulders that remain protruding from the floor of the clearing (Figure 16 d). The shadow then disappears as the sun rises away from the E Boulders.

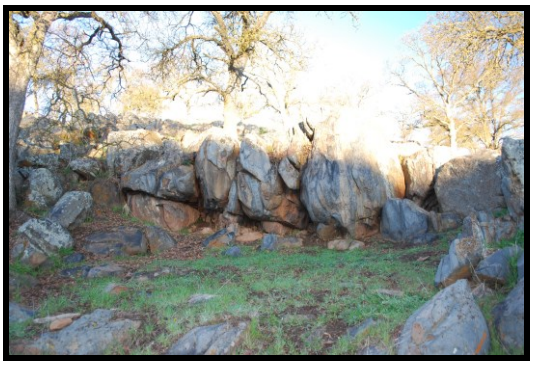


Figure 16 a.

Figure 16 b.

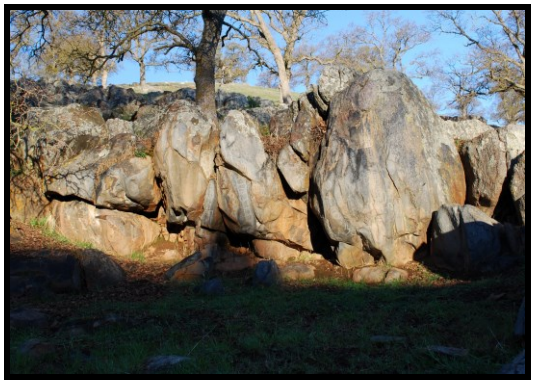


Figure 16 c.

Figure 16 d.

Figures 16 a-d. The shadow moving down the rock art panel and over the center niche during the vernal equinox, 2012.

Figure 17. The sun rising along the south edge of the E Boulders during the vernal equinox, 2012.

One low, level rock at the northeast border of the clearing served as a datum point on the west bank from which to make consistent recordings. It was found that one could stand at this level point and view the solar and shadow alignments without one's own shadow interfering with the event (Figure 18). However, the solar and shadow alignments can be witnessed much the same when standing within 3 m of the west bank, at the east edge of the clearing in front of wall of rock art panels. If one moves any further away from the west bank and into the clearing, their shadow may interfere with the event. The alignments cannot be viewed if one moves to the south or north of the clearing a few meters. It is also possible to witness the shadow effect when standing on the east bank at or below the E Boulders, but it is not easy to see the sun rise along the E Boulders from this location.

Figure 18. The low, level rock served as a datum point from which to make consistent recordings.

Numerous, consecutive visits to witness this process confirm this repeated occurrence. For at least four days surrounding the equinoxes, as the earth revolves around the sun, the shadow forms and covers a different niche each morning. The shadow moves to the north during the autumnal equinox, and to the south during the vernal equinox. The sun rises next to the E Boulders and creates this visual effect only during the few days around the time of the equinoxes. After those few days, the sun has moved far enough away in either direction from the E Boulders that these solar and shadow alignments no longer occur. Visits to CA-MRP-402 at sunrise in February, April, July, and August confirmed these equinoctial solar and shadow alignments do not occur in this way at any other time.

It may also be worth noting that given this is a shadow feature, if it is overcast the solar and shadow alignments may not be visible. I found it to be too cloudy or rainy to make observations roughly 20 percent of the time in over five years of repeated visits, but even then, the alignments could be viewed the day before or the day after.

Moreover, on September 22, 2012, as I stood in the clearing on the west bank, I noticed Venus was just to the north and above the E Boulders on the east bank. As I waited for the sunrise, I observed Venus move south and pass over the top of the E Boulders (Figure 19). Then the sun began to rise,

Venus visually disappeared, and the shadow began to slowly move down the rock art panel once again. The visibility and placement of Venus in the sky is more variable than that of the sun, but it occurred to me there might be a regular pattern to its appearance.

Figure 19. Venus above the E Boulders just before sunrise on September 22, 2012.

Winter Solstice. On the morning of the winter solstice, the sun rises at a bearing of 130 degrees (southeast) and immediately to the south side of another barely visible boulder on the bank (Figure 20). No rock art or signs of cultural alteration were found on this boulder. It appears to be in its natural geologic position. No other solar alignments or shadows have been recorded during the winter solstice. However, it was noted that all four niches at the bottom of the wall of rock art panels are illuminated during sunrise on the winter solstice, and several of the petroglyphs consistently appear more visible on this morning than they do at other times of the year.

Summer Solstice. On the morning of the summer solstice, the sun rises on top of another hill at a bearing of 62 degrees (northeast) (Figure 20). There are no visible alignments with any particular feature on this hill, and a quick survey of the top of this hill confirmed there are no boulders or other

prominent features on top. There are no visible solar alignments with the E Boulders, and no particular solar or shadow alignments with the wall of rock art panels. Although, it was observed that the four niches remain shadowed by a natural overlap in the boulders that form the wall of rock art panels. It was also noted that the petroglyphs were more difficult to discern on the morning of the summer solstice.

Lighting and atmospheric conditions greatly affected the visibility of petroglyphs, yet it has been repeatedly observed that while some of the petroglyphs are virtually impossible to see most of the year, they are clearly perceptible on the morning of the equinoxes and winter solstice.

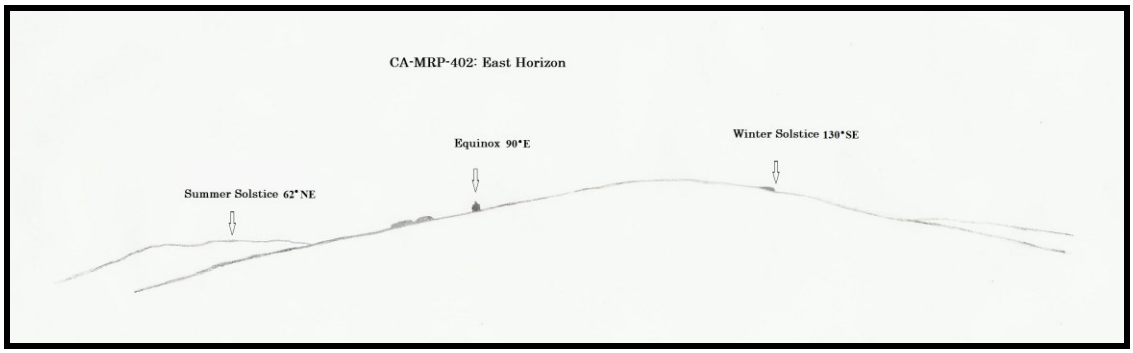


Figure 20. A sketch depicting the position of the sunrise during the summer solstice, the equinoxes and the winter solstice.

Diachronic Analysis. Astronomy simulation software called Starry Night was utilized to confirm the occurrence and temporal depth of the solar alignments observed at CA-MRP-402. In Starry Night, one can enter the longitude and latitude coordinates for any place on earth and observe the night sky at that location at any given point in time. The landscape in the software is pre-set and cannot be altered, but at the longitude and latitude of CA-MRP-402, the program happens to depict an apple tree on the eastern horizon which, given its near due east position, could serve to represent the E Boulders on the hill.

I used this program to observe the position of the sun on the horizon at sunrise on March 21, September 21, and December 20 on several different years as early as 2000 B.C.; I compared the past positions of the sun to its current position at sunrise on the same days. I also observed the sky just before sunrise on the morning of March 21, A.D. 160-168, September 21, A.D. 500-519, and September 21, A.D. 1502-1507 to confirm if there was a pattern to the appearance of Venus on the eastern horizon during the equinoxes.

I was able to discern that during the vernal equinox, the sun would have risen at the same position on the horizon as early as 100 B.C.; in 300 B.C. and earlier, the sun would have risen visibly further to the south than it does currently (Figure 21). During the autumnal equinox, the sun would

have risen at the same position on the horizon to A.D. 300; in A.D. 100 and earlier, the sun would have risen visibly further to the north than it currently does (Figure 22). During the winter solstice, the sun would have risen at the same position on the horizon as early as 1500 B.C., and possibly earlier.

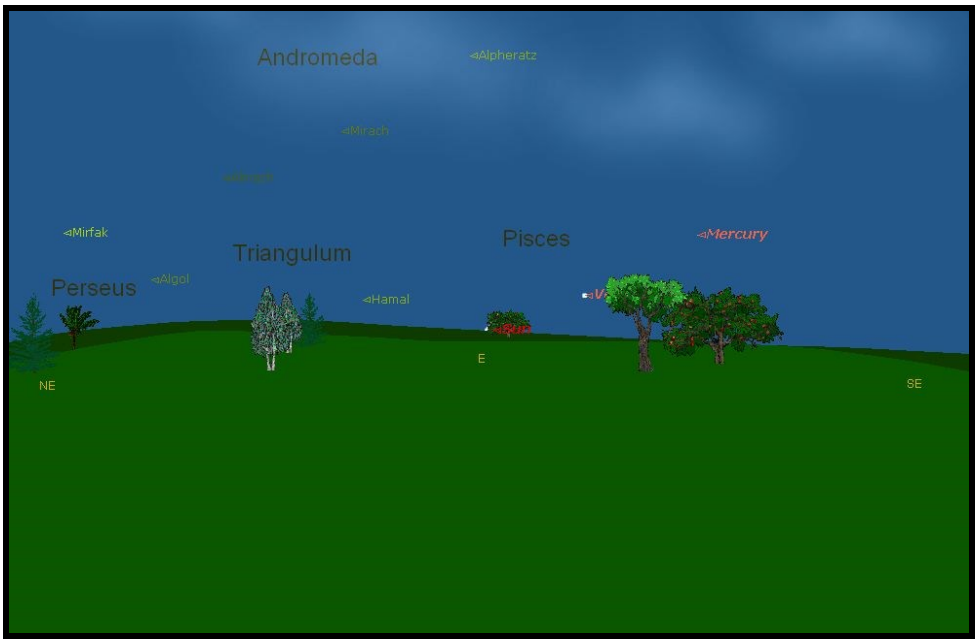


Figure 21. Sunrise, March 21, 100 B.C. The sun is barely visible rising behind the tree. Image from Starry Night.

Figure 22. Sunrise, September 21, 300. Image from Starry Night.

I was also able to verify there is an eight-year cycle to the position of Venus on the eastern horizon at sunrise during the time of the equinoxes. In the fall, the eight-year cycle is as follows: Venus nearly due east approximately 10 degrees above the E Boulders, Venus absent, Venus absent, Venus about 15 degrees above the horizon and a few degrees south of the E Boulders, Venus absent, Venus a few degrees above the horizon and north of the E Boulders, Venus about 11 degrees above the horizon and a few degrees south of the E Boulders, Venus absent, repeat (Figure 23). In the spring the eight-year cycle is as follows: Venus approximately 10 degrees above the horizon and 15 degrees south of the E Boulders, Venus absent, Venus roughly 5 degrees above the horizon and 10 degrees south of the E Boulders, Venus absent, Venus absent, Venus about 8 degrees above the horizon and 16 degrees south of the E Boulders, Venus absent, Venus a couple degrees above the horizon and a few degrees south of the E Boulders, repeat (Figure 24). There may be patterns to the appearance of other planets as well, but none were observed in my site visits or with the assistance of Starry Night.

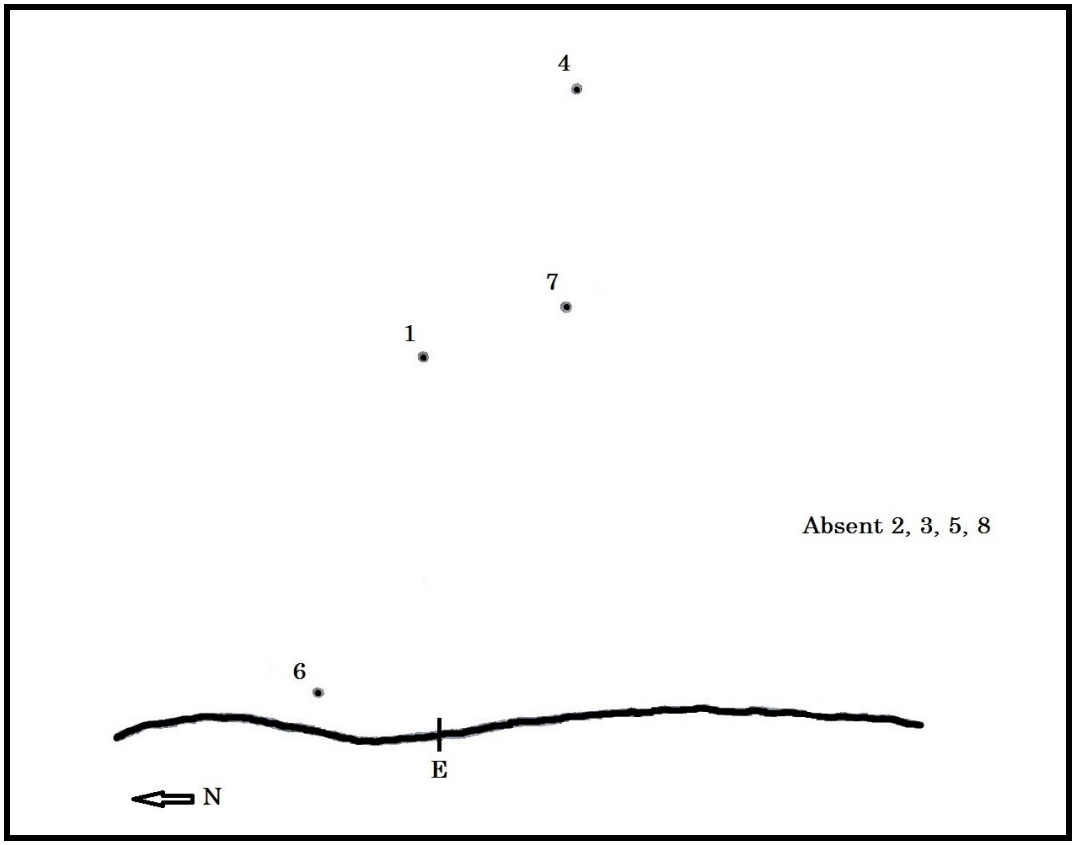


Figure 23. Schematic representation of the position of Venus at sunrise as it appears on the eastern horizon during the autumnal equinox over an eight year cycle.

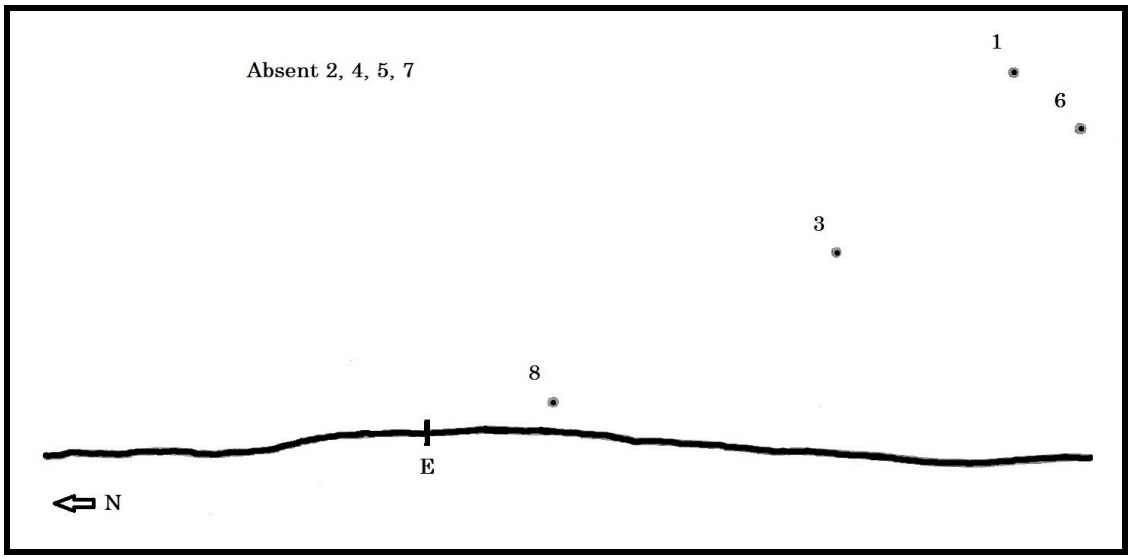


Figure 24. Schematic representation of the position of Venus at sunrise as it appears on the eastern horizon during the vernal equinox over an eight year cycle.

Subsurface Data. In order to determine the significance of the three boulders remaining in the clearing, the northernmost of the three boulders was incorporated into the southwest corner of the test pit. This excavation revealed that a rock was wedged under the boulder in order to keep it in an upright position. Furthermore, ochre is not known to be a natural geologic occurrence within the study region. Yet ochre and small pieces of charcoal recovered from the excavation were most likely left there as a result of human activity. Their presence throughout the soil deposits indicates the clearing is likely the result of intentional human behavior, although excavation has not been undertaken elsewhere at the site for comparison.

How Does CA-MRP-402 Fit into the Broader Cultural Landscape?

Results of Records Search. The archival research resulted in an updated compilation of the documented rock art sites in Merced and Mariposa counties. It also revealed that such sites tend to cluster in three regions, each with its own style. The first region encompasses 14 rock art sites on the west side of Merced County, all reported to be cupule glyphs except for two documented petroglyph sites. The second region comprises nine rock art sites in eastern Mariposa County, in and near Yosemite Valley. Six of these sites are reported to be pictographs, one is documented to be a petroglyph, and the remaining two sites were recorded only as "rock art" in the record log books.

The third region, with the greatest concentration of rock art sites, is located in the Sierra Nevada foothills of eastern Merced and western

Mariposa counties. In this region, there are approximately 25 recorded rock art sites, of which 32 percent are within 2 km of CA-MRP-402. Sites assigned multiple trinomials, trinomial revisions, and incomplete site records made it difficult to determine the exact number of sites in this area. There is one documented pictograph site, five sites are reported as containing cupule glyphs or pit and groove marks, three site records mention rock art with no further description, and the remaining sites are all reported to be petroglyphs. A second pictograph site was verbally reported to be in this region, but this was not confirmed. Research for this thesis focused on the rock art sites located in the foothills region.

Neighboring Ancient Archaeological Sites. The survey of the surrounding area provided a greater contextual understanding of the larger geographical and cultural landscape. No new sites were located, but a single mano was found on the surface 0.3 km north of CA-MRP-402. The prehistoric archaeological sites located within 1 km^2 of CA-MRP-402 are discussed here.

CA-MRP-597 is located just 56 m south of CA-MRP-402. Given its close proximity, this site could reflect the southern limit of CA-MRP-402 (Peak and Associates 1982a). CA-MRP-597H measures 70 x 50 m, contains four bedrock mortars on three outcrops and is reported to have four petroglyph panels of circle designs divided by straight lines (Clay 1993). However, this rock art was not relocated during the current survey.

CA-MRP-606 is a rock art site on the east bank of the same creek, 500 m north of CA-MRP-402. This 32-x-25-m site contains 34 rock art panels (most facing west towards the creek) and 17 bedrock mortars on three outcrops (Clay 1993). Although there is some duplication in elements with CA-MRP-402, the images depicted at this site are somewhat different, with a greater number of circular patterns, connecting circles, divided circles, curvilinear lines, few geometric patterns, one or two "sun" glyphs, and one unique "butterfly" shape (Figure 25). The immediate area around this site has "sustained extensive mining impact and consequent mass rearrangement of the original terrain" (Peak and Associates 1982a:30). There is a small, open valley to the east, and a low hill on the west bank. This site was also visited during sunrise on the equinox during the current study, but no solar or shadow alignments were observed.

Figure 25. A unique "butterfly" shape at CA-MRP-606.

CA-MRP-610 is "the most massive complex site … [with] 19 bedrock mortar stations, and 30 housepit depressions, of which the largest is 10.7 m in diameter and 50 cm deep and [the site] may have over two meters of midden depth" (Peak and Associates 1982a:32). This 8-x-180-m site is located on a terrace on the north bank of the creek, 600 m northeast of CA-MRP-402. The large housepit depression may be a ceremonial or dance house (Peak and Associates 1982a). In addition, seven of the other housepit depressions measure at least seven meters in diameter. There is no rock art at this site. Only a few artifacts were found on the surface during the recordation of CA-MRP-610, including three steatite disk beads, two *Olivella* shell beads, and one piece of obsidian debitage.

While the deep midden deposit is evidence of long-term repeated use of CA-MRP-610, it is not known if the people were living here full-time or only during certain seasons or periods. There is insufficient archaeological evidence such as floral or faunal data to indicate seasonality of use, but according to ethnographic records, the Yokuts may have permanently resided in some villages (Latta 1977:600; Lee 1997:16). This location would have afforded a sufficient place to live year-round as it is at a high enough elevation to be above the winter fog and wetlands, yet it is below the snow level. In addition, there is a perennial water source at CA-MRP-402. Food supplies were likely scarce during the summer, but depending on the amount

of food a group had stored (e.g., acorns, dried fish) permanent residence may have been possible. Regardless, we do know that people repeatedly inhabited the area on a regular basis over a number of years.

Additional Archaeological Sites Located on the Same Creek. Six additional sites situated along the same creek as CA-MRP-402 are all located within a 2 km^2 area surrounding CA-MRP-402, yet it is impossible to view CA-MRP-402 from any of these other sites. These sites were last reassessed by Clay (1993), but Peak and Associates (1982a) provided the only drawings of the rock art. Relocating much of the rock art at these sites for the current study was challenging, since many images are difficult to see unless the atmospheric conditions are just right. The following data are based on personal observations as well as the drawings and documents completed by Peak and Associates (1982a) and Clay (1993).

These six sites all have 10 or less rock art panels with less diversity in the types of elements represented—most elements are wavy lines or circular images. The different rock art frequencies and elements may signify these sites witnessed different activities than CA-MRP-402. Digital photographs were taken at some of the panels at these rock art sites and analyzed using DStretch; no traces of pigment were observed. Other than the markings on the boulders and the previously recorded housepit depressions, no apparent prehistoric alterations of the landscape or cultural astronomy features were observed.

CA-MRP-604 is a 90-x-205-m site is located 1 km north of CA-MRP-402 that contains three housepit depressions, 200 BRMs on 11 outcrops, five petroglyph panels, and a midden deposit extending to 110 cm in depth (Peak and Associates 1982a). The number and type of rock art elements at this site are different than those found at CA-MRP-402. Three of the petroglyph panels depict a few wavy lines connecting to circles, another has one divided oval, and the fifth has a short wavy line, a divided circular pattern, and several indistinct marks. The landscape is an open, slightly sloping area on the north bank of the creek with foothills to the south and east. No other outstanding features were observed.

CA-MRP-611 is located 1.2 km northeast of CA-MRP-402. Measuring 46 x 32 m, it is located on a southwest-facing slope on the north side of the creek. It has seven housepit depressions that range from 3.5 m to 5.5 m in diameter, with the deepest measuring 30 cm deep. The midden deposits extend to 85 cm in depth (Peak and Associates 1982a). There is no rock art at this site.

CA-MRP-612 is located in a narrow canyon 1.4 km northeast of CA-MRP-402. This 600-x-800-m site is situated on the east bank of the creek, and contains 77 BRMS on 12 outcrops, one lithic scatter, and 10 petroglyph panels. The midden is 90 cm deep (Peak and Associates 1982a). The number and type of rock art elements at this site are different than those found at

CA-MRP-402. One panel displays a "sun" symbol, two of the panels exhibit a cluster of lines or tally marks with a few circular or oval designs, five panels present a few abstract marks, one panel exhibits one bisected circle with four short random lines radiating off its circumference, one panel is nothing more than two lines (one of them connecting two cupules), and one panel depicts a couple abstract grid-like geometric patterns.

CA-MRP-614 is located 0.15 km north of CA-MRP-612 in the same narrow canyon. This 15-x-180-m site contains six bedrock mortars and 10 petroglyph panels (Peak and Associates 1982a), and has a higher number of circular images and curvilinear lines, and only one or two geometric patterns. Noteworthy glyphs include two "sun" signs and two concentric circles.

CA-MRP-607 is a relatively small site measuring 5 x 15 m that contains 10 petroglyph panels and is located 1.5 km south of CA-MRP-402 (Clay 1993; Peak and Associates 1982a). The rock art elements here are circles, bisected circles, wavy lines, and one abstract curvilinear form. This site is in a valley with a hill rising above the rock art on the west bank and a sloping hill on the east bank. No other outstanding features were observed.

Located 1.6 km south of CA-MRP-402, CA-MRP-613 measures 5 x 60 m and contains 11 BRMs on four outcrops (Peak and Associates 1982a) and one previously unrecorded southwest-facing petroglyph panel that consists of a series of vertical lines. This site is in a valley with a hill rising on the west bank and a sloping hill rising above the rock art on the east bank. No other outstanding features were observed.

There were insufficient data to definitively associate these neighboring archaeological sites with CA-MRP-402. The possibility that the archaeological remains date to different temporal periods cannot be ruled out. However, given the time it would have taken to create the observation area, the solar and shadow alignments, and numerous images pecked into the boulders at CA-MRP-402, it seems likely that the people who created the space used the area repeatedly over many years. If these neighboring sites are not associated, then it is unknown where the people who created the images at CA-MRP-402 came from or resided.

Other Rock Art Sites in Eastern Merced and Western Mariposa Counties. The survey of additional rock art sites in eastern Merced and western Mariposa Counties provided an even greater contextual understanding of the larger geographical and cultural landscape. It was discovered that all of the documented rock art sites in this area are located within 30 km of CA-MRP-402. All of the sites are situated next to water except for CA-MRP-2, which is located on the top of a hill. Only three or four rock art sites are reported to have associated village or habitation sites. While there is some redundancy in rock art designs with those found at CA-MRP-402, the number and types of elements vary between rock art sites. Digital photographs of the images were analyzed using DStretch; no traces of

pigment were observed. These sites were not visited at the time of the solstices or equinoxes, but no other alterations of the landscape or features were observed that might indicate these sites were utilized for astronomical observation.

The following descriptions are not a thorough account of all rock art sites in the foothill region of Merced and Mariposa counties, but they do demonstrate the variability in the number and types of elements depicted at each rock art site.

CA-MER-52/100 appears to have been first recorded by Elmer Murchie (1945), a rancher who discovered the glyphs, took photographs of them, and reported the site to U.C. Berkeley in 1945. According to a site record filed by Dorothy Cowper (1968b:1), Murchie was told there was not enough money to send an investigator at that time. The site record originally lists this site as CA-MER-94, but it was changed sometime later to CA-MER-100 (1968b:1).

According to Clelow (1976), this same site was recorded by Mohr in 1950 and assigned trinomial CA-MER-52. There is no mention in Clelow's (1976) report of any other record of this site or other assigned trinomials. Peak and Associates (1981) relocated this site and drew the petroglyphs in their report. The images drawn by Peak and Associates (1981) match the photographs taken by Murchie (1945), which I examined during my research. Therefore, I have determined that CA-MER-52 is the same site as CA-MER-100. This information will be sent to the Central California Information Center so they may update their records accordingly. Payen (1966:43) referred to this site as Site 119.

CA-MRP-52/100 is located 6 km southwest of CA-MRP-402 at an elevation of 91 m. The surrounding landscape is open grasslands with vernal pools. The petroglyphs are located in a low, vertical, west-facing sandstone creek bluff. They are more deeply pecked into the rock surface than those at CA-MRP-402, and exhibit far fewer elements (Peak and Associates 1981:31). The majority of the images are circles, but there is one crescent shaped image and one horizontal "ladder." The site is at the base of a dam and is likely frequently inundated. I was unable to access this site, but Peak and Associates (1981:31) reported exfoliation had disturbed at least one element since Mohr (1951) had recorded the rock art.

CA-MRP-546 has been previously assigned trinomials CA-MRP-141 and CA-MRP-145. Payen (1966:42) referred to this site as Site 111. Located 22.5 km northwest of CA-MRP-402 at an elevation of 152 m, this site was photographed by Murchie in 1950, recorded by Charles Ostrander in 1976, and reassessed in 2012 by Guerrero and colleagues. This site measures 125 x 55 m, is situated in a narrow canyon along a river, and would have faced a waterfall before a dam was built upstream. I was unable to access this site, but I did find copies of Murchie's (1950) photographs and Ostrander's (1976) records. There are several BRMs and the petroglyphs are similar to those at

CA-MRP-402, except there are more circular elements, at least four images of concentric circles, and no geometric designs. There are also petroglyphs encircling some of the bedrock mortars (Figure 26).

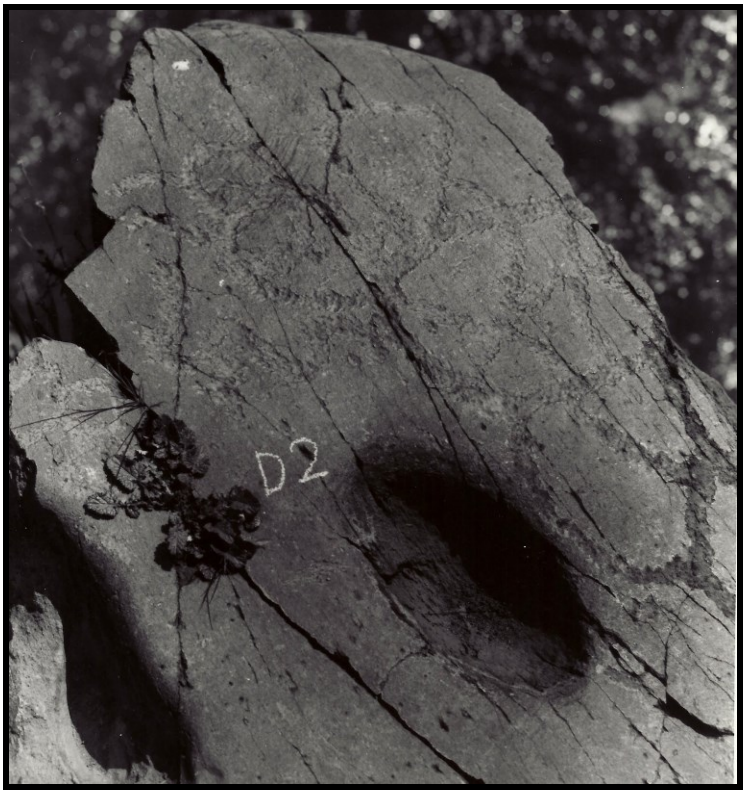


Figure 26. Petroglyph next to a bedrock mortar at CA-MRP-546. (Photograph taken by Ostrander 1976).

Payen (1966:43) referred to CA-MRP-1 as Site 116. This site is located 20 km southeast of CA-MRP-402 at an elevation of 280 m and measures 100 x 30 m in size. I was able to access this site and took photographs of the petroglyphs, which are located on an outcrop of metamorphic rock on the north bank of a seasonal stream. There is also a spring at this site and six bedrock mortars (Foster et al. 1986a; Hewes and Massey 1939a); one of the mortars is situated at the north edge of a bedrock metate. The landscape is grassland with low rolling hills, and one can see into the San Joaquin Valley from this site. I also noticed a few rocks of a micaceous schist scattered on the surface above the water line. As there is no evident on-site source of these, they were likely transported here from elsewhere.

A Department of Parks and Recreation "Summary of Burial Collections" dated August 1992 attached to this site record reports that a village and cemetery at CA-MRP-1 were excavated by Stanislaus State College in 1963 and 1965. The attachment notes six burials and 20 artifacts were uncovered, and that although a local Miwok consultant who was born in

1901 did not know of a village at this site, he did state that "Tuolumne Indians" camped here two months a year to collect acorns (Foster et al. 1986a). This comment is intriguing because the closest oak trees are currently located 1 km from the site and there are no stumps of felled trees in the area.

The petroglyphs at CA-MRP-1 are also abstract and include straight, curved and wavy lines, two "suns," "rakes," and other geometric and amorphous elements. The art is different from that at CA-MRP-402 in that there are few circles and spirals, there is one panel of concentric circles (Figure 27), a high number of cupules are present, triangle and diamond shapes were observed, and one geometric petroglyph unlike any others found in the region was observed (Figure 28).

Figure 27. A panel of concentric circles at CA-MRP-1.

Figure 28. A unique geometric image at CA-MRP-1.

Payen (1966:42) referred to CA-MRP-2/898t as Site 113. It is located 15 km southeast of CA-MRP-402 at an elevation of 320 m and measures 260 x 140 m. I was unable to access this site. The surrounding landscape is oak covered hills with scattered large granitic boulders. There was an apparent village with 18 housepit depressions, one dancehouse pit, 120 bedrock mortars, "several" bedrock metates, and a short, low rock wall feature (Foster et al. 1986b:1; Hewes and Massey 1939b:1).

This site was first recorded by Hewes and Massey (1939b), and Payen (1966:Figures 71-73) stated he did not access this site, yet he included drawings of the rock art in his study. Foster et al. (1986b:11-15) reassessed the site in 1986, noting the presence of the petroglyphs and including copies of the drawings from Payen's (1966:Figures 71-73) thesis with the site record. Foster and Ciccio reported on this site again in 1988, but in this record they referred to CA-MRP-002 as "a housepit village site" located east-northeast of the petroglyphs, and they stated that the petroglyphs were not previously recorded (Foster and Ciccio 1988a:2). Two photographs of the rock art are included in the 1988 record, along with the same copies of the drawings presented by Payen (1966:Figures 71-73). The petroglyphs were then assigned trinomial CA-MRP-898 (Foster and Ciccio 1988a:1).

The rock art at this site is unique in that it is located on an outcrop at the top of a hill. The images are also abstract, and include straight, curved and wavy lines; one "sun" image; and other geometric and amorphous elements (Foster and Ciccio 1988a:6; Payen 1966:Figures 71-73). They are different from images at CA-MRP-402 in that there are triangle shapes and only a few circles.

CA-MRP-275 is located 23 km southwest of CA-MRP-402 at an elevation of 244 m along a seasonal and spring-fed creek and it measures 200 x 80 m (Foster and Ciccio 1988b:1). Payen (1966:43) referred to this site as Site 117. I was able to access this site and observed it is in a shallow, north-south oriented valley in the foothills, with tall hills (250 -260 m) to the east and west.

CA-MRP-275 contains two BRM outcrops containing at least 27 mortars, and rock art distinct from most of the other sites included in this study. The art consists of numerous cupules and incised lines (pit and groove) in the south-facing vertical panels of two boulders. The boulders themselves are shiny, micaceous schist and are distinct from the surrounding sandstone, shale and slate boulders also found in this area (Figure 29).

Figure 29. Petroglyphs at CA-MRP-275.

Located 11 km northeast of CA-MRP-402, CA-MRP-1519 contains the only documented pictograph in the study area. The single design consists of a 1-x-1.2 m panel of red, vertical zig-zag lines in a southwest-facing rock overhang next to a pool. There are also 10 bedrock mortars at the site (Smith and Associates 1999).

Discussion. The majority of the site records for other sites considered in this landscape assessment do not include data on the number of petroglyph or panels present, nor was I able to obtain such data through access to all sites. Based on the available information, however, CA-MRP-402 certainly has one of the highest concentrations of rock art found in this foothill region. No viewsheds, trails or other obvious connections between the sites was observed, yet they are all within a day walk of CA-MRP-402.

The brief field observations at these other rock art sites confirm that the solar and shadow alignments at CA-MRP-402 are a unique part of the archaeological record for this geographical area. Yet a single extraordinary case is not proof of an interpretation (Whitley 2011:155). Thus, documentation of other cultural astronomy sites in California was also investigated in order to establish that the intentional solar and shadow alignments at CA-MRP-402 are consistent with broad patterns of behavior of

native Californians and are not an anomaly, random acts, or chance. The majority of such sites are located in southern California and are associated with the Chumash, the Tipai-Kumeyaay, the Tübatulabal, and the Yokuts. At least 19 rock art sites in California are associated with a solar horizon or shadow alignments (see Table 2).

Table 5. Rock art sites in California associated with solar horizon or shadow alignments.

Trinom.	A.K.A.	Grp.	Obsv.	Mthd.	Notes	Ref.	Cite.
Tul-19	Painted Rock	Y	W	I	"Indirect sunrise observation of light entering painted cave."	U	H
Ker-317	Walker Pass	T	B	D	"Sunrise observation of a horizon defined in a rock depiction."	S	H
SBa-101	Condor Cave	C	W	I	"Indirect sunrise observation of light entering painted cave after passing over nearby peak."	H/U	H
SBa-550	Honda Ridge	C	W	D	"Sunrise observation of a horizon defined in a rock art depiction."	S/U	H
SBa-665	Window Cave	C	W	B	"Sunset observation of a horizon in which sun sets over prominent peak (shrine?), while sunlight enters cave with petroglyphs."	S/U	H
SBa-103/1663	Edward's Cave	C	W	I	"Sunset observation of light striking painted disc on column of rock inside cave."	J/U	H
LAn-511	Castle Peak	C-F	S	D	"Sunrise observationof the horizon from a natural rock window on top of shrine."	R/U	H
SDi-6648	Viejas Mtn.	T-K	W	D	"Sunrise observation of the horizon from cross-shaped manmade alignment."	He/U	H
SDi-5693	Cowles Mtn.	T-K	W	D	"Sunrise observation of the horizon from bisected circle manmade alignment."	He/U	H
LC-44-18	Rumeros a	T-K	W	I	"Indirect sunrise observation of light entering cave and striking painted figure."	He/U	H
SBA-502	House of the Sun	C	W	D	Pictograph of "depicton of the east-southeast skyline...with notch where sun rises."	Ho	Ho
SBA-526	House of the Sun	C	B/E	D	Sunlight on pictographs during solstices and equinoxes	Ho	Ho
LAN-357	Burro Flats	C	B	D	Shadows on petroglyphs during the W solstice, rising at obvious points on horizon during both	R	R

Table 5 Continued. Rock art sites in California associated with solar horizon or shadow alignments.

Trinom.	A.K.A.	Grp.	Obsv.	Mthd.	Notes	Ref.	Cite.
KER-17		T	W	D	Sun rises at a distinct point on horizon	HS	HS
SBR-291		Ch	W/E	D	Alignments btwn rock art at sunrise on horizon during W, sun rises in horizon notch during E	T	T
Arbor-glyph		C	St	D	"Associated with Ursa Major and Polaris."	SO	SO
SBA-1318	House of Two Suns	C	B	D	"'Sundaggers' and shadow lines upon 3 cupules in the floor."	SO	SO
MNT-256	La Cueva Pintada	S	W	I	"Beam of light exposed particular panel during the afternoon."	SO	SO
INY-272		?	E	D	"6 vertical bars that can predict the time of the equinox, relative to sunset, within 3 hours."	G	G
INY		?	B/E	I/D	Web site proposing several possible cultural astronomy sites in Eastern California	G	G

Group: Y = Yokuts; T = Tübatulabal; C = Chumash; C-F = Chumash-Fernandeño; T-K = Tipai-Kumeyaay;
Ch = Chemehuevi; S = Salinan.
Observed: S = Summer Solstice; W = Winter Solstice; B = Both Solstices; E = Equinox.
Method: I = Indirect Observation; D = Direct Observation; B = Both.
Reference Cited: U = Underhay et al. 1979; S = Schiffman 1977a,b; H/U = Hudson & Underhay 1978;
S/U = Spanne/Underhay et al. 1979; J/U = Junak/Underhay et al. 1979; R/U = Romani/Underhay et al. 1979;
He/U = Hedges/Underhay et al. 1979; Ho = Hoskinson 1988; R = Romani et al. 1988; HS = H.-Slabosz. et al. 1988;
T = Trupe et al. 1988; SO = St. Onge 2009; G = Gillespie, A., equinox-project.com.
Cited In: H = Hudson et al. 1979, p 46; Ho = Hoskinson 1988, p. 34-36; R = Romani et al. 1988, p. 116;
HS = H.-Slabosz. et al. 1988, p. 136; T = Trupe et al. 1988, p. 156-157; SO = St. Onge 2009, p. 35-43;
G = Gillespie, A., equinox-project.com.

Why did the cultural landscape of CA-MRP-402 attract people to mark and transform this place?

Sacred Space.

> It is difficult to verbalize in another language, for another language, for another culture, exactly what makes a place sacred, but I'll do what I can. There are spirits that dwell in certain places that may be beneficial to a fast and helpful in other ways to the individual and to The People when one fasts and prays there. Other things that make a place sacred are what our grandfathers and their grandfathers before us have put there, or how the Great Spirit has shaped the rocks, or the ancientness of the grandfather trees, or the power of the plants. Our brothers, the animals know these places and come to these places ~ Hawk Little John, Cherokee [Gulliford 2000:67].

Taçon (1999:34) observed that "the very location and organizational structure of rock art speaks of human relationships to places and spaces." This observation seems especially germane to rock art sites in the western Sierra Nevada foothill region since they are rare. Their placement is concentrated in specific places and on specific rocks. It is not unusual to find one rock exhibiting numerous images, while a neighboring rock that affords the same physical qualities is devoid of any markings. The particular placement of rock art raises the question: why these specific places?

For most indigenous peoples, the world was organized into an upper world, an underworld, and a middle world—each inhabited by beings— with four cardinal directions and an axis or center (Krupp 1997:15, 35; Merriam 1993:11; Taçon 1999:40). The center of the cosmos was where creation began, and a place of supernatural power (Krupp 1997:16-17). Many groups identified a special place in the landscape as the axis or center of their universe (Krupp 1997:16). These were places in the middle world that embodied the structure of the cosmos (Knapp and Ashmore 1999:13; Krupp 1997:17) and encompassed distinctive features on the landscape that were thought to provide a connection to the cosmic realm; mountains, caves, rivers, springs, and rocks (Buikstra and Charles 1999:203; Taçon 1999:37). The supernatural power at the center of the world could be accessed in places where these features came together in a striking manner (Whitley 2011:107, 117); these were sacred places (Krupp 1997:17, 35; Taçon 1999:37).

Such an intersection is found in the landscape at CA-MRP-402, where there is the north-south flowing creek, the tall hill rising from the site to the west, the shorter hill rising to the east, the accentuated east-west natural

rock alignments, a perennial pool in the center, a natural acoustic amplifier, and the created clearing, niches and rock wall that provide a cavern-like environment. Therefore, I contend that the landscape at CA-MRP-402 was probably considered special or sacred by the native people who used this site.

Such sacred places in the landscape were also where the spirits that inhabited the other worlds could be contacted and "where the world was renewed through celestial power" (Krupp 1997:16). The upper and lower worlds could not be reached on foot. To access them, people had to rely on supernatural power and that was the domain of the shaman (Krupp 1997:33, 35; Whitley 2011:107). The shaman's role was to interact with sources of power and preserve equilibrium by engaging in rituals (Krupp 1997:51). Given the ethnographic data for the foothill region, it is reasonable to suggest one way shamans did this was by ingesting *Datura* to acquire supernatural powers and attain an altered state of consciousness (Kroeber 1907:366; Kroeber 1925:503; Meighan 1981:17). In this state, their soul could travel along the world axis to the other worlds and interact with the spirits on behalf of the people the shaman served (Krupp 1997:35, 37, 51, 54). This was done where the power resided, in sacred spaces that imitated the cosmos, acted as a stage for rituals (Krupp 1997:17), and may have included rock art.

Some rock art was created at sacred places to communicate between humans and the cosmic realm (Lee 1997:88), and also to acquire and use power in both good and bad contexts (Whitley 2011:131). Such rock art served as a link between the sacred and the profane (Lee 1997:88), and may have been created during shamanistic rituals. The markings on the rocks also served to enhance the ambiance of the space (Meighan 1981:19), or to point out significant or sacred features in the landscape as a type of "special attention" marker (Bradley 1991; Knapp and Ashmore 1999:15). Cultural landscapes became marked as time passed, and sites that had significant markings were considered most powerful by native people (Knapp and Ashmore 1999:16). In other words, "spectacular rock art sites tend to be in spectacular places" (Meighan 1981:5).

As noted in Chapter 4, the analysis of the geographical and cultural landscape has shown CA-MRP-402 is exceptional in containing 103 rock art panels. This is possibly the highest concentration of images in the study region. The creation of rock art in California has been identified in the ethnographic record as associated with supernatural places, important permanent village sites, places where ceremonial goods or a shaman's cache were hidden, and ceremonial places (Gayton 1948:113; Latta 1977:600). Regional ethnographic data also provide insight into how native Californians viewed the world around them; with an upper, middle, and lower world (Merriam 1993:11; Powers 1877:396). Certain places, including where mourning ceremonies were held, were understood to be powerful and supernatural among the Yokuts (Latta 1977:684). Similarly, it seems that

the Chumash believed certain places, including caves and ritual spaces, were sacred and powerful (Hudson et al. 1977:6; Laird 1976:38).

The regional ethnographic data (see Kroeber 1925:938) also supports the argument for the shamanistic origin of the images. Shamans were responsible for communicating with and influencing the animate supernatural world. They did this by performing rituals in sacred and powerful spaces. Therefore, it is reasonable to suggest that CA-MRP-402 was viewed as a powerful or sacred place, and that the rock art images were created by shamans interacting with this sacred space through various ritual acts.

Ritual Space. As discussed in Chapter 2, ritual involves specific actors and actions, but there are "no identifiable depictions (ethnographies or theories) that reliably predict ritual activity" (Ross and Davidson 2006:309). Moreover, the identification of ritual activity in the archaeological record is hindered by several factors, including the fact that each native group potentially participated in a variety of rituals that were subject to change over time. Some of these rituals may have produced rock art sites of different styles and meaning, or a single site may have been employed in more than one way; for example, "a site incorporating rock art in puberty rituals could also be a sacred place where astronomical meanings were also present" (Meighan 1981:16).

Bearing this in mind, discussion herein of CA-MRP-402 as a ritual space primarily relies on criteria developed by Zedeño (2008:267), who recognized four components for defining ritual landscapes and sites: (1) the intrinsic qualities of an object and its relationship to properties of power; (2) an object's spatial association with other objects of power; (3) an object's spatial association with powerful landscape features; and (4) an object's spatial association with anything used ritually.

With respect to the first and third criteria, as discussed above, CA-MRP-402 was likely selected by native people because of intrinsic qualities such as the hills, a perennial water source, a natural acoustic amplifier, and an alignment of the natural rock wall and the E Boulders with the cardinal directions. These traits allowed it to be viewed as, and to become, a special or sacred place associated with the cosmos and powerful landscape features. The astronomical observation area that was created may have also been considered a place of power.

Defining spatial associations with ritual or powerful objects following Zedona's second and fourth criteria poses a challenge since the objects utilized for ritual varied from group to group or over time, and may have involved seemingly insignificant items such as feathers or twigs. A repetitive sequence of actions is identified with most ritual activities (Ross and Davidson 2006:312). Repetition of actions at CA-MRP-402 are reflected in the abundance of images at this site, the creation and use of the clearing, and

the manipulation of rocks to form shadows to observe the time of the equinox. As argued above, however, the rock art at CA-MRP-402 was likely created as part of rituals and, therefore, the images are ritual objects. *Datura* currently grows adjacent to the site, and may have been present in the past, so this may have been used ritually. Other items found at the site, such as mineral pigments, quartz, and charcoal uncovered in the test pit, cannot be unequivocally identified as relating to ritual. Nonetheless, the four criteria components for defining ritual landscapes and sites are met at CA-MRP-402. Based on this information, it seems that CA-MRP-402 likely functioned as a ritual space for native people.

Moreover, it is possible that CA-MRP-402 served as a ritual center for this region. This is suggested by the high concentration of rock art elements and presence of solar alignments here that are absent from neighboring sites, as well as its central location with respect to surrounding rock art sites. Currently, however, there is insufficient archaeological evidence to confirm this hypothesis.

This interpretation of CA-MRP-402 as a ritual space is further supported by the ethnographic accounts that confirm nearly all native groups in California participated in ceremonies and rituals, and many were performed by shamans (Kroeber 1907:326-327). For example, many native groups participated in some type of mourning ceremony that lasted from one to five days (Kroeber 1907:335). The Miwok and Chumash are reported to have held harvest ceremonies to ensure the return of the harvest the following year (Bennyhoff 1977:14; Hudson et al. 1977:43). Female adolescent rites and male initiation ceremonies were common to many groups (Bennyhoff 1977:14; Kroeber 1907:336; Latta 1977:627), and the Yokuts and Chumash shamans are said to have conducted rain rituals (Cummins 1978:31-34, 48; Gayton 1948:112; Hudson and Underhay 1978:57; Latta 1977:637; Powers 1877:372). The use of *Datura* by shamans also appears to have been common to many groups (Barrett and Gifford 1933:169; Hudson et al. 1977:6; Hudson and Underhay 1978:57; Laird 1976:39; Latta 1977:600; Powers 1877:380).

The rituals were necessary to interact with the supernatural realm, employ power, and establish order in the world or encourage departures from the normal patterns and organization of the universe (Krupp 1997:33). Thus, the rock art at CA-MRP-402 may also represent ritual acts done to request certain actions. The rituals were likely performed by a shaman at this sacred place. Furthermore, given the created clearing and solar and shadow alignments during the time of the equinoxes, some rituals were likely related to astronomical observation.

What Role did the Rock Art Play in the Cultural Landscape of CA-MRP-402?

This study of the cultural landscape of CA-MRP-402, combined with ritual study approaches and informed through ethnography, brings together the natural and social worlds and reveals that native peoples engaged with this powerful and sacred place over time through the ritual creation of rock art. This engagement formed a material record of at least 103 petroglyph panels and an astronomical observatory at the site.

Interaction with the heavens rested on a complicated power structure that included the celestial objects, people, sacred spaces, and rituals. As noted by Hudson (1988:25), "because celestial objects were perceived as supernaturals capable of acquiring and using power to alter the universe, it was essential for man to watch them in earnest." Daily observation was likely the responsibility of shaman astronomers as they were the individuals who were capable of acquiring the necessary power to interact with the supernatural celestial beings. This was done at powerful, sacred places in the landscape such as CA-MRP-402. Observance emphasized the cyclical nature of the solar year, the moon, and the seasons that enabled the detection of future cycle changes and resulted in a type of calendar. Daily observations combined with the calendar enabled shaman astronomers to detect shifts of power and to know when a necessary ritual activity should be performed to insure stability and balance and request certain actions (Hudson 1988:26). The rock art was created during these ritual interactions with the supernatural celestial powers.

Conclusion

My research incorporated landscape and ritual approaches ethnography, archival research, field survey of both CA-MRP-402 and the surrounding area, photodocumentation of images and astronomical events, and limited excavation. This resulted in a greater contextual understanding of the cultural landscape of the site. This multifaceted approach expands our knowledge of the people who lived here long ago and discerns how they viewed and interacted with the cultural landscape. Like other studies conducted elsewhere, this thesis demonstrates that the landscape is both what is visible and what is understood. Individual perceptions are as much a part of the landscape as hills, rivers, and rocks.

While this thesis has combined large quantities of data, there is still much more that can be done. The rock art sites in this area represent a broader tradition and should be addressed in that context. Future research could include a larger study on the rock art of the greater foothill area to better understand the complete landscape of this region.

Geochemical analysis of the mineral pigments uncovered at CA-MRP-402 might provide information on trade networks. Further studies such as additional survey, excavation, AMS radiocarbon dating, and XRF and hydration analysis could also be done to help determine when various activities were undertaken at CA-MRP-402. For instance, although only one piece of obsidian was located during my survey of neighboring CA-MRP-610, the property owner has found fragmented obsidian artifacts on the surface of the archaeological sites along the same creek and future systematic transect surveys over large areas may reveal additional obsidian. Such material could be geochemically sourced and subjected to obsidian hydration dating. Likewise, a study of the patina by a specialist might provide additional temporal information (Whitley 2011). Also, it might be possible to date the lichen growing over some of the images. Although, such studies involve measurement of the lichen growth and I have witnessed the lichen grow at various rates at CA-MRP-402 over the years. Data from these studies would increase current archaeological and cultural interpretations of the region.

Based on the data that was collected, it was determined that CA-MRP-402 is unique for this region, encompassing a concentration of 103 petroglyph panels. This site also contains an ancient astronomical observation area.

It is only since the 1970s that archaeologists have begun to fully explore the potential significance of astronomy in hunter-gatherer societies. Before that time, agricultural societies tended to be the focus of such work. It was believed such knowledge stemmed from a need for a seasonally aligned calendar to know when it was time to plant and harvest crops. Ethnographic data published in the 1970s prompted a broadening of this archaeological perspective (e.g., Hudson et al. 1977; Hudson and Underhay 1978), yet some researchers continue to associate ancient astronomy with agriculture. Even Whitley recently reiterated this idea: "In cultures where time was not presumed important – commonly, among hunter gatherers – archaeoastronomical practices are less likely" (Whitley 2011:156).

I differ from this perspective and assert the common association of astronomy with agriculture is partially a reflection of modern thought processes. The use of astronomy among ancient cultures reflected more than a time to plant and harvest; it represented a connection to the animated landscape and the skyscape that surrounded the ancient people. Today, we spend most of our time in unnatural environments with artificial lighting, and the light pollution that floods our skies at night makes all but a few of the brightest stars invisible to most of us. As a consequence, many people have become detached from the sky. Most people have no idea what time the sun rose in the morning or what phase the moon is in, but this was not the case for the prehistoric hunter-gatherers (Aveni 2001:1). They were surrounded by (and imbedded in) the landscape, including the sky and the celestial objects that moved through it. It is difficult for us to imagine the

degree to which the native peoples were preoccupied with astronomical pursuits, but "the heavens touched nearly every aspect of their culture" (Aveni 2001:1). Consequently, we find astronomy in the ethnographic record and woven into native myths and religion.

As noted in Chapter 2, the regional ethnographic literature reveals the sky and the objects moving through it were not only observed by many native peoples, but that most groups considered these celestial objects to be living beings. The sun brought the people life and warmth (Latta 1977:216; Merriam 1993:36), and the moon showed the people everything including occurrences associated with the cycle of the months and seasons (Heizer and Hester 1972:44; Hudson et al. 1977:37; Hudson and Underhay 1978:143; Kelly 1932:153). The Yokuts and Chumash are said to have believed a contest was played between the celestial beings each night, with the yearly outcome having an effect on the balance of the world (Hudson and Underhay 1978:32-33). The ethnographic accounts of the Chumash provide the greatest insight on the potential prehistoric native beliefs associated with the astronomical body, since the Chumash had shaman astronomers known as the *'alchuklash* who were responsible for observing and interacting with the sky (Hudson and Underhay 1978:32). Their observations allowed the *'alchuklash* to know when it was the necessary time to perform certain rituals that were believed to manipulate the cosmic forces and ensure balance (Hudson and Underhay 1978:43). Shaman astronomers are also reported among the Miwok and Yokuts (Hudson 1988:24). Therefore, it is reasonable to conclude that evidence of cultural astronomy may also be found in the material record of these and more ancient groups.

Systematic data collection for the current study has revealed the observed solar and shadow alignments that occur at CA-MRP-402 during the time of the equinoxes are the result of intentional behavior and, therefore, not random or coincidental (Whitley 2011:154). The excavation of the test pit and the geologic analysis verified the niches and clearing in front of the wall of rock art panels on the west bank are the result of ancient acts rather than natural processes. The geologic analysis of the east bank also confirmed the E Boulders were lifted into their current position. The equinoctial solar and shadow alignments are the result of these modifications of the cultural landscape. This alteration of the landscape created a fixed point on the horizon from which to make consistent astronomical observations. It also afforded a type of calendar that allowed shaman astronomers to know when it was time to perform necessary rituals.

This research also identified the significance of this place to those who created the images, and determined the role of the rock art in the cultural landscape. It is probable that most of the rock art at CA-MRP-402 was created as part of rituals performed by shaman astronomers. Moreover, it is likely the shaman astronomers performed the rituals at this site because they

considered it to be a powerful or sacred place (Krupp 1997:17). The majority if the rock art likely represents the shaman astronomer's ritual interactions with this powerful landscape and the celestial beings (Hudson and Underhay 1978:58; Lee 1997:88).

Moreover, the creation of the observation area would have required an investment in time and labor—to notice the natural fortuitous rock alignments at the site, to alter spaces and features to create the clearing, niches, alignments and shadow effects, and repeatedly observe the results. Therefore, it is reasonable to conclude that the people who created the observation area must have occupied this site at least seasonally over a number of years during the time of the vernal or autumnal equinox, or both. It is not known if attention was given to one or both equinoxes, or when the site was altered, but the Starry Night program provided terminus post quem dates for the alignments of 100 B.C. for the vernal equinox and A.D. 300 for the autumnal equinox. It is unknown if the winter solstice was observed, but the Starry Night program confirmed it could have been observed as early as 1500 B.C. and possibly earlier. Furthermore, the excavation of the clearing and the lifting of the E Boulders would probably have required the participation and cooperation of several people sharing a common desired result. Therefore, this alteration of the cultural landscape can be construed as a testimony of the social and cosmological beliefs of the group. More significantly, this research suggests astronomical observation may have been a wide-ranging tradition practiced among the native peoples of California.

This thesis demonstrates the value of including rock art in archaeological studies and the importance of examining context when attempting to deduce the function or purpose of rock art panels. It also validates the utility of this newer approach to California rock art studies.

Furthermore, this thesis and the documented fieldwork I conducted have contributed significant amounts of comprehensive data to the relatively few studies previously conducted on the rock art of this region. This thesis and the photodocumentation of images have preserved both visual images and other data about the rock art sites for the use of future researchers.

REFERENCES CITED

Ashmore, Wendy, and A. Bernard Knapp (editors)
1999 *Archaeologies of Landscape: Contemporary Perspectives*. Blackwell Publishers, Malden MA.

Anschuetz, Kurt F., and Cherie L. Scheick
2002 Introducing Cultural and Ethnographic Landscapes. In *"That Place People Talk About"*, edited by K. F. Anschuetz, T. J. Ferguson, H. Francis, K. B. Kelley and C. L. Scheick. Report on file with the National Park Service, Petroglyph National Monument, Albuquerque.

Arsenault, Daniel
2004 From Natural Settings to Spiritual Places in the Landscape: An Archaeological, Ethnological and Ethnographic Analysis of Canadian Shield Rock-art Sites. In *The Figured Landscapes of Rock Art*, pp. 289-317. Cambridge University Press, Cambridge.

Aveni, Anthony
2001 *Skywatchers: A Revised and Updates Version of Skywatchers of Ancient Mexico*. University of Texas Press, Austin.

Aveni, Anthony (editor)
2008 *Foundations of New World Cultural Astronomy: A Reader with Commentary*. University Press of Colorado.

Barrett, Samuel A., and Edward W. Gifford
1933 *Indian Life of Yosemite Region: Miwok Material Culture*. Yosemite Association, Yosemite National Park, California

Bell, Catherine
1992 *Ritual Theory, Ritual Practice*. Oxford University Press, New York.

1997 *Ritual Perspectives and Dimensions*. Oxford University Press, New York.

2007 Response: Defining the Need for a Definition. In *The Archaeology of Ritual*, edited by Evangelos Kyriakids, pp. 277-288. Cotsen Institute of Archaeology, University of California, Los Angeles.

Bender, Barbara (editor)
1993 *Landscape: Politics and Perspectives*. Berg Publishers, Providence, RI.

Bennyhoff, James A.
1977 *Ethnogeography of the Plains Miwok*. Center for Archaeological Research at Davis, California.

Binford, Lewis
1962 Archaeology as Anthropology. *American Antiquity* 28(2):217-225.

Bradley, Richard
1991 Rock Art and the Perception of Landscape. *Cambridge Archaeology Journal* 1:77-101.

Bradley, Richard (editor)
2000 *An Archaeology of Natural Places*. Rutledge, New York.

Brandt, John C., Stephen P. Maran, Ray Williamson, Robert S, Harrington, Clarion Cochran, Muriel Kennedy, William J. Kennedy and Von Del Chamberlain
2008 Possible Rock Art Records of the Crab Nebula Supernova in the Western United States. In *Foundations of New World Cultural Astronomy: A Reader with Commentary,* edited by Aveni, Anthony, pp. 635-646. University Press of Colorado.

Buikstra, Jane E., and Douglas K. Charles
1999 Centering the Ancestors: Cemeteries, Mounds, and Scared Landscapes of the Ancient North American Midcontinent. In *Archaeologies of Landscape*, edited by Wendy Ashmore and A. Bernard Knapp, pp. 201-228. Blackwell Publishers, Massachusetts.

Button, Melinda
2009 Multiple Ways of Seeing One Place: Archaeological and Cultural Landscapes of the Sutter Buttes, California. Unpublished thesis, Department of Anthropology, California State University, Chico.

Children, George, and George Nash
1997 Establishing a Discourse: The Language of Landscape. In *Semiotics of Landscape: Archaeology of the Mind*, edited by George Nash, pp. 1-4, Archaeopress, Oxford.

Chippindale, Christopher, and George Nash
2004 Pictures in Place: Approaches to the Figured Landscapes of Rock-Art. In *Pictures in Place: The Figured Landscapes of Rock-Art*, edited by Christopher Chippindale and George Nash, pp. 1-36, Cambridge University Press, New York.

Chippendale, Christopher, and Paul S. C. Tacon (editors)
1998a *The Archaeology of RockArt*. Cambridge University Press, Cambridge.

1998b An Archaeology of RockArt Through Informed Methods and Formal Methods. In *The Archaeology of Rock Art*, edited by Christopher Chippendale and Paul S. C. Tacon, pp. 1-10. Cambridge University Press, Cambridge.

Clay, Vickie L.
1993 *Merced County Streams Group Cultural Resources Status Report for Bear Reservoir, Mariposa County, California*. Submitted to Lee Foster, Department of the Army Corps of Engineers, Sacramento, Contract No. DACW05-92-P-2302. On file at Central California Information Center, California State University, Stanislaus, Turlock.

Clelow, C. William Jr.
1976 *Final Report on the Archaological Reconnaissance of the Merced County Streams Project, California*. Submitted to Department of the Army Corps of Engineers, Sacramento, Contract No. DACW05-76-0039. On file at Central California Information Center, California State University, Stanislaus, Turlock.

1998 The History of California Rock Art Studies: A View from the Coso Range. In *Coso Rock Art: A New Perspective*, edited by Elva Younkin, pp. 11-26. Maturango Museum Publication no. 12. Banning, California.

Cook, Sherburne F.
1955 The Aboriginal Population of the San Joaquin Valley, California. *University of California Anthropological Records* 16(2):31-74.

Conkey, Margaret W.
1997 Beyond Art and Between the Caves: Thinking About Context in the Interpretive Process. In *Beyond Art: Pleistocene Image and Symbol*, edited by Margaret W. Conkey, Olga Soffar, Deborah Stratmann, and Nina G. Jablonski, pp. 343-367, N. G. Jablonski. California Academy of Sciences, San Francisco.

Cowper, Dorothy
1968a Archaeological Site Survey Record for CA-MER-92. On file at The Central California Information Center, California State University, Stanislaus, Turlock.

1968b Archaeological Site Survey Record for CA-MER-100 (CA-MER-52). On file at The Central California Information Center, California State University, Stanislaus, Turlock.

Cummins, Marjorie
1978 *The Tache-Yokuts: Indians of the San Joaquin Valley, Their Lives, Songs, and Stories*. Pioneer, Fresno California.

David, Bruno, and Julian Thomas (editors)
2008 *Handbook of Landscape Archaeology*. Left Coast Press, Walnut Creek, California.

Davies, Robert
2013 Geology Report for MRP-402. Report on file at the Geology Department, Merced College.

DeLue, Rachael Ziady, and James Elkins (editors)
2008 *Landscape Theory*. Routledge, New York.

Fentress, Jeffrey B.
1999 *Excavations at a Native American Rock Art Site: Archaeological Research at CA-ALA-571*. Department of Anthropology, San Francisco State University, California.

Foster, Dan, Rich Jenkins, and Sam Payen
1986a Archaeological Site Survey Record for CA-MRP-001. On file at The Central California Information Center, California State University, Stanislaus, Turlock.

1986b Archaeological Site Survey Record for CA-MRP-002. On file at The Central California Information Center, California State University, Stanislaus, Turlock.

Foster, Dan, and J. Ciccio
1988a Archaeological Site Survey Record for CA-MRP-898. On file at The Central California Information Center, California State University, Stanislaus, Turlock.

1988b Archaeological Site Survey Record for CA-MRP-275. On file at The Central California Information Center, California State University, Stanislaus, Turlock.

Gayton, Anna H.
1930 Yokuts-Mono Chiefs and Shamans. *University of California Publications in American Archaeology and Ethnology* 24:361-420.

1948 Yokuts and Western Mono Ethnography. *University of California Publications in American Archaeology and Ethnology* 10:1-290.

Gillette, Donna
2011 Cultural Markings on the Landscape: The PCN Pecked Curvilinear Nucleated Tradition in the Northern Coastal Ranges of California. Ph.D. dissertation, University of California, Berkeley.

Gillespie, Alan
2008 Precise Petroglyph Equinox Marker in Eastern California. www.equinox-project.com/v230071.htm, accessed October 2013.

Gilreath, Amy J.
2007 Rock Art in the Golden State: Pictographs and Petroglyphs, Portable and Panoramic. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 273-290. Lantham, Maryland.

Golla, Victor
2007 Linguistic Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 71-82. Lantham, Maryland.

Grant, Campbell
1965 *The Rock Paintings of the Chumash*. University of California Press, Berkeley.
1967 *Rock Art of the American Indian*. Thomas Y. Crowell, New York.

1968 Rock Drawings of the Coso Range: Inyo County, California. Maturango Press, China Lake, California.

Gulliford, Andrew
2000 *Sacred Objects and Sacred Places: Preserving Tribal Traditions*. University Press of Colorado, Boulder.

Guerrero, M., G. Hilpert, C. Jones, and A. Arceo
2012 *Archaeological Report for CA-MRP-546*. Submitted by HDR Engineering to State of California Department of Parks and Recreation. On file at Central California Information Center, California State University, Stanislaus, Turlock.

Harper-Slaboszewicz, V. J., and R.M. Cooper
1988 CA-KER-17: A Possible Tübatulabal Winter Solstice Observatory. In *Visions of the Sky: Archaeological and Ethnological Studies of California Indian Astronomy*, edited by Robert A. Schiffman, pp. 135-142. Coyote Press, Salinas, California.

Harville, Les, and A. Lucas
1978 *Archaeological Report for CA-MRP-0892/H*. Submitted to State of California Department of Parks and Recreation. On file at Central California Information Center, California State University, Stanislaus, Turlock.

Heizer, Robert F.
1978 *California*. 8. Smithsonian Institution, Washington.

Heizer, Robert F., and Martin A. Baumhoff
1962 *Prehistoric Rock Art of Nevada and Eastern California*. University of California Press, Berkeley.

Heizer, Robert F. and Thomas R. Hester (editors)
1972 *Notes on Northern Paiute Ethnography: Kroeber and Marsden Records*. University of California, Berkeley.

Heizer, Robert F., and C. W. Clelow Jr.
1973 *Prehistoric Rock Art of California*. Ballena Press, Ramona, California.

Heizer, Robert F. and Karen M. Nissen
1973 *The Human Sources of California Ethnography*. Archaeological Research Facility, Department of Anthropology, Berkeley.

Hewes, G. W., and W. C. Massey
1939a Archaeological Site Record for CA-MRP-001. On file at The Central California Information Center, California State University, Stanislaus, Turlock.

1939b Archaeological Site Record for CA-MRP-002. On file at The Central California Information Center, California State University, Stanislaus, Turlock.

Hoskins, William G.
1985 *The Making of the English Landscape*. Faber, London.

Hoskinson, Tom, and R. M. Cooper
1988 Sapaksi: Archaeoastronomical Investigation of an Island Chumash Site. In *Visions of the Sky: Archaeological and Ethnological Studies of California Indian Astronomy*, edited by Robert A. Schiffman, pp. 31-39. Coyote Press, Salinas, California.

Huckell, Lisa W., and Christine S. VanPool
2006 Toloatzin and Shamanic Journeys: Exploring the Ritual Role of Sacred Datura in the Prehistoric Southwest. In *Religion in the Prehispanic Southwest*, edited by Christine S. Vanpool, Todd L. Vanpool, and David A. Phillips, Jr., pp. 147-163, AltaMira Press, Lanham, Maryland.

Hudson, Travis
1988 The Nature of California Indian Astronomy. In *Visions of the Sky: Archaeological and Ethnological Studies of California Indian Astronomy*, edited by Robert A. Schiffman, pp. 5-30, Coyote Press, Salinas California.

Hudson, Travis, Thomas Blackburn, Rosario Curletti, and Janice Timbrook (editors)
1977 *The Eye of the Flute: Chumash Traditional History and Ritual as Told by Fernando Librado Kitsepawit to John P. Harrington*. Santa Barbara Museum of Natural History, California.

Hudson, Travis, and Ernest Underhay
1978 *Crystals in the Sky: An Intellectual Odyssey Involving Chumash Astronomy, Cosmology, and Rock Art*. Ballena Press, Ramona, California.

Hudson, Travis, Georgia Lee, and Ken Hedges
1979 Solstice Observers and Observatories in Native California. *Journal of California and Great Basin Archaeology 1(1):39-63.*

Hull, Kathleen L.
2007 The Sierra Nevada: Archaeology in the Range of Light. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 177-190. Lantham, Maryland.

Ingold, Tim
1993 The Temporality of the Landscape. *World Archaeology* 25(2):154-174.

Jackson, John
1997 *Landscape in Sight: Looking at America*. Yale University Press, New Haven, Connecticut.

Jennings, Charles W.
1977 *California Geological Survey, Geologic Data Map No. 2*. Updated in 2010 by Carlos Gutierrez, William Bryant, George Saucedo, and Chris Wills.

Joyce, Rosemary
2001 Archaeology of Ritual and Symbolism. In *International Encyclopedia of the Social and Behavioral Sciences*, edited by N. J. Smelser and P. B. Baltes, pp. 13371-13375. University of Pennsylvania Press, Philadelphia.

Kelly, Isabel T.
1932 Ethnography of the Surprise Valley Paiute. *University of California Publications in American Archaeology and Ethnology* 31(3):67-210.

Knapp, A. Bernard, and Wendy Ashmore
1999 Archaeological Landscapes: Constructed, Conceptualized, Ideational. In *Archaeologies of Landscape*, edited by Wendy Ashmore and A. Bernard Knapp, pp. 1-30. Blackwell Publishers, Massachusetts.

Kroeber, Alfred L.
1907 The Religion of the Indians of California. *University of California Publications in American Archaeology and Ethnology* 4(6):319-356.

1922 Elements of Culture in Native California. *University of California Publications in American Archaeology and Ethnology* 13(8):260-328.

1925 *Handbook of the Indians of California*. Smithsonian Institution, Bureau of American Ethnology Bulletin 78. Reprint (1976); Dover Publications, New York.

Krupp, E.C.
1997 *Skywatchers, Shamans and Kings: Astronomy and the Archaeology of Power*. John Wiley and Sons, New York.

Laird, Carobeth
1976 *The Chemehuevis*. Malki Museum Press, Banning, California.

Latta, Frank F.
1977 *Handbook of Yokuts Indians*. Bear State Books, Santa Cruz, California.

Layton, R., and P. J. Ucko
1999 Introduction: Gazing on the Landscape and Encountering the Environment. In *The Archaeology and Anthropology of Landscape*, pp. 1-20. One World Archaeology, London.

Lee, Georgia
1997 The Chumash Cosmos: Effigies, Ornaments, Incised Stones and Rock Paintings of the Chumash Indians. Bear Flag Books.

Lee, Georgia, and William D Hyder
1991 Prehistoric Rock Art as an Indicator of Cultural Interaction and Tribal Boundaries in South-central California. *Journal of California and Great Basin Anthropology* 13(1):15-28.

Lenssen-Erz, Tilman
2004 The Landscape Setting of Rockpainting Sites in the Brandandberg (Namibia): Infrastructure, *Gestaltung*, Use and Meaning. In *The Figured Landscapes of RockArt*, pp. 131-150. Cambridge University Press, Cambridge.

Lewis-Williams, J. David
1995 Seeing and Construing: The Making and 'Meaning' of a Southern African Rock Art Motif. *Cambridge Archaeological Journal* 5(1):3-23.

Lewis-Williams, David, and Thomas Dowson
1988 The Signs of All Times: Entoptic Phenomena in Upper Paleolithic Art. *Current Anthropology* 29:201-45.

1990 Through the Veil: San Rock Paintings and the Rock Face. *South African Archaeological Bulletin* 45:5-16.

Levy, Richard
1978 Eastern Miwok. In *Handbook of the Northern California Indians, Vol. 8*, edited by William C. Sturtevant and Robert Heizer. pp. 398-413. Smithsonian Institution, Washington D.C.

Mallery, Garrick
1893 Picture Writing of the American Indians. Smithsonian Institution, Bureau of American Ethnology Annual Report for 1888-89: 25-807 Washington D.C.

McCarthy, H. C., C. M. Blount, and R. A. Hicks
1985 Appendix F: A Functional Analysis of Bedrock Mortars: Western Mono Food Processing in the Southern Sierra Nevada. In *Cultural Resources of the Crane Valley Hydroelectric Project Area, Madera County, California. Vol. 1, Ethnographic, Historic, and Archaeological Overviews and Archaeological Survey*, edited by S. K. Goldberg, pp. 189-214. INFOTEC Research, Sonora, California. Submitted to Pacific Gas and Electric Company, San Francisco.

Meighan, Clement
1981 *Messages from the Past: Studies in California Rock Art.* Institute of Archaeology, University of California, Los Angeles.

Merleau-Ponty, Maurice
1962 *Phenomenology of Perception*. Routledge, London.

Merriam, C. Hart
1993 *The Dawn of the World*. Reprinted. Bison Book, University of Nebraska. Originally published 1910, H. Clark Company, Cleveland, Ohio.

Mohr, Albert
1951 *Archaeological Appraisal of Burns Reservoir, Merced County, and Bear and Owens Reservoirs, Mariposa County, California*. Submitted to River Basin Surveys, Smithsonian Institution. On file at Central California Information Center, California State University, Stanislaus, Turlock.

Morales Jr., Reinaldo
2005 Considerations on the Art and Aesthetics of Rock Art. In *Aesthetics and Rock Art*, edited by T. Heyd and J. Clegg, pp. 61-74. Ashgate, Hampshire, England.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, Orlando, Florida.

Muñoz, Fray Pedro, Robert Glass Cleland, and Haydée Noya
1946 The Gabriel Moraga Expedition of 1806: The Diary of Fray Pedro Muñoz. *Huntington Library Quarterly* 9(3):223-248.

Murchie, Elmer
1945 Copies of photographs and original unpublished notes for CA-MER-100 (CA-MER-52). Manuscript on file, Merced College, California.

1950 Copies of photographs and original unpublished notes for CA-MRP-546. Manuscript on file, Merced College, California.

Ostrander, Charles
1976 A Petroglyph Preservation Project: CA-MRP-546. On file at The Central California Information Center, California State University, Stanislaus, Turlock.

Ouzman, Sven
1998 Towards a Mindscape of Landscape: Rock-Art as Expression of World-Understanding. In *The Archaeology of RockArt*, edited by Christopher Chippendale and Paul S. C. Taçon, pp. 30-41. Cambridge University Press, Cambridge.

Payen, Louis A.
1966 *Prehistoric Rock Art in the Northern Sierra Nevada, California*. Unpublished Master's Thesis, Department of Anthropology, California State University, Sacramento.

Peak and Associates
1981 Archaeological Site Survey Record for CA-MER-52 (CA-MER-100). On file at The Central California Information Center, California State University, Stanislaus, Turlock.

1982a *Merced County Streams Project, Bear Reservoir, California: Intensive Cultural Resources Survey*. Submitted to Department of the Army Corps of Engineers, Sacramento, Contract No. DACW05-81-C-0097. On file at Central California Information Center, California State University, Stanislaus, Turlock.

1982b Historic Registry Nomination Form. Submitted to The National Register of Historic Places. On file at Central California Information Center, California State University, Stanislaus, Turlock.

Powers, Stephen
1877 Tribes of California. *Contributions to North American Ethnology*, 3:384-391.

Quinlan, Angus R.
2007 Integrating Rock Art with Archaeology: Symbolic Culture as Archaeology. In *Great Basin Rock Art: Archaeological Perspectives*, edited by Angus R. Quinlan, pp. 1-8. Reno, Nevada.

Rappaport, Roy
1979 The Obvious Aspects of Ritual. In *Ecology, Meaning and Religion*, edited by Roy Rappaport, pp. 173-221. Richmond, California.

1999 *Ritual and Religion in the Making of Humanity*. University of Cambridge Press, Cambridge.

Richards, Colin, and Julian Thomas
1984 Ritual Activity and Structured Deposition in Later Neolithic Wessex. In *Neolithic Studies: A Review of Some Current Research*, edited by R. Bradley and J. Gardiner, pp. 189-218. BAR British Series 133, Oxford.

Romani, John, Dan Larson, Gwen Romani, and Arlene Benson
1988 Astronomy, Myth, and Ritual in the West San Fernando Valley. In *Visions of the Sky: Archaeological and Ethnological Studies of California Indian Astronomy*, edited by Robert A. Schiffman, pp. 109-134. Coyote Press, Salinas, California.

Rosenthal, Jeffrey S, Gregory G. White, and Mark Q. Sutton
2007 The Central Valley: A View from the Catbird's Seat. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 147-164. Lantham, Maryland.

Ross, June, and Iain Davidson
2006 Rock Art and Ritual: An Archaeological Analysis of Rock Art in Arid Central Australia. *Journal of Archaeological Method and Theory* 13(4):305-341.

Saint-Onge, Rex W. Sr., John R. Johnson, and Joseph Talaugon
2009 Archaeoastronomical Implications of a Northern Chumash Arborglyph. *Journal of California and Great Basin Archaeology* 29(1):29-57.

Schaafsma, Polly
1995 *Images in Stone*. Brown Trout, San Francisco, California.

Schama, Simon
1995 *Landscape and Memory*. Vintage Books, New York.

Schiffman, Robert A. (editor)
1988 *Visions of the Sky: Archaeological and Ethnological Studies of California Indian Astronomy.* Coyote Press, Salinas, California.

Schoenherr, Allan A.
1992 *A Natural History of California*. University of California Press, Berkeley.

Sims, Lionel
2009 Entering, and Returning from, the Underworld: Reconstituting Silbury Hill by Combining a Quantified Landscape Phenomenology with Archaeoastronomy. *Journal of the Royal Anthropological Institute* 15:386-408.

Sofaer, Anna, Volker Zinser, and Rolf M. Sinclair
1979 A Unique Solar Marking Construct. *Science* 206:283-291.

Sonin, Bill
1995 *California Rock Art: An Annotated Site Inventory and Bibliography*, edited by M. L. Marymor.

Steward, Julian
1929 Petroglyphs of California and Adjoining States. *University of California Publications in American Archaeology and Ethnology* 24(2):47-238.

Storer, Tracy I., and Robert L. Usinger
1963 *Sierra Nevada Natural History: An Illustrated Handbook*. University of California Press, Berkeley.

Taçon, Paul S. C.
1999 Identifying Ancient Sacred Landscapes in Australia: From Physical to Social. In *Archaeologies of Landscape*, edited by Wendy Ashmore and A. Bernard Knapp, pp. 33-57. Blackwell Publishers, Massachusetts.

Tilley, Christopher
1994 *A Phenomenology of Landscape: Places, Paths and Monuments*. Berg, Providence, Rhode Island.

Trupe, Beverley S., John M. Rafter, and Wilson G. Turner
1988 Ring of Pictures Stones: Astronomical Connotations of a Rock Art Site in the Eastern Mojave Desert. In *Visions of the Sky: Archaeological and Ethnological Studies of California Indian Astronomy*, edited by Robert A. Schiffman, pp. 153-171. Coyote Press, Salinas, California.

Tuan, Yi-Fu
1977 *Space and Place: The Perspective of Experience*. University of Minnesota Press, Minneapolis.

1990 *Topophilia: A Study of Environmental Perception, Attitudes, and Values*. Columbia University Press, New York.

Turner, Victor W.
1973 Symbols in African Ritual. *Science* 179(4078):1100-1105.

Wallace, William J.
1978 Northern Valley Yokuts. In *Handbook of the Northern California Indians, Vol. 8*, edited by William C. Sturtevant and Robert Heizer. pp. 462-470. Smithsonian Institution, Washington D.C.

Waller, Steve
2000 Spatial Correlation of Rock Art and Acoustics Exemplified in Horseshoe Canyon. *American Indian Rock Art* 24:85-94.

West, G. James, Wallace Woolfenden, James A. Wanket, and R. Scott Anderson
2007 Late Pleistocene and Holocene Environments. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 11-34. Lantham, Maryland.

Whitley, David S.
1998 Finding Rain in the Desert: Landscape, Gender and Far Western North American Rock-Art. In *The Archaeology of Rock Art*, edited by Christopher Chippindale and Paul S. C. Tacon, pp. 11-29. Cambridge University Press, United Kingdom.

2000 *The Art of the Shaman: Rock Art of California.* The University of Utah Press, Salt Lake City.

2011 *Introduction to Rock Art Research*. Left Coast Press, Walnut Creek, California.

Whitley, David S., Johannes H. N. Loubser, and Don Hann
2004 Friends in Low Places: Rock-art and Landscape on the Modoc Plateau. In *Pictures in Place: The Figured Landscapes of Rock-Art*, edited by Christopher Chippindale and George Nash, pp. 217-238, Cambridge University Press, New York.

Whittlesey, Stephanie M.
1997 Archaeological Landscapes: A Methodological and Theoretical Discussion. In *Vanishing River: Landscapes and Lives of the Lower Verde Valley: The Lower Verde Archaeological Project: Overview, Synthesis, and Conclusions*, edited by Jeffrey H. Altschul, Stephanie M. Whittlesey, and Richard Ciolek-Torrello, pp. 17-28. Statistical Research, Tuscon, Arizona.

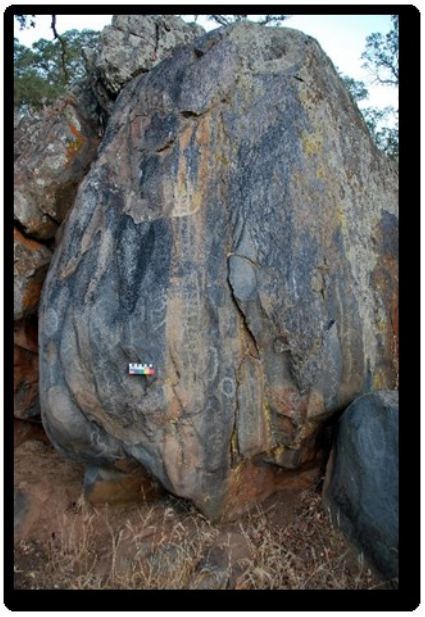
Wright, Dawn J., Michael F. Goodchild, and James D. Proctor
1997 GIS: Tool or Science? Demystifying the Persistent Ambiguity of GIS as "Tool" Versus "Science". *Annals of the Association of American Geographers* 87(2):346-362.

Wylie, John
2007 *Landscape*. Routledge, New York.

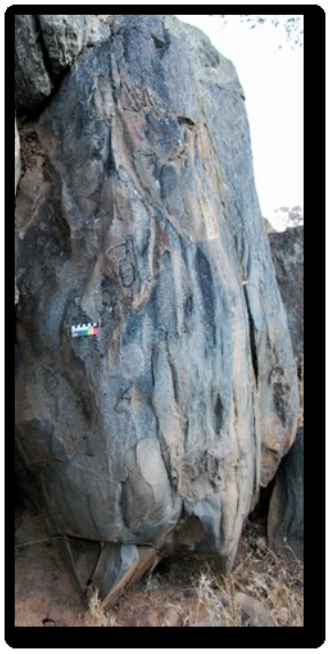
Yoshiyama, Ronald M., Eric R. Gerstung, Frank W. Fisher, and Peter B. Moyle
2001 Historical and Present Distribution of Chinook Salmon in the Central Valley Drainage of California. *Fish Bulletin* 1:71-176.

Zedeño, M. Nieves
2008 Traditional Knowledge, Ritual Behavior, and Contemporary Interpretations of the Archaeological Record – An Ojibwa Perspective. In *Belief in the Past: Theoretical Approaches to An Archaeology of Religion*, edited by D. S. Whitley and K. Hays-Gilpin, pp. 259-274. Left Coast Press, Walnut Creek, California.

Appendix A.
The Rock Art at CA-MRP-402.



Panel 1.



Panel 1.

Panel 1.

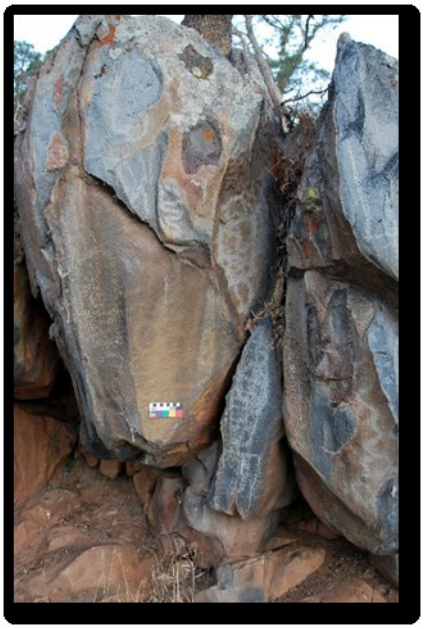
Panel 2.

Panel 2.

Panel 2.

Panel 2.

Panel 2.



Panel 3.

Panel 4.

Panel 4.

Panel 4.

Panel 5.

Panel 5.

Panel 5.

Panel 5.

Panel 6.

Panel 7.

Panel 7.

Panel 8.

Panel 8.

Panel 8.

Panel 8.

Panel 9.

Panel 10.

Panel 10.

Panel 10.

Panel 10.

Panel 10.

Panel 10.

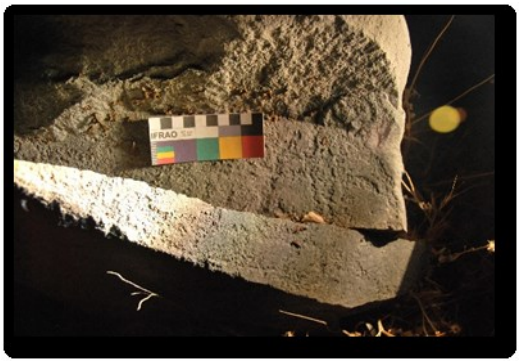
Panel 10.

Panel 10.

Panel 10.

Panel 10.

Panel 10.



Panel 10.

Panel 11.

Panel 12.

Panel 12.

Panel 12.

Panel 12.

Panel 12.

Panel 12.

Panel 13.

Panel 13.

Panel 13.

Panel 13.

Panel 13.

Panel 13.

Panel 14.

Panel 15.

Panel 16.

Panel 18.

Panel 19.

Panel 19.

Panel 19.

Panel 19.

Panel 20.

Panel 20.

Panel 21.

Panel 21.

Panel 21.

Panel 22.

Panel 22.

Panel 22.

Panel 22.

Panel 23.

Panel 24.

Panel 25.

Panel 26.

Panel 27.

Panel 27.

Panel 28.

Panel 28.

Panel 29.

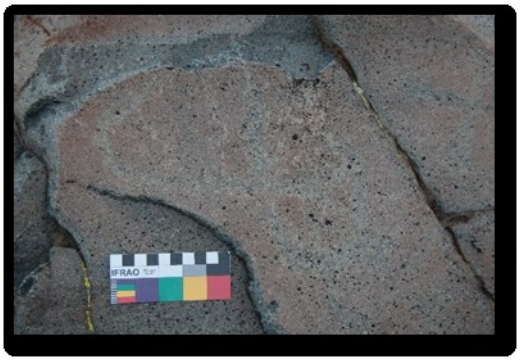
Panel 30.

Panel 30.

Panel 30.

Panel 30.

Panel 31.

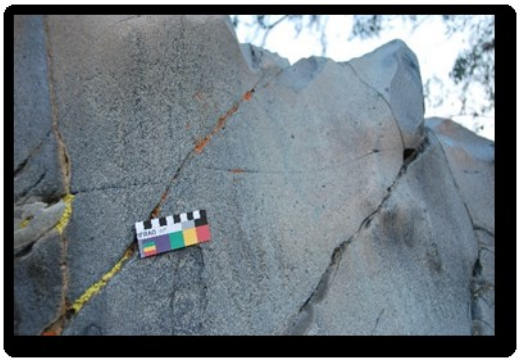


Panel 31.

Panel 31.

Panel 32.

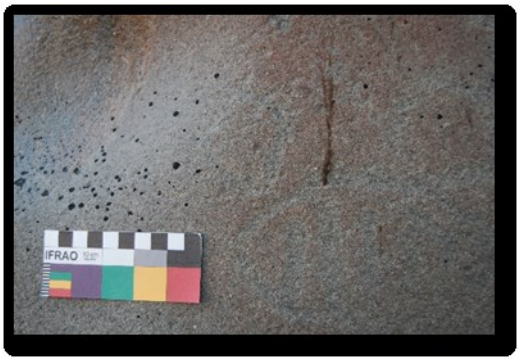
Panel 33.



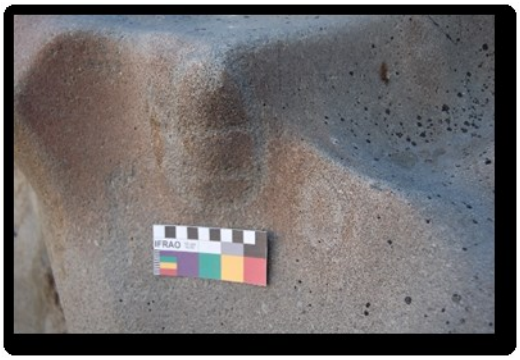
Panel 33.

Panel 34.

Panel 34.



Panel 34.



Panel 34.

Panel 34.

Panel 34.

Panel 35.

Panel 37.

Panel 37.

Panel 38.

Panel 39.

Panel 40.

Panel 41.

Panel 41.

Panel 42.

Panel 42.

Panel 42.

Panel 42.

Panel 42.

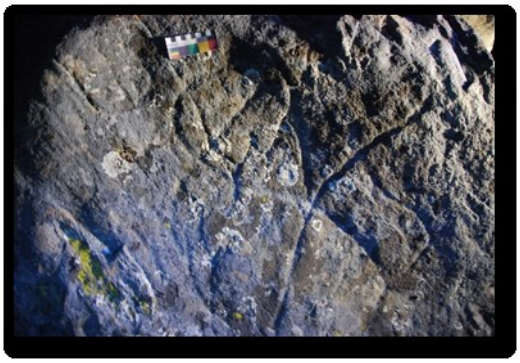
Panel 42.

Panel 42.

Panel 42.

Panel 42.

Panel 43.



Panel 43.

Panel 43.

Panel 44.

Panel 45.

Panel 46.

Panel 47.

Panel 48.

Panel 49.

Panel 50.

Panel 51.

Panel 52.

Panel 52.

Panel 53.

Panel 55. (Possibly natural.)

Panel 56.

Panel 57.

Panel 58.

Panel 59.

Panel 59.

Panel 59.

Panel 60.

Panel 60.

Panel 60.

Panel 60.

Panel 60.

Panel 60.

Panel 60.

Panel 60.

Panel 60.

Panel 63.

Panel 64.

Panel 64.

Panel 65a.

Panel 65a.

Panel 65b.

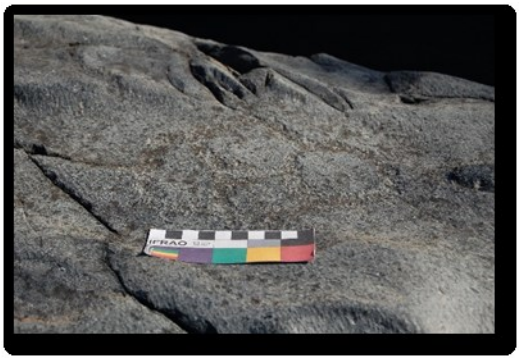
Panel 65b.

Panel 65b.

Panel 66.

Panel 67.

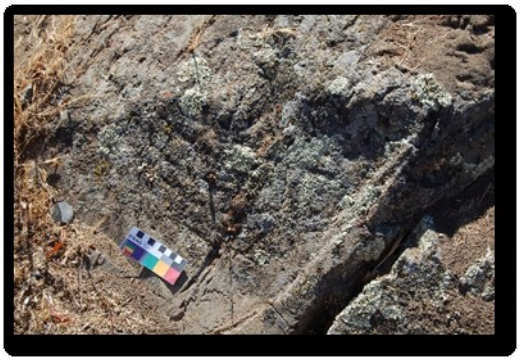
Panel 68.



Panel 69.

Panel 70.

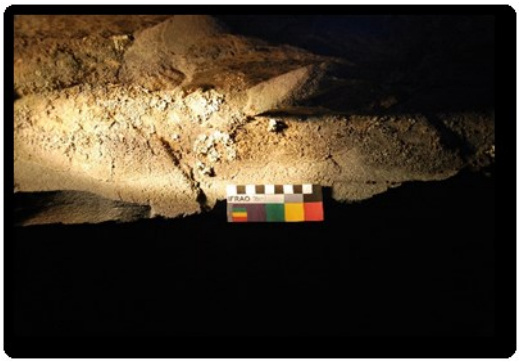
Panel 71.



Panel 72.

Panel 73.

Panel 74.



Panel 75.

Panel 76.

Panel 77.

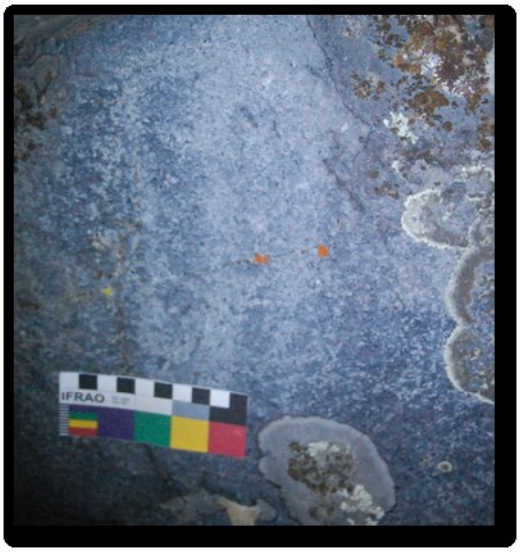
Panel 78.

Panel 79.

Panel 80.

Panel 81.

Panel 82.



Panel 83.

Panel 84.

Panel 84.

Panel 84.

Panel 85.

Panel 87.

Panel 86.

Panel 88.

Panel 89.

Panel 90.

Panel 91.

Panel 92.

Panel 93.

Panel 94.

Panel 95.

Panel 96.

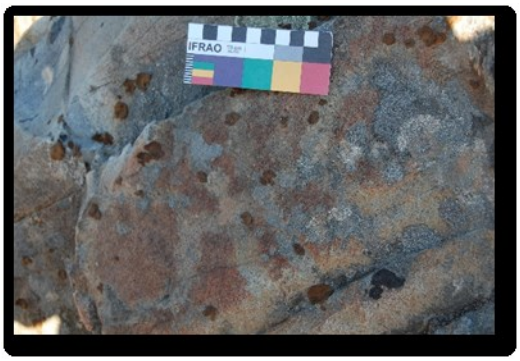
Panel 97.

Panel 98.

Panel 99.

Panel 100.

Panel 101.



Panel 102.

Panel 103.

Panel 103.