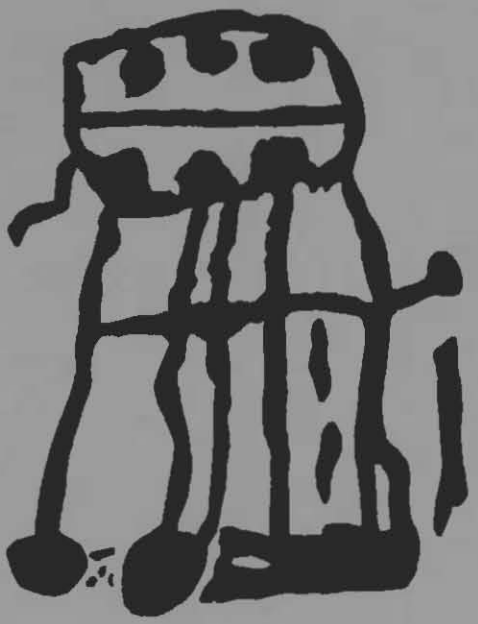
BUREAU OF LAND MANAGEMENT

CALIFORNIA



An Overview of the Cultural Resources of the Western Mojave Desert

by

E. Gary Stickel

and

Lois J. Weinman - Roberts

with sections by

Rainer Berger

and

Pare Hopa

cultural resources publications

anthropology—history

Eric Ritter

Cover design represents a petroglyph element from Inscription Canyon, San Bernardino County, California.

AN OVERVIEW OF THE CULTURAL RESOURCES OF THE WESTERN MOJAVE DESERT

by

E. Gary Stickel and Lois J. Weinman-Roberts
Environmental Research Archaeologists:
A Scientific Consortium
Los Angeles

with sections by

Rainer Berger and Pare Hopa

Prepared for the:

UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
California Desert Planning Program
3610 Central Avenue, Suite 402
Riverside, California 92506
Contract No. YA-512-CT8-106

ERIC W. RITTER
GENERAL EDITOR
RIVERSIDE, CA
1980

FOREWORD

Culture resource overviews such as this bring together much of the available information on prehistoric and historic peoples and present-day Native American groups along with their associated environments. The purpose behind these studies is to provide background information for the management of and research into these prehistoric, historic, and contemporary resources.

This overview is one of seven covering the southern California deserts undertaken as part of a comprehensive planning effort by the Bureau of Land Management for these deserts. Overviews aid in the day-to-day management of cultural resources and in the completion of environmental analyses and research projects. Its general value to the public in the fields of education and recreation-interpretation must also be stressed.

Usually cultural overviews are completed prior to beginning the field assessments of prehistoric and historic remains and contemporary ethnic values. In this case, however, the nature of the planning effort was such that both field-work and literature search were completed at approximately the same time. The complementary field report by Gary Coombs (1979) in this series is titled "The Archaeology of the Western Mojave". Portions of the field report are discussed in this overview.

The final report manuscript was submitted by Environmental Research Archaeologists in May of 1979 following contract initiation one year earlier. The authors are to be congratulated for their time-consuming efforts in bringing together relevant information on lands administered by the Bureau and considerable data concerning the surrounding private land.

This work should prove popular with both the lay-reader and professional as it presents new ideas and interpretations of existing data which is sure to stimulate further interest and work. Its value to the management of cultural resources has already been realized in part and will no doubt continue.

Eric W. Ritter
General Editor

TABLE OF CONTENTS

I. ACKNOWLEDGEMENTS....1

II. ABSTRACT....2

III. THE LITERATURE SEARCH PROJECT (G. Stickel)....4
Project Area....7
Methodology, Methods, Study Problems, and Their Resolutions....7
Project Personnel, Personnel Deployment, Aspects of Field Data Collection, Synthesis and Report Production....9

IV. ENVIRONMENTAL BACKGROUND (R. Berger)....10
Introduction....11
Geographic Features....11
Climatic Changes and their Effects....12
Hydrologic History....17
Present Environment....19

V. CULTURAL RESOURCE INVESTIGATION AND RESEARCH BACKGROUND (G. Stickel)....22
Summary of Past and Current Work in the Planning Units....23
Museum Collections from the Western Mojave Planning Units....36
Present Research Orientations in the Planning Units....40

VI. CULTURAL RESOURCE NARRATIVE....45
A) Cultural History: Chronology (G. Stickel)....46
1. Early Systems Period....46
2. Mojave I Period....50
3. Mojave II Period....53
4. Amargosa I....54
5. Amargosa II....55
6. The Proto-Historic--Historic Mojave....56

B) Past Lifeways....58
1. Overview and Characteristics of Prehistoric Human Settlement in Planning Units (G. Stickel)....59
a. Introduction....59
b. Early Systems Period....60
c. Mojave I Period....64
d. Mojave II Period....68
e. Amargosa I Period....71
f. Amargosa II Period....78
g. Proto-Historic--Historic Mojave Period....80
2. Ethnographic Overview (P. Hopa)....91
a. Preface....92
b. Introduction....93
c. Ethnographic Overview....93
d. The Tataviam....95
e. The Vanyume....98
f. The Serrano....98
g. The Kitanemuk....102
h. The Kawaiisu....107

C) History: Narrative Overview (L. Weinman).....113
1. Introduction.....114
2. Exploration and Early Settlement to 1840.....114
3. Economic, Social, Commercial, and Development History--1840s to Present 128
4. Census Data.....175
5. The Historic Sites.....177

VII. CONTEMPORARY CULTURES.....218
A) Assessment of Contemporary Native American Attitudes Towards Cultural Resources in the Planning Units 219
B) Assessment of Contemporary Non-Native American Attitudes Towards Historical Cultural Resources in the Planning Units...225
C) Assessment of Contemporary Non-Native American Attitudes Towards Cultural Resources in the Planning Units Regarding Archaeological Sites 226

VIII. FUTURE RESEARCH AND MANAGEMENT OPTIONS.....227
A) Archaeological Research.....228
B) Historical Research.....237
C) Cultural Resources Management in the Planning Units.....240

IX. CULTURAL RESOURCE MANAGEMENT SUMMARY.....246
A) Archaeology.....247
B) History.....250

X. BIBLIOGRAPHIES.....262
A) Bibliography: Archaeology, Ethnology, and Environment.....263
B) Bibliography: History.....327

LIST OF FIGURES

1. Fossil Plant Debris in the Mojave Desert 16
2. System of Pleistocene Lakes in California's Mojave Desert 18
3. Lake Level Changes in the California Deserts 18
4. Mountain Ranges and Playas of the Mojave, Colorado, and Southern Great Basin Deserts 20
5. Comparative Chronologies 47
6. Suggested Chronology and Time Marker Points 48
7. Tools from the Vicinity of Bones at China Lake 51
8. Newberry Cave Fire Kit 73
9. Newberry Cave Dart Shafts 74
10. Newberry Cave Split Twig Figurines 75
11. Manufacture Process of Split-twig Figurines 77
12. Transition of Atlatl and Dart to Bow and Arrow 81
13. Dendrochronological Graph for the San Gabriel Mountains over the Last 500+ Years 83
14. Brush Hut in Study Area 85
15. Casa del Desierto, the Santa Fe Harvey House at Barstow 215
16. John W. Burgess Sketch, Tropico Gold Camp 215
17. Alf's Blacksmith Shop, Daggett, with Borate Wagons 216
18. Chinese Railroad Workers' Stone Houses 216
19. Desert Sailing on Rosamond Dry Lake, ca. 1905, Mojave Desert 217
20. Example of Rock Art From Study Area 235

LIST OF MAPS

1. Western Mojave Desert Study Area 6
2. Present Environment 13
3. Historic Trails 121
4. Historic Sites 178

LIST OF TABLES

1. Mammalian Remains Identified in Antelope Valley Sites 87

ACKNOWLEDGEMENTS

The authors of this study are gratefully indebted to many institutions and individuals who made the project possible. This study was conducted under a contract with the Bureau of Land Management (BLM) (contract no. YA-512-CT8-106). Mr. John Hunt served as Contracting Officer for the Bureau. Invaluable assistance to this project was given by Mr. Eric Ritter, who served as the Contracting Officer's Authorized Representative at the Riverside Office of the Bureau, and his staff. The archaeological analysis and assessments for this study were assisted by the contributions of data from several institutions including the BLM's Barstow Way Station, the San Bernardino County Museum (directed by Dr. Gerald Smith who also served as a consultant to this project), the UCLA Archaeological Survey, the Bakersfield College Archaeology Laboratory, Antelope Valley College Archaeology Laboratory (directed by Mr. Roger Robinson who also was a consultant to this project), Cerro Coso College at Ridgecrest, the Archaeological Survey Association, the Antelope Valley Indian Museum, Edwards Air Force Base, and the Archaeological Research Unit, UC Riverside. In addition, the archaeological team on this project would like to thank the following scholars for their help: Mr. John Alsoszatai-Petheo, Mr. Russell Kaldenberg, Mr. Nelson Leonard, Mrs. Catherine Lewis, Ms. Carol Leyba, Mrs. Grace Oliver, Ms. Carol Rector, Mr. Gordon Redtfeldt, Mr. Marty Rosen, Mr. Robert Schiffman, Ms. Ruth Simpson, and Mr. Mark Sutton. Mr. Campbell Grant kindly gave permission to use Figure 12. Dr. Gerald Smith furnished Figures 8, 9, 10, and 11. And Mr. Wilson Turner graciously gave permission to use Figure 20.

The ethnographic assessments for this study were made possible by the kind assistance of several knowledgeable persons. ERA would like to express special thanks to the following individuals: Mrs. Martha Chacón, Mrs. Christine Hernandez, Mr. Henry Duro, and Mrs. Francis Morongo (of San Manuel Reservation), Mrs. Jane Penn (of the Malki Museum, Morongo Reservation), Mr. Willie Pink (of San Jacinto) and Mr. Andrew Green (of Tehachapi). Also, with regard to ethnography, the following scholars' help is gratefully acknowledged: Dr. Lowell Bean, Dr. Tom Blackburn, Mr. Bob Laidlaw of the BLM, Riverside, Dr. Gerald Smith, and Ms. Ruth Simpson.

The synthesis of historical data was made possible by the help and counsel of many individuals as well as access to public and private libraries. Mr. Eric Ritter at the BLM Desert Planning Staff office in Riverside, supplied the necessary start and guided researchers to specialists in the BLM office, such as Mr. Wesley Chambers. Mr. Larry Vrendenburgh, BLM, not only supplied counsel for the desert mines, but also mapped locations and reviewed the manuscript. Special Collections at the University of California, Los Angeles, the Huntington Library, and the Bancroft Library at Berkeley permitted access to their documents, rare publications, and maps as did the San Bernardino County Museum. Thanks is especially due to the volunteers at the Mojave River Valley

Historical Museum: Mrs. Pat Keeling, Mrs. Jean Petroff, and Mrs. Germaine Moon. Their collection of desert related material cannot be matched elsewhere and deserves more attention in future studies. Mrs. Gertrude Alf of the Daggett Historical Society and Mrs. Nancy Robison of the Western Hotel Historical Society also graciously supplied useful material. Mr. Ted Bear, Historian at Edwards Air Force Base opened his files to us and Sgt. John Cooley, Historian, George Air Force Base advised on historical matters at his base. Gratitude is also due to others in public office such as Mrs. Bobby L. Gaines, U. S. Dept. of Agriculture, Mr. Don V. Tucker, Regional Parks, Department, San Bernardino, and Mr. Jenkins, Mojave State Fishery. Dr. Paul Black, railroad historian pointed to the literature on that subject, and Mr. Robert Chandler, Wells Fargo Research Specialist devoted time to our study. Many other people were interviewed and to all we owe thanks, including Mr. Pat Mitchell, President of the High Desert Cattlemen's Association and Mrs. Dorene Burton Settle.

ERA would like to express its special appreciation to this project's consultants (not mentioned above) Dr. Berger and Prof. Fenenga. Mr. Jerry Howard served as Research Assistant for Archaeology, Ms. Ellen McCann, Ms. Loraine Heller, Ms. Susie Piper, and Mrs. Karen Stickel all helped in report production activities.

ABSTRACT

The results of a literature search are presented in this study. The literature search pertained to all unpublished and published written works relative to cultural resources located within the study area. These cultural resources consist of prehistoric and ethnohistoric archaeological sites as well as historic sites. Altogether the project area encompasses a vast amount of land in the western Mojave Desert of approximately 2.35 million acres. The majority of the project area is located within present San Bernardino County with the remaining areas located in Los Angeles and Kern counties.

A total of some 775 archaeological sites were inventoried as part of the study. They consist of a wide array of types ranging from habitation-village sites to cemeteries, petroglyph and pictograph sites, etc. The literature search also discloses that few of these sites have been scientifically investigated, researched, or even dated by radiometric methods. By means of generating the cultural resources overview for the project, it became apparent that the sites represent the entire span of time of human inhabitation of the Mojave Desert. Six chronological periods were utilized for the archaeological sections of the report ranging from the Early Systems Period (50,000 B.P. ?) to the Proto-historic/Historic Period.

The Literature survey for the Historic Period was directed toward constructing a background overview of Spanish-Anglo exploration and settlement in the western Mojave. Furthermore, it inventoried the historic sites elicited through the literature and through interviews with local informants and historical societies. Trail-blazing, mining, and homesteader activities produced the 78 historic sites recorded in this survey. Many of these are on privately held land. Some are geographical sites and display no ruins or evidence of human use. The mine shafts and mills are outstanding and can yield valuable data for industrial history. Field assessment is needed to determine whether sites meet criteria for the National Register of Historic Places.

Findings from this study indicate that there is a great number of archaeological and historical sites in this part of the Mojave Desert (many of which, especially prehistoric sites, have not been found as yet). Many of these sites are to be considered as valuable cultural resources to both the State of California and the Nation. Indeed some sites are already on the National Register of Historic Places. This study is designed to facilitate the Bureau of Land Management's future management of these cultural resources.

THE LITERATURE SEARCH PROJECT

G. Stickel

THE LITERATURE SEARCH PROJECT

This project was conducted as part of the Bureau of Land Management's comprehensive study of the California Desert needed in order to provide for their general management plan. Specifically, this project has been referred to as the "Class I--Cultural Resources Existing Data Inventory--Cultural Resources Overview of the Calico, Kramer, Johnson/Morongo, Stoddard, and Antelope Valley Planning Units, California" (Bureau of Land Management 1978) (see Map 1). This "Class I" project is a literature search designed to do the following:

1) Compile data and generate bibliographies on the prehistory, ethnography/ethnohistory, and history for all sectors of the study area.

2) Provide a working "thematic" outline of the prehistory, ethnography/ethnohistory, and history of the study area.

3) Provide a narrative history of the study area for both public and private lands.

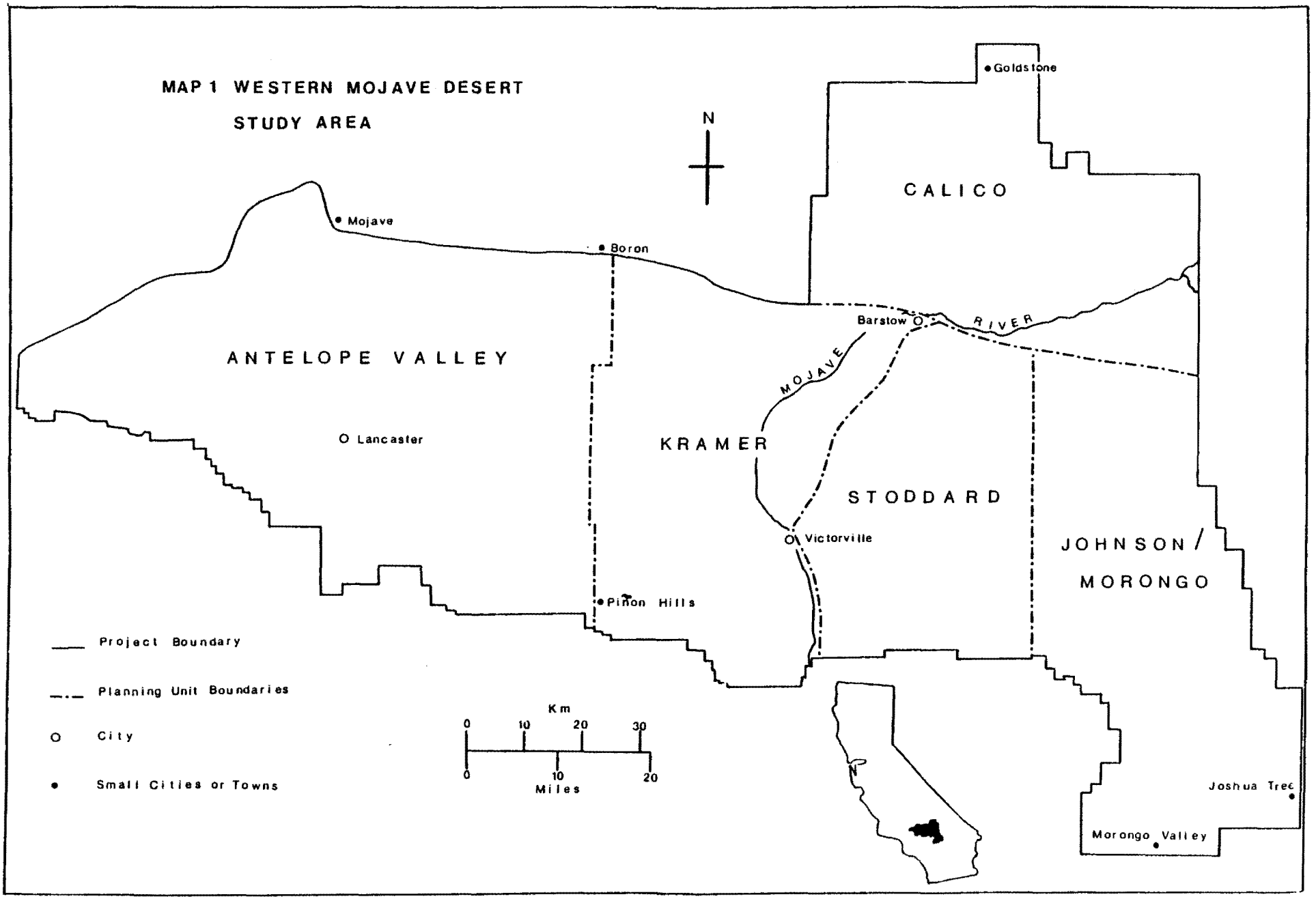
4) Consult all reasonably available unpublished and published literature pertinent to cultural resources in the study area including site file data, manuscripts, maps, reports, archival data, museum collections, bibliographies, documents, and published literature (e.g., books, articles, monographs, etc.).

5) Consult with professional and non-professional archaeologists, anthropologists, Native Americans, professional and amateur historians, and other local persons knowledgeable about the cultural resources of the planning units.

6) To conduct a "brief field reconnaissance" of the study area to familiarize the research team with important features and data sources.

7) To generate a comprehensive overview of the cultural resources and human use of the planning units from initial occupation to the present and document this narrative according to the accepted professional procedures of anthropology and history. Also, the resultant document is to be supported with relevant tables, maps, graphics and other materials deemed appropriate.

8) In addition, a cultural resources management summary was to be written in order to briefly summarize the conduct and results of the program with special attention paid to recommendations for resources management of data in terms of its protection and proper uses.


MAP 1 WESTERN MOJAVE DESERT
STUDY AREA
N
Goldstone
CALICO
Mojave
Boron
Barstow
RIVER
MOJAVE
ANTELOPE VALLEY
Lancaster
KRAMER
STODDARD
Victorville
JOHNSON / MORONGO
Pinon Hills
Project Boundary
Planning Unit Boundaries
City
Small Cities or Towns
Km
0 10 20 30
0 10 20
Miles
N
Joshua Tree
Morongo Valley

In short, the purpose of the report is to provide a tool for cultural resources management by the Government and to provide a useful compendium of past research for scholars as well as to present fruitful avenues for future research--research which would undoubtedly add to both the academic and public appreciation of the data.

PROJECT AREA

It is quite important that the Government is undertaking the inventory of this sector of the Mojave Desert at this time because the planning units (Antelope Valley, Kramer, Calico, Stoddard, and Johnson/Morongo units) lie to the north of the most heavily populated area of southern California--greater Los Angeles. This proximity necessarily has led to a greater use of the study area, which has had a negative result due to the theft, vandalism, and inadvertent destruction of archaeological and historical sites. Together, the five planning units comprise approximately 2.35 million acres. Most of the land is distributed in San Bernardino County with about one-fifth of the area split roughly between Los Angeles and Kern counties (see Map 1). More or less of a natural boundary exists on the southern perimeter of the study area formed by the San Gabriel and San Bernardino mountains, and the hills of western Riverside County. The northwest boundary of the study area is formed by the Tehachapi Mountains. The northern perimeter is more arbitrarily formed by, going from west to east, Edwards Air Force Base, Fremont Valley and Camp Irwin Military Reservation and United States Naval Ordnance Test Station. To the east, the area is bounded by the Cady Mountains and the Twentynine Palms Marine Corps Training Center.

Thus, the project area forms a large and important sector of the Mojave Desert which takes on special significance due to the increasing use and potential settlement posed by the heavily populated Los Angeles Basin and environs.

METHODOLOGY, METHODS, STUDY PROBLEMS, AND THEIR RESOLUTIONS

A development of a methodology is a necessary aspect of conducting a project such as this. In contrast to this project, past studies, attempting to synthesize literature or to generalize about the data for this area of California, were limited in several ways. They were limited usually by the fact that they were conducted by one scholar who necessarily had limited expertise (e.g., a prehistorian vs. a historian). Past studies were severely curtailed in the amount of time and funds they could reasonably expend on such an endeavor (most prior studies were not formally funded at all and the support of the investigator came from his or her own job as a professor, etc.). Past studies also were limited in the data sources available to them and the number of then existing/cooperating institutions. Past studies were also curtailed by their objectives, for very few past studies had both research archaeology and/or history as well as cultural resources management as objectives when they were conducted. Such studies also were limited by the scope of subjects to which they were addressed. They were not oriented to compile data on prehistory, ethnography/ethnohistory, history, and cultural resources management. And lastly, these studies were limited as to the spatial

extent of their interest for none were directed to specifically study the entire area of interest to this project.

As a response, Environmental Research Archaeologists: A Scientific Consortium drew together from its membership a multidisciplinary team of scholars who are specialists in each area to be addressed. Thus, there were specialized researchers for prehistory (archaeologists), ethnography/ethnohistory (an ethnographer), for history (historians), for the environment (a geophysicist) as well as for the aspects of cultural resources management. This team was a necessary aspect of this work since a range of expertise is required.

The multidisciplinary team then set about meeting the requirements and objectives of the program through their network of facilities, institutions, scholars, and other knowledgeable individuals with whom they were in contact.

Another important methodological aspect of this program was the gathering of cultural information from a point of view of the current state of the art regarding perspectives on the management of cultural resources developed by the Society for American Archaeology (McGimsey and Davis 1977). Thus, the data was gathered and assessed with an eye towards their utility for serving the needs of the Bureau of Land Management as well as the professional and public sectors as presently defined by the Society.

Special archaeological aspects of methodology for the program were developed. A major one was the use of special forms to record and organize site record form data including an indication of the USGS topographic map on which a site may be located, whether or not a given site has been properly located with latitude and longitude, UTM coordinates, or with the legal system (township, range, section), etc. In this manner, site record data was organized as much as possible. Each archaeological site was interpreted in terms of the existing BLM desert site typology in order to provisionally characterize a given site. In toto, 16 pertinent categories of information were abstracted from the numerous original site record forms which were found to be highly varied in quality as their data was often problematic. Many in fact lacked most of the standard information entries. As a consequence, a site descriptor format was developed (Appendix A on file with the Bureau of Land Management, Riverside). This site descriptor format was developed to facilitate the review of data. The format is considered to be more useful than the original site forms on which they are <u>partly</u> based because: 1) they provide a standard format for presenting data as opposed to the variety of site forms encountered in the original reports; 2) they indicate the present data gaps in the original forms; 3) they succinctly summarize the most useful information; 4) they present an interpretation of the site in terms of the existing BLM site typology; and importantly, 5) they provide those pertinent references to each site which, for the most part, were not presented on the original site forms but were compiled instead as a result of this literature search.

Special problems involved in the ethnographic work for the project are discussed elsewhere in this report. But some of the major problems encountered involved finding willing informants and being able to confer with them in a timely manner, given their own schedules, in order to produce the needed

information. Many of the informants felt that they should have been given substantially more notice. Notwithstanding this view, an immediate and concerted effort was made by the project ethnographer upon the award of the contract to fulfill this portion of the program. Another major problem was that much ethnographic data exists in an unpublished and highly disorganized form. It would have taken an inordinate amount of time to properly review and assess such data. The project ethnographer responded to these problems by expending more travel, time, and total effort than what was provided for by the contract.

In following the traditional routes of historical methodology, the major problem confronting the research was time. The western Mojave has seen a century and a half of occupation by literate societies that have recorded their activity in a variety of ways. Records range from the classical accounts of trails and old mines to county archives, papers of private ranching societies, and water companies, to music, art, local informants, and railroad and mining personnel who no longer live in the area. Research of the private and public papers affecting the study zone can only be pointed to in this survey. The data retrievable from the sites inventoried are, of course, another component of the whole. The historian geared the report to the subject "Resources Overview," while acknowledging the potential information which the work of future scholars could produce.

These methodological responses were all made in a concerted effort to provide as comprehensive and informative a document as possible given the scope and time alloted for the project.

PROJECT PERSONNEL, PERSONNEL DEPLOYMENT, ASPECTS OF FIELD DATA COLLECTION, SYNTHESIS AND REPORT PRODUCTION

The following scholars and researchers directly participated on this project: Dr. Gary Stickel, Dr. Lois Weinman-Roberts, Mr. Jerry Howard, Mr. Alan Curl, Dr. Rainer Berger, and Dr. Pare Hopa. In addition, the project had the following special consultants: Prof. Franklin Fenenga, Dr. Gerald Smith, and Mr. Roger Robinson.

These team members had the following tasks on the program: for prehistoric Archaeology and Cultural Resources Management, Dr. Gary Stickel, Mr. Jerry Howard; for history and cultural resources management, Dr. Lois Weinman-Roberts, Mr. Alan Curl; for paleo- and present environmental analysis, Dr. Rainer Berger; and for ethnography/ethnohistory, Dr. Pare Hopa. The consultants provided the following areas of expertise: Prof. Franklin Fenenga, historical archaeology/ general prehistory; Dr. General Smith, general archaeology and ethnology of the greater Barstow sector of the study area; and Mr. Roger Robinson for general archaeology and ethnology of the Antelope Valley sector of the study area.

ENVIRONMENTAL BACKGROUND

R. Berger

ENVIRONMENTAL BACKGROUND: INTRODUCTION

The study area encompasses a major portion of the southwestern part of the Mojave Desert in the State of California. The term "Mojave Desert" came into general use with the Wheeler Survey of 1875. Originally the name was that of an Indian tribe on the Colorado River, the Mohave. The name itself has been spelled in a variety of ways in the early records as far back as the explorations of John Fremont of the United States Cavalry(1843-44). Finally the Sixth Report of the Geographic Board of the United States decided on the spelling "Mojave" for California place names, and "Mohave" for the Indians, names along the Colorado River, and in the State of Arizona (Gudde 1960).

GEOGRAPHIC FEATURES

The area described in this study is located between 34° and 35° North latitude centered on 117° West longitude. As such, it falls into the region of downward motion of the northern Hadley Cell which produces a high pressure belt worldwide. Consequently, it is an arid region which, in addition, is sheltered by mountains from the ocean resulting in desert climate.

In the northwest the Tehachapi Mountains provide a barrier against the San Joaquin Valley with peaks reaching over 2000 meters. The southwestern and southern border is set by the San Gabriel and San Bernardino ranges, which thrust as high as about 3500 meters. Towards the east, the high desert continues to the Colorado River. It is interspersed with a number of mountain ranges generally not higher than about 1500 meters. In the north the snowy peaks of the southern Sierra Nevada are visible (Mt. Whitney, 4755 meters) yet just east of them the land drops to almost 100 meters below sea level. Thus the highest and lowest points of the contiguous United States are only about 140 km. apart and not much over 100 km. distant from the northern boundary of the study area.

The area itself is high desert at an average elevation of some 600 to 900 meters. Jutting out of masses of desert sediments are a few mountains, the highest of which is Ord Mountain (2067 meters) southeast of the city of Barstow. In general, Quaternary sediments provide a sea out of which rise the remnants of Mesozoic granitic rocks in the west, Jurassic metavolcanics in the central south and Miocene volcanic rocks towards the northeast. The most up-to-date tectonic study for the Mojave Desert is being prepared by Burchfiel in context with the Proceedings for the Second Rubey Colloquium, University of California, Los Angeles, 1978.

There is another way in which the boundaries of the study area can be described. In the south, the San Andreas Fault sets a clear cut line and

to the northwest, the Garlock Fault. Thus, the Mojave Desert is located on the western fringe of the North American Continental Plate. Several other faults run in a northwest-southeast direction through the Lancaster-Barstow region. In fact, the famous "Palmdale Bulge" is located here which at present is under serious study by the United States Geological Survey and other institutions. Research by earth scientists in the area is based on the urgent suspicion that it might conceivably be the center of a massive earthquake in the not too distant future (see Map 2).

Within the project boundaries are found numerous dry lakes such as Rosamond, Rogers, El Mirage, Harper, Coyote, and Troy lakes. Just east of the city of Barstow freeways run through the bed of the ancient Lake Manix of Pleistocene age, now but a sea of sand. These dry lake beds more than anything else attest to the presence of a completely different climate in the past which is the subject of the next section (see Map 2).

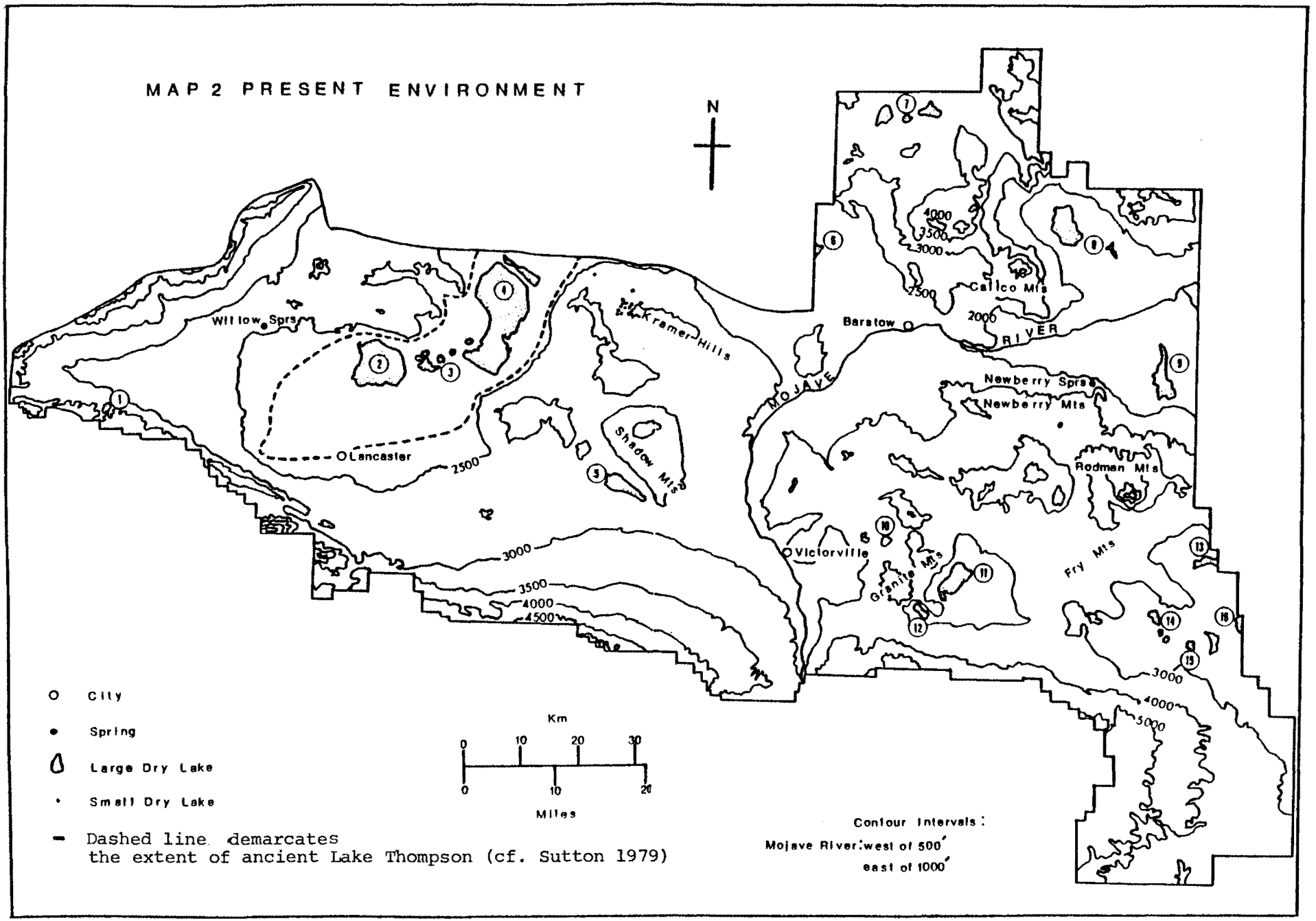
CLIMATIC CHANGES AND THEIR EFFECTS

In 1975 a report by the National Academy of Sciences stated succinctly: "The climates of the earth have always been changing, and will doubtless continue to do so in the future. How large these changes will be, and where and how rapidly they will occur, we do not know." It is precisely for the latter reason that a major effort is being undertaken in the United States to try to forecast weather and climate over ever greater time intervals. The underlying reason is that climate, much as politics, affects significantly our economy, perhaps in the end to its most profound effect.

The underlying reasons for major climate changes lie undoubtedly in variations of insolation. This was recognized over fifty years ago by Milankovitch (1920, 1930). Detailed discussions of the factors underlying climatic change can be found in Lamb (1977) but, in a nutshell, our understanding may be summarized as follows.

The earth undergoes certain known changes in its orbital characteristics which alters the amount or distribution of solar energy received with periods of 95,000 $\pm$ 5,000, 40,000 and 21,000 years. There may or may not be contributing effects due to differences in solar energy output as well as contributions by volcanism in the form of dust interfering with the amount of solar energy received at the surface of the earth. It is only now that a bolometer on the moon is measuring continuously solar output. In other words, the solar constant may not be totally constant. In fact, we know that sunspot cycles of varying frequencies affect solar output, but very long cycles are simply not understood, if they exist. Moreover, dust in the atmosphere is known to reflect sunlight back into space if the grains are larger than a certain critical size and retain heat in the earth's atmosphere below that particular size.

Many years ago the occurrence of large erratic boulders on plains far removed from mountain ranges of the high mid-latitudes plus the observation of moraines led to the recognition that major ice advances had been the cause. This led to the postulation of the Ice Ages with their beginning set today at the Pliocene-Pleistocene boundary in the two to three million


MAP 2 PRESENT ENVIRONMENT
N
Willow Spgs
Kramer Hills
Lancaster
2500
Shadow Mts
MOJAVE
RIVER
Barstow
Calico Mts
4000
3500
3000
2500
2000
Newberry Spgs
Newberry Mts
Rodman Mts
Victorville
Granite Mts
Fry Mts
3000
3500
4000
4500
5000
City
Spring
Large Dry Lake
Small Dry Lake
Dashed line demarcates
the extent of ancient Lake Thompson (cf. Sutton 1979)
Km
0 10 20 30
0 10 20
Miles
Contour Intervals:
Mojave River: west of 500'
east of 1000'

KEY TO DRY LAKES ON MAP 2 ENVIRONMENT

1. Holiday Lake
2. Rosamond Lake
3. Buckhorn Lake
4. Rogers Lake
5. El Mirage Lake
6. Harper Lake
7. Superior Lake
8. Coyote Lake
9. Troy Lake
10. No name
11. Lucerne Lake
12. Rabbit Lake
13. Galaway Lake
14. Melville Lake
15. Means Lake
16. Emerson Lake

Small dry lakes in Kramer quad are unnamed

year ago range. The classic American Pleistocene chronology recognized four major ice incursions: the oldest being the Nebraskan, followed by the Kansan and Illinoian and terminating after the Wisconsin. In the meantime, it has been generally recognized that each ice age is a complex sequence of alternating changes of cold and amelioration of varying degrees. The exact chronology of the first three glacial periods is far from settled inasmuch as geo-chronologic tools and suitable samples are sadly missing. There is, however, general concensus about the events of the last 100,000 years which make up the Wisconsin glacial. Until now radiocarbon dating has been generally possible back to about 40,000 to 50,000 years. Therefore, the prehistory of the Mojave Desert will be described for that time-range.

For example, typical glacial conditions on the earth existed about 18,000 years ago when the last massive long-term cold spell occurred. The National Science Foundation during the International Decade of Ocean Exploration published under its Climap Program a map of climatic conditions which shows the initial absence of deserts in the American Southwest, including the region of the Mojave. Precisely the same results were obtained in a study by Wells and Berger (1967; see Fig. 1) on the presence of late Pleistocene coniferous woodlands in the Mojave Desert. In this study, plant remains in packrat (*Neotoma*) middens were analysed botanically and simultaneously dated by radiocarbon. As a result, it was determined that the Mojave was essentially covered by woodland consisting of piñon pine and juniper due to the tree-line reaching about 600 meters lower. In another study, King (1976) explored similarly the late Lucerne Valley Region of the Mojave Desert. The advantages of *Neotoma* middens containing macrofossil plant remains lie in the fact that they are found *in situ*. Packrats are known to roam only over an area of approximately a few square kilometers in their lifetime. Thus, the samples are truly representative of their immediate past geographic environment.

On the other hand, pollen studies have aided prehistoric environmental reconstruction immensely. Yet the analyst must carefully exclude pollen blown in by the wind over distances of hundreds of kilometers or washed down with alluvium from higher vegetation zones to lower elevations. A major discussion of the Pleistocene pollen record and biogeography of the American Southwest including the Mojave has been published by Martin and Mehringer (1965), in a more regionally specific study by King (1976) and most recently by Mehringer and Sheppard (1978). These publications contain very extensive relevant pollen diagrams and lists which describe in detail the plant communities of the past.

Despite some inherent difference, macroscopic and microscopic prehistoric plant analyses agree in their conclusion on the Pleistocene vegetation cover of the Mojave. A notable difference is found in the level of depression of the piñon-juniper line held by pollen analysis to be about 1000 meters, whereas *Neotoma* middens call for about 600 meters or so. But in the end, both approaches postulate a piñon-juniper woodland cover over most of the Mojave Desert during the late Pleistocene.

Looking up from the Pleistocene desert toward the San Bernardino Mountains one would have seen seven valley glaciers (Sharp, Allen and Meier 1959). Apparently they accumulated at altitudes above 3000 meters on the north flanks of the highest peaks of the San Bernardino Range and descended

Fossil plant debris in, radiocarbon ages of, and elevations of wood-rat middens in the Mohave Desert of Nevada and California. Abbreviations: S, Spotted Range; A, Ayres Peak; M, Mercury Ridge; F, Funeral Range; R, Ranger Mountains; N, Negro Butte; T, Turtle Mountains. Symbols (relative abundance): +, low; ++, intermediate; +++, high (principal constituent).

Species, structures	Midden site, elevation (meters), and radiocarbon age (years)											
	S-1, 1830, 8420 ±100	S-2, 1550, 9450 ±90	A, 1525, 9320 ±300	M-1, 1390, 9000 ±250	M-2, 1280, 7800 ±150	M-3, 1250, 12,700 ±200	F, 1280, 11,500 ±160	R-1, 1130, 16,800 ±300	R-2, 1100, 10,100 ±160	N, 1070, 9140 ±140	T-1, 850, 19,500 ±380	T-2, 730, 13,900 ±200
Trees and arborescent shrubs												
**Juniperus osteosperma*, leafy twigs, seeds, wood	+++	+++	+++	++	+++	+++	+++	+++	+++	+++	+++	+++
**Pinus monophylla*, leaves, cones, seeds		++									++	+++
**Acer glabrum*, twigs with buds, samaras		+										
**Cercocarpus ledifolius*, leaves			+				+					
Cowania mexicana, leaves		++	+	+++								
**Fraxinus anomala*, twigs with buds, samaras							+					
Shrubs												
Artemisia nova, leaves	+	+	+		+		+		+	+		+
Atriplex canescens, fruits	+		+									
A. confertifolia, leaves, twigs, fruits	++	++						+	++			
**Ceanothus greggii*, leaves		+										
Cercocarpus intricatus, leaves, calyces, achenes	++	++	+				+					+
**Chamaebataria millefolia*, twigs with buds, follicles		+										
Chrysothamnus sp., involucres		+							+			
Coleogyne ramosissima, achenes		+	+		+							
Encelia virginensis, achenes							+					
Ephedra viridis, twigs, seeds	++	++	++	+	+		+	+		++		+
Eriogonum microthecum, leaves			+						+	+		
Fallugia paradoxa, leaves, achenes		+	+	+	+		+					
Fendlerella utahensis, capsule		+										
Haplopappus cuneatus, leaves										+		
Hecastocleis shockleyi, leaves		+										
**Lepidospartum latisquamum*, involucres			+						+			
Petrophytum caespitosum, leaves, inflorescences, follicles		++							+			
Prunus fasciculata, leaves, drupes	++	++	++		+		+++					
**Purshia glandulosa*, leaves, fruits										+++		
**Ribes montigenum*, twigs with trifid spines or prickles		++					+		+	+		
**Ribes* cf. *velutinum*, twigs with spines											+	+
Senecio douglasii, involucres	+	+	+	+		+			+			
Sphaeralcea ambigua, leaves, fruits		+	+									
Symphoricarpos longiflorus, leaves, twigs, flowers, seeds	+	++	+	+	+		++	+	+			
Tetradymia canescens, involucres		+										
Agavaceae, Cactaceae (*succulents*)												
Agave utahensis, leaves, seeds	+		+									
**Nolina parryi*, leaves							+					
Yucca brevifolia, leaves, seeds	+	+	+							+		
Opuntia erinacea areoles, fruits, seeds	++	+	+	+	+	+	+	+	++	+	++	+++
Grasses and forbs												
Oryzopsis hymenoides, fruits	+	++	+	+	+		+	+	+			+
Stipa arida, fruits		+										
S. speciosa, fruits	+	+	+	+					+			
Artemisia ludoviciana, leaves, twigs, flowers			++						+			
Amsinckia tessellata, nutlets		+										
Cryptantha confertiflora, nutlets	+											
C. flavoculata, nutlets		+										
Cryptantha sp., nutlets									+			
Penstemon palmeri, leaves, capsules		+	+	+		+						
Viguiera multiflora, achenes		++			+				+			

* Species no longer present in mountain range of midden site.

Figure 1. Fossil Plant Debris in the Mojave Desert

(Source: Wells and Berger 1967).

for a few kilometers some 1000 meters of elevation downward. In contrast, the San Gabriel Mountains never were glaciated during comparable times.

At the end of the Pleistocene, some 10,000 years ago, the landscape of the Mojave began to change dramatically. The ancient lakes like Lake Manix (formerly waxing and waning in response to considerable rainfall) began to shrink permanently and finally the water disappeared leaving only a salt crust. Equally the flora became more xerophytic in nature. Steppe, then desert, made their entry probably inching their way northward from the Sonoran Desert.

The height of the last thermal maximum was reached during the Altithermal (Antevs 1948) dated today to range from about 7000 to 3000 years ago depending on location. Thereafter the climate approached today's conditions in terms of long-term trends on the order of a millenium. Within the last one thousand years a number of climatic optima and minima have been observed elsewhere in the world. The most immediate record available in the Mojave has been described by Mehringer and Sheppard (1978) except that the Little Lake area, which they discuss, is not immediately situated in the study area and under effective control of the burdening high Sierra Nevada.

HYDROLOGICAL HISTORY

It was mentioned earlier that a considerable number of lakes existed during Pleistocene times not only in the Mojave but throughout the present American Desert West. Their remnants today are playas with high albedos easily visible from the air by the interested traveler. Some of them have been modified into airfields (Edwards Air Force Base) or race car courses (Bonneville Flats). Inasmuch as rainfall was more plentiful, these lakes occupied considerable areas (Fig.2). Moreover, they fluctuated in lake level in response to climatic trends (Fig.3). Presumably the drainage at maximum water carrying capacity allowed excess water to spill into Lake Manly, that is to say, into the modern Death Valley, as indicated by the drainage direction illustrated in Figure 2.

In general, the size of these Pleistocene Lakes can be judged from exposed beach lines and terraces. Furthermore, tufa deposits clearly mark water stands, so that the extent and level of these fossil lakes can be very well documented by radiocarbon dating (Broecker and Orr 1958). Such studies on a smaller scale have also been carried out for ancient Lake Manix, east of Barstow, the largest of the Pleistocene lakes in the study area. These lakes must have played a significant role in the region affecting both flora and fauna. Indeed, the late Louis Leakey suggested to the San Bernardino County Museum that at a location near the Calico Mountains, quite likely traces of very early man might be found (Berger and Libby 1967). He based this working hypothesis on his long years of field observations in Africa. Excavations there yielded material which some archaeologists consider to be man-made stone tools. Investigation of ancient Lake Thompson has indicated that it covered an extensive portion of the Antelope Valley and later remnants of this lake became Rosamond and Muroc Dry Lakes, to name a few. The extent of this ancient lake and its

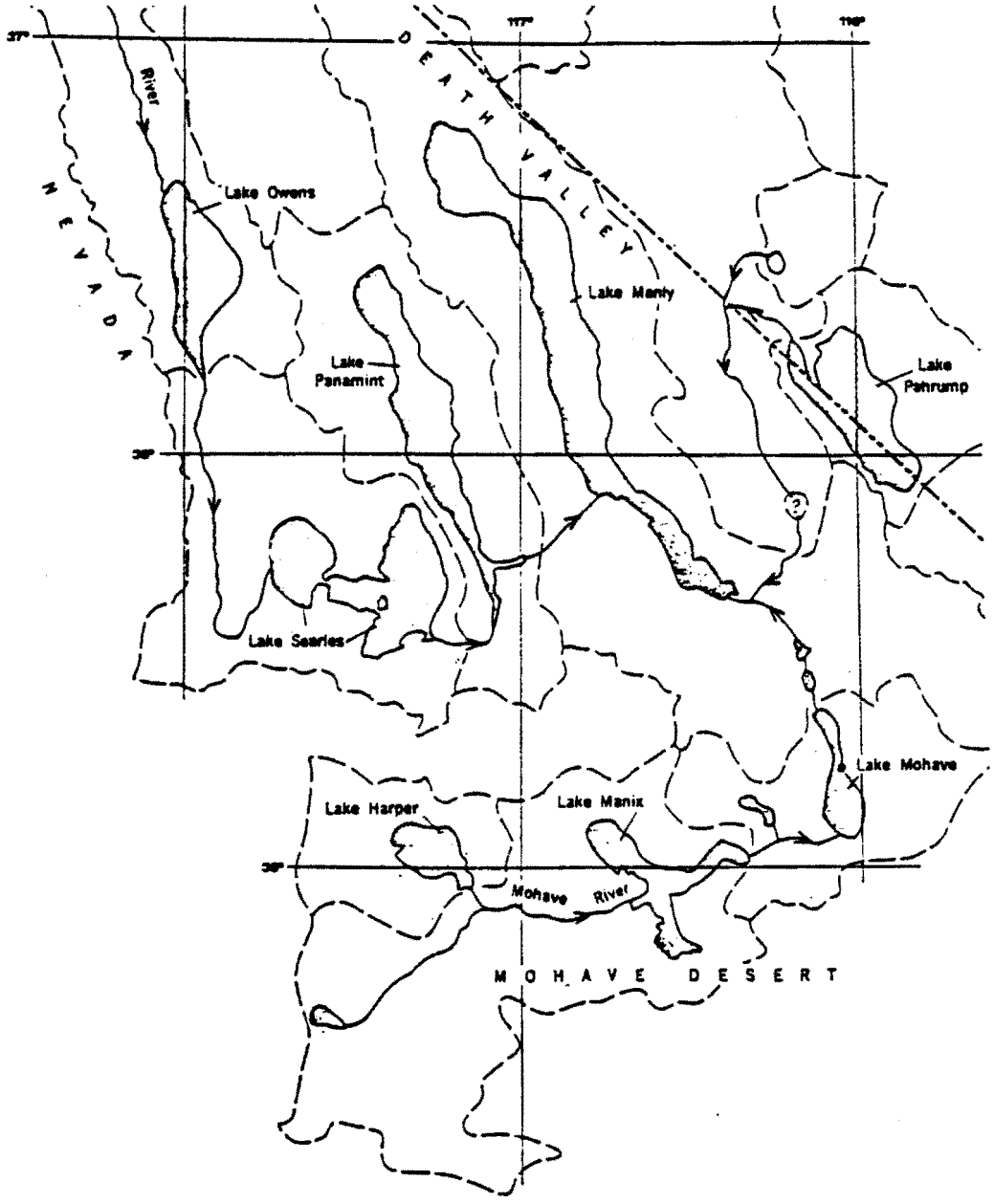


Figure 2. System of Pleistocene Lakes in California's Mojave Desert.

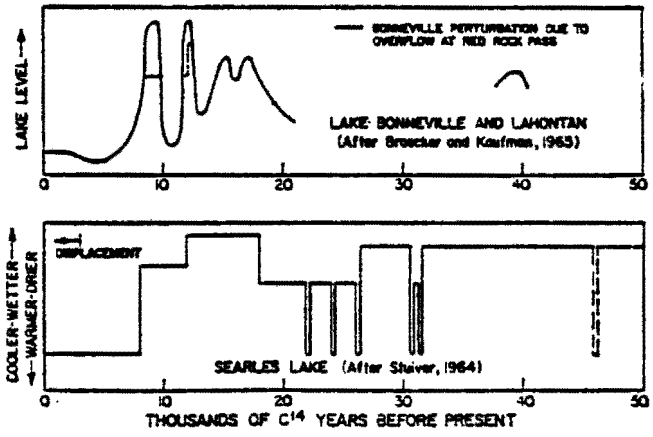


Figure 3. Lake Level Changes in the California Deserts.

archaeological implications are being investigated by Dr. Charles Forbes and Mr. Mark Q. Sutton (Sutton 1979 c).

Today, desert washes carry water from the mountains into dry lake beds which are occasionally filled to a certain degree with water during the winter months. The Mojave River, originating in the San Bernardino Mountains, runs dry and underground most of the year, but during rain storms, it may turn into a torrent flowing first north and then east to ultimately die out in the desert. The same river as well as so many other washes are the principal carriers of flash floods which travel with devastating swiftness and force down their beds causing destruction to road beds and rail lines. During the summer months, thunderstorms from the southeast penetrate into the Mojave and suddenly unload quantities of rain which the hard-baked desert soil cannot absorb. Thus, most precipitation is turned into runoff which can swell into deep rivers with often eight foot waves. Besides being conduits for water, the desert rivers also fulfilled another function. The bed of the Mojave River served, in fact, as a principal travel route of Indians from the east to the west as documented by pottery remains. These imports stem largely from Arizona or Nevada and prove that the desert dwellers of the Mojave had exterior contacts.

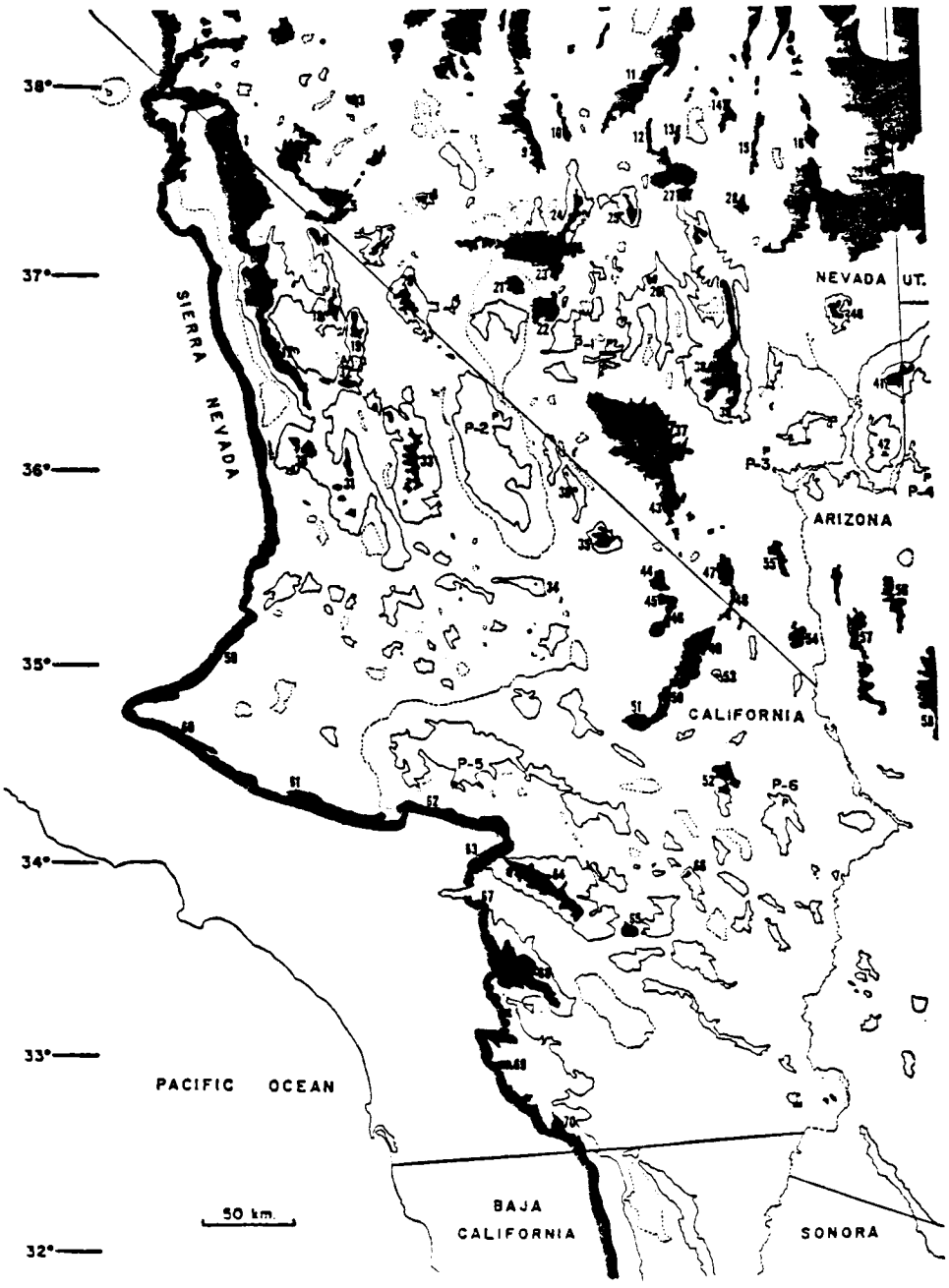
It is of considerable interest to note that tectonic faults, which run in a parallel northwest to southeast orientation throughout the study area, have important hydrologic consequences. They affect storage by impounding water. A close inspection of appropriate maps (USGS topographic maps) reveals that many water holes of the desert are located along fault lines. Thus, archaeological sites, water availability and tectonic displacement features go hand in hand in astonishing regularity.

Water is found in the desert at favorable locations at recoverable depths allowing today limited irrigation projects. If more water could be imported, the Mojave might be turned into an agriculturally highly productive area. It would not match the production of the Imperial Valley to the south, since the Mojave's altitude brings freezing temperatures during winter nights and snowfall on occasions. But it could be returned to a close equivalent of the Pleistocene woodland of more than 10,000 years ago.

PRESENT ENVIRONMENT

A large compendium into the physical and biological environments of the deserts of the world including the Mojave has been edited by McGinnies, Goldman and Paylore (1968). This work contains an appraisal of research on weather and climate of desert environments, their geomorphology and hydrology, surface materials and vegetation and fauna (see Figure 4).

High-lighting the most important floral species in the Mojave, they can be summarized as follows. Probably the most common shrub throughout the desert regions is the creosote bush (*Larrea tridentata*), which consists of clumps of branches that reach one to two meters high, bearing small



Mountain ranges and playas of the Mohave, Colorado, and southern Great Basin deserts, showing in black the areas of higher elevation that now support woodland, forest, or other vegetation zones within the desert region to the east of the Sierra Nevada, Transverse, and Peninsular ranges. Mountain ranges are located by unbroken lines or by extent of existing woodland. Dashed lines show playas, which were often the sites of larger pluvial lakes, and principal streams. Symbols: *P*, Pleistocene wood-rat middens and coprolites of the ground sloth containing remains of former woodland or desert vegetation; *P-1*, Frenchman Flat series; *P-2*, Funeral Mountains; *P-3*, Gypsum Cave; *P-4*, Rampart and Muav caves; *P-5*, Negro Butte; *P-6*, Turtle Mountains. Other mountains cited are numbered as follows: *P-1* (northernmost of four), Aysees Peak; *P-1* (third from south), Ranger Mountains; *P-1* (second from south), Mercury Ridge; *P-1* (southernmost of four), Spotted Range; *P-5* (north side), Ord Mountains; *33*, Panamint Range; *34*, Avawatz Range; *35*, Kingston Range; *36*, Nopah Range; *37*, Spring Range; *44*, Clark Mountain; *52*, Old Woman Range; *61*, San Gabriel Range; *62*, San Bernadino Range; *66*, Coxcomb Mountains.

Figure 4. Mountain Ranges and Playas of the Mojave, Colorado, and Southern Great Basin Deserts. (Source: Wells and Berger 1967)

leaves divided into two crescents. Especially after a rain, these bushes heavily smell like creosote.

Other dominant species are white bursage, *Ambrosia dumosa* and *Atriplex polycarpa* of the Chopodiaceae family.

Near the southeastern boundary of the study area Joshua trees, *Yucca brevifolia*, are protected in Joshua Tree National Monument. However, these tree-like plants of the lily family prevail in the upper elevations of the Mojave as well. Whenever some water is available near the surface, mesquite (*Prosopis glandulosa torreyana*) grows. The size of these tree-like bushes depends on how much water they receive which limits them to lower elevations below about 1000 meters.

The faunal assemblage of the desert consists mainly of lizards, rattlesnakes (Mojave rattlesnake, *Crotalus scutulatus*), rabbits, hares, rats and mice plus cunning coyotes and foxes. Birds commonly found are the Sage Sparrow (*Amphispiza belli*), the Cactus Wren (*Campylorhynchus brunneicapillus*), Roadrunners (*Geococcyx californianus*), Rock Wren (*Salpinctes obsoletus*) and Quails. Rapacious birds are the Golden Eagle (*Aquila chrysaetos*), the Great Horned Owl (*Bubo virginianus*), Turkey Vulture (*Cathartes aura*), Raven (*Corvus corax*), Prairie Falcon (*Falco mexicanus*) and Sparrow Hawk (*Falco sparverius*).

With respect to present day climate, orographic barriers restrict the flow of cool ocean air which results in an extremely arid climate. Rainfall is generally in the range of about 10-15 cm. per year in the desert itself, however, incursions of summer thunderstorms can change these numbers drastically. During the winter months, snow may fall which lasts on the ground up to a few days in time. The Mojave is not quite as dry as Death Valley to the north about which Browne and Taylor (1867) remarked: "The climate in winter is finer than that of Italy...perhaps fastidious people might object to the temperature in summer...I have even heard complaint that the thermometer failed to show the true heat because the mercury dried up. Everything dries, wagons dry, men dry, chickens dry; there is no juice left in anything, living or dead, by the close of summer." But once the rains of winter have come and spring temperatures rise, the desert floor explodes in an unbelievable carpet of flowers which last a few weeks at most.

The high desert country of the Mojave is regarded by many as a vast health resort, of good air quality and cooler upper desert temperatures. There always are slight breezes and it never becomes too hot for comfort in the shade. Indeed many people have decided just for that reason to settle in the desert near local communities. Yet this is applying population pressure into the up-to-now virtually empty desert. Inasmuch as Los Angeles, with its artificially and naturally caused photochemical smog, fights constantly to assure adequate air quality, the Mojave next door is also beginning to become the subject of greater development, both from expanding residential communities and large public facilities such as the new International Airport.

CULTURAL RESOURCE INVESTIGATION AND RESEARCH BACKGROUND

CULTURAL RESOURCE INVESTIGATION AND RESEARCH BACKGROUND

SUMMARY OF PAST AND CURRENT WORK IN THE PLANNING UNITS

Below is listed a brief summary of research projects in those portions of the three counties which comprise the study area. Details on the results of past research in the planning units may be found in the Chronology and Past Lifeways sections of this report. This discussion here will only briefly summarize past research--making reference to the more important research projects which have been conducted in the study area. These "important" research projects were determined on the basis of the professional opinions of the archaeologists, historians, and consultants involved in this study.

Essentially, archaeological research began in the planning units in the 1930s with the work of A. Woodward in the Los Angeles County sector and with the eclectic and extensive work of Malcolm Rogers at such petroglyph sites in San Bernardino County as CA-SBr-2267.

Virtually all of the sites formally reported in the westernmost sector of the study area, the Antelope Valley, were not recorded until the lated 1960s or 1970s. Some early excavations in the 1930s were made in the Antelope Valley at Barrel Springs and at Piute Butte by H. E. Edward (Oliver 1978). But the results from those projects were not published. The UCLA Archaeological Survey, under James Toney (1968) and Charles Rozaire, conducted a salvage excavation at site CA-LAn-192 at what later became "Lake Los Angeles" in the Antelope Valley. Again the results from that work have not been published. Since 1968, Roger Robinson, Instructor of Anthropology/Archaeology at Antelope Valley College at Lancaster, has recorded and excavated about two dozen sites in Antelope Valley (Robinson 1978), but the results of that work have not been published. Mark Q. Sutton, who was teaching at Cerro Coso College, excavated four sites (CA-Ker-733; CA-LAn-765, Sutton n.d.a ; CA-LAn-298 , Sutton n.d.b ; and CA-Ker-303). In a recent review, Mark Q. Sutton stated:

> Antelope Valley is a little known area archaeologically. Few sites have been excavated in the valley and only one is reported in published form (Glennan 1971b; Sutton 1977n).

Moreover, intensive, systematic surveys have been relatively rare in the valley (cf. Ritter and Berg 1978).

In the Kern County portion of the study area, the earliest archaeological work was conducted by H. E. Edwards under the auspices of the Southwest Museum in the 1930s at the site CA-Ker-93. Since that time, "research" has essentially been only of a site survey nature with sporadic reporting

over the years. The recent survey of Ritter and Berg (1978) is an exception. The survey work of Mark Q. Sutton in 1977 at Edwards Air Force Base has been the most extensive project work to date in that region, resulting in a number of new sites being recorded (Sutton n.d.; various Ms. 1977 and various Ms. 1979).

As stated above, Malcolm Rogers in the 1930s began to work at sites in the greater Barstow sector of the study area. His initial interest in the sites of this region has been continued through projects implemented by the San Bernardino County Museum largely under the direction of Gerald Smith from the 1940s to the 1970s as well as by the Archaeological Survey Association (Redtfeldt 1979; also see various listed projects under ASA in the Bibliography).

For the most part, past research has been of a purposive site survey nature. The Archaeological Survey of the Mojave River and Adjacent Regions by Gerald Smith (1963a) is a major example. Other examples are Hanks' (1968) Harper Lake Survey and Simpson's Victorville Narrows Survey (1976).

The Archaeological Survey Association has been particularly interested in the petroglyphs of the study area (such as at Black Canyon) and have published a number of descriptive articles (e.g. Pederson 1956; also see various projects listed under ASA in the Bibliography). This continuing interest in petroglyphs has led to a major on-going study of the petroglyphs of the Black Canyon area by Wilson Turner, an art historian from Rio Hondo College (Smith and Turner 1975; Turner 1978).

There have been a number of excavations by various persons, but few have been pursued to publication. The excavations of the important sites of Schuiling Cave (Smith 1955a) and particularly Newberry Cave (Smith et al. 1957; Smith 1963b; see the extensive discussion of the findings from this cave in the Past Lifeways section for prehistory) are exceptions. The most renown excavation in the study area is located at the Calico Site (CA-SBr-2102). This project was begun in 1964 by the late Louis Leakey in collaboration with Ruth Simpson of the San Bernardino County Museum. This site has yielded disputed evidence of early people (late Pleistocene era) in America (see the discusion of this site in the Past Lifeways section of the report). The Calico project is on-going with its primary research goal being to establish the presence of early man occupation at the site (Simpson 1979).

Modern anthropologically oriented projects have only recently been implemented in the study area particularly with the excavation of site SBCM-616 near Victorville by the Archaeological Research Unit of the University of California at Riverside. The excavation resulted in a great quantity of artifacts and ecofacts. This material is being analyzed to answer questions concerning aspects of paleoecology and paleoenvironment of the early human inhabitants (Rector 1978, 1979).

Cultural resource management projects have been sporadic over the years. A number of "highway surveys" were conducted mainly in the 1960s by the UCLA Archaeological Survey (see various projects listed under UCAS in the Bibliography). Other projects have been recently conducted within the study area in the 1970s which have resulted in more substantial data (Decker 1973; Simpson 1976; Sutton and Robinson 1977; Sutton 1977, various manuscripts). Some of these cultural resource management projects involving site survey have been extensive in the study area, e.g. Stickel

(1975), Fowler et al. (1978), and especially the surveys of Mortland (1974), (Lucerne Valley Survey), King's (1972a) Cinnamon Roll Hills survey and Kaldenberg's (1978f) Calico Mountains survey.

The BLM began its own intensive CRM projects with a number of studies (Desautels 1969; see also the end of this section for a description of that project; Ritter and Berg 1978; Kaldenberg 1978, various manuscripts, etc.).

But in the mid-1970s the BLM implemented its comprehensive plan to inventory and assess the cultural resources in the California Desert. So far Class I overviews (of which this literature search study is an example) and Class II surveys (field survey programs designed to locate and identify sites) have been conducted. The recent BLM Class II survey of random sampling programs for the study area (Coombs 1979) coupled with such research as this report and the ARU project at Victorville (Rector 1978) will eventually allow the archaeology of the planning units to take a meaningful place within the greater prehistory of California, the Great Basin, and the Southwest.

The following is a listing of past projects, organized by county, involving excavation and intensive site recordation and/or surface collection.

LOS ANGELES COUNTY: Summary of Past Sites Which Were Excavated, Intensively Recorded and/or Surface Collected

CA-LAn-77 A protohistoric Chumash or Aliklik site which included still standing house structures. Site excavated by Woodward prior to 1933.[1] Collection and notes may be housed at UCLA (Woodward 1933).

CA-LAn-192 A late prehistoric site, probably a village with an attached cemetery. Salvage excavations were made by Charles Rozaire and James Toney of the UCLA Archaeological Survey in 1968. Nine burials were removed and then the site was destroyed by the construction of Lake Los Angeles. Material stored at UCLA (Toney 1968, on file, UCLA-AS Library; UCAS 1968a).

CA-LAn-239 A habitation site, its cultural affiliation is unknown. Site was collected by Mrs. Ball, a local resident. J. C. Jordan, of the Los Angeles City College, Department of Anthropology, also collected a hammerstone from this site. Collections made prior to 1962 and stored at LACC.

CA-LAn-296 This is a quarry area and a chipping station. Surface collections were made by a Mr. Huf, possibly of UCLA where the collection may be stored.[1]

CA-LAn-297 Habitation site, cultural affiliation unknown. Collection made by Mr. Huf. Collection may be stored at UCLA.

[1] These notations in this list refer to remarks made in the original site record form for a given site.

CA-LAn-298 Pictographs were noted at this site. Also, one test pit at this site was excavated by M. J. Cobb and her students from Antelope Valley College. The collection is stored at Antelope Valley College. Sutton also dug there in 1977-78 (Sutton 1978b, n.d.d.; Robinson, Sutton and Eggers 1976).

CA-LAn-305 A habitation site. A single test pit was excavated here by W. Willis of UCLA (?) in April 1964. Notes for this excavation are on file at UCLA Archaeological Survey (file #UCAS-053).

CA-LAn-483 This is a surface and slight subsurface deposit. Eleven 5 x 5 ft. test pits were excavated there by Roger Robinson of Antelope Valley College in 1968. Collections are stored at Antelope Valley College.

CA-LAn-484 This site consists of a small midden area between several bedrock mortars. The site has pictographs. Approximately 70% of the site area was excavated by Roger Robinson of Antelope Valley College in 1968. Collections are stored at Antelope Valley College.

CA-LAn-485 A small midden and possible habitation site. It was excavated by Roger Robinson of Antelope Valley College in 1969. A depression 15 ft. in diameter was excavated and a floor and butchered calf were recovered which suggested a historic date for the site. Collection is stored at Antelope Valley College.

CA-LAn-486 This site consisted of a surface scatter of lithic material. Surface collections were made by Roger Robinson of Antelope Valley College in 1969. The collection is stored at Antelope Valley College.

CA-LAn-488 This site is a habitation site and a cemetery. It was excavated in 1969-1970 by Roger Robinson of Antelope Valley College. Several burials were removed and a ^{14}C date of 770 $\pm$ 90 B.P. was obtained. The collection and burials are housed at Antelope Valley College.

CA-LAn-679 The UCLA Archaeological Survey, under the direction of Tom Blackburn and James Toney, conducted a survey and excavation at this site. Notes are on file at the UCLA Survey (UCAS 1964a).

CA-LAn-714 This site is a large lithic scatter. It was excavated and collected by A. Van Eggers in 1976. The site was partially destroyed by construction of the Space Shuttle Transport Road. The collection is stored at Antelope Valley College (Sutton and Robinson 1977).

CA-LAn-716 This site is a large lithic scatter. It was excavated and collected by A. Van Eggers in 1976. This site was partially destroyed by the Space Shuttle Transport Road. The collection is stored at Antelope Valley College (Sutton and Robinson 1977).

CA-LAn-720 This is an historic site which was tested in 1977 by Mark Q. Sutton (n.d.b.) Site was destroyed in 1977. Collection is stored at UCLA.

CA-LAn-721 This site is a large midden site which was tested by Roger Robinson of Antelope Valley College in 1977-78 (AVC-34).

CA-LAn-764 This site consisted of only five millingstone fragments. The site was surface collected in 1977 by Roger Robinson of Antelope Valley College. The collection is housed at Antelope Valley College.

CA-LAn-765 This site was a lithic scatter tested by Mark Q. Sutton in 1977. The report is in press (Sutton n.d.a.)

CA-LAn-767 This is a cemetery site now buried under alluvium. It was excavated by Roger Robinson of Antelope Valley College in 1975. Several burials were removed. The collection is housed at Antelope Valley College.

CA-LAn-770 This site consisted of an isolated find of one flake. It was collected by Mark Q. Sutton in 1977. The flake is stored at Edwards Air Force Base (Sutton 1979c).

CA-LAn-771 This site is a dense surface lithic scatter. Surface collections were made by Mark Q. Sutton of Edwards Air Force Base. The collections are housed at Edwards Air Force Base (Sutton 1977g; 1978a; n.d.c; n.d.f).

CA-LAn-772 This site was collected by Mark Q. Sutton. The material is stored at Edwards Air Force Base or UCLA.

CA-LAn-787 This site is a light scatter of lithic material. It was excavated by Mark Q. Sutton and Roger Robinson in 1976. The site was partially destroyed by the Space Shuttle Transport Road. Collection is stored at Antelope Valley College (Sutton and Robinson 1977).

CA-LAn-788 A single projectile point was collected by A. V. Eggers (see Sutton and Robinson 1977).

CA-LAn-828 Some excavation was made at this site by A. V. Eggers in 1972 or 1973 (?). Eggers has the notes. Chester King analyzed the beads and dated them to 200 B.C. to A.D. 600.

"Juniper Lodge" site This site consisted of a still-standing brush hut located just south of Palmdale. It was investigated in 1961 by Dr. Charles Rozaire of the Los Angeles County Museum of Natural History as the site was to be destroyed by the construction of the then new Highway 14. Fortunately the site appears to have been preserved (Rozaire 1979). The main supports for the hut were made of juniper branches and, after being mapped (see Figure 14), these were removed to the Los Angeles

County Museum of Natural History where they are now stored along with maps, photos and some collected photographs. No analysis or published report was made. This is a unique site in the planning units of a recent and preserved native house structure. No other such structure has been found in the study area (Photograph of this site can be found in Glennan 1971b).

KERN COUNTY: Summary of Past Sites Which Were Excavated, Intensively Recorded and/or Surface Collected.

CA-Ker-93 This site consists of two rockshelters or caves. One was excavated by H. E. Edwards in the 1930s through the Southwest Museum where the collections and notes are still housed. The other cave was excavated by Steward L. Peck through the University of California, Los Angeles. (Peck n.d., Ms. on file at the UCLA Archaeological Survey).

CA-Ker-219 The Horseshoe Canyon Site. Possibly excavated by S. Peck around 1950 although the date is not clear (Peck n.d., Ms. on file at UCLA Archaeological Survey).

CA-Ker-302 Site surface collected by W. Glennan, a graduate student at UCLA in 1970. Petroglyphs are present at the site. A full report is published (Glennan 1971b).

CA-Ker-303 The site was excavated by R. Robinson from 1971-76. Structures, cemetery, two figurines, and seven ^{14}C dates were obtained.

CA-Ker-308 A dry cave excavated by R. Robinson in 1969. He found basketry, fiddleneck seeds, and tule matting.

CA-Ker-322 This site was test excavated by A. Peak (1974b, 1976) and by Mark Q. Sutton (1979a). Collection is stored at California State University at Sacramento.

CA-Ker-323 This site was test excavated by Mark Q. Sutton in 1978. (Sutton 1979a). Collection at Antelope Valley College.

CA-Ker-470 This site consisted of an isolated find of one obsidian projectile point. The single specimen was collected by Russell and Whitley of the UCLA Archaeological Survey where the specimen is now housed.

CA-Ker-487 This site has a prehistoric component which was tested in the Space Shuttle Road project (Sutton and Robinson 1977).*

CA-Ker-505 This excavated site (Sutton and Robinson 1977) includes a historic occupation and several early prehistoric components (indicated by Pinto Basin points). This site is on the National Register.

* Since this list was compiled (1978), M. Q. Sutton has informed us that he has test excavated some sites at Edwards Air Force Base as part of the NASA Space Shuttle Project (CA-Ker-494, 495, 496, 497, 498, 499, 504) (cf. Sutton and Tremblay 1977; Sutton 1979c).

CA-Ker-508 This prehistoric site, containing a pithouse depression, was excavated by the Archaeological Survey Association in 1955. Collections and notes on file at the ASA. There is no publication.

CA-Ker-515 This site consisted of only one known burial (others may exist in the area). This burial, found eroding out of a river bank, was wearing an elaborate shell bead necklace. It was excavated by Mr. Roger Robinson of Antelope Valley College in 1974. Burial, artifacts, and notes are on file at Antelope Valley College (Robinson 1973a).

CA-Ker-525 This site consisted of only one mano and one metate. They were collected by Mr. Earl Steward prior to 1976. Data and material are on file at Antelope Valley College.

CA-Ker-527 A small pottery scatter. It was collected prior to 1976 by Mr. Earl Steward. Material stored at Antelope Valley College.

CA-Ker-544 This site consisted of one obsidian projectile point base. Collected by Mark Q. Sutton in 1977, it was catalogued and is now stored at Kern County Museum.

CA-Ker-554 This site consisted of a single retouched flake, collected in 1977 by Mark Q. Sutton. It is stored at Kern County Museum.

CA-Ker-555 This site consisted of an isolated flake. Collected by Mark Q. Sutton in 1977. Material stored at Kern County Museum.

CA-Ker-556 This site consisted of a box of 572 historic "swizzel sticks" marked "Muroc Jug Factory, Muroc, CA." Collected by Mark Q. Sutton in 1977.

CA-Ker-562 This site consisted of an isolated flake. Collected by Mark Q. Sutton in 1977. Material stored at Kern County Museum.

CA-Ker-696 This prehistoric habitation site was test excavated by Mark Q. Sutton of Edwards Air Force Base. The collection is stored at Edwards Air Force Base (Sutton, Forbes, and Robinson 1978; Sutton n.d.e).

CA-Ker-709 A single artifact comprising an isolated find. It was collected by Mark Q. Sutton in 1977 and stored at the Kern County Museum.

CA-Ker-733 Mark Q. Sutton dug this site in 1977. Apparently it is a special purpose site (Sutton 1979c).

SAN BERNARDINO COUNTY: Summary of Past Sites Which Were Excavated, Intensively Recorded and/or Surface Collected.

CA-SBr-53 Rock shelter excavated by S. Peck in 1948. Collection stored at San Bernardino County Museum (SBCM-284).

CA-SBr-63 Rock shelter. A basket was removed here by G. Smith. It is now stored at the San Bernardino County Museum (SBCM-67a).

CA-SBr-93 This site was excavated under the supervision of Gerald Smith by the San Bernardino County Museum. The collection is now stored at the museum (SBCM-13).

CA-SBr-115 Site excavated by R. Sayles and G. Smith in 1946. Collection now stored at the San Bernardino County Museum (SBCM-130).

CA-SBr-128 Some surface materials which were screened by J. Smith and H. Grossen in 1960. Location of collection unknown (SBCM-89c).

CA-SBr-146 A "few" 5 x 5 foot test pits dug by Scott H. Riverson in 1965. Location of the collection is unknown. A collection was also made by a Richard Faust, a non-professional whose "folks live in Newberry." This occurred circa 1962 and was recorded by G. Smith. Location of collection is unknown (SBCM-94).

CA-SBr-147 Petroglyphs recorded by San Bernardino County Museum in 1963. Data located in the SBCM files (SBCM-322).

CA-SBr-158 Site was excavated by G. Smith before 1964. The collection is on file at the San Bernardino County Museum (SBCM-845).

CA-SBr-177 One child burial was removed in the 1950s by E. F. Walker to protect it from damage by erosion. Exact date unknown. Location of the burial is unknown but it's probably in the Southwest Museum, San Bernardino County Museum or the Los Angeles County Museum (SBCM-47).

CA-SBr-179 Site was excavated by Mr. Carl Cambridge, a local school teacher. The material is stored at Victor Valley College. Date of dig unknown but it was prior to 1974. Site contains a large historic-late prehistoric aboriginal occupation (SBCM-66a).

CA-SBr-182 Site was excavated by Mr. Turner in 1941. Late prehistoric component with a large amount of coastal trade items. It was suggested to be a "historic Paiute occupation." Burials were found and possible house depressions. Also known as the Turner Springs Ranch Site (SBCM-88).

CA-SBr-183 Earth moving operations uncovered burials at this site. The data is now stored at the San Bernardino County Museum. Apparently this was the site of Topiabi (Smith 1955b, Kroeber 1909). Recorded by G. Smith (SBCM-72).

CA-SBr-199 The Newberry Cave Site. This early site was excavated by G. Smith and the San Bernardino County Museum in 1953. Artifacts include many unique perishable objects including split twig figurines. Materials stored and displayed at San Bernardino County Museum (SBCM-102). This site is discussed at length in the text.

CA-SBr-216 This site consists of petroglyphs recorded by Mrs. Kingman of the Archaeological Survey Association of Southern California and Mr. Paul Chace. Data on file with the ASA (SBCM-126).

CA-SBr-218 A petroglyph site recorded by G. Smith. Ms. on file in the University of California Archaeological Survey at the University of California, Berkeley. Also recorded by George Momyer in 1947, data probably on file at the San Bernardino County Museum (SBCM-149).

CA-SBr-261 A concentration of sherds, bone, and charcoal which was screened by J. Smith and G. Grosscup. Material now stored at the San Bernardino County Museum, no date given (SBCM-89c).

CA-SBr-306 Petroglyphs recorded by Francis Riddell and L. Sparler in 1962. For data contact F. Riddell at the Department of Parks and Recreation, State of California, Division of Cultural Heritage, Sacramento, CA. (SBCM-302 to 309).

CA-SBr-316 Schuiling Cave. This site was excavated by G. Smith and the San Bernardino County Museum (SBCM-264) (Smith 1955a).

CA-SBr-341 "Pottery sherds" and "arrowheads" were surface collected from this site by Marion E. Ely II of Apple Valley, Ca. in 1975. Data stored at SBCM.

CA-SBr-349 The site was collected by Pat Kolby, Morongo Valley area. An excavation was reportedly made by UCLA in the 1930s but it is not confirmed at UCLA. An excavation was made by "Redlands College" where that collection is now stored. Pottery, Elko-Eared points, shell beads (California type) and "Hohokam style" shell bracelets were recovered along with cremation burials (SBCM-141b).

CA-SBr-421 Test excavations were conducted at the site by M. Kowta in 1968. Location of the collection unknown but Dr. Kowta may be contacted at California State University, Chico, Ca. (For further details see Kowta 1969)(SBCM-129a-f).

CA-SBr-425 The Cajon Camp site, excavated by the Archaeological Survey Association of Southern California and Dr. G. Smith of the San Bernardino County Museum in 1949. Late Serrano material was recovered. The collection is stored at the San Bernardino County Museum (SBCM-2).

CA-SBr-434 A collection was made by Mr. Day. The information was then obtained by Ruth Simpson. Artifacts stored at the Mojave River Valley Museum. Collection made in 1972 (SBCM-2752). Transferred to San Bernardino County Museum.

CA-SBr-577 This site was mapped and "large flake tools" were surface collected by A. McCurdy of Archaeological Research Inc., 1969, of Costa Mesa, CA. Data stored at BLM-DPS.

CA-SBr-519 Ten artifacts were collected in 1969 from this site by R. Desautels of ARI. Data stored at BLM-DPS.

CA-SBr-540 An excavation was conducted to expose an "old fireplace." Only a 2 x 2 foot area was excavated. Conducted by the San Bernardino County Museum (SBCM-436).

CA-SBr-560 Sherds were collected from this site by Phil Wilke for California Department of Parks and Recreation. Data stored at ARU, University of California, Riverside.

CA-SBr-561 A collection made by Pat Kolby of Morongo Valley. The current disposition of artifacts is unknown (SBCM-2235).

CA-SBr-939 This site was excavated by G. Smith of the San Bernardino County Museum and the Archaeological Survey Association of Southern California. Many large house pits were reported at this late prehistoric site. Excavated in 1940 (SBCM-66b).

CA-SBr-998 The collection from this site is housed at the San Bernardino County Museum. Origin (surface-subsurface) of artifacts is unknown. The collection was made in 1973 (SBCM-2241).

CA-SBr-1460 This site was excavated by the Archaeological Survey Association of Southern California in 1951, and Victorville College in 1975. It is a late Serrano site ("Atongaibit"). Burials were reported (SBCM-48).

CA-SBr-1464 An artifact (fused shale biface) was collected by M. Rosen in 1976 and stored at the University of California, Archaeological Survey, Anthropology Museum (SBCM-3292).

CA-SBr-1882 One mortar was removed from this site and brought to the Kee's Ranch in 1962. Also known as the Mounds Spring site (SBCM-513).

CA-SBr-1888 This site was photographed, mapped, and recorded by James S. Benton (30204 E. Hwy. 91, Barstow, Ca.) in 1967-1969. Location of data unknown, except possibly with investigator (SBCM-1224).

CA-SBr-1907 This site was collected by Cleo Findley, Mr. and Mrs. Hukill, all non-professionals, in 1962. The collection may be housed at the Mojave River Valley Museum or the SBCM or with the persons involved (SBCM-1510).

CA-SBr-1936 This petroglyph site was recorded and described by Ruth Simpson (Simpson 1961:227). (SBCM-600).

CA-SBr-2074 This chipping station site was surface collected by San Bernardino County Museum.

CA-SBr-2100A This apparently is a true quarry site which dates to the Manix Lake Complex times. It was test excavated in 1965-68 by the San Bernardino County Museum under the supervision of Ruth Simpson (SBCM-1508). (Alsoszatai-Petheo 1975:188; Simpson 1979).

CA-SBr-2102 The famous Calico Site, excavated by Ruth Simpson of the San Bernardino County Museum and Dr. Louis Leakey of the Leakey Foundation and the National Geographic Society (combined multiyear excavation project) 1964-present. (see numerous publications under Simpson)(SBCM-1500).

CA-SBr-2110 This site had excavated from it a burial of a "Headless Horseman and horse." It is known as the Toomey Headless Horseman site. Excavation circa 1965. Data may be at the San Bernardino County Museum (SBCM-875).

CA-SBr-2119 This site was surface collected by the San Bernardino County Museum.

CA-SBr-2120 A site excavated by Alsoszatai-Petheo then of California State University at Fullerton in 1972, the artifacts are stored at the San Bernardino County Museum (SBCM-1803). Extensive lithic analysis and other types of analysis (e.g. pollen) conducted at the site (Alsoszatai-Petheo 1975, 1978).

CA-SBr-2162 This site was excavated by the Mojave River Valley Museum, Barstow, under Pat Keeling. Results unknown (SBCM-2750).

CA-SBr-2163 A site excavated by the Mojave River Valley Museum, Barstow, under Pat Keeling. Results unknown (SBCM-2751).

CA-SBr-2169 A large collection from the site was made by a "Schmidt" (only note on site record form) possibly from the VFW post at the west end of Coyote Lake. Results and location of collection unknown, collector apparently not friendly towards archaeologists (SBCM-1509).

CA-SBr-2174 A collection was made by "E. Peck" prior to 1955. The collection may be stored at the San Bernardino County Museum (SBCM-1820).

CA-SBr-2195 These petroglyphs have been extensively recorded. This information is on file at the BLM-DPS, Riverside.

CA-SBr-2198 This site was excavated by Mike Mosely, Gerald Harris, and Jimmy and Carl Cambridge through the San Bernardino County Museum. Site excavated in "a random fashion." Collections stored at the San Bernardino County Museum (SBCM-586).

CA-SBr-2267 The petroglyphs at this site were recorded by Malcolm J. Rogers in the 1930s of the San Diego Museum of Man. This data is in that institution's files (SBCM-814).

CA-SBr-2293 This collection was made by a local, Mrs. Dupree. Location of the collection is unknown (SBCM-150).

CA-SBr-2302 The Indian Tank Site. Interiors and exteriors of stone structures "swept clean for photos and the site was completely excavated in doing this." Work done by Paul Langenwalter in 1977. No artifacts or other materials were recovered (SBCM-1925).

CA-SBr-2321 A collection (one metate) was made by Mrs. Melissa Poesch of 62 Treasure Island, Laguna Beach, California 92651. The artifact remains with collector (SBCM-1926).

CA-SBr-2846 This excavation was carried out by Dr. Phillip J. Wilke, University of California, Riverside, Archaeological Research Unit. This data included 3 basket fragments, a grass bed, 2 bundles of snares and one formerly hafted rodent jaw, all removed from 1 x 2 meter rock shelter. A report is in preparation. Collection is now stored at UCR.

The Roger Desautels Survey of the Mojave Desert (conducted for the Bureau of Land Management, data on file at the BLM, Desert Planning Staff Office, Riverside, CA).

Between 1969 and 1972, Roger Desautels conducted a survey of the Mojave Desert for the Bureau of Land Management under contract #940-490 and 940-396 (Desautels 1972). This study provided a collection of survey records for Inyo, San Diego, Riverside, Imperial and San Bernardino counties. A total of 829 site records was assembled including 179 San Bernardino sites, many of which fall within the study area of this project. The site survey was carried out to a seemingly large extent but the areas surveyed and methodology used are not outlined in the BLM-DPS reports. Several volumes of notes are on file at the BLM Riverside Office and these include site reports from all of the areas concerned. A site catalogue for the 34 surface collected sites are included. The artifacts are now in storage with the BLM. There is, however, no final report by Archaeological Research, Inc., through which Desautels was working at that time. The major goal of this project was to gather literature and survey data for the Mojave Desert area (boundaries unknown except for large BLM master map) for planning purposes.

LIST OF SITES EXCAVATED AND COLLECTED AND ARTIFACTUAL YIELD

SITE #	# ARTIFACTS COLLECTED	WORK DONE
SBr-290	7	surface collection
SBr-291	57	"
SBr-325	17	"
SBr-366	13	"
SBr-504	2	"
SBr-506	3	"
SBr-507	8	"
SBr-508	4	"
SBr-509	3	"
SBr-510	3	"
SBr-511	12	"
SBr-512	26	"
SBr-513	3	"
SBr-515	2	"
SBr-516	9	"
SBr-517	15	"
SBr-519	10	"
SBr-521	26	"
SBr-522	9	"
SBr-523	9	"
SBr-524	15	"
SBr-525	6	"
SBr-526	7	"
SBr-527	2	"
SBr-528	6	"
SBr-530	7	"

SBr-531	10	surface collection
SBr-532	4	"
SBr-533	13	"
SBr-534	4	"
SBr-535	4	"
SBr-536	13	"
SBr-537	37	"

MUSEUM COLLECTIONS FROM THE WESTERN MOJAVE PLANNING UNITS

During the course of this project, a number of official data repositories and museum collections were visited which have data gathered from the planning units. The amount and quality of the information (e.g. field notes) and data (artifacts, bones, etc.) varies from facility to facility. It is our impression that much surface data has been collected from sites in the study area. Unfortunately, these collections have not been adequately described or annotated. The collections from the sites for the most part are in need of detailed studies describing both visual and quantitative variability represented by each set of data. If such information were available, then archaeologists would be able to utilize such past collected data to its fullest potential prior to the conduct of any future excavation. When mitigation is eventually conducted on sites in the study area, such collections will aid in the comparative analysis of new data. Recently there has been an influx of environmental impact studies, and each of the three data repositories in the study area is attempting to compile, organize, and annotate these various reports. They have not been adequately funded to do this as yet, and, hence, this information is not available at present. It is this analyst's observation (corroborated by others, e.g. King and Casebier 1976:37), that the museums in the study area have not been utilized to their fullest extent by archaeologists. This is an unfortunate situation since some of these institutions, such as the San Bernardino County Museum, house highly important collections of data.

These institutions have collections of artifacts, field notes, and photographs, and some manuscripts and occasional publications. The following is a list by county and institution of data from the study area. That is to say, if data from a given county is known to be stored at an institution, then that institution is listed under the pertinent county heading. The particular county Clearing House, which issues and houses official site record forms and reports from both pure research and CRM studies, is listed first and is followed by the other facilities listed in alphabetical order. Also, a brief listing of those sites from which data are stored at a given institution, is presented under the pertinent museum.

LOS ANGELES COUNTY

The Los Angeles County portion of the study area is located in the Antelope Valley Planning Unit. It comprises about one-sixth of the total area of concern to this study.

1) UCLA Archaeological Survey

The survey is the official data repository for Los Angeles County. Data on the following investigated sites are stored there: CA-LAn-77, 192, 297, 298, 305, and 720.

2) Antelope Valley College Archaeological Laboratory.

A number of sites have been investigated by AVC since 1968 by R. Robinson, Instructor in Anthropology/Archaeology there. These include data from CA-LAn-298, 483, 484, 485, 486, 487, 488, 714, 716, 721, 764, 765, 767, 787, 950 and 954.

3) Antelope Valley Indian Museum

The Antelope Valley Indian Museum has stored a number of artifacts from valley sites, the primary ones of which are the Barrel Springs Site, located near Palmdale, and the Piute Butte site, located at the site of the museum. Photographs of artifacts from that collection are presented in an appendix to this report.

4) Antelope Valley Archaeological Society

AVAS has miscellaneous information on Antelope Valley sites. Artifacts are stored at Antelope Valley College.

5) Edwards Air Force Base

Edwards Air Force Base retained archaeologist Mark Q. Sutton for a year (1976/1977), and during that time a number of sites were recorded on the base in both Los Angeles and Kern counties. Two of them, in the Los Angeles County portion of the base, were tested (CA-LAn-720 and 771). These data are now stored on the base (contact Base Civil Engineering).

6) Los Angeles City College

A collection was made of site CA-LAn-239, by Dr. J. C. Jordan of the Department of Anthropology at the college. This data can presumably be obtained by contacting Dr. Jordan.

KERN COUNTY

Less than one-eighth of the study area extends into Kern County. Very little of this area has been systematically surveyed by trained archaeologists. A high number of sites, however, is to be expected in the Kern County portion of the study area.

1) Bakersfield College Archaeological Laboratory

The Archaeological Laboratory at the College, administered by Mr. Robert Schiffman, is the official data repository for the Kern County portion of the study area. Official data/survey forms are kept at the laboratory, although no physical artifacts or other material from the Antelope Valley planning unit are there. These collections are kept at the facilities

listed below.

2) Antelope Valley College Archaeological Laboratory.

A number of sites investigated by R. Robinson of AVC have data from them stored at the laboratory. These sites include: CA-Ker-303, 308, 323, 505, 514, 515, 525, 527, and 733.

3) Archaeological Survey Association

The ASA has long held an interest in the Mojave Desert, and numerous informal projects and reconnaissances have been made within the study area. Formally collected data, however, exits from CA-Ker-508.

4) Edwards Air Force Base

The basic information (field notes) and collected data which was obtained from the former archaeologist, Mark Q. Sutton, are stored at the base. The collection information includes data from site CA-Ker-696.

5) Kern County Museum.

The museum has material from the following sites: CA-Ker-494, 495, 496, 497, 498, 499, 504, 544, 554, 555, 562, and 709.

6) Southwest Museum

One rockshelter (CA-Ker-93) was excavated by H. E. Edwards in the 1930s when he worked under the auspices of the Southwest Museum. Data and notes from that work are stored at the museum.

7) UCLA Archaeological Survey

The UCLA Survey has received artifacts and notes from a number of sites in the Kern County portion of the study area: CA-Ker-93, 219, and 302.

SAN BERNARDINO COUNTY

By far the greatest portion of the study area is included within San Bernardino County. Thus, all the area within the Johnson/Morongo, Calico, Stoddard, and Kramer planning units are all contained in San Bernardino County. Importantly, the vast majority of land under the jurisdiction of the Bureau of Land Management in the study area is located in this county (90% of total land area). In addition to data at the BLM offices in Riverside (e.g. data on the Blackwater Well site, SBCM-2322, excavated by R. Kaldenberg, 1979), the following institutions have useful information on the study area.

1) San Bernardino County Museum

In terms of the bulk of available data, the San Bernardino County Museum furnished the most useful data set for cultural resources management for the study area. The largest amount of site record information for the area is correspondingly stored there. The greatest number of published and

unpublished data sources are to be found there as well. The best available collections and/or information on individual sites include: CA-SBr-53, 63, 93, 99, 115, 158, 177, 183, 199, 215, 218, 261, 316, 425, 540, 939, 998, 2102, 2110, 2174 and 2198.

2) The Archaeological Research Unit, University of California, Riverside.

This facility has done much highly useful research in the study area, particularly with a recent excavation near Victorville (SBCM-616). One other site (CA-SBr-2846) has excavated data stored at the ARU.

3) The Archaeological Survey Association of Southern California.

The ASA has been intensively interested in sites in San Bernardino County, particularly petroglyphs. Correspondingly, there are a number of sites with data stored at the Association's headquarters including CA-SBr-216, 393, and 1460.

4) The Department of Parks and Recreation, Sacramento.

Information for site CA-SBr-306 is stored with the department in Sacramento.

5) Los Angeles County Museum of Natural History

Site data for CA-SBr-177 is stored at the LACMNH in Los Angeles.

6) Mojave River Valley Museum

A number of projects have been carried out by the Mojave River Valley Museum. The museum has information for sites: CA-SBr-434, 561, 1907, 2162, and 2163.

7) University of Redlands

Site CA-SBr-349 was reportedly excavated by University of Redlands where the collection is presumably housed.

8) San Diego Museum of Man

Data from site CA-SBr-2267 is stored at this museum.

9) UCLA Archaeological Survey

A fused shale biface was collected from site CA-SBr-1464 and is now stored at the UCLA survey.

10) Victor Valley College

One site, CA-SBr-179, was excavated by Victor Valley College, where the data are also stored.

ETHNOGRAPHIC MUSEUM COLLECTIONS FOR THE PLANNING UNITS

1) Smithsonian Institution, National Anthropological Archives (Harrington notes on the Tataviam, Kitanemuk, Vanyume, Serrano, and Kawaiisu).

2) Antelope Valley College (Harrington notes on the Kitanemuk, Vanyume, and Kawaiisu).

3) Los Angeles County Museum of Natural History

4) San Bernardino County Museum

5) Bancroft-Library, University of California, Berkeley (e.g. Merriam papers).

6) Huntington Library (W. H. Weinland Collection for the Serrano) San Marino.

7) Malki Museum, Morongo Indian Reservation.

8) Chicago Natural History Museum

9) U. C. Davis, Merriam Basket Collection

10) San Gabriel Mission Records

11) San Fernando Mission Records.

Note: All institutions have field notes and/or some artifacts and photographic collections.

PRESENT RESEARCH ORIENTATION IN THE PLANNING UNITS

There has been an increasing number of cultural resources management studies within the study area. Primarily these have been E.I.R. reports and site surveys (Desautels 1972 ; Ritter and Berg 1978; Leonard 1977, 1978 various ms.; G. Smith various Ms.; Mortland 1974; Connelly 1974; Decker 1973; Sutton and Robinson 1977; Sutton 1977 various ms.). These studies have been directed towards identifying the presence of cultural resources in a given area and then making the appropriate CRM recommendations. The few recent publications, and the interviews and contacts made for this presentation would indicate the following research directions in the study area. There is a continuing interest in defining the culture history of the area (cf. Robinson 1977; Sutton 1979b), as well as documenting the presence of early humans in the greater Barstow sector of the study area (cf. Kelly 1976; Alsoszatai-Petheo 1975; 1976 ;1978; Glennan 1976 ; publications of Simpson from 1964-present). The "flagship" site for this interest has been the now-famous Calico site (CA-SBr-2102). There have been some particular focused research projects: those interested in past prehistoric exploitation of faunal resources (e.g. Sutton 1977n ;Garfinkel 1975) and those interested in documenting petroglyphs (Smith and Turner 1975 ; Turner 1978) and protecting petroglyphs (e.g. Hanks 1975). Turner's (1978) Black Canyon Petroglyph study is conducted from an art history point of view. Although the study is not anthropological/

archaeological per se, it is providing invaluable scientific data since to date more than 7,000 petroglyphs have been recorded. Due to the rate of vandalism of the sites, this project may provide some of the only data we will ever have on some of these sites and glyphs.

The most anthropologically oriented project to date has been conducted by the Archaeological Research Unit of the University of California, Riverside, at their excavation of a site (SBCM-616) located near Victorville. A variety of pertinent questions concerning the past human paleoecology, as well as relevant environmental problems of paleoenvironment, geology, etc. will hopefully be answered once the results of this project are published (Rector 1978, 1979a and b).

The present research orientations are diffuse and are not focused on a coordinated regional approach geared to the joint study of mutual problems of archaeological interest (cf. Gumerman 1971). Such a coordinated approach could be implemented in the planning units with specific research projects directed to answering a series of relevant questions of the data (cf. Section 5, Future Research Directions).

The following constitutes a listing description of current research projects in the study area.

CURRENT CULTURAL RESOURCE RESEARCH AND INVESTIGATION PROJECT SUMMARY

1.0 CALICO PROJECT

1.1 Project title: The Calico Hills Archaeological Project

1.2 Principal Investigator(s): L.S.B Leakey and Ruth D. Simpson

1.3 Sponsoring institution: San Bernardino County Museum and the National Geographical Society (for selected years).

1.4 Dates of fieldwork: 1964-present.

1.5 General Location of Fieldwork: Calico Hills east of Calico, Ca.

1.6 Purpose of fieldwork: To provide proof of the occupation of the site by early humans ca. 50,000 years before present or earlier (i.e. late Pleistocene human occupation of the Americas).

1.7 Field procedures and techniques: Two large and deep test pits were excavated down to ten meters through rock-hard material as well as other control units. The most exacting, state of the art methods and tools were used to excavate the pits and other "control" units.

1.8 Project results: Several thousand"stone tools" were recovered. An elephant tusk fragment, and a presumed "hearth" also were recovered One ^{14}C date of $< 37,000$ B.P.; sediments were carefully studied by geologists.

1.9 Evaluation of project: An outstanding program of excavation was conducted at the site under the most difficult circumstances. Although the data from the site is not undisputed, the project has made important contributions to the methods and methodology of searching for early humans in the Americas.

1.10 Records (i.e., reports, notes, and collections): The site has seen a number of publications (see Simpson-various dates, Leakey, Simpson, and Clements 1968; Clements 1970; Leakey et al. 1972; Haynes 1969; Hester 1973).

2.0 BLACK CANYON PROJECT

2.1 Project Title: Black Canyon Petroglyph Study

2.2 Principal investigator(s): Mr. Wilson Turner

2.3 Sponsoring institution: Earthwatch and Rio Hondo College

2.4 Dates of fieldwork: 1977-present

2.5 General location of fieldwork: Black Canyon, north of Barstow, Mojave Desert, California.

2.6 Purpose of fieldwork: To record the petroglyphs of Black Canyon.

2.7 Field procedures and techniques: Each petroglyph site is defined as a grouping and mapped. Each petroglyph element is recorded by both drawing and photographs. These elements are then catalogued and analyzed to form a chronological (or typological) series.

2.8 Project results: Two seasons of work have now resulted in the recording of approximately 7,000 petroglyph elements. The first season's work resulted in one publication (Turner 1978) and the publication on the second season is currently in preparation.

2.9 Evaluation of project: This project is resulting in the recordation of the endangered petroglyph elements in the highly traveled and heavily vandalized Black Canyon area. It is resulting in a very high quality of recorded data and unique types of analysis.

2.10 Records (i.e, reports, notes, and collections): Drawings and photos of the sites are on file with Earthwatch, Rio Hondo College, and are available in synthesized form through Mr. Wilson Turner's publications through the San Bernardino County Museum Association's Quarterly publication series.

3.0 SBCM-616 PROJECT

3.1 Project title: Excavations at SBCM-616.

3.2 Principal investigator(s): Carol Rector

3.3 Sponsoring institution: Archaeological Research Unit, University of California, Riverside.

3.4 Dates of fieldwork: Spring-summer 1978.

3.5 General location of fieldwork: Site located on a rise on the west bank of the Mojave River near the city of Victorville to the south and east of Cuthbertson Ranch.

3.6 Purpose of fieldwork: "The analysis of this site will answer many questions about the late prehistoric period of desert archaeology. It will also make available much needed information on the paleoenvironment, paleoecology, geology..."

3.7 Field procedures and techniques: Standard archaeological excavation procedures were systematically followed throughout the excavation.

3.8 Project results: A total of 6,367 items (or groups of items) were recovered and catalogued. Approximately 90,000 faunal remains were unearthed; charred seeds, 54 fossil human footprints, 8 animal tracks, one ^{14}C date of 4330 $\pm$ 100.

3.9 Evaluation of project: An extensive project of this type was badly needed for the study area in order to provide basic data to partially answer many extant archaeological questions. A fully modern approach was adopted.

3.10 Records (i.e., reports, notes, and collections): The data, including all photographs, notes, forms, maps, as well as the artifacts and ecofacts, are stored at the Archaeological Research Unit at U. C. Riverside (Rector 1978).

4.0 BLACKWATER WELL PROJECT

4.1 Project title: An Excavation at Blackwater Well in the Northern Mojave Desert (site SBCM-2322) (just outside study area).

4.2 Principal investigator(s): Russell Kaldenberg and N. Nelson Leonard, III.

4.3 Sponsoring institution(s): Bureau of Land Management, Riverside; SBCM.

4.4 Dates of fieldwork: Summer of 1978.

4.5 General location of fieldwork: The site is located at a spring at the north edge of Cuddeback Dry Lake, in northern San Bernardino County.

4.6 Purpose of fieldwork: The research objective is to define the ecological adaptation of Middle Period to Ethnohistoric/historic human occupants at the site.

4.7 Field procedures and techniques: A sample of four 1 x 2 meter units were excavated at the site with standard archaeological techniques.

4.8 Project results: A sample of lithics and bone (mainly rabbit) was obtained from the site. Based on bead analysis by Chester King, the site dates from 3000 B.P. to the historic era. Also, Gypsum, Pinto, Rose Springs, Eastgate, and Cottonwood projectile points were found at the

site (Kaldenberg 1979). Also, this site was the first stop on the 20-mule-team trail from Mojave to Death Valley, California. A preliminary paper on this project was read by R. Kaldenberg at the Society for California Archaeology Data Sharing Meeting at the San Bernardino County Museum in 1978.

4.9 Evaluation of Project: Problem oriented projects of this type are badly needed for the study area. Hopefully the planned monograph by R. Kaldenberg and N. Leonard (which is planned for publication in 1979 or 1980 by the San Bernardino County Museum) will help to fill the present archaeological data gap for this northern county area.

4.10 Records (i.e. reports, notes, and collections): The data from this site will be stored at the San Bernardino County Museum.

CULTURAL RESOURCE NARRATIVE

CHRONOLOGY

G. Stickel

CULTURAL HISTORY: CHRONOLOGY

There have been numerous proposals for a chronology to characterize the human habitation of the Mojave Desert. The most salient ones are co-listed in Figure 5 for the reader's reference. This project views the chronologies of Wallace (1962) and Bettinger and Taylor (1974) as the two most germane ones to use for the study area. There is presented below an attempt to reconcile those competing chronologies (Figure 6). The most hotly debated of any of the chronological eras is the earliest period of possible human occupation of the area.

EARLY SYSTEMS PERIOD (50,000(?) B.P. to ca. 10,000 B.P.)

There have been several proposed chronological terms for the era of the earliest human habitation of California. "San Dieguito" (i.e. San Dieguito I) was proposed by Malcolm Rogers for southern California, especially for the Mojave Desert (Pourade 1966:140). "San Dieguito Tradition" was proposed for the San Diego County area (Warren 1968:4). The "Early Man Horizon" was developed for the southern California coastal area in general (Wallace 1955). Wallace (1978) has proposed the term "Period I: Hunting." Perhaps Wallace's (1955) term of "Early Man Horizon" is the most used term to date. According to Wallace, this horizon "...began in the late Pleistocene and ended sometime circa 5000 to 4000 B.C. (Wallace 1955). Most recently Warren and Crabtree (1969) propose a "Hypothetical Pleistocene Period." Although they give no dates, this period obviously would have to date prior to the end of the Pleistocene or before 10,000 B.P. Warren and Crabtree include the Manix Lake Complex and the Calico site in this hypothetical period. Willey (1966:367) proposed a pan-California term of "Pre-5000 B.C."

The 10,000 year B.P. time line occurred during the very end of the Wisconsin (i.e. Pleistocene). This epoch refers to the fact that deglaciation, for the most part, halted sometime between 11,000 to 10,000 years ago. After that time, drier climatic conditions set in for California as a whole and certainly on the Mojave (Johnson 1977a). The climatic change coincided with the extinctions of the megafauna (Johnson 1977b). This environmental change probably induced resident human systems to change their adaptations and, hence, may have led to the development of the first distinctive California cultures: such as the California Early Period, (Heizer 1964); Oak Grove Period 7,000 to 5,000 B.P., (Spaulding and Glassow 1972); Millingstone Period 5000 B.C. to 1000 B.C., (Wallace 1955); and the San Dieguito to La Jollan sequence, (Moriarty 1966). For the study area, this distinctive local development has been referred to as the "Lake Mojave Period" (Wallace 1962) and more recently the "Mojave Period" (Bettinger and Taylor 1974), and the "Period I: Lake Mojave" era (Warren and Crabtree 1969). This presentation refers to that era as Mojave I Period, which is discussed below.

DATES	SOUTHERN GREAT BASIN SERIES	OWENS LAKE (Lanning 1963)	DEATH VALLEY (Hunt 1960)	MOJAVE DESERT (Wallace 1965)	COLORADO (Rogers 1939) cf. Pourade 1966:140	SOUTHWESTERN GREAT BASIN (Warren & Crabtree 1979)
Historic						
	MARANA	COTTONWOOD	DEATH VALLEY IV	PREHISTORIC YUMAN-SHOSHONEAN	PAIUTE, MOJAVE ETC. 1500.....	PERIOD V SHOSHONEAN
				A.D. 1000		A.D. 1000.....
A.D. 1300.....						
				AMARGOSA PHASE II	PREHISTORIC YUMAN AND	PERIOD IV
	HAIWEE	LATE ROSE SPRING	DEATH VALLEY III		SHOSHONEAN GROUPS	SARATOGA SPRINGS
				A.D. 500.....	A.D. 500.....	A.D. 500 .....
A.D. 600.....		MIDDLE ROSE SPRING.....		AMARGOSA PHASE I	PUEBLO II(?) BASKETMAKER III (?)	
			LATE DEATH VALLEY II	A.D.1	A.D. 1	PERIOD III
	NEWBERRY				AMARGOSA III(?) B.C. 1000.....	GYPSUM
1200 B.C.....		EARLY ROSE SPRING			B.C. 2000.....	B.C. 2000 .....
					AMARGOSA II (Pinto-Gypsum)?	
	LITTLE LAKE	LITTLE LAKE	EARLY DEATH VALLEY II	PINTO BASIN	B.C. 3000.....	PERIOD II
4000 B.C.....						
						PINTO
				B.C. 5000.....	Amargosa I(?) B.C. 5000.....	B.C. 5000.....
	MOJAVE	(OWENS LAKE II)	DEATH VALLEY I	LAKE MOHAVE B.C. 7000.....	6000..... 7000.....	PERIOD I LAKE MOJAVE
					SAN DIEGUITO II-III B.C. 8000.....	B.C. 8000 .....
					SAN DIEGUITO I ? B.C. 9000.....	HYPOTHETICAL PLEISTOCENE PERIOD ?

Figure 5. Comparative Chronologies (source: mainly Bettinger and Taylor 1974:10)

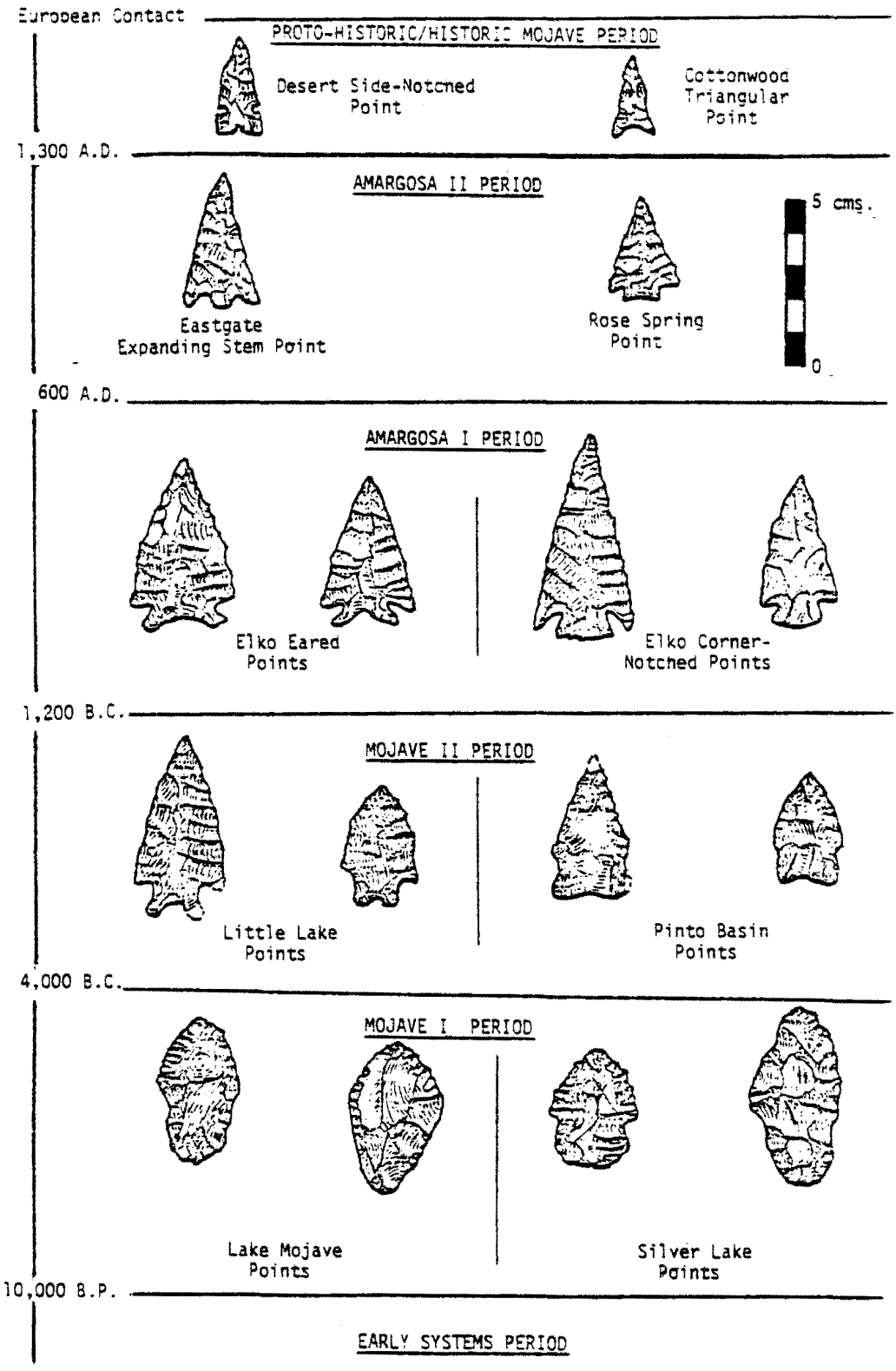


Figure 6. Suggested Chronology and Time Marker Points. (Source of redrawn point illustrations: Bettinger and Taylor 1974:12)

It would appear that there are sufficient finds and chronometric dates to warrant a more defined period dating from 10,000 B.P. back to the time of the first occupation of the area. Hence, such a time frame has recently been proposed for this earliest era--the Early Systems Period (Stickel 1979b; cf. Alsoszatai-Petheo 1976; 1978).

The term systems is emphasized in order to connote that all of the early artifacts, bones and other biotic materials found to date were once parts of living human systems whose populations were the first to adapt to California. Thus, the systemic term is considered here more suitable for referring to the early human adaptations in the state which left the extant data discussed below.

There have been those who have suggested a "pre-projectile point" period for the Mojave Desert (e.g. Krieger 1962; discussion of Hall and Barker 1975:43-48) The validity of this "period" has been questioned, however (Haynes 1969:712; Hester 1973:123). Consistent with the systemic view discussed above, it is considered here inappropriate to term a period after an artifact or to the lack of an artifact class. Hence, any "pre-projectile point" assemblage in California would be considered as part of the general Early Systems Period. Data from the greater Barstow area has been used to infer the presence of the earliest human occupation in America, particularly at ancient Manix Lake, including Troy Dry Lake, Afton Canyon, and Coyote Basin, Coyote Gulch, and the Calico Hills (e.g. Glennan 1972a, 1976; Simpson 1960-to present). Subsequently, Simpson (1960) postulated a "Manix Lake lithic industry" dating beyond 20,000 B.P. (Simpson 1958). The most renown candidate for this type of data in the planning units is the Calico site (CA-SBr-2102).

Calico has been one of the most hotly debated "early sites" in the United States. It now seems to be losing the support it once had in terms of being the earliest late Pleistocene site in America (cf. Payen 1979). At present there is only one radiometric date from the site. This one ^{14}C date of greater than 34,000 years ago was obtained from secondary carbonate cementation on some of the stones found in the excavation. Notwithstanding this date (which many archaeologists are reluctant to accept since it is not based on primary archaeological material such as hearth charcoal or bone artifacts as well as the difficulties of obtaining reliable dates from carbonate encrustations), many archaeologists today are suspect about the late Louis Leakey's estimate of the antiquity of this site:

> The artifacts which have come out of these two pits completely satisfy me that we have at Calico a site with clear evidence that tool-making man was here over 50,000 years ago (Leakey et al. 1972, italics ours).

The age dating of the artifacts is based on a disputed geological assessment rather than on a chronometric one. But even the artifacts themselves have been questioned as to whether they were human-produced or not (Haynes 1969: 713; Hester 1973; Payen 1979).

In spite of the criticisms Calico will have importance to California archaeology for two reasons. First, it has generated interest in demonstrating the antiquity of man in the Americas on an international basis largely due to the efforts of the late Louis S. B. Leakey and his colleague, Ruth Simpson of the San Bernardino County Museum. Secondly, the dispute has led to an increased awareness by archaeologists that only the most objectively defined artifacts, sites, and dates will satisfy the requirements for documenting the presence of Pleistocene peoples in the New World.

Hall and Barker (1975:48-51) discuss a "Fluted Point Tradition" dating circa 8,000-10,000 years ago. But Early Man specialists would date these points to 10,000 B.P. or earlier (Davis 1978:5; see Figure 7).

Based on her work at the China Lake Basin to the north of our study area, E. L. Davis has just proposed a detailed chronology for the span of time from ca. 50,000 to 10,000 B.P. Her chronology includes both heavy lithic tool and fluted point complexes. It runs as follows: "Early Core Tool Tradition," 45,000-27,000 B.P.; "Late Core Tradition," 27,000-25,000 B.P.; "Late Wisconsin Culture I," 20,000-15,000 B.P.; "Early Lake Mojave/ Early San Dieguito-blended with Proto-Clovis Culture," 15,000-13,000 B.P. and "Classic Clovis, Sandia," 13,000-10,000 B.P. (Davis 1978:5). Although Davis estimates the initial settlement at China Lake at 45,000 years ago, the oldest radiometric date obtained so far on her data is one ^{14}C date of 10,275 $\pm$ 165 (Davis 1978:170). Given the available data to date, it is the position here that such a detailed early chronology is premature at this time except as an hypothesis. It seems more appropriate to conceive of a generalized chronological unit for the early data both real or expected at this time--hence, the use of the Early Systems Period concept (Stickel 1979b).

There is very scant evidence within the planning units for an Early Systems occupation of the area. The only radiometric dated site which falls in the era is the Calico site. And as stated above this is not universally accepted at present. Much basic research needs to be conducted in order to substantiate a late Pleistocene human occupation in the area which now comprises the planning units.

MOJAVE I PERIOD (10,000 B.P. to ca. 4000 B.C.)

There have been few refinements of the basic southern California deserts chronology developed by William Wallace in the early 1960s (Wallace 1962). Wallace's basic information is presented first, followed by other pertinent information from subsequent research in the area.

At the time of the writing of his article, there was no objective evidence for "early man" in the California Deserts: "...no certain traces of Pleistocene occupation have been located." (Wallace 1962:173). This situation is no longer quite the case with recent research (e.g. Davis 1975b;1978), hence the use of the Early Systems Period above. Wallace discounted claims of "pre-projectile point" artifacts and stated that these artifacts could just as well be the remains of recent Indians. Thus, Wallace began his chronological sequence with the "Lake Mojave" period. According to his estimate, the period began some time during the "...closing

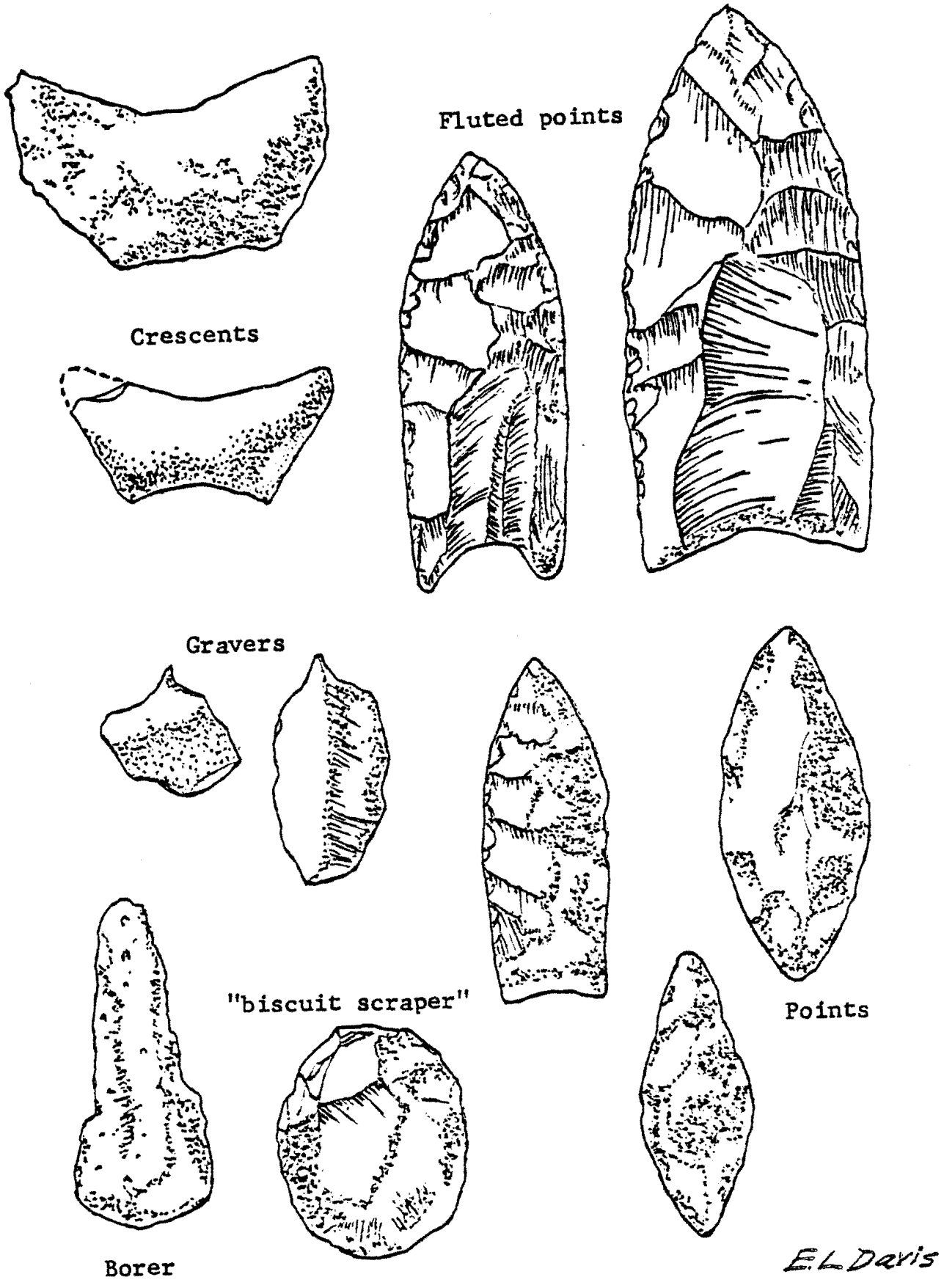


Figure 7. Tools From the Vicinity of Bones at China Lake.
(Drawing by E. L. Davis)

phase of the last deglaciation lasting roughly, from 7,000 to 5,000 B.C." (Wallace 1962:174). Thus, this period was a postglacial (i.e. post Pleistocene) era of human inhabitation. Wallace suggested that the best evidence of human occupation during this time came from sites along the shorelines of ancient Lake Mojave (cf. Campbell et al. 1937). The most diagnostic artifacts of the period are the heavy well-flaked Lake Mojave projectile points. These points have long tapering tangs (or hafting elements), "weak shoulders," and short blade elements (see Figure 6). Another time-marker artifact for the period is the Silver Lake point (see Figure 6). Wallace suggests that the people of this period subsisted mainly by hunting large game, with some possible fishing and gathering activities employed as well.

In one of the latest general published papers on the chronology of the California Deserts, Bettinger and Taylor (1974) proposed five "New" periods which they collectively term "Southern Great Basin Series... at the risk of further confusing terminology." These five periods are termed, from early to late, Mojave, Little Lake, Newberry, Haiwee, and Marana. However, as can be seen from their chronological chart (see Figure 5), they are simply renaming Wallace's basic chronological units with their Newberry and Haiwee periods corresponding to Wallace's Amargosa Period's two phases I and II. Similarly, Warren and Crabtree (1979) have proposed six chronological periods including (1) Hypothetical Pleistocene Period, (2) Period I: Lake Mojave (3) Period II: Pinto, (4) Period III: Gypsum, (5) Period IV: Saratoga Springs, and (6) Period V: Shoshonean. As viewed here, this proposed chronology is not a substantial revision of the chronologies of Wallace or Bettinger and Taylor. Like Wallace, Bettinger and Taylor (1974) use Lake Mojave and Silver Lake points as time-marker artifacts (cf. Hall and Barker 1975:51). They also, like Wallace, cite the wide-spread distribution of these points from ancient Lake Mojave (now Soda and Silver Lake playas: Campbell, et al. 1937), Death Valley (Hunt 1960), Owens Valley (Lanning 1963; Davis 1963), Pinto Basin (Campbell and Campbell 1935) as well as from a variety of other locations. Bettinger and Taylor (1974) cite one radiocarbon date (8,320$\pm$ 100 B.C.) from Warren's studies of Lake Mojave (Ore and Warren 1971), but they go on to discount its accuracy (Bettinger and Taylor 1974:8). Based on the estimates of Warren (1967; Warren and True 1961) for the time-marker points of between 8,000 or 6,000 B.C., and Cressman's (1973) correlation of Lake Mojave points at 9,000 to 12,000 B.C. at Fort Rock Cave, Oregon, Bettinger and Taylor (1974:13) state that they believe this period began before "6,000 B.C." Also, Warren and Crabtree (1979) date their Period I: Lake Mojave from 8,000 to 5,000 B.C.

The view here is that the period may be simply termed the Mojave I Period as a reconciliation of the Wallace and Bettinger and Taylor schemes. The "Western Pluvial Lakes Tradition", i.e. 9,000 - 6,000 B.C., as applied to the Mojave Desert (Hall and Barker 1975:51-54) is also included in the Mojave I Period. Although there are no objective radiometric dates, this period here is assumed to have begun circa 10,000 B.P., or at the beginning of the Holocene. It is suggested here that the late Pleistocene Early Systems Period ended at that time due to major environmental change. The probable readaptations of resident human populations in the study area, in response to the environmental change to warmer and considerably drier conditions, resulted in the development of new artifacts and settlement patterns. Thus, the Mojave I Period is a local variant of post Pleistocene adaptations in America which is generally known as the Archaic Period in the United States (Willey 1966, cf. Wallace 1978).

MOJAVE II PERIOD (4,000 B.C. to 1,200 B.C.)

Wallace (1962:175) recognized an "apparent gap" in the archaeological record after his initial Lake Mojave Period. This gap, he suggests, lasted from 5,000 to 3,000 B.C. and was caused by a spell of hot and dry conditions which precipitated a prolonged drought. This era is commonly referred to as the Altithermal. Wallace suggested that the entire Mojave may have been virtually abandoned by the early human populations. "A complete exodus seems unlikely..., but aboriginal groups must have been obliged to leave more desolate localities...and seek out oases suitable for settlement" (Wallace 1962:175). He states, however, that no traces of such occupations have been found. Hall and Barker (1975:55) state that the "occupational hiatus" between 6,000-4,000 B.C. may not have occurred. Bettinger and Taylor (1974:14) also discount any such abandonment. The severe climatic conditions were alleviated, according to Wallace (1962), and flora and fauna became re-established. In response, "bands of aboriginal peoples" began moving back into the area to exploit these resources. Regardless of the nature of the occupation, people of this era began using the distinctive "Pinto" projectile points which were first defined at the Pinto Basin site in the Pinto Basin in northeastern Riverside County (see Antevs in Campbell and Campbell 1935). The Basin is located to the southeast of the project area. Assemblages with this point type, according to Wallace, have been found throughout the entire California Desert. They occur from Owens Lake (Antevs 1952), Little Lake (Harrington 1957), and Death Valley (Wallace 1958; Hunt 1960), from the study area (e.g. at Cuddeback Dry Lake, Kaldenberg 1979) south to southeastern San Diego County (Wallace and Taylor 1960; cf. Clewlow 1967; O'Connell 1971; Bettinger and Taylor 1974). Wallace suggests that the people during this period had a hunting and gathering subsistence pattern. He also estimates that the period began 3,000 (or 2,500) B.C. and lasted until "...the beginning of the Christian Era" (i.e. A.D. 1; Wallace 1962:175).

Bettinger and Taylor (1974:13) renamed this period "Little Lake" and Warren and Crabtree would call it "Period II: Pinto". They also state that the Pinto points are the time-marker artifacts for the period. In addition to the finds of these points cited above, Bettinger and Taylor (1974) cite additional reports from the central and western Great Basin (Clewlow 1967; O'Connell and Ambro 1968). Bettinger and Taylor maintain, however, that those reporters had obscured significant stylistic variation between Little Lake and Pinto Basin Points--the latter are thick and percussion-flaked while the former are longer, thinner, and are pressure flaked. They also suggest that the Pinto Basin forms are confined to the Colorado Desert and to portions of the eastern Mojave Desert (Rogers 1939, Campbell and Campbell 1935, Hunt 1958)--perhaps even extending to the Ventana Cave area in western Arizona (Haury 1950). The Little Lake forms, however, are found on the Mojave desert (Rogers 1939; Campbell et al. 1937) northward to Death Valley (Hunt 1960) and to Owens Valley (Harrington 1957, Lanning 1963, Davis 1964).

Bettinger and Taylor (1974:14) cited Kowta (1969) who, like Wallace (1962) before him, suggested a chronological break during the Altithermal interval between 6,000 to 3,000 B.C. Bettinger and Taylor reject those inferences. They cite Great Basin radiocarbon dates from sites with these point types. A date of 4025-4225 B.C. was obtained from such a site in Surprise Valley in northeastern California. These dates were obtained from data just preceding in time the placement of points identical to the Little Lake forms (O'Connell and Ambro 1968; O'Connell 1971). Another Little Lake point was dated by association with a charcoal radiocarbon date of 3,700 B.C. (Elston 1971). Bettinger

and Taylor therefore begin their period sometime after 4,000 B.C. Their terminal date for the period (and the one adopted for this presentation) comes from a date of 1200-1125 B.C. from the Rose Spring Site (Clewlow, Heizer, and Berger 1970) also with Little Lake points (Lanning 1963). Wallace (1962), as stated above, took essentially this same period chronologically up to A.D.1. Bettinger and Taylor (1974:14) prefer the 1200 B.C. date because another date of 850 B.C. from Surprise Valley (O'Connell and Ambro 1968) "seems too late and may be anomalous." Thus the Pinto Basin and Little Lake points would appear to be a good time indicator for this period. This presentation would rather use the term Mojave II Period than to use either Wallace's terms of "Pinto Basin" or Bettinger and Taylor's "Little Lake" period for two reasons: 1) the human cultures which made use of the points may well have been those of the preceding period and perhaps only the point styles were changed due to some systemic factor, and 2) these two other terms are both from specific geographic places and the usage of their names does not convey the widespread distribution of the points.

AMARGOSA I (1,200 B.C. to A.D. 600)

Wallace (1962:176) states that there are very meager remains following the previous period (for him this was A.D.1 - A.D. 1000). Wallace referred to this era as the Amargosa Period (see Rogers in Pourade 1966) because the "...greatest concentration of representative artifacts is located in the vicinity of the Amargosa River in the north-central Mojave Desert." Wallace (1962:176) defined two phases (I and II) which differ in their representative artifacts. He did not specify the temporal extent of each phase, however. The most distinctive artifacts of his Phase I were "...broad, corner-notched dart tips with squared bases..." Phase II has "Its distinctive characteristic in the beginning, (consisting) of dart points with long slender blades and corner notches. Later these give way to arrowheads..." (Wallace 1962:176). In chronological summary Wallace stated:

> It is difficult to establish meaningful time limits for the Amargosa occupation. At the earlier end of its range it may have overlapped with the closing phase of the Pinto Basin period and, at the opposite, with the late prehistoric time horizon. A dating from quite near the beginning of the Christian Era to A.D. 1000 or thereabouts can be tentatively assigned to it (Wallace 1962:177).

Warren and Crabtree (1979) would term this era "Period III: Gypsum" and would date it 2,000 B.C.-A.D. 5,000. Bettinger and Taylor's counterpart to Wallace's Amargosa Phase I is termed the "Newberry" period after Newberry Cave (Smith et al. 1957; Smith 1963b). Their counterpart to the Amargosa Phase II period is the "Haiwee" period. Bettinger and Taylor (1974:14) suggest that the Newberry period dates from 1,200 B.C. to A.D. 600. The points which Wallace referred to as distinctive of his Phase I are now known as Elko and Gypsum points. Elko points refer to two well-known sub-types "Eared" and "corner-notched" (Heizer and Baumhoff 1961)(see Figure 6). Elko eared points have expanding stems in contrast to the straight stems of the Little Lake points of the previous period. It was once thought that the points known as the "Gypsum Points" were quite old--even older than Pinto Points (Rogers 1939; Harrington 1957; Campbell 1936). These points derive their name from Gypsum Cave in Nevada (Wormington 1957; Harrington 1933).

These points, however, have more recently been reclassified as "Elko contracting stem" forms (Thomas 1971; Clewlow 1967).

The Elko series of points are widespread across eastern California (e.g. in Owens Valley, Davis 1964; Harrington 1957; Death Valley, Hunt 1960) and in the Mojave Desert where they have been previously referred to as Amargosa Points (Rogers 1939, Lanning 1963, Davis 1964). The so-called Gypsum Cave points are also essentially co-extensive with the Elko series (Rogers 1939, Lanning 1963, Davis 1964). Bettinger and Taylor (1974:18) cite several ^{14}C dates from Nevada and California and suggest that Elko Eared/Elko Corner-Notched types date from 1200 B.C. to A.D. 600. For example, within the study area, Elko and possible Humboldt points were found at Harper Dry Lake (Hanks 1968:23). Also, Elko Eared/Elko Corner-notched and Gypsum Cave type points occurred together at Newberry Cave (Smith et al. 1957). In addition, a Gypsum point was found recently at Cuddeback Dry Lake (Kaldenberg 1979). A split-twig figurine was found in association with the Gypsum type points at Newberry Cave and radiocarbon dated to 1325-1200 B.C. (Suess corrected date; cited by Bettinger and Taylor 1974:18; see Figure 6). These point types, according to Bettinger and Taylor, would appear to be restricted in their distribution to the Mojave Desert and have not been found in the Colorado Desert. It would appear that these points are good time-marker artifacts for this period.

This presentation prefers the usage of the Amargosa I period term because the name "Amargosa" is much more widespread (ranging from the Amargosa Mountains and River in north-central Mojave Desert to Amargosa Creek in the Antelope Valley planning unit at the city of Lancaster) than to name the period after only one locality such as Newberry Springs or Gypsum Cave.

AMARGOSA II (A.D. 600--A.D. 1,300)

Bettinger and Taylor's "Haiwee" period runs from A.D. 600--A.D. 1,300. Similarly, Warren and Crabtree (1969) term this era "Period IV: Saratoga Springs which they date from A.D. 500- A.D. 1,000, both schemes essentially rename Wallace's Phase II Amargosa Period. Wallace's time-marker artifacts for this period of "...dart points with long slender blades and corner notches (which)...later give way to arrowheads" have now been named. These point forms are now known as Rose Spring and Eastgate Expanding stem points (see Figure 6). These forms are much smaller and lighter than the previous forms, and this fact has been used to infer that there was a shift during this period from dart and atlatl to the bow and arrow (Fenenga 1953, Wallace 1962:156; Bettinger and Taylor 1974:19). Most of Malcolm Roger's (1939) Amargosa II arrow points could be classified as various Rose Spring types. Eastgate Expanding stem points have been previously termed "Late Basketmaker" (Harrington 1957) or "Basketmaker" (Davis 1964).

These point types have essentially the same Great Basin distribution (pan Mojave Desert) as the Elko-Eared series, e.g. at the Mesquite Flat and the Saratoga Springs sites in Death Valley (Wallace, Hunt, and Redwine 1959; Wallace and Taylor 1959); the Stahl site at Little Lake (Harrington 1957) at the Rose Spring type-site in Owens Valley (Lanning 1963) and up north to the Mono Lake area (Davis 1964). They commonly occur within the study area

(e.g. both Rose Spring and Eastgate forms were recently found at Cuddeback Dry Lake (Kaldenberg 1979). Bettinger and Taylor (1974) state that the beginning of their "Haiwee" period is recognized from sites with these points in northeastern California which date ca. A.D. 650 (O'Connell 1971) and from sites dating between A.D. 775-850 in western Nevada (Clewlow 1967). The end of their period is based on a date of A.D. 975 from a site component with Rose Spring points in northeastern California (O'Connell and Ambro 1968).

Although this presentation provisionally accepts the dating proposed by Bettinger and Taylor, the general term for the period offered by Wallace, Amargosa, is retained here because, again, it has a more general basis than the term "Haiwee" or "Saratoga Springs".

THE PROTO-HISTORIC-HISTORIC MOJAVE PERIOD (A.D. 1,300-Contact)

Wallace's period IV Prehistoric Shoshonean and Yuman was originally dated from A.D. 1,000 to historic contact. This period was indicated by time-marker artifacts of "...triangular arrowpoints and pottery." Wallace (1962:178) characterized this period thusly:

> It seems reasonable to attribute most, if not all, of the late prehistoric remains to the ancestors of the recent Shoshonean and Yuman speaking Indians. When the first bands of these people appeared in the region cannot be readily established, but present estimates tend to place initial arrival at around A.D. 1,000.

Bettinger and Taylor designated this period "Marana ". They maintain that the era should date from A.D. 1,300 to historic times. Warren and Crabtree refer to this era as "Period V: Shoshonean" which they date from A.D. 1,000 to contact. The "triangular" points mentioned by Wallace are now known as "Cottonwood" points. Those and especially the Desert side-notched points-a particularly well-made small point (see Figure 6) are the primary indicative time-marker artifacts for the period (ceramics are also considered a good late period indicator although they are less frequently found at sites than projectile points). These points have for some time been recognized as good indicators of the late period in the Great Basin and the Mojave Desert (Baumhoff and Byrne 1959, Clewlow 1967, Lanning 1963, Elston 1971). At the Marana Site in Riverside County, a radiocarbon date of A.D. 1,450 was obtained by Bettinger on material which lies just above the first stratigraphic appearances of Cottonwood triangular points at the site. These forms have been purported to occur in historic contexts (Lanning 1963). In addition, a radiocarbon date of less than 150 years ago was obtained from site CA-SBr-260 (located beside Cronese Lake just outside the northeastern boundary of the project area)-a site which had triangular Cottonwood points in association (Drover 1978). However, Rector found Cottonwood points at the SBCM-616 site which appears to be a prehistoric era site (Rector 1979). In terms of the distribution of these points, they are found in virtually every area of the interior Southern California Desert.

Rather than use the terms proposed by Wallace and the site-particular term of "Marana" proposed by Bettinger and Taylor or the ethnologic "Shoshonean" term of Warren and Crabtree, this presentation would rather refer to the late period as the "Proto-historic--historic Mojave Period" in order to connote the time frame as well as the major area to which this chronological term is applicable. This late period ends with the influx of the Spanish explorers in 1772 which is discussed in the History section. As discussed in the Past Lifeways section, these "periods" are not well-defined and much basic research needs to be conducted in order to establish their validity and chronological reality.

CULTURAL RESOURCE NARRATIVE

PAST LIFEWAYS

G. Stickel

PAST LIFEWAYS: OVERVIEW AND CHARACTERISTICS OF PREHISTORIC HUMAN SETTLEMENT IN THE PLANNING UNITS

INTRODUCTION

Every attempt to reconstruct and explain past human cultural systems is predicated on some general model or conceptual framework which guides the presentation of ideas about the past. Often these underlying general models are implicit in the minds of researchers rather than explicitly stated. Two of the most widely used general models have been proposed by Binford (1962, 1968) and Clarke (1968).

Seven system components are described for each chronological period below. These components represent a modification of Binford and Clarke (Stickel 1979a). The first component is human population. This, for the present discussion, represents what is presently known or inferred about the nature of the human population structure during a given period. Material culture represents the next component discussed. This pertains to the actual artifacts, ecofacts,[1] or other relevant biotic data used by the human population during a given period. Technology and Economics is the next component discussed. It includes elements such as subsistence practices, settlement patterns, and trade. Sociological component variation is also presented in terms of what has been previously inferred about the features of prehistoric social organization of cultural units during each of the periods. The ideological component refers to the organized sets of information with which any human systems operates. Although it pertains to all types of such information (e.g. technological information) it has been generally addressed in the past by reconstructions of religion, mythology, etc. System psychology is rarely addressed in general anthropological studies in California. Moreover, archaeological studies rarely deal with this variability, but what few references have been made to it (e.g. food avoidances as "taboos," etc.) will be presented. The last component is communications. This component is comprised of the forms of communication used by a given system, the primary one of which is language.

Each of the components of variability will be presented based on data from the planning units. In addition, any culture change observed in them from period to period will be noted.

---

[1] Ecofacts are materials taken by people from the environment (e.g. stones, bones, shells, etc.) which may or may not be food remains (e.g. butchered animal bones) but which have not been intentionally shaped or manufactured into a prespecified form to be directly used (e.g. an arrowhead) for some purpose(s).

EARLY SYSTEMS PERIOD
(50,000 B.P. ? to 10,000 B.P.)

ENVIRONMENT

There has been a recent attempt to reconstruct the general late Pleistocene environment of California including what is now the Mojave Desert (Johnson 1977a). Johnson uses several lines of evidence in his work: 1) data from on-land and submarine sediments; 2) pollen and other paleobotanical evidence; 3) tree-ring evidence; 4) historical rainfall records; and 5) theoretical meteorological studies including fossil sand dune evidence which shows prevailing wind directions by the orientation of "frozen" ripples.

Notwithstanding his meager evidence, Johnson (1977a) concludes that California's climate was "Mediterranean" and "semi-arid" throughout the late Pleistocene even during maximum glaciation. There was probably somewhat cooler and moister levels in California than now because the entire climatic zone was shifted southward from its present point. The pattern of wet winters and warm, dry summers was set at that time making for a unique climate in North America.

The southward shift in the climate (from 70,000 to 10,000 B.P.) led to hydrological and vegetational patterns quite different from today. Davis (1978) would term the greater study area at that time "the Mojave Lakes Country " for the entire region seems to have been interspersed with numerous shallow lakes, marshes, sloughs, and sluggish steams. These waterways were surrounded by "gallery forests." Between the lakeside forests were tall-grass savannahs. These areas supported the great Pleistocene Rancholabrean fauna which must have attracted early humans to the area.

Johnson (1977a) states that the favorable climate made late Pleistocene California an "Ice Age Refugium"--which in effect produced a biogeographic "island" for both animals and cold sensitive plants, for the rest of the continent was covered at that time by inhospitable glaciers, tundra and aspen parkland in the north and dark forests of conifers or vast areas of sand in the south. E. L. Davis (1978) suggests that early people took full advantage of this favorable environment.

HUMAN POPULATION

As opposed to other areas of California, there has been no early human skeletal evidence found on the Mojave Desert and certainly not within the planning units (cf. Stickel 1979b). Thus, statements about the nature of the human population during the Early Systems Period must be inferred at this time. Williams (1974:100) proposed a model of basic band organization which he maintains is applicable to human populations around the world over the last 50,000 years. In it he infers that the modal size of the common population unit, the band, was about 50 individuals. In considering California ethnographic data and other factors relating to population units of generalized hunter-gatherers in California, a figure of between 15-50 individuals to a

band with a modal size of 25 has been proposed as more appropriate for California (Stickel 1979 b:48). Importantly, such bands have been noted to be frequently based on population sizes of 25 individuals and have been observed in the ethnographies from areas around the world and in all types of environments (Lee and DeVore 1968).

Thus it is inferred here that this pattern was operative during the Early Systems Period and most probably during successive periods in the study area as well (cf. Ritter 1976a).

MATERIAL CULTURE

Over 2000 "tools" were uncovered during the Calico excavations, and it is suggested by Leakey's analysis that some of these tools are utilized flakes, flake scrapers, hammerstones, cores, choppers, and "handaxes." These presumed tools have been disputed, however, (e.g. Haynes 1969; Hester 1973). As stated in the Chronology section, this is the only site (CA-SBr-2102) in the planning units that has a chronometric date within the time frame of the period. Alsoszatai-Petheo (1978) has excavated and extensively analyzed the East Rim Site (Ca-SBr-2120) which must practicably date to this period. A good quantity of heavy lithic tools and other data such as pollen was recovered. Also, Simpson (1961) states that several sites in Coyote Gulch date to this era. Other San Bernardino County sites, however, have been interpreted as dating to the Early Systems Period in their original site record forms. These sites include CA-SBr-1907, 1137, 1591, 1933, 1963, 1964, 1968, 2097, 2104, 2105, 2123A, 2172, and 2290. All of these sites are located within the greater Barstow sector of the study area. There are possibly five or six sites at Edwards Air Force Base which date to this period (Peak 1974, 1976; Sutton, Forbes, Robinson 1978).

E. L. Davis suggests that a wide range of artifacts characterize the Early Period. From her sample of surface finds of about 20,000 stone tools from the China Lake Basin, she concludes that the following tool types are characteristic of her Early Period including: core tools, chopping tools, "biscuit" scrapers, spokeshaves, end-scrapers, knives, borers, crescents, bifacial cutters, and the Clovis-like "knife-points" (See Figure 7). Fluted points have also been found in the greater study area, e.g. at Pilot Knob Valley (Amsden 1937) and at Lake Mojave (Amsden 1937; Rogers 1939; Simpson 1947; E. Davis and Shutler 1969). East Rim site and the Calico finds would comprise a substantial sample of Early System material culture from the Mojave Desert.

Davis believes she has found at least one kill site at China Lake (Davis 1975; 1978). Her survey work recovered over 800 bones and bone fragments. Rancholabrean fauna comprised 95% of the faunal assemblage at China Lake. The extinct fauna includes bone from mammoths, two species of camelids, horses, and bison. In addition, bones of dire wolf and saber-tooth cat and birds were found. No such ecofacts have been found in the planning units associated with artifacts except for the possible association of ground sloth bones with artifacts at Newberry Cave (Smith 1963) and from Schuiling Cave (Smith 1955). Both of those associations, however, if they are valid, may be related to later Amargosa era periods for those species did not die out in California until after 10,000 B.P. (Ross 1978).

TECHNO-ECONOMICS

Subsistence is usually emphasized in discussions of the technology and economy of "Early Man" sites. Many scholars have suggested a "big game hunting" subsistence pattern for the earliest inhabitants of the Western Hemisphere. This inference seemed justified by the mammoth and bison kill sites on the Great Plains (cf. Wilmsen 1970). Similarly, this pattern has been assumed for California in general and certainly for the Mojave Desert. However, this view has been challenged by two recent studies. Wallace (1978) refers to his earliest period as "Period I: Hunting." But he goes on to say that big game hunting was not the mainstay of the economy at that time. He emphasized smaller game, waterfowl and fish--even shellfish--and vegetal foods (also see Alsoszatai-Petheo 1978).

E. L. Davis (1978) seems to feel more than Wallace that big game hunting was important. But she does say it only provided a portion of the diet and that the Paleoindians only occasionally killed a large animal. According to her data, they apparently killed them in the following order of frequency: camel, horse, bison, and mammoth. Davis states they were "...general foragers who ate everything they could catch" (Davis 1978:12).

Just about nothing else has been inferred about economic pursuits other than subsistence with the possible suggestion that the people at Calico "imported" their lithic materials from over 100 miles away (Witthoft in Leakey et al. 1972). Similarly, Davis (1978:178) mentions that Early people procured lithic materials "from distant sources."

SOCIAL ORGANIZATION

All researchers seem to agree about one aspect of inference about early period people, namely their general form of social organization. They assert that it had to have been a very flexible generalized band type (e.g. Davis 1978:12). Williams (1974:100) has proposed a model of a basic band form of social organization which he says was operative over the last 50,000 years:

> ...the large majority of paleolithic populations are expected to conform to the model of a patrilineal, patrilocal, exogamous lineage-band (Williams 1974:100).

Such a pattern would be reasonable to apply to the earliest occupants of the Mojave as well.

IDEOLOGY AND PSYCHOLOGY

Little has been inferred relative to the ideology of human systems during the period. Witthoft (in Leakey et al. 1972:48) states that a clear quartz crystal was brought to the Calico site from 40 miles away as "magical material." He does not define what he means by "magical material," however. Davis (1978) presents evidence of evolving lithic technologies (from her pre-Clovis to Clovis cultures). She suggests, for example, that her Classic

Clovis groups had three "technological signatures" including: 1) selection of the highest quality raw materials from distant sources; 2) heat treatment of the stone; and 3) "exquisite workmanship." The information relative to these activities would certainly be important parts of the ideology of the makers of the artifacts.

All cultural activities have their own associated information quotients. Davis (1978:177) infers that the ancient people at China Lake used the area seasonally during the spring and fall seasons. They would have had, therefore, the necessary information on the seasonality of the resources they were exploiting as well as how to exploit them as important parts of their collective ideology.

Psychological aspects of the Early Systems people have not been formally studied. But Davis (1978) does mention the "exquisite workmanship" of the Clovis knife/points. As viewed here, the exact style (attributes not needed for utilitarian functions) of the fluted points was due to a desired aesthetic design on the part of the makers rather than to any economic function. It is suggested that these non-economic attributes of the points constitute their style. A recent model for Clovis points emphasized their style. This model, presented by Gorman (1969), suggests that there was a purposeful selection for both color and stylistic variability on Clovis points. He suggested that this variation served to identify both those animals killed by a particular individual as well as what portion of the animal belonged to a given hunter. Whereas the variation may have had those functions, the stylistic attributes themselves reflect the psychological/artistic expressions of the makers of those points. When a Clovis person made a point, he or she combined both structural attributes (e.g. the strength and sharpness of the point) with stylistic/artistic attributes in order to make the point in "the right way." Clovis-type points were made in essentially the same form across the entire continent. Retention of this point style over time and space is but one indication of the effect group psychology had on the manufacture of artifacts.

COMMUNICATIONS

The language(s) of the early people have not been intensively studied. Fowler (1977) discusses language formation in the Great Basin in general, however. Davis (1978:1, 79) states that the earliest period had "... considerable cultural and linguistic diversity." Shipley (1978) indicates that the oldest evidenced language in California is the Hokan group. But he does not infer how long such a language could have been present in California.

Davis (1978) maintains that the early people in the Mojave had a rich, natural environment which favored their development. The vast "lake country" became a cultural staging area, in a sense, where a unique cultural system (Clovis) originated (the older theory being that Clovis developed further east in Arizona and New Mexico). After 11,000 B.P., according to Davis's model, the climate became drier and warmer. This climatic change destroyed the lush lakes country and eventually turned it into the Great Basin and Mojave Desert of today. At the same time, the midlands of the continent became more hospitable so through adaptation both animals and people moved

eastward in response. In this manner Davis (1978:13) explains the sudden appearance of Clovis across wide areas of the continent.

For those groups who stayed behind in the deteriorating environment (or those newcomers into the area) new patterns of adaptation were required and, presumably, new forms of artifacts such as projectile points. Hence, the next period of cultural development began.

MOJAVE I PERIOD

(10,000 B.P. to ca 4,000 B.C.)

ENVIRONMENT

As stated in the environmental section of this report, the study area had a somewhat cooler and wetter climate during the late Pleistocene than today. The earlier environment is characterized as having a "late Pleistocene coniferous woodland." The piñon pine and juniper woodland was as much as 600 meters lower in elevation than today. Hence, the study area had much more extensive forestation during the Early Systems Period. The study area also was characterized by a great number of lakes, such as Lake Manix, which were quite extensive (see Map 2). But after 10,000 B.P., the climate became warmer and drier. As a consequence the lakes first fluctuated then began to permanently shrink in size. Gradually too, the floral distributions began to change in composition and extent--the piñon-juniper woodlands began to retreat upward in elevation in adaptive responses. This environmental change was accompanied by the culture changes discussed below.

HUMAN POPULATIONS

Very little in the way of inferences about population size for this period have been made. Wallace (1962:174) states that this period was characterized by "small groups of humans." Speaking of the human population structure for all periods in general, Wallace (1962:172) states:

> At best the desert offered only limited resources for aboriginal peoples and, expectantly, had a small body of inhabitants. Population was not only sparse but spread thinly with the size of the individual community limited.

As viewed here, the basic band model of population of Williams (1974), which was applied to the Early Systems Period section above, probably applies to this period as well. Cultural changes were probably effected in the other system components (e.g. changes in projectile point forms from Clovis-like to Lake Mojave and Pinto Basin forms). Cultural change could have been effected by two major causative factors: 1) natural environmental changes, and 2) human environmental changes (e.g. movement of intruder people into the area). To date, the natural environment has been emphasized as the change-effecting factor by regional scholars:

> Sequential fluctuation in temperature and precipitation over these many millennium frequently altered the patterns of distribution of water and other resources. These fluctuations certainly caused many changes in the distribution and nature of cultural developments throughout the area as well. The specific details of these varied developments are not fully known but general temporal and spatial models dealing with cultural sequences have been worked out (Robinson 1977:45).

Robinson (1977:45) suggests that human populations during the Mojave I Period (as well as subsequent periods) were "forced" to adapt to environmental changes in a way essentially similar to the "Desert Culture" model developed by Jennings (1957). Cultural changes were, thus, effected in response to the climate and environment changing from the cooler and wetter early post-Pleistocene to the warm and arid characteristics of the Great Basin environment of today.

MATERIAL CULTURE

Stone tools, according to Wallace (1962:174), mainly comprise the known material culture of this period. These were primarily chipped or flaked lithic items the most diagnostic of which were the Lake Mojave and Silver Lake projectile points (see Figure 6). Lake Mojave points were found in the study area at Black Canyon (Simpson 1952b:141); a possible Silver Lake point was found at Harper Dry Lake (Hanks 1968:24). Other forms noted by Wallace include knife blades in several forms, "crescents," varied types of flake scrapers, crude perforators, some choppers and scraper planes. Additional lithic tools were pebble hammers, abraders, and anvils. With some questionable exceptions, there was a noticeable lack of pecked and ground stone tools.

In terms of ecofacts, Wallace notes "two fragments of fossilized bone" which were not identified as to species. No other ecofacts have been identified for the period with certainty.

The evidence of sites for this period has not been well studied for the planning units. This is undoubtedly due, in part, to the lack of reported excavations and systematic surveys. For instance, in the western portion of the study area, the Antelope Valley to Edwards Air Force area, about 2 dozen sites have been excavated, but few have been published (Glennan 1971; Sutton and Robinson 1977; Sutton 1978a; n.d.d.) Most of the excavated sites in the valley have been investigated by Robinson (1977) who states that isolated finds of Lake Mojave points of the period have been found in the valley but no characteristic sites. More specifically, at site CA-Ker-303, a Lake Mojave Point was found (Sutton 1979c).

For the greater Barstow area (the remainder of the Johnson, Stoddard, Morongo and Calico planning units), both individual finds of points and entire sites have been identified with the Mojave I Period (Smith 1963a)--e.g. CA-SBr-1606, 2081, 2085, and 2094.

The artifacts and features of archaeological sites constitute the major portion of material culture of any human group in the past. Wallace noted a variety of site types in the project area (and for the whole of the interior deserts as well) including "Habitation sites," "living spots," "rock shelters," "quarries," "workshops," "petroglyphs and pictographs," well-worn "trails," boulder-ringed "circles," artificial rock "piles," stone "alignments" and "unique gravel figures of huge dimensions" (Wallace 1962:172-173). At this point it is uncertain which of these types of sites were made and used by people of the Mojave I Period (please refer to the Cultural Resource Synthesis section for additional information on the types of sites present in the planning units.)

A recent excavation at a site located on the west bank of the Mojave River near Victorville (Kramer planning unit), has yielded some unique data dating to this period. This site (provisionally identified as site SBCM-616) was excavated by the University of California at Riverside, Archaeological Research Unit as a mitigation excavation prior to development. Most of the cultural deposit went to a depth of 50 cm and the material within it dates probably from the Mojave I period through late period times (this important site is described at the end of this section on past lifeways in the planning units). Furthermore, it should be noted that a "silty clay layer" was discovered at 95 cm, separated from the upper midden by a sterile layer. Charcoal, either from fire hearths or a brush fire, overlays this layer. This charcoal has been radiocarbon dated to 4330 $\pm$ 100 years B.P. Prior to this discovery, Wallace (1962) mentions that no hearths were identified for this period. Thus, this situation may now be changed.

A remarkable and highly rare find was made below the level of the lens. A layer of human and animal footprints and tracks were found preserved at the site. A total of 54 human footprints was recorded. The eight animal tracks were identified as those of raccoon, an ungulate, coyote, and possibly other mammals. Those of birds and reptiles were noted as well. This site has, thus, yielded data of great significance to the archaeology of the Mojave Desert (Rector 1978, 1979).

TECHNO-ECONOMICS

In general, Wallace (1962; see Fig. 6) states that the period was characterized by hunting with some possible additions of fishing and gathering of plants. The artifacts, e.g. Lake Mojave and Silver Lake points, were "designed for the chase and related activities" (such as butchering and scraping hides). Wallace maintains that big game was emphasized. He believes that the size and weight of the projectile points are evidence that they were used as points on darts which were also propelled by an atlatl (or the throwing stick). He also suggests that it was "likely" that fishing was conducted. Moreover, the virtual absence of grinding implements suggests that if gathering of plants was practiced at that time, it was a minor activity.

Whereas a settlement pattern of temporary habitation sites is most probable, Wallace states that the "exceptional circumstances of the local environment may have permitted these people to maintain fixed residences during a good portion of the year" (Wallace 1962:174).

SOCIAL ORGANIZATION

There are no direct inferences about the nature of the social organization of the human systems during the Mojave I period, but it is highly likely, according to this assessment, that Williams' (1974) general band model of social organization characterizes this period.

IDEOLOGY AND PSYCHOLOGY

There have been no direct inferences about the patterned psychological responses of the human systems which existed during this period. But, the widespread utilization of the diagnostic point styles of the Lake Mojave and Silver Lake points indicates to this analyst that there was marked human psychological value placed on those styles which were so extensive in both space and time. It is highly unlikely that the precise form of these points was determined solely by their hunting-economic functions. The style variation of these points, such as their tang elements, most probably is an aesthetic addition to the basic attributes required for any economic function they may have had--commonly referred to as "utilitarian" vs. "non-utilitarian" aspects of artifacts. This aesthetic expression is a tangible reflection of system psychological tastes and values deployed in the construction of artifacts. Additional psychological variability may be monitored if any of the petroglyph or pictograph sites can be dated to the Mojave I period and studied in this light.

COMMUNICATIONS

Relative to the possible means of communication (language) of the people during this period, it has been implied that it is possible that they were members of the greater Shoshonean language family (Robinson 1977:44). But this area of research has not been essentially explored as yet for the study area.

MOJAVE II PERIOD

(4000 B.C. to 1200 B.C.)

ENVIRONMENT

There is somewhat of a consensus that a relatively long period (4,000 years) of increased warmth and dryness lasted from 7,000 to 3,000 years ago. This period is commonly refered to as the Altithermal. The vegetation was markedly reduced in lushness and in distribution and it is thought that most of the Pleistocene lakes dried up during this era. This period of environmental change may be correlated with a cultural change noted below.

HUMAN POPULATION

As noted in the discussion of the chronology of this period above, Wallace (1962:175) suggests that the entire area was substantially reduced in population

from 5000 B.C. to 3000 or 2500 B.C. (i.e. from the latter Mojave I period through the middle of the Mojave II period), although this is not always accepted today (cf. Bettinger and Taylor 1974; Warren and Crabtree 1979). Wallace also suggests that once human populations began to reestablish themselves (due to an improvement of the environment) there was a change towards increased population during the period.

> For the period following this arid phase, when a cycle of increased rainfall once again made the region attractive for human settlement, there are ample traces of human occupation...bands of aboriginal peoples began moving in to exploit the (re-established) natural food resources. Apparently the area supported a heavier population than during earlier times... (Wallace 1962:175).

Wallace was basically supporting this statement with data from the greater Barstow sector of the study area and elsewhere. Recently there is more evidence from the Antelope Valley. For example, Robinson (1977:45) notes that only isolated finds of projectile points (Pinto Basin type) have been found in the valley). There is a Pinto component at site CA-Ker-505 (Sutton and Robinson 1977). Glennan (1971b) assigns CA-Ker-302 site to this era and Sutton (1978 and n.d.d.) indicates that the lower levels of CA-LAn-298 may date to Mojave II times (Sutton 1979 c).

MATERIAL CULTURE

An assemblage of stone artifacts characterizes Mojave II period sites (referred to as Pinto Basin period by Wallace 1962:175) to which was added the "Little Lake" type points by Bettinger and Taylor (1974:13). In addition, Wallace (1962:175) notes leaf-shaped points, knife blades, drills, and scrapers. He adds a number of "rough service tools" including hammers, choppers, and scraper planes. Seed-grinding tools (manos and metates) are present too but in small numbers. Wallace states that no clear evidence of structural (e.g. house) remains are present on the sites of this period. But Harrington (1957 found structures at Little Lake which he dates to this time period.

Wallace also notes a marked lack of ecofacts at sites and states that whereas some fragments of fossil bone (of mainly camel and horse) have been found at some "encampments," they probably constitute a coincidential association with the artifacts and have probably been weathered out from an older underlying deposit by the deflation process.

In terms of the distribution of this material culture, Wallace states that "Assemblages of tools showing a typological affinity to these from Pinto Basin occur over practically the entire desert country of southern California." However, there is variability for "the make-up of this far-flung assemblage is not everywhere identifiable. Even the major unifying feature, the Pinto points, exhibits a diversity of form." (Wallace 1962: 176).

The distribution of Pinto Basin points in the study area extends from the environs of Pinto Basin (just outside the southeast zone of the study area; Campbell and Campbell 1935), to the Barstow area (e.g. Simpson 1952b:14 reports these points at Black Canyon) and at Cuddeback Dry Lake (Kaldenberg 1979). Moreover,

isolated Pinto type points as well as some entire sites have been found in the Antelope Valley, which date to the period. It has been suggested that the extant evidence indicates that the Antelope Valley was initially occupied during Amargosa I period times. W. S. Glennan (1971), however, suggests the possibility that an older cultural occupation may be present at CA-Ker-302 and CA-LAn-298 in the Antelope Valley based on crude rhyolite biface knives and choppers. The assemblage at CA-LAn-298 has been reinvestigated and correspondingly reinterpreted as data from a quarry-workshop associated with a much later "Shoshonean" occupation (Robinson, Sutton and Eggers 1976). Another investigation has added support to the Glennan interpretation (Sutton 1978b).

In terms of the site record forms, sites with Pinto points have been noted for Kern County (CA-Ker-266, 505) and San Bernardino County (CA-SBr-1005, 1932, 2079, 2081, 2082, 2119, 2162 and 2169).

TECHNO-ECONOMICS

A combined hunting and gathering subsistence mode for this period has been hypothesized (Wallace 1962:175). Based on the apparent frequencies (ratios) of artifacts, Wallace suggests that hunting was emphasized more than plant gathering. But the presence of manos and metates at sites shows that some plant processing went on.

The thickness and weight of the projectile points are interpreted by Wallace to mean that the use of the dart and atlatl continued during the period, and that the bow and arrow had not yet made its appearance.

In terms of site type variability, Wallace notes "camps," "campsites," "encampments," "dwelling places," and "camping spots," all of which refer to habitation sites.

Wallace is somewhat contradictory in describing the settlement pattern during the period for he states that the "Conditions of their hunting-gathering life must have imposed frequent wanderings" which would indicate a pattern of limited residence of temporary habitation sites. However, Wallace states that there are "...numerous campsites, some of considerable size and giving evidence of protracted residence ascribable to this time span..." (Wallace 1962:175).

SOCIAL ORGANIZATION

Wallace (1962:175) states that the period was characterized by "... bands of aboriginal peoples." Thus, the basic band form of social organization described by Williams (1974) may be inferred to have still characterized this period. No other inferences relative to this period's social organization have been made so far.

IDEOLOGY AND PSYCHOLOGY

No direct inferences about the ideology of the peoples who lived during Mojave II times have been made. But, by extension, the ideologies (i.e. information sets) relative to lithic technological production of artifacts, artifact material selection, and the hunting and gathering subsistence techniques discussed by Wallace (1962:175) may be deduced.

As stated earlier, projectile point stylistic variability is a reflection of systematic system psychology (e.g. values and "tastes"). The presence of such variability is evident in the following statement by Wallace about one of the major artifacts of the Mojave II period:

> Even the major unifying feature, the Pinto points, exhibits a diversity in form. Apparently these "type-fossils" enjoyed a long popularity and might well be susceptible to subdivision into stylistically significant temporal and regional variants (Wallace 1962:176).

COMMUNICATIONS

There are no inferences about the means of communication of people who lived in what is now the planning units during this era excepting the suggestion by Robinson (1977:44) of a greater antiquity for Shoshonean language in the area than previously thought.

AMARGOSA I PERIOD

(1200 B.C. to A.D. 600)

ENVIRONMENT

After the Altithermal (ca. 3,000 years ago) the climate essentially assumed its present form. Correspondingly, it is assumed that the floral and faunal distributions became much as they are today. This period of a somewhat "improved environment" is, as with former times, accompanied by a new cultural period identified by changes in archaeological data.

HUMAN POPULATIONS

Wallace (1962:176) may be interpreted to have implied that there was a decrease in population or a population shift to other areas during Amargosa I period times for he states: "...there is only meager and uncertain archaeological information and remains attributable to this period are either few in number or, for some reason, have eluded discovery" (Wallace 1962:176). This interpretation would be consistent with his reasoning that the number and extent of archaeological sites directly reflects the population size of an area during any given era. Thus, if the evidence is indicative and not skewed due to a lack of an adequate sample, for as yet undetermined factors, there may have been a culture change to a lower level of total population for the study area during Amargosa I times.

Even though the finds are meager, this period derives its name from its greatest concentrations of artifacts along the environs of the Amargosa River in the north-central Mojave Desert. Some remains of this period have also been found "...at the bottoms of some Antelope Valley sites..." (Robinson 1977:45; Sutton 1979). In the greater Barstow sector of the study area, a remarkable site has been found--the Newberry Rockshelter (Smith et al. 1957). This site has a significant assemblage of both non-perishable and perishable material culture which indicates a variety of human activities. This remarkable site has, thus, been used by Bettinger and Taylor (1974:14) as their name for this period. The extensive material culture from this site is discussed below.

MATERIAL CULTURE

"Five classes" of artifacts have been suggested as representative of the Amargosa I period (Wallace 1962:176). First, (1) there are the distinctive point types of Elko and Gypsum forms. (Possible Elko and Humboldt points were found at Harper Dry Lake in the study area (Hanks 1968:23) and Elko and Gypsum points are noted at such places as Black Canyon in Smith's 1963 Mojave River survey synthesis). Also present are (2) blades, (3) drills, (4) flake scrapers, and (5) slate pendants. There is a marked absence of seed-grinding tools. Wallace, however, finds this absence "suspect," thereby inferring that seed processing tools must have been part of the material culture of the period.

Bettinger and Taylor (1974) essentially renamed Amargosa I as "the Newberry" period after the locally well-known Newberry Cave. Newberry Cave is located in the Newberry Mountains to the southeast of Barstow in the Calico Planning Unit. It was discovered in 1933 by Gerald Smith, now director of the San Bernardino County Museum (Smith et al. 1957; Smith 1963b). This cave yielded an outstanding array of artifacts--especially perishable artifacts. Originally the cave's artifacts were interpreted as indicative of three cultures, "Pinto," "Basketmaker," or Roger's "Amargosa," and "Mojave River Vanyume" or Roger's "Desert Mohave Early." More recent work has reassessed this:

> At the Newberry Cave site a cultural association was found with Malcolm Rogers Amargosa Industry, Phase II, which is now considered a part of the Desert Culture. Rogers believed the Amargosa Phase II artifact assemblage fitted into the material pattern of the Basketmaker II horizon as established in southern Nevada by M. R. Harrington.
>
> Further work at Newberry Cave has now established Amargosa Phase I artifacts in association with ground sloth bones and tooth underlying the deposit containing the split-twig figurines (Smith 1963b:89).

Determining which of the artifacts may be related to Amargosa I and which to Amargosa II is a problem which needs additional attention. For this presentation, the assemblage from this important site will be presented in this section. Four "rooms" were distinguished along the elongated cave and were excavated in the early 1950s. Many pictographs were noted at the entrance to the cave painted with pigments of green, red, white, and black. "In most drawings there appears to be an attempt to depict some type of animal" (possibly a rabbit) (Smith et. al. 1957:12). Stone artifacts recovered from the cave included a mano, quartz crystals (2), one red paint stone, painted stones--green with red and white paint--(19), projectile points (38), one chopper, and scrapers (9). Bone artifacts included two bone awls and one atlatl hook. Two fragments of abalone shell were found--one had a hole in it indicating it might have been a pendant. Black paint and white pigment (which Smith suggests was possibly from bird droppings) was found as well.

But the most remarkable artifacts from Newberry Cave are the ones comprising a wide array of perishable items and ornaments. A "tortoise-shell bowl" (food container) was suggested by a piece of broken carapace. Remnants of feathered plume were found wrapped in green-dyed sinew. A piece of red pigmented buckskin was found on the talus slope in front of the cave. Two fragments of sandals, one apparently made of willow bark and the other of fiber from juniper bark or sage brush, were found. In addition to the cordage used on the sandals, three other distinct cordage types were found. There were two specimens of fire blocks (see Figure 8). A rare find from this cave was the variety of composite atlatl equipment. These included atlatl butts (3 types), atlatl shafts (6 types), foreshafts, and the decoration on the atlatl shafts (see Figure 9). These decorations consisted of bands of black or red, strips of black or green as well as sections along a shaft painted in a solid color.

The number of types of atlatl darts or spears at Newberry Cave attests to a varied and complex set of hunting media of the Amargosa people. Type 1 is a straight shaft of hard wood, sharpened to a point at one end with the socket for the spur at its butt end. Type 2 is the same as 1 except it had a stone point affixed to it by glue and sinew. Type 3 is also similar to 1 except it has a foreshaft of hard wood which is then fitted onto the main shaft. Type 4 is similar Type 3 except the wooden foreshaft is affixed with a stone point. It is a three piece dart (stone point, wooden foreshaft, and the main shaft). Type 5 is similar to 4 except it has sinew wrappings on the main shaft at its juncture with the foreshaft in order to strengthen the connection. And, Type 6 is similar to Type 4 except in addition it has a separate insertable wooden nock to engage the atlatl spur (see Figure 9).

Other perishable items of note were a "bed" of grass and a grass-lined storage cyst. There were two quids of "leafy material" found as well.

Another set of remarkable finds were five nearly complete split-twig figurines (see Figure 10). Similar figurines have been found in Utah, Nevada, and Arizona. The Newberry specimens are particularly comparable with similar ones found in the Grand Canyon (Smith 1963b; Swartz, Lange, and DeSaussure 1958) which were dated by radiocarbon in excess of 3000 years B.P. If the Newberry figurines have a similar age, they would date to

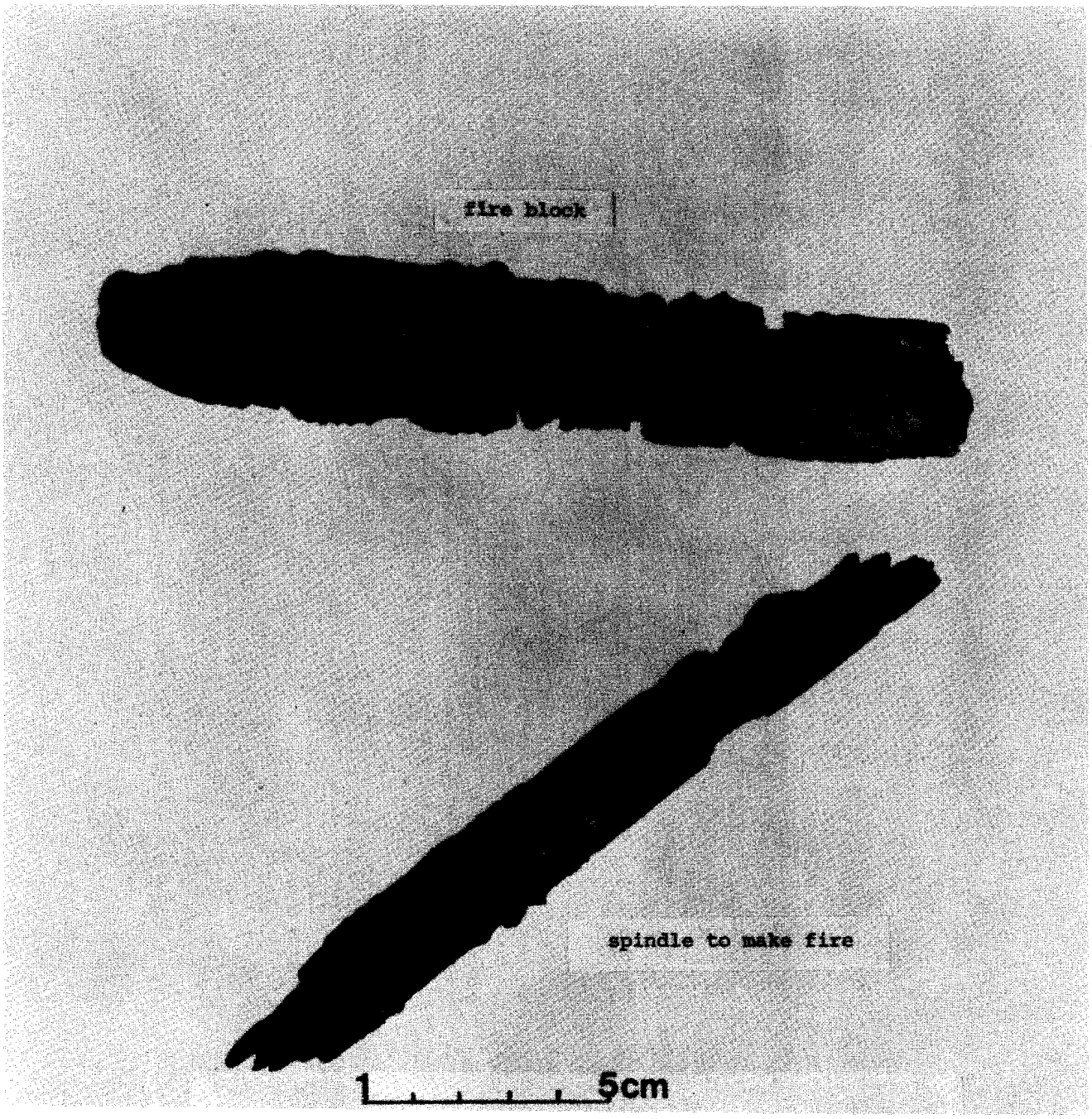


Figure 8. Newberry Cave Fire Kit (source: San Bernardino County Museum).

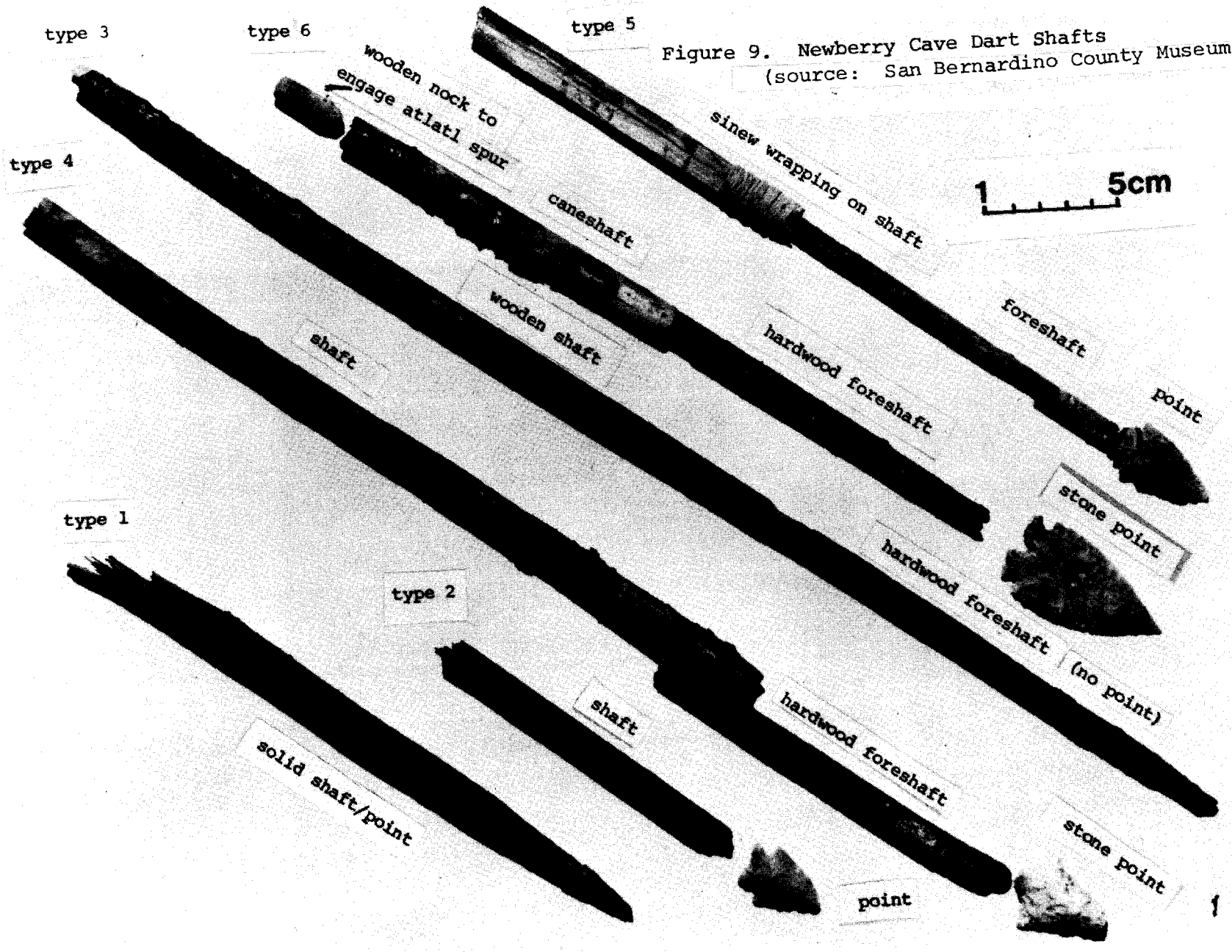


Figure 9. Newberry Cave Dart Shafts (source: San Bernardino County Museum).

Figure 10. Newberry Cave Split Twig Figurines.
(source: San Bernardino County Museum).

the very beginning of the Amargosa I period. A bighorn sheep dung "pendant" was also found by Smith (1963b) who would associate it with figurines as part of a ceremonial complex.

Fragments of cane shafts and some lithic waste flakes of jasper and chalcedony, possible cordage and a fire hearth have also been found at nearby Schuiling Cave (Smith 1955a), but Newberry Cave remains unsurpassed in the study area in terms of the variety of material culture found preserved in one site.

Wallace (1962:176), in discussing the material culture of the period states: "The limited range of tools ascribed to this archaeological unit make it uncertain whether it forms a true and full assemblage or only a partial and selected inventory." The array of artifacts from Newberry Cave certainly suggests the latter.

It is relatively difficult to get to the entrance of Newberry Cave (Smith 1978). In contrast, Wallace (1962:176) states that habitation sites of the period are located on the flat margins or bottoms of dry lakes or on low rises near waterholes. He suggests, based on site size, that they may have been lived upon "...over a long period of time."

In addition to the sites noted above, other sites which have been ascribed to this period, based on reports in the site record forms, include in San Bernardino County CA-SBr-349, 2083, 2085, 2132, and a new site recently investigated, SBCM-616. In the Antelope Valley there are numerous sites which probably date to this period (Sutton 1979).

TECHNO-ECONOMICS

All that has been suggested regarding the economy of Amargosa I people is that they were "hunters and gatherers" (Wallace 1962 see chronological chart p. 173, 176). These people's skills in lithic technology and floral-faunal artifact fabrication are well attested to by the finds from Newberry Cave (see method of split-twig manufacture Figure 11).

SOCIAL ORGANIZATION

There are no specific statements of reconstructed social organization during this period, but it is suggested here that the basic social organization of the band structure model of Williams (1974) was operative. Evidence from the Antelope Valley in terms of site size, presence of structures, internal complexity, and general variability of artifacts may well suggest a level of organization above the band level (e.g. at CA-Ker-303; Sutton 1979).

IDEOLOGY AND PSYCHOLOGY

Only one aspect of ideology has been suggested for data of the period in the study area. In analyzing the data from Newberry Cave, Gerald Smith states:

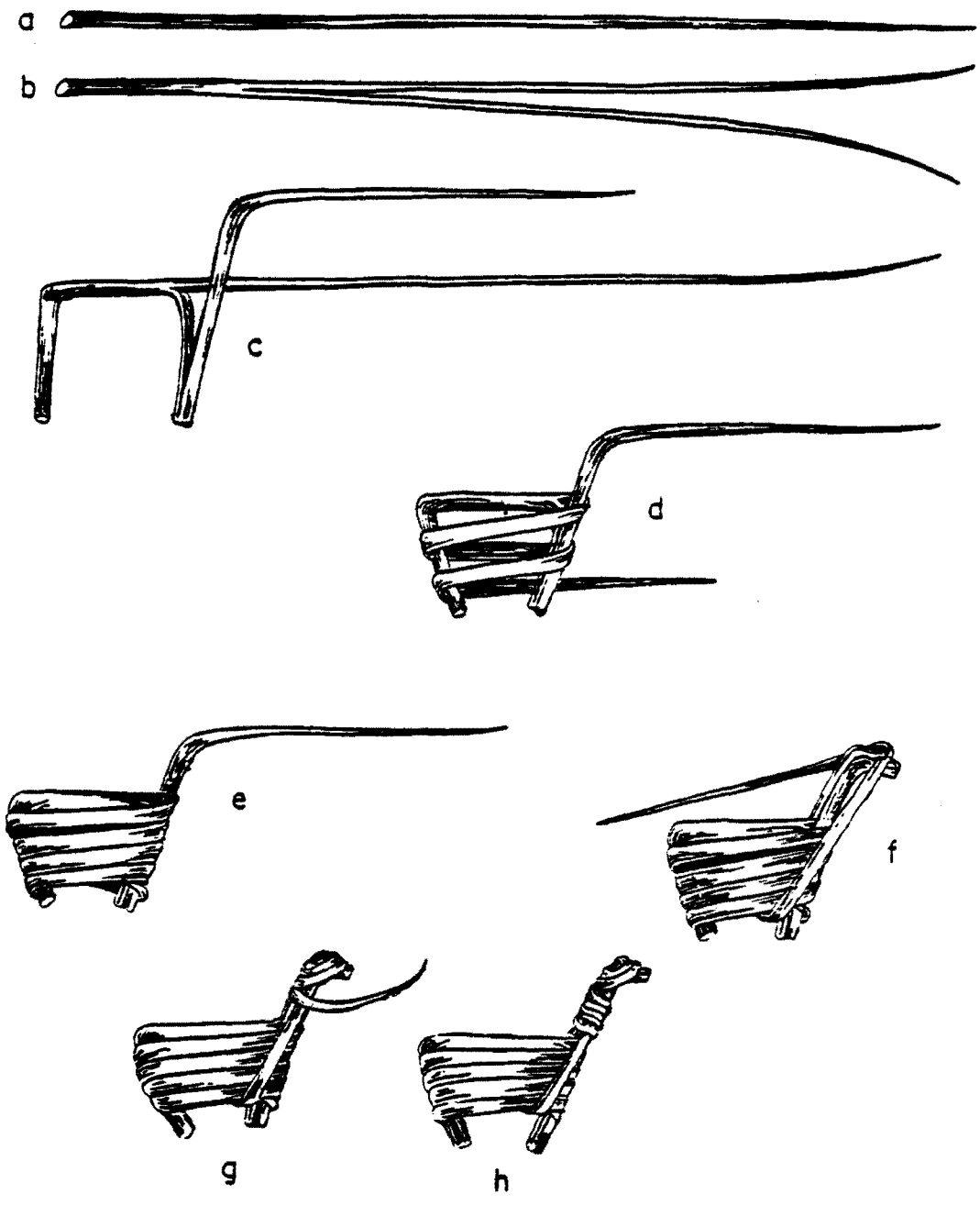


Figure 11. Manufacture Process of Split-twig figurines. (Drawing furnished by Gerald Smith)

> It was the feeling of the investigators that these caves (Newberry and analogous ones in the Grand Canyon) were used for the purpose of performing ceremonial hunting magic. Here, preparatory to the hunt, small models were made from split twigs, taken to certain sacred inaccessible caves, and ritually killed, buried or otherwise magically annihilated in order to insure success in the coming hunt. It is believed that Newberry Cave was also used for the purpose of performing ceremonial hunting magic. Quartz crystals painted with a green pigment, pictographs, painted stones and a sheep-dung pendant strung on sinew, combined with the split-twig figurines, all seem to indicate ceremonial hunting magic activity (Smith 1963:88-89).

Only tests of hypotheses formulated for future research can evaluate the validity of such reconstructions of ideology.

The types of the painted designs on the artifacts from Newberry Cave as well as the pictographs evidence the types of aesthetic design which were approved of by the collective psychology of the culture at that time. The above quote implies that there was also a psychologically established belief in the apparent "hunting magic"/ceremonialism associated with the special finds from Newberry Cave.

COMMUNICATIONS

There have been no inferences as to the means of communication during the period with the possible exception of Robinson's (1977) suggestion of the use of a greater Shoshonean language family in the area.

AMARGOSA II

(A.D. 600-A.D. 1300)

ENVIRONMENT

There is no substantial environmental change which can be correlated with the beginning of the Amargosa II period. It is thought that the general climate and environment was much as it is today. If this situation is not in error due to a lack of relevant data, then archaeologists will have to seek explanations other than environmental change to account for the cultural change indicative of this period.

HUMAN POPULATION

Wallace (1962:176) implies that even though Amargosa II "...is more known" than Amargosa I, it is still characterized by meager archaeological evidence. However this may well not be the case in the Antelope Valley where

about two dozen sites dating to this era have been found (Sutton 1979). Wallace did not infer population levels for the period. However, direct evidence of a human population is characteristic of the period in terms of that era's burials, although no demographic analysis has been made of them as yet.

Wallace states that Amargosa II begins with the use of its distinctive dart points now known as Rose Spring and Eastgate Expanding types.

MATERIAL CULTURE

This period saw the development of true arrowheads as opposed to spear/dart points. Other artifacts ("...which continue on without appreciable change in shape from Phase I times...," Wallace 1962:176) are knives, drills, flake scrapers and slate pendants. Millingstones (manos and metates) are definitely present suggesting plant food exploitation. Wallace suggests that the presence of artifacts indicative of Southwest contact/interaction during the period form part of the data:

> Anasazi sherds occur in association with Phase II materials at some places and exploitation of the Mohave Desert's extensive turquoise deposits, possibly by miners from the Southwest, is assumed to have happened at this time (Wallace 1962:176).

Such ceramic evidence has been found from one side of the study area to the other. Malcolm Rogers (1929) made much of the variety of Southwest sherds he found such as at Cronese Lake (East Cronese) located just outside the study area at its northeast sector. He even suggested that there had been a Pueblo colony site at Cronese which he suggested was there to exploit the local turquoise at the Toltec mine and other places (Rogers 1929). From Christopher Drover and this writer's own investigations of that particular site and others at Cronese, Rogers' interpretation cannot be substantiated. Southwest interactions are evident, though, for recently a Pueblo II sherd (a Kayenta Black-on-White Virgin River Branch sherd dating to A.D. 1200) was found near site CA-SBr-259 (Drover 1978). On the other side of the study area, several Southwest sherds were found at the Barrel Springs site near Palmdale during an excavation conducted there in the 1930s by the University of Southern California (that data is now stored at the Antelope Valley Indian Museum). A turquoise mine located near Goldstone Ghost Town has been identified (Leonard 1978).

In addition to those sites mentioned above, Amargosa II occupations were identified in the site record forms, specifically in the San Bernardino County sector of the study area. They are CA-SBr-1901 and 2079 respectively.

TECHNO-ECONOMICS

Amargosa II people are characterized as having a hunting and gathering economy (Wallace 1962:173). Little is known about their specific technology of adaptation, but their settlement pattern is characterized as having "campsites" sited on sandy terrain in the vicinity of waterholes or on the edges of playas where water can be easily secured via digging. Wallace (1962:

176) states that although there are small "temporary and unproductive" sites, others are of "...considerable magnitude and richness."

The major technological advance during the period was the introduction (invention?) of a simple but highly effective machine--the bow and arrow. The bow and arrow was rapidly adopted at the expense of the use of the atlatl and spear "sometime during Phase II" (Amargosa II times; Figure 12). One scholar indicates that there is tangible evidence of this cultural change depicted in petroglyphs (Grant et al. 1968). As to lithic technology, Wallace (1962:176) states that "...skillfully-chipped and delicate arrow points" were made at that time period.

SOCIAL ORGANIZATION

There are no direct inferences about social organization during the period. But the view maintained here is that the basic band social organization of Williams (1974) was still operative during this period. However, in the Antelope Valley there are many very large and complex sites which may well indicate a level of organization greater than that of the band (Sutton 1979).

IDEOLOGY AND PSYCHOLOGY

The introduction of the bow and arrow is a hallmark of this era and, obviously, the ideology (information) relative to its construction and effective use became operative with the Amargosa II cultural systems.

The repeated stylistic attributes of the arrowheads attest to patterned aesthetic (i.e. psychological) expressions during this era.

In addition, Wallace (1962:177) mentions that such arrowpoints were placed as grave goods with burials (which he mentions in his chronological sequence for the first time). In addition, rock cairns were constructed over burials. If the presence of formal burials is not an "artifact" of a lack of preservation or discovery from prior periods, then it could be hypothesized that there was a new psychological pattern developed during the period with respect to the treatment and disposal of the dead.

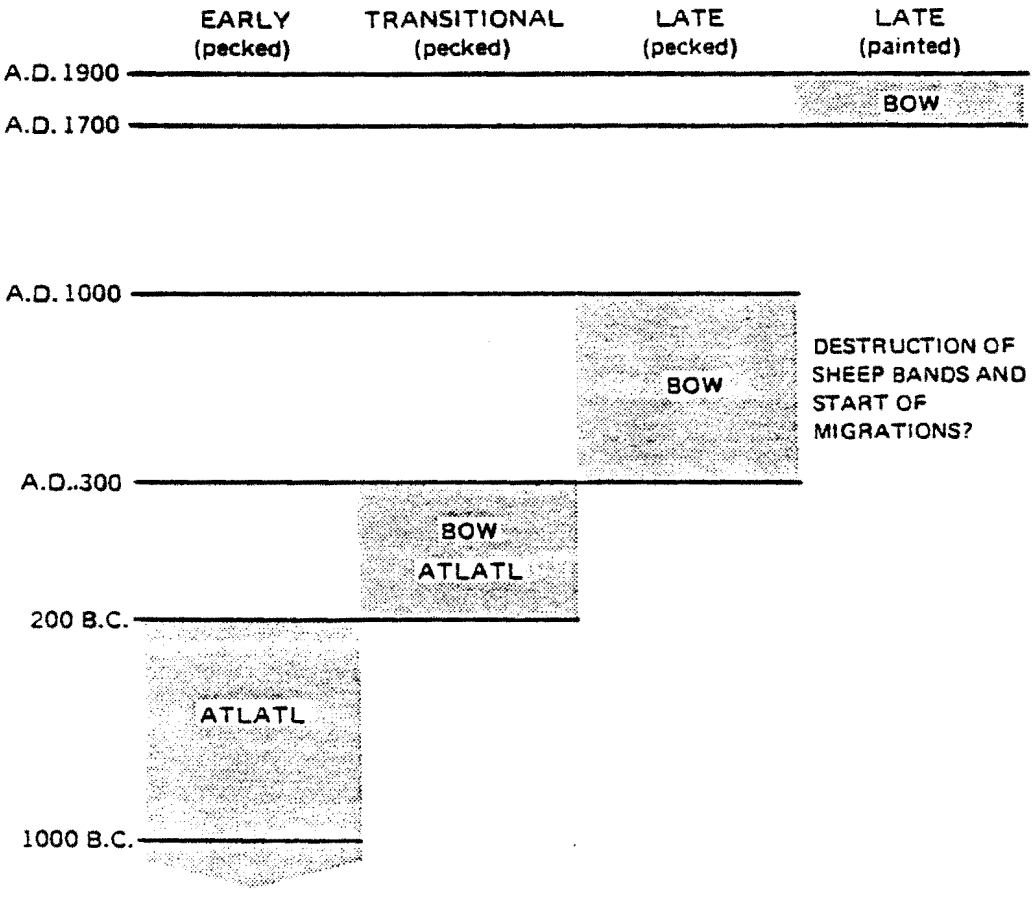
COMMUNICATIONS

At present, there are no available inferences concerning the language(s) used by Amargosa II peoples, except that it has been suggested that the general form of communication of the population was "Shoshonean" (Robinson 1977).

THE PROTO-HISTORIC - HISTORIC MOJAVE PERIOD

(A.D. 1300 -- Contact)

Bettinger and Taylor (1974) have renamed Wallace's (1962) Prehistoric Shoshonean and Yuman period as the "Marana Period," and Warren and Crabtree (1979) refer to the era as "Period V; Shoshonean." This presentation simply refers to it as the "Proto-historic--Historic Mojave period." Each of this period's aspects are discussed below.



A Possible Dating With the Relationship Between Coso Rock Art Styles and the Transition of Weapons.

Figure 12. Transition of Atlatl and Dart to Bow and Arrow. (Source: Grant, Baird, and Pringle 1968:58)

ENVIRONMENT

As noted in the environmental section of this report, a number of climatic "optima and minima" have been observed elsewhere in the world within the last 1000 years. Whether this situation occurred on the Mojave or not has not been established. Until it is, it will not be certain whether the last period began in concert with an environmental change or not. Based on tree ring data from the San Gabriel Mountains (Schulman 1947; Troxell et al. 1954), certainly the rainfall patterns in the Mojave Desert have fluctuated. Certain lakes in the study area must have been correspondingly filled and dried for periods of time depending on these fluctuating rainfall eras (see Figure 13). Since flora and fauna would also increase and decrease in concert with rainfall, and since human populations would be dependent on these resources, a number of cultural responses to these conditions are to be expected in the archaeological record.

HUMAN POPULATION

Both Malcolm Rogers (see Rogers in Pourade 1966:140) and Wallace (1962:177) maintain the late period was the era of Shoshonean and Yuman people. Wallace (1962:178) suggests the date of their "initial arrival at around A.D. 1000," whereas Bettinger and Taylor present evidence suggesting it was at A.D. 1300. Their dating frame has essentially been adopted for this presentation. Wallace (1962:178) also notes:

> An interesting mixture of Amargosa II and late materials at a few desert encampments implies that some had arrived while Amargosa peoples were still present.

Thus, Wallace suggests that the late period began with an influx of a new population of people distinct from prior regional inhabitants (whether prior periods are represented by a development of one human population over time or whether there had also been similar influxes in the past is not discussed). The reason(s) for the disappearance of the Amargosa population is not discussed by Wallace. Nevertheless, the net effect during the period, according to Wallace (1962:178), was population increase in the Mojave Desert:

> The apparent increase in the number of habitation sites suggests that the desert country had more occupants than in former times. A fuller utilization of the diverse wild flora, such as seed-gathering, could have made possible a modest expansion in population either by an influx of people from surrounding regions or through natural multiplication.

MATERIAL CULTURE

Arrowpoints and pottery are the two time-marker artifacts for the late period in the Mojave Desert. The Cottonwood points and especially the Desert Side-Notched points comprise the indicative point types. Wallace

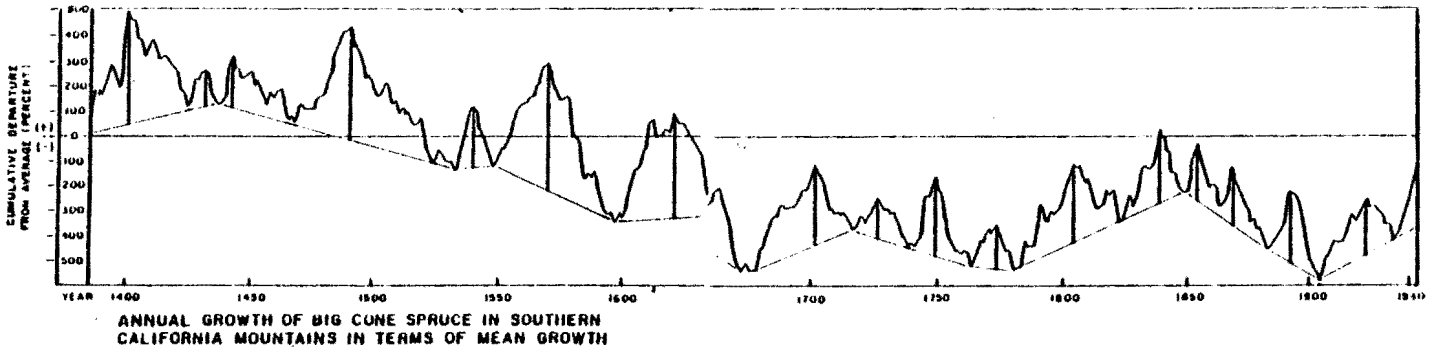


Figure 13. Dendrochronological graph for the San Gabriel Mountains over the last 500+ years. (Note: Since tree rings correlate with rainfall, the graph is a good indicator of recent past climatic conditions for the late ethnohistoric/ historic period).

(Source: Troxell et al. 1954)

mentions two major pottery "traditions" of the period. There was Owens Valley Brown (of Great Basin "affiliation")--a coiled and scraped vessel type. On the southern Mojave there was also coiled pottery, but vessels were also thinned by paddle and anvil techniques. This dominant southern tradition was referred to by Wallace as Tizon Brown Ware of the "Palomar Type." This was an oversimplification, however, for a wide variety of local types and shapes have been found in the study area as recognized by the late Malcolm Rogers (e.g. Cronese gray, Deadman's gray)(Rogers 1929).

In general, according to Wallace, artifact assemblages are somewhat varied from "district to district" but in the main there was a high degree of "cultural homogeneity." In addition to the arrowhead types were other lithic tools of metates and manos, knife blades, flake scrapers, bedrock mortars, pestles and an "assortment of crude service tools." Beads made of imported sea shells were found. Other plant fiber items of basketry and wood have been found in rare instances (Wallace 1962:177).

Several sites have been excavated in the Antelope Valley which date to 300 B.C. (Sutton 1979). A highly unusual site was discovered south of Palmdale in the Antelope Valley planning unit by Charles Rozaire of the Los Angeles County Museum of Natural History and was analyzed in 1961. This site consisted of an extremely well-preserved framework of a brush hut, undoubtedly of recent date (within the last century). The framework was made of juniper branches (see Figure 14). Glennan(1971b) has a photograph of this structure as well. This is the only known preserved house structure for any time period in the study area.

Sites with the main diagnostic time indicators of Cottonwood or Desert Side Notched points are widespread in the study area and are the most numerous of any period. Such sites noted in the site records forms include, for Los Angeles County, CA-LAn-419, 485, 765 (Sutton n.d.a.), Kern County, CA-Ker-303 (Robinson 1973b), for San Bernardino County CA-SBr-146, 349, 1883, 1903 and 1932.

TECHNO-ECONOMICS

Trading technologies reflecting a developing economy are indicated by the presence of Southwest pottery in the planning units and by the turquoise mines and their mining implements (Rogers 1929). Lithic technology would seem to have developed during the period via the making of fine arrowheads.

Settlement technology is characterized by Wallace (1962:178) as consisting of numerous habitation sites usually located among sand dunes, at boulder clusters, at rock sheltered places, and at other places protected from the wind. He states that sites generally were at a "convenient" distance from water holes or springs. Some sites were quite distant from water resources, however. Wallace (1962:177) also suggests that the nature of assemblage variability indicates a culture change from the previous period to an economy more based on wild plant exploitation. This is because he saw manos and metates (and mortars and pestles) as much more numerous than any hunting associated artifacts. Wallace suggests that while hunting was practiced, it was of less importance to the diet, with rabbits and other small game being emphasized. He suggests that late people had a highly mobile mode

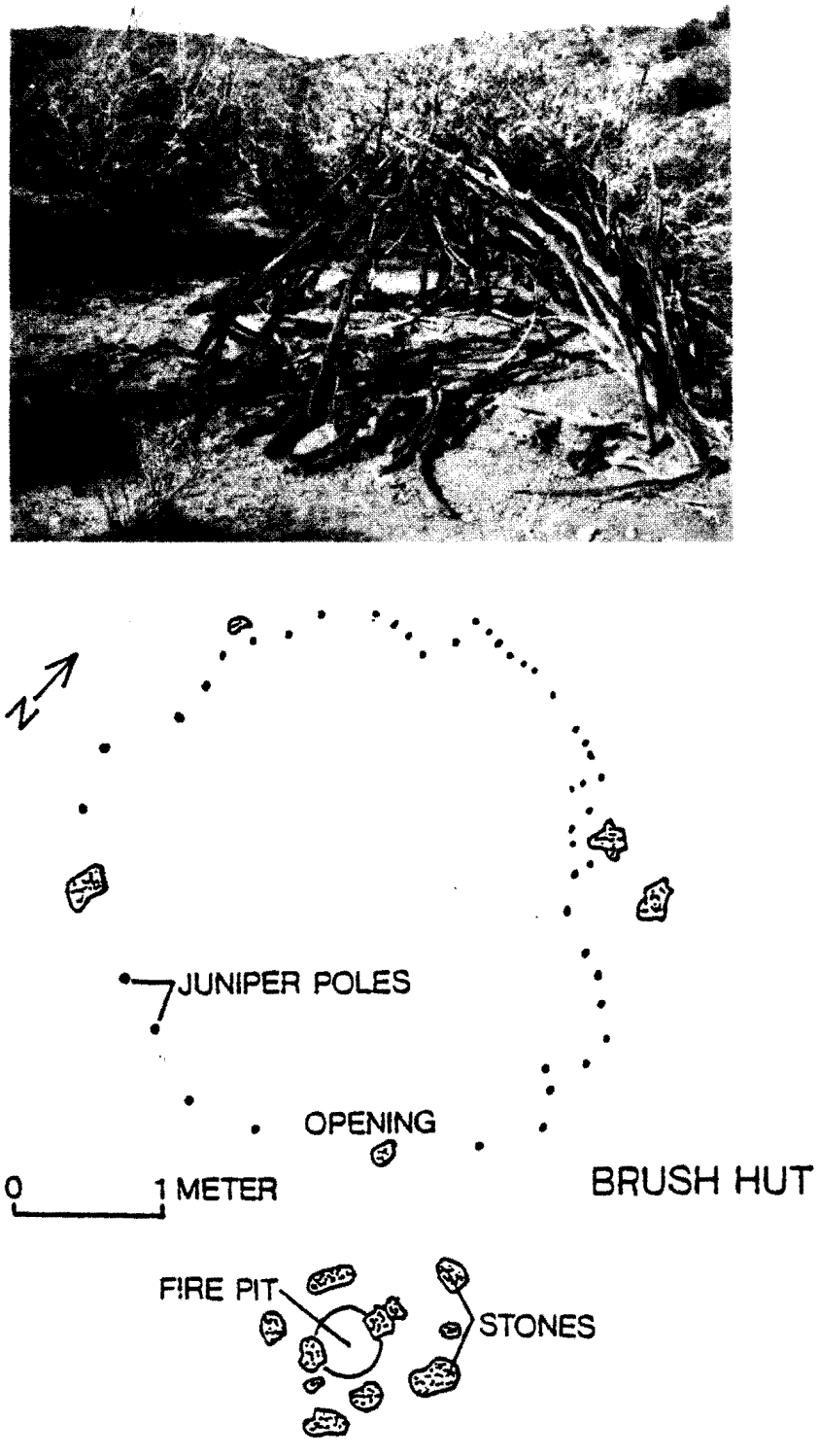


Figure 14. Brush Hut in Study Area.

of life with a "foraging economy" and hunted only incidentally as they moved in small groups on a seasonal round in accordance with the ripening of wild plant crops (cf. Steward 1937a).

Wallace's basic economic hypothesis is partially supported by faunal remains at some of the sites excavated in Antelope Valley planning unit (most of these sites are assumed to be late). This analysis lists rodents and rabbits as "abundant," only deer are "common" as opposed to the "rare" designation for other large game such as mountain sheep (see Table 1). In fact, Sutton (1977:7) suggests that antelope (in the Antelope Valley no less) were not an important food source to the Kitanemuk.

SOCIAL ORGANIZATION

Wallace (1962:178) states that the period was characterized by a "mobile existence of small bands." Their precise forms of social organization were most likely the ones presented in the next section on the ethnographic overview.

IDEOLOGY AND PSYCHOLOGY

Aside from new ideologies (bodies of information) relative to the knowledge of how to make and use the bow and arrow and pottery, one apparent change in ideology was the development of new information relative to the "proper" disposal of the dead. For, as Wallace (1962:177) presents it, this period was characterized by cremation of the dead instead of the previous period's usage of inhumations. New information on other cultures and means of exchange are evident by the presence of Southwest pottery.

A redeployment (or introduction) of a new collective psychology with respect to disposal of the dead is apparent for the period as evidenced by the cremations.

COMMUNICATIONS

During this late period, people in this area in all probability spoke the same languages as those recorded by the ethnographers (see Ethnography section). As Wallace (1962:178) puts it:

> It seems probable to attribute most, if not all, of the late prehistoric remains to the ancestors of the recent Shoshonean and Yuman speaking Indians.

Thus, in general, our knowledge of the culture history in the planning units is quite scanty and preliminary due to a lack of data and analysis. More major excavations are needed at sites dating to each of the culture periods in order to provide adequate information to understand the course of cultural development, and the completed excavations need to be written and published. There has recently been one such major excavation in the Kramer planning unit. The site (SBCM-616) is located on a rise on the west bank of the Mojave River near the present city of Victorville. This site was excavated under the direction of Carol Rector of the Archaeological

TABLE 1
MAMMALIAN REMAINS IDENTIFIED IN ANTELOPE VALLEY SITES

COMMON NAME	SCIENTIFIC NAME	RELATIVE FREQUENCY
Woodrat	*Neotoma spp.*	abundant
Pocket Gopher	*Thomomys bottae*	abundant
Ground Squirrel	*Citellus sp.*	abundant
Desert Cottontail	*Sylvilagus audubonii*	abundant
Black-tailed Jackrabbit	*Lepus californicus*	abundant
Grey Fox	*Urocyon cinereoargenteus*	rare
Coyote	*Canis latrans*	uncommon
Bobcat	*Lynx rufus*	rare
Deer	*Odocoileus hemionus*	common
Mountain Sheep	*Ovis canadensis*	rare
Cow	*Bos sp.*	rare

Important reptile remains identified in Antelope Valley sites.

Desert Tortoise	*Gopherus agassizi*	rare
Pond Turtle	*Clemmys marmorata*	rare

(source: Sutton 1977n: Table 1) (cf. Sutton and Tremblay 1977)

Research Unit of the University of California at Riverside. A great quantity of data was recovered from the site including 6,367 catalogued items (or groups of items). In addition over 90,000 faunal remains were recovered (Rector 1978). This great quantity of data may be eventually related, when analysis is completed, to several of the Mojave Desert periods. Rector (1978) states that the site represents a long period of cultural occupation. This is based on the fact that one ^{14}C date of 4330 $\pm$ 100 B. P. was obtained for a component of the site. A sequence of projectile points has been identified from the site suggesting a long period of occupation. Projectile point types have been tentatively identified as of the Mojave Cottonwood triangular series (most frequent, of the Late Prehistoric period), Elko series (one example of the Amargosa I period), Rose Springs series, and at least one Rose Springs knife or Humboldt concave based point was recovered (Amargosa II period).

In general the numerous artifacts from the site were divided into four major categories. The first is a category of modified and unmodified shell including both marine and fresh water shell and some bird and reptile eggshells. The second category was comprised of modified and unmodified bone (both burned and unburned specimens). The third category was "stone ornaments and tools." This was comprised of the aforementioned projectile points, knives, drills, punches, reamers, scrapers, and cores, and some ground stone artifacts of manos, metates, pestles, hammerstones, stone bowl fragments. Two metates were painted on both sides with red and black pigment which has been rarely reported for California. A long pestle was interpreted to have been used in conjunction with a wooden mortar which was not preserved.

Shell beads and ornaments were identified from both the Pacific Coast and from the Gulf of California--which most probably indicates ancient patterns of trade. (The latter is a likely interpretation since the "Mojave Trail" route between the Colorado River and the Pacific Ocean ran essentially right by the site). Preliminary shell bead analyses suggest a date from A.D. 0 to 1000 years ago.

The fourth category was ecofacts: "coprolites," flotation samples including charred seeds, soil samples, ^{14}C samples, and "historic" artifacts.

Some of the research goals of this project included identifying the economic resources exploited, span of time of the site's occupation, and the season of occupation using ^{14}C and botanical studies of ecofacts.

The general goals of this project attest to the present need for data and interpretation of the cultural development within the study area:

> The analysis of this site will answer many questions about the later prehistoric periods of desert archaeology. It will also make available much needed information on the paleo-environment, paleo-ecology, and geology of the area which will benefit scientists in many disciplines (Rector 1978; 1979b).

Much effective research could be conducted in the planning units with late period sites via the testing of ethnographic analogue models. For instance, the following ethnographic model of an ecological seasonal round of adaptive human poses was proposed by Ritter (1976:2-146;2-151) for the Koso who were the ethnographic occupants of the area to the north of the study area (his study pertained to the Randsburg, Spangler Hills, and south Searles Lake area).

The Koso, as all Mojave Desert native groups, were generalized hunters-gatherers who moved seasonally in accord with the ripening of critical plant resources at different locations. The Koso seasonal round would begin in mid-November. Little food procurement would take place during this time and most of the subsistence would be based on using stored foods such as pine nuts with some additions of fresh game. Villages were located near permanent water sources at the base of mountains or on valley floors. At about the end of February to about May, the winter collective camps would fission. Smaller groups of people would move down to lower elevations to exploit Joshua Tree pods and stalks, mesquite beans, tule roots, and other seeds and tubers ripened during this early spring time.

The next pose would occur during late spring and summer (May through July) when, according to the model, the Koso would actually occupy the subject area. Population units would be at their lowest with nuclear family groups spreading out to exploit bunch grass perhaps returning to small village sites periodically. Sites utilized during this time would be short-term camps. Primary food procurement areas would have been localized on the alluvial fans. From August through mid-October, groups of people would begin leaving the grasslands to return to higher elevations for the piñon harvest. The harvest itself would take place during September and October. Initially during that time people would have lived in temporary camps to exploit the nuts. In addition most hunting activities for rabbits, antelope, and deer would have mainly taken place during this time period. By the end of the seasonal round, mid-November, the various groups of people would have collected together at certain major camps where the piñon nuts would be stored for the winter food-gap. The population would then have been the most sedentary and concentrated and much time would have been expended on their equipment maintenance activities at these winter villages.

There would appear to be some data attesting to the ethnographic model:

> Based on the available archaeological data it is possible to begin building a model on regional settlement patterns and demography. At this stage in the analysis we are hindered by a lack of systematic analysis of the cultural constituents of representative site types so that we must address ourselves more to generalities rather than specifics.
>
> Villages or base camps were located around the periphery of Lava Mountains and Red Mountain at the hill-fan interface where springs were present. Such sites are rare in the area indicating population density was not large, most likely no more than three local groups or bands and more likely only one or two.

> Such groups probably averaged around 25 persons based on analogy to historic hunting and gathering groups in the desert west . . . (Ritter 1976:2-168).

Such ethnographic analogue modeling and testing could greatly enhance our scientific understanding of human ecological adaptations during the late period in the study area since the human responses there were undoubtedly quite similar in character to those noted by Ritter.

CULTURAL RESOURCE NARRATIVE

ETHNOGRAPHIC OVERVIEW

P. Hopa

ETHNOGRAPHIC OVERVIEW OF THE WESTERN MOJAVE PLANNING UNITS

PREFACE

This report is prefaced by a few brief comments on the problems encountered and the limitations imposed upon the research for the project area.

It goes without saying that, for a systematic account of indigenous Native American cultures--or, any indigenous cultures for that matter, reconstuction is an essential and valid enterprise (Vanshin 1965; Bean 1972). The task poses, however, a general problem, one which faces all historians--the building up of a picture from fragmentary and secondary sources.

For the study area, the problem is particularly acute, because earlier descriptions overlooked important evidence supportive of the socio-cultural complexity of these aboriginal communities (Strong 1929; Kroeber 1925; Benedict 1924).

A re-examination of this data in terms of modern perspectives is serving to change this situation. The 'new ethnography' involves a fresh appreciation for the real complexities of aboriginal Californian cultures in general and the study area in particular (Lawton and Bean 1968; Shipek 1971; Lewis 1972, 1973; Bean and Saubel 1972; Bean 1974; Bean and King 1974; Bean and Blackburn 1978). The addition of this data base of archival materials, such as the unpublished and previously inaccessible ethnographic field notes of men like J. P. Harrington and C. Hart Merriam, will provide a further rich source of information, once systematization and analysis is complete. And, the scholarly community can look forward to new insights and hypotheses as ethnographers continue to explore the field for new data.

However, to gather, collate and assess the value of <u>all</u> accessible material so that an adequate account can be obtained, requires unlimited amounts of time and, however well funded a project may be, there is no substitute for time as the most critical factor in the task of reconstruction.

As most researchers will testify, many hours can be devoted to combing archival records, chasing elusive clues, and surveying existing accounts on the peoples under study. But, when the other inevitable and integral aspect is added to the schedule--the gathering of information from Native American informants--then the assumption that an adequate job can be accomplished within a specified time is reduced to an absurdity.

It implies, moreover, an imposition of values and time perspectives which, as past and present experiences have shown, have been more destructive than constructive to human relations and development (Deloria, 1969, 1971).

Native Americans have a significant contribution to make to the proposed development in the desert areas. That claim, however, can be meaningful only if Native Americans are directly involved in the research, as historians, as genealogists, or as ecologists. In short, doing the kinds of tasks that only they can do. Rather than being merely objects of research or sources of information, their direct involvement would provide an appreciation of their world view. How far this belief is reflected in administrative practice is still a matter for conjecture and speculation. In any event, Native Americans are the most important cultural resources, and how they perceive themselves, their material and psychic resources, is a fundamental and primary concern.

If they are not directly involved, then a comprehensive survey of their attitudes, values and opinions can be obtained only after confident relations have been established and continuity maintained.

The most serious limitation upon research for the project area, therefore, has been the insufficiency of time to cover each aspect of the library research and time to locate informants and to follow through once initial contacts were made.

Apart from the practicalities involved, including the expenditure in travel expenses, administrators are well advised to re-examine their own assumptions, to consider how these and their own concepts of time and space can affect the adequacy of discription, the quality of human relations and, ultimately the strength of their proposals insofar as they involve the interests of Native Americans.

INTRODUCTION

For the most part this description of aboriginal cultures in the study area is based upon: early ethnographic accounts (e.g. Strong 1929; Gifford 1918; Kroeber 1925; Benedict 1924); studies that have reinterpreted this data base (e.g. Bean and Lawton 1973; Blackburn 1975, 1978; Heizer and Whipple 1971; Heizer 1978; King 1974; Bean and Blackburn 1976); data given by a few Native Americans recalling past experiences; data handed down to them by elders; and personal experiences derived from their continuing to believe and participate in customary practices as these have persisted into the contemporary context.

ETHNOGRAPHIC OVERVIEW

The original inhabitants exploited the region through foraging--a food strategy adapted to desert and mountain conditions. That they maintained a stable and productive economy is supported by studies which have re-evaluated the subsistence strategies of prehistoric Californian Indians

(Lewis 1972; Heizer 1958; Bean and Lawton 1973). According to these scholars, indigenous communities had developed an efficient, interlocking series of exploitative processes, some of which were semi-agricultural. The latter is reflected in the existence of proto-agricultural techniques and in the quasi-agricultural patterns of harvesting acorn, yucca, mesquite, and pine nuts. The technique of burning was also applied to enhancing the growth of plant and animal resources (Lewis 1972; Bean and Blackburn 1976: 45). Contact with the European, however, was to alter this situation drastically, if not tragically.

The major groups who occupied the study area include the Serrano, Kitanemuk, Vanyume, probably the Tataviam, and the Kawaiisu. Suggestions that Mohave, Chemehuevi and desert Cahuilla also occupied the area have not been substantiated.

Ethnographic and ethnohistoric accounts indicate that the Mohave traded with the northern Serrano and went as far as the Pacific Coast to exchange products with the Chumash. But there is no evidence at this point to indicate that they established permanent residence in the study area during the prehistoric period. This situation, similarly, applied to the Chemehuevi whose territories extended west to the Spring Mountains and south to the Providence Mountains. It is probable that in the historic period, desert Chemehuevi traveled over a portion of the territory. According to Laird, "One of the first High Chiefs of the Teeranewee (desert Chemehuevi) was Tukupera whose band traveled about near Daggett. He had lesser chiefs under his control. His jurisdiction probably included the desert Chemehuevis of Providence Mountains, and he was in every way the equal of the 'Big Chief' down by the River" (Southern Chemehuevi Big Chief)(Laird 1976).

Concerning the settlement of desert Cahuilla in the study area, Bean (personal communication) says that desert Cahuilla had no association with the area in prehistoric times.

Regarding settlement patterns, Heizer's comments are suggestive and pertinent to patterns of settlement in the study area (Heizer 1978:649). He contends that California Indians, while knowing individuals in neighboring tribelets, for the most part lived out their lives mainly within their own limited and familiar territory. Beyond this, their knowledge, experience, and understanding of neighbors was limited as their tolerance was minimal. The works of other early ethnographers tend to substantiate this assumption (Kroeber 1925: 145, 213, 395; Gifford 1932). Furthermore, and as if to emphasize or reinforce their sense of localization, many tribes put their children through an exercise of learning the group boundaries. Powers (1877:109-110) explains:

> The boundaries of all tribes...are marked with the greatest precision, being defined by certain creeks, cañons, bowlders, conspicuous trees, springs, etc., each of which objects has its own individual name. It is perilous for an Indian to be found outside of his tribal boundaries, wherefore it stands him well in hand to make himself acquainted with the same early in life. Accordingly, the squaws teach these things to their children in a kind of sing-song....

> Over and over, time and again, they rehearse all these bowlders, etc., describing each minutely and by name, with its surroundings. Then when the children are old enough, they take them around...and so faithful has their instruction, that (they) generally recognize the objects from the descriptions of them previously given by their mothers. If an Indian knows but little of this great world more than pertains to boundary bush and bowlder, he knows his own small fighting-ground intimately better than any topographical engineer can learn it.

While natural and physical features served to differentiate groups from their neighbors, so too did language. For many groups, however, the linguistic data is meager but that such material exists is indicative of the function of language in maintaining boundaries between social and cultural entities.

THE TATAVIAM

The Tataviam appear to have occupied the southwestern fringe of the study area. The term Tataviam itself is an example of 'other ascription' because it derives, not from the Tataviam language itself, but from Kitanemuk expressions of ta-vi-yik meaning "sunny hillside" and ata vihukwa meaning "he is sunning himself" (King and Blackburn 1978:537). What term the Tataviam used in referring to themselves is, at this point, unknown.

TERRITORY AND ENVIRONMENT

The Tataviam occupied the upper reaches of the Santa Clara River drainage east of Piru Creek, and the territory extending north over the Sawmill Mountains to the southwestern fringe of the Antelope Valley. Beyond this eastern periphery lay Kitanemuk and Vanyume territory.

Various Chumash groups occupied the territory west of the Tataviam. Specifically, to the northwest lay the Castaic Chumash, domiciled predominantly around present Castaic Lake; northwest of the region were the Sespe Chumash occupying the banks of the Sespe Creek; southwest lay a mixed population of Chumash and Tataviam, while various Gabrieliño-speaking communities resided along the southern borders.

The bulk of Tataviam country was mountainous; most of the region lies between 1,500 and 3,000 feet above sea level with maximum elevations of 6,503 at Gleason Mountain and a minimum level of 600 feet along the Santa Clara River. The heart of the region and of the Tataviam polity itself comprised the south facing slopes of the Liebre and Sawmill Mountains. Both elevation and degree of exposure to sunlight were functional determinants of the various types of vegetation in the region. The nature of slope exposure in their territory encouraged the Tataviam to exploit the yucca plant. It was a major food source and, together with food strategies involving animals and

plants, Tataviam subsistence patterns were in their essentials very similar to those pursued by their Takic-speaking neighbors.

TATAVIAM POPULATION

A great deal more research remains to be done before population figures or village locations can be described with any accuracy. According to recent ethnographic reports Tataviam villages appear to have varied in size from large centers with perhaps 200 people to small 'bands' of 10 to 15 members (King and Blackburn 1978:536). Researchers such as King and Blackburn provide lists of Tataviam village names and also suggest their probable locations. The main village of Akavavya probably occupied the same site as historic Piru. Other villages such as Piru, Hyung, and Esteng were located along the lower reaches of Piru Creek. The village of Tochonga lay close to present-day Newhall, while Kwarum (suggested Tataviam name for Elizabeth Lake), on the shores of Elizabeth Lake, probably straddle the boundary line between the Tataviam and Kitanemuk. Following contact with the Spanish colonizers, it is recorded that the Tataviam lived at Kuvung above the village of Huyung on Piru Creek, at hwi?tahevya, better known as La Liebre Ranch and at tɨkkattsin on the upper reaches of Castaic Creek. By the time of American colonization, the Tataviam were apparently living among the Chumash at Pastoria Creek.

TATAVIAM MATERIAL CULTURE

There are very few studies which mention the material culture of the Tataviam. The eclectic Harrington notes give some information and the archaeological work of Richard Van Valkenberg in the 1930s and the salvage excavations at Castaic Reservoir, conducted in 1970 and 1971, have produced stone artifacts common to Late period sites (King and Blackburn 1978).

TATAVIAM TECHNO-ECONOMICS

The Tataviam were generalized hunters and gatherers. They apparently relied on small mammals, deer, and perhaps exploited antelope as well. Important plant foods were the buds of the yucca (*Yucca whipplei*) and also acorns, sage seeds, and juniper and islay berries (*Prunus ilicifolia*). Present information indicates that the Tataviam had technologies for obtaining and processing their foodstuffs which were essentially similar to their neighboring groups (King and Blackburn 1978).

TATAVIAM SOCIAL ORGANIZATION

According to a contemporary study, there are no data that might serve to distinguish Tataviam social organization from that of the Kitanemuk or Gabrieliño (King and Blackburn 1978). The recent recovery of materials from Bower's Cave near Newhall does suggest major similarities among Tataviam, Chumash, and Gabrieliño ritual organization. Specifically, the site contained ritual trappings identical to those used by members of the secret societies or ʔantap described for the Ventureño Chumash. These ritual accoutrements were used in the performance of ceremonials including mortuary rites.

Like many other California communities, the Tataviam also celebrated

their annual mourning ceremony in the late summer and early fall, using open circular structures on the site (King and Blackburn 1978:536). Documentation of the Gaspar de Portolá expedition, which passed through the territory in the fall of 1769, included a reference to a congregation of people within a brush enclosure, presumably assembled to conduct mortuary rites. Strong similarities between the pictographs in the Tataviam area and adjacent ones have also been demonstrated.

There is very little information on Tataviam social and political interaction with other groups. It is probable, however, that they were involved in the north-south enmity and east-west amity system of relationships common throughout southern California in aboriginal times. More certain information regarding external relations derives from the post-mission period during which surviving Tataviam intermarried with the Kitanemuk. By this time too, Tataviam were interacting with the Chumash because Tataviam were observed participating in and attending Chumash fiestas and ceremonials.

TATAVIAM LANGUAGE

The fragmentary evidence on the Tataviam language has rendered the task of classification difficult for both linguists and ethnographers. Two hypotheses, however, have been advanced in an attempt to assign it to a language family. The linguist, Bright, concluded that, though influenced by Takic, Tataviam belonged to a language family unknown in California (Bright, 1975a). The second hypothesis, supported by ethnohistoric, archaeological and comparative enthnographic data, suggests that Tataviam was not merely influenced by, but was probably a Takic language itself. Ethnohistoric support is afforded by Garcés, who journeyed through the area and who used the term "Beneme" collectively to refer to groups living along the Mojave River and upper reaches of the Santa Clara River, to groups dwelling in the San Gabriel and Fernando Valleys, and to people residing in the Elizabeth Lake area--thus, to Tataviam and their Takic neighbors. Garcés (1965) and Fages (1935) both noted the similarities between Tataviam and their southern Takic neighbors in terms of their language, dress, and political organization. More support for the similarity between Tataviam and Takic is provided by archaeological evidence. For example, the types of artifacts used in ceremonials, the internal organization of Tataviam villages, and cemeteries strongly resemble such features among neighboring Takic groups. The archaeological evidence also suggests that by 1000 B.C., Tataviam had begun to differ from other southern California Takic speakers. This interpretation is based upon the increased evidence for cremation as a mortuary practice in areas ethnographically occupied by Takic speakers. By historic times Tataviam appears to have become a quite distinct language. Further research on this and other aspects of Tataviam culture is required before a complete assessment can be made.

Missionization of the Tataviam was virtually complete by the first decade of the nineteenth century. By 1834 when secularization had been ushered in, the descendants of missionized Tataviam had intermarried with other groups resulting in the virtual disappearance of Tataviam as a separate and distinct entity.

THE VANYUME

The Vanyume, who occupied the northwestern section of the study area, were early casualties of the mission relocation projects and other European encroachment into their territory. They were apparently never large in numbers and were extinct by 1900 (Bean 1978). The Vanyume are believed to have been members of the Serrano language family, but possibly spoke a separate Shoshonean language. They were foragers of the desert--an ecology type which has been described as "an impoverished extension of the Great Basin culture" (Beals and Hester 1971:81). To date, no site or population figures exist.

THE SERRANO

The term "Serrano" translates literally to mean "mountaineer" and is commonly applied to four groups of southern California Indians: the extinct Vanyume and Tataviam, the Kitanemuk, and the main Serrano group. This main group occupied an area which included the San Bernardino Mountains and extended north as far as Victorville and east to Twentynine Palms. The exact boundaries are, however, difficult to define because of the nature of the Serrano system of groupings and the incomplete historical record.

According to most sources the Serrano were first exposed to whites in 1776 when Fray Francisco Garcés encountered a community of about forty people near present-day Victorville. The estimated population of the Serrano before European contact is somewhere between 1,500 and 2,500. The combined effects of removal from their traditional land, exposure to diseases introduced through contact with whites, and the hostility of white settlers reduced their number to between 100 and 150 by the time of the 1910 Census Report. Without more research the numbers who claim Serrano ancestry cannot be ascertained. One report, however, suggests that only about 100 people recognize and maintain their Serrano descent (Bean and Smith 1978:573). Most of these individuals reside on the Serrano reservations of Morongo and San Manuel. In ceremonial and political affairs, however, they interact with other Native Californians (mainly Cupeño, Cahuilla, some Luiseño) on a pan-reservation rather than a strictly Serrano basis.

SERRANO ENVIRONMENT

The area believed to have been inhabited by the precontact Serrano is one of considerable variation in elevation ranging from deserts to mountains. The plant life includes oak, piñon pine, mesquite, yucca, sage, barrel cacti, and Joshua trees. The main settlements were located in the foothills of the San Bernardino Mountains, but some were situated higher in the transition zone while others were on the desert floor. Access to water sources was the determining factor in choosing habitation sites.

SERRANO POPULATION

As already indicated, the estimated population of the Serrano before European contact was in the range of 1,500 to 2,500. The sizes of the Serrano's communities are difficult to estimate, but Fray Garcés reported having seen three villages which had populations of 70, 25, and 80. It seems likely that the villages held only as many residents as could be accommodated by the water sources; probably larger in the vicinity of permanent mountain streams and springs, and smaller in the desert areas.

An early description of the Serrano people stated they were small in stature, having broad noses, high cheek bones, wide mouths, and dark, coarse hair (Caballeria y Collell, Father Juan 1902:47). One study compared a jaw bone from a Serrano site to one of an Arizona Pueblo Indian and found the Pueblo bone to be fully one-third larger than that of the Serrano (Mosely 1958:7)

SERRANO MATERIAL CULTURE

The Serrano lived in single-family dwellings which were circular, domed structures built over an excavated area twelve to fifteen feet in diameter. The houses had willow frames covered over with tule and brush mats which were secured to the framework. These structures were provided with fire pits and served primarily as sleeping areas. Most activities took place out-of-doors or under 'ramadas'--roofed structures built of willow poles without walls. The only other buildings in the villages were ceremonial houses occupied by the village priest and used for religious rites and ceremonial activities, and a granary for storing provisions.

The Serrano were accomplished potters and basket makers. Their pots were made of coiled clay smoothed with a paddle and dried in the sun before being fired in a pit. The plain brown ware was sometimes decorated with freehand designs of circles and lines of either red or black. Clay bowls, ollas, and trays as well as storage jars have been found.

Baskets and other woven artifacts were fabricated from yucca fiber and willow along with other reeds and grasses found in the area. Baskets were elaborately decorated with designs created by weaving dyed fibers into an unfinished basket. Dyes were made from natural ingredients. Large, flared-mouthed baskets were used for carrying burdens, water-tight baskets were used for cooking, and wide trays for winnowing. Other woven items included bags, ropes, floor mats, nets and sandals.

In their artifacts, the Serrano are described as being similar to the neighboring Cahuilla. Their artifact inventory comprised: musical instruments such as rattles, flutes, and whistles; utensils and ornaments such as fire drills, pipes, mortars, metates, beads, pendants, awls; and projectile points from wood, shell, bone and stone.

Petroglyphs abound on rock surfaces in the Serrano territory. Abstract and geometric designs are interspersed with representational figures of sheep, lizards, human beings and possible celestial bodies. The petroglyphs

are typical of those found throughout the Great Basin area. According to some informants, petroglyphs were records of important events, artistic representations of native life, and rough maps. Interpretations are at best speculative, so that their true meanings remain unclear.

SERRANO TECHNO-ECONOMICS

The Serrano sustained a hunting and gathering economy. They exploited virtually every possible food resource in their environment. Hunting was generally the task of the males who used bows and arrows, throwing sticks, traps and snares to catch deer, antelope, mountain sheep, rabbits and other rodents, and various birds, especially quail. The women of the group collected seeds, tubers, roots, and nuts, particularly acorn and piñon. The latter were food staples. Although they did not engage in agricultural activities per se, the Serrano manipulated the natural plant environment by annually harvesting the acorn crop and by burning areas where chia seeds grew, thereby increasing the yield.

Meat was cooked in baskets filled with water into which heated stones were dropped, or baked in earth ovens, or sun-dried and then stored. Seeds were eaten raw or ground into flour on metates. Acorns were ground and cooked into mush after being leached of the poisonous tannic acid. Bones were cooked and cracked open to remove marrow.

One source described the Serrano as having been "omniverous animals" who would "devour anything that would sustain life," including such things as snakes, lizards, insects, tortoises and other food sources considered inedible by Europeans (Rumble 1950:1). These were, however, typical foods in most Indian culture of the region and thus logical nutritional resources. The Serrano were not unlike other desert, foothill and mountain dwellers who used the materials at hand to sustain themselves.

SERRANO SOCIAL ORGANIZATION

Serrano socio-political organization was characterized by exogamous clans. Loosely organized, they were affilitated with one of two exogamous moieties, tuk^{w}utam (Wildcat) and wahi iam (Coyote) (Strong 1929). Ethnographers have not been able to ascertain the exact nature, structure and function of these clans, but a few distinguishing features have been identified. Strong determined that the clan was the largest autonomous political and landholding unit at the core of which was the patrilineage. It included all males claiming descent from an eponymous ancestor, their wives, and offsprings. A female spouse did, however, continue ritual ties with her natal group and use of its name. Coalitions with other Serrano clans were based upon reciprocal ceremonial, marital and economic relationships. Over and above these bonds, clans also established alliances with similarly organized Cahuilla, Chemehuevi, Gabrieliño, and Cupeño (Strong 1929; Bean 1962, 1972). This explains in part the great difficulty scholars have in attempting to determine the boundaries of Serrano territories.

The clan's leader was called the kika. The kika was not only the group's administrator but also its religious and ceremonial leader. The office of kika was passed from father to the most able son and not necessarily the eldest. The kika was responsible for determining the times and places that hunting and gathering activities should be carried out, and for announcing and presiding over ceremonies. The "big house" was also the training place for young shamans and the place where the sick were brought to be healed.

Another person of high status in the community was the paha who assisted the kika in his ceremonial duties and informed the people of ceremonies about to take place. One of his most important functions was keeper of the "sacred bundle," which contained the ritual materials and amulets of the clan.

The kika-paha inter-dependency was common among most southern Californian groups, but was particularly distinctive among the Serrano in that the clan(s) of one mostly possessed the kika and the "big house" while those of the opposite moiety held the paha and the "sacred bundle." This pattern of complementary ritual roles carried over into economic and marital affairs. The above features of socio-political organization and leadership roles appear to have been also shared by the Mohaves (Laidlaw, 1978).

SERRANO IDEOLOGY AND PSYCHOLOGY

Life crises were marked by several ritual observances. Beginning with birth, a child and its mother were placed in a heated pit for several days. On the second day after birth, a feast was held by the paternal grandparents who distributed gifts to assembled clan members.

Upon reaching adolescence, boys and girls of prominent families were initiated in public ceremonies. During the course of the waxan, or girls' ceremony, the young girls were placed in a heated pit, their bodies covered with sand and their faces concealed under woven caps. They remained in the pit for a day or more, after which they were given a beverage made from bitter herbs and instructed to observe certain ritual and dietary taboos.

The boys' ceremony, called tamonin, took place at the same time as the waxan. First the boys were taken to a secret place outside the village and given a brew made from jimsonweed. They were then brought to the "big house" where they danced around a fire until the hallucinogen rendered them immobile. During sleep they were thought to have visions which were later interpreted by shamans as revealing an individual's future status. This ritual lasted three days and nights during which the shamans taught the boys special songs.

Before European contact the Serrano, like many southern Californian inland tribes, practiced cremation during which most of the deceased's possessions were destroyed. Within a month, a ceremony called mamkwot was staged during which certain of the deceased's remaining possessions were burned.

Each year the Serrano staged a week long mortuary ceremony which also afforded the opportunity to observe other rituals. The first two days were

given to the preparation of food and gifts to be consumed or distributed over the remaining five. On the evening of the third day, the "sacred bundle" was brought out and displayed before the assembled clans. The fourth night was given over to naming children born in the preceeding year or born since the last annual mortuary celebration. Following naming of the children, their families distributed gifts to the assembled. The fifth evening witnessed the killing of a young eagle raised specifically for the occasion. Its feathers were removed and stored to be used later for adorning images of the dead. On the sixth day, the mourners constructed images representing the dead; made of tule and life size in dimensions, they were dressed in garments once belonging to the deceased. The sixth evening saw the performance of the Eagle Dance in which the dancer decorated in eagle feathers simulated its movements. Singing and dancing continued throughout the night during which gifts and shell monies were also distributed.

Among the Serrano the shaman or priest was a man who was blessed with psychic powers gained from dreams or visions brought on by ingesting the jimsonweed concoction (Datura). The shaman used his powers to heal the sick and to oversee social and religious gatherings.

Serrano religion included myths of creation, beliefs regarding magical animals and spirits and tales of the trickster Coyote.

SERRANO COMMUNICATION

It was stated at the beginning of this report that the name Serrano was a general one applied to four groups of Shoshonean speaking people. Not only is the term overly general in its designation, but it did not accord with the social reality. It represents the kind of phenomenon apparent in other colonial and imperialist situations; i.e., where the categorical terms indigenes applied to themselves were ignored. Interestingly enough, some present day Serrano descendents maintain, "our real name is ka-wush-wala-wetum" --meaning foothill. For these informants the term had far more sociological significance than the designation Serrano.

KITANEMUK

KITANEMUK ENVIRONMENT

The Kitanemuk are one of the California Indian groups about which very little information is available. They lived in an area that included the Tehachapi Mountains bordered on the north by the San Joaquin Valley, on the east by the Sierra Nevada, and on the south by the Antelope Valley.

KITANEMUK POPULATION

The Kitanemuk were apparently so small a group they attracted little attention. They are virtually unmentioned historically, and were never the subject of a census. An approximate figure of 500 to 1,000 people has been suggested, based on comparison with similar groups in areas of equivalent size. The bulk of their population appears to have been absorbed

by the mission groups of San Gabriel, San Fernando, and San Buenaventura. Some went to live and work at Fort Tejon, south and west of their home in the Tehachapis, sometime in the 1850s. There were Kitanemuk residing near Fort Tejon as late as 1917. In fact, the Kitanemuk were so associated with the fort they came to be known by some as the "Tejon Indians." Descendants of the Kitanemuk are believed still to live among the other tribes at the Tule River Reservation near Porterville, California.

KITANEMUK MATERIAL CULTURE

No records of Kitanemuk tools or artifacts exist, but since they were known to have traded and intermarried with neighboring groups, it seems safe to assume that their artifactual inventory was similar, or equivalent to that of their neighbors. This would most likely include a variety of basketry and woven articles, pottery, cooking and storage vessels, utensils, wood, bone, shell and stone ornaments, musical instruments, tools, and weapons, as well as items fabricated from animal products and combinations of the above materials.

KITANEMUK TECHNO-ECONOMICS

The Kitanemuk, like their neighbors, were hunters and gatherers, subsisting on game and plant life that surrounded them, and trading with other groups for commodities not available in their home territory. According to one source (Beals and Hester 1971), the Kitanemuk were among the "classic" California Indian types that dwelled in the mountains or foothills, and who had at their disposal a variety of vegetation upon which to subsist. The primary plant food was the acorn which was harvested annually. Other edible plants available included piñon pine, chia, elderberry, yucca, and mesquite. Proportionately, fish and game were of less dietary significance to the mountain dwellers.

KITANEMUK SOCIAL ORGANIZATION

From what data is available the Kitanemuk appear to have resembled other southern California groups in being patrilineally organized. Moreover, like the Serrano, political and ritual leadership was assumed by the kika and paha. An essential difference, however, lay in the absence of moieties and totemic systems of arrangement. Other special status individuals included shamans, diviners and special messengers.

Data on the social organization of the Kitanemuk is meager, but it is suggested that the close similarities between Kitanemuk and Cahuilla kinship terminologies indicate the presence of some form of patrilineage system (Strong 1929:5-35). The Kitanemuk do not appear to have had the typical totemic moiety system observed for other groups in the region. Status systems were, however, well developed, for the data indicate an administrative elite composed of chief, ceremonial manager, messengers, shamans, diviners, and other ritual experts.

KITANEMUK IDEOLOGY AND PSYCHOLOGY

Consistent with neighboring groups, Kitanemuk life crises were marked by ritual enacted to ensure the well being of the individual and the group.

Children were born at home with a midwife in attendance. Following birth, a small pit was prepared, filled with hot coals and covered over by dirt and matting on which mother and child rested. The mother drank only warm water and avoided eating meat, fat, and salt for three months. Proper disposal of the afterbirth involved burying it in a secluded place, usually the corner of the house. The afterbirth was important for another reason. If a mother wanted another child but of the opposite sex, the afterbirth was turned inside out.

Newborns were placed on elliptical troughlike cradles for a month before being placed in a regular cradle. Soon after birth the child was named after a deceased relative, and, if both parents were involved in the naming, a child might have two names.

With the onset of puberty, both girls and boys underwent a number of ordeals and observed a set of restrictions. These served to stress their changing physiological and social status. At first menses girls might be lashed with nettles, bathed in a solution of hot water and pounded estafiata (probably *Artemisia sp.*), and given some of the same solution to drink. Other practices included the painting of the girl's body with red and white spots by a woman hired for the purpose and running a prescribed distance pursued by a woman known to be industrious.

Following these observances, a young woman was taken to a small, isolated hut especially constructed by her father. She remained there for four months with an elderly kinswoman in attendance. Restrictions on food, water and social relations continued throughout this period of seclusion. After confinement the young woman was bathed by her mother, and, with this act of purification, the restrictions were lifted. With her first regular menstruation, a young woman abstained from eating certain foods and submitted to futher physical ordeals.

The puberty rites for young men took place during the winter months. The rites were presided over by a pinipha, or captain, who gave one or more initiates an infusion of Datura, which was believed to bring on visions. Following their visionary experiences, young men were asked to reveal whether they had seen or spoken to some animal or bird, or whether they had seen nothing at all. Before dawn, following their hallucinogenic experience, the young men were taken to an isolated place in the mountains or to a shrine to pray, taking seeds, tobacco, beads and feather down as offerings. After this event, they lived apart from the community for a month in a specially constructed hut, refrained from bathing, eating meat and interacting with people. Thus isolated, a young man would, through frequent prayer, establish a relationship with his dream maker and, as a result, attain the status of a man. Thereafter, the dream maker became both protector and friend.

Marriages were contracted by arrangement or by choice. A couple became engaged once the gifts offered by a suitor to the parents of a young woman had been accepted. During the engagement period the young man continued to take gifts to the family and young woman of his choice until his future

mother-in-law arranged a feast at which guests bearing gifts were entertained. Newlyweds lived with the parents of the groom until the wife became pregnant, at which time they moved into their own residence.

Death rituals involved the mourners and the remaining members of the community in a set of behaviors similar to those described for the Serrano.

The chief sponsored the wake which was held in his house. Attendance at the wake was restricted to old people who sang and wept over the body which was buried the next day by hereditary morticians. As the body was conveyed to the cemetery, a single mortician would come in order to warn the dead of the burial party's approach. The deceased was buried in a grave previously excavated by men with digging sticks. At the grave side, the skull of the deceased was broken and portions of the brain given to each mourner to eat. The body was buried along with valuables and then covered over with dirt pushed in with baskets which the mortician retained. Upon the return of the burial party to the village, the morticians and singers were given food and money to distribute.

For a month following the wake the mourners observed restrictions on food such as meat and fat. Any remaining clothes or possessions of the deceased were burned at a later wake. On this occasion, the chief would announce the next mourning anniversary. These events took place at four or five year intervals because of the expense involved. Lasting a week, these ceremonials were held in a horseshoe-shaped ramada. Guests attending these ceremonies helped defray the expenses of the host chief. Dancing and singing marked each stage of the proceedings, most prominent among which was the construction of an effigy(s) and its destruction by fire especially built for the purpose. Baskets, beads and other property were also burned along with the effigy. When the fire had burnt out, the pit was filled in with dirt and a specially selected dancer was asked to perform over the spot in order to erase any trace of it.

The mourners, whose faces had been painted with soot, were cleansed by people selected for the task. The host paid for these services at the same time as he distributed monetary gifts to others assembled. After the dressing and cleansing of mourners' faces, guests would depart, although some might remain to dance in the evening.

When a chief died, a special gravepole, obtained from the mountain by men selected for the task, was prepared. Painted red, white and black, it was carried to the ramada and laid on mats placed on the ground. Mourners threw seeds and beads over it. From these materials the men took their pay. Erected in the center of the patio, the pole was decorated with strips of fabric and feather banners. After the celebration, it was then removed to the cemetery where inverted baskets were slipped over it. Two ceremonial wands were attached to the top to form a "V," after which it was then erected at the head of the chief's grave.

Becoming a shaman depended on the ability of an individual to establish a relationship with a "dream helper." This relationship could be made after ingesting a hallucinogen, either Datura or a species of ant. Exceptional supernatual power was acquired by establishing relationships with several "dream helpers." Only a few individuals with the interest, personality and capabilities were able to reach this state.

Most men acquired a "dream helper" at the puberty ritual, but those who wished to acquire additional power could do so by engaging in a ritual involving the ingestion of ants.

Major illnesses were treated by a curing shaman who, in an all night dancing performance, would call upon his "dream helper" to come to his aid. Patients did, however, resort to curing themselves, using a variety of plants among which tobacco and datura were the most important. Red ants swallowed whole or bitten in half were believed to be theraupeutic for women who experienced menstrual problems or problems in childbirth.

Powerful shamans were believed to bring rain, cause small animals to appear on their arms while dancing, and make animal skins come alive. Diviners were yet another group of specialists in Kitanemuk society.

The Kitanemuk possessed a complex mythology, incorporating elements derived from the Chumash, Yokut and Gabrieliño people. The myth dealing with the origin of the universe must suffice to illustrate the richness of their mythological belief system.

The creation of the universe is attributed to a being cañniqpa who also created the "first people" by breathing life into clay images of them. These "first people" included the ancestors of birds and animals who inhabited the environment. Among the most important of these creatures were five brothers and a sister to whom is credited the creation of five superimposed worlds, with the smallest at the top and the largest at the bottom. Humans occupied the largest world, which was circular in shape, and which floated on a surrounding ocean supported by two giant serpents. The latter were believed to cause earthquakes. A flood later engulfed the universe, killing all except the six siblings. They were secure in their beautiful home located in the south.

The sister became pregnant by one of her brothers and gave birth to Hummingbird. His father was later punished for committing incest by having his arm and leg bones removed, immobilizing him forever. Hummingbird's mother bore many children, the ancestors of people living in the present. Wisest of all the siblings, it was believed that she gave the people their material culture. She also sent them off in different directions, instructing the men to marry particular women, to settle in certain localities, and to speak certain languages. As a result, different tribes of people came into existence.

Kitanemuk believed that the land of the dead was located in the east where the normal round of activities was reversed because the spirits slept during the day and spent the evenings in song and dance. It was a place of great beauty and plenty--a place where spirits never aged.

KITANEMUK COMMUNICATION

They were part of the Serrano group of southern California Shoshonean speakers. Their own dialect is now extinct, and, save for a few linguistic terms, very little is known about the language.

THE KAWAIISU

"In the famous Tahichapah Pass was a tribe called by themselves Tahichapahanna, by the Kern Indians Ta-hichp and by the Yokuts, Kawaiasuh, they are now extinct" (Powers 1877:393).

At the time Powers was writing, Kawaiisu culture had ceased to be a coherent system, yet he may have been somewhat premature in saying that the Kawaiisu were extinct. Zigmond worked with several Kawaiisu while conducting ethnobotanical fieldwork during 1936-40. Although few in number and dispersed throughout southern California, they not only acknowledged their identity, but were sufficiently knowledgeable as to aid Zigmond in his reconstruction of their traditional culture. His research, together with an unpublished manuscript, constitute the major source for this description of Kawaiisu culture (Zigmond 1938; 1941; Ms. n.d.).

The Kawaiisu refered to themselves as nɨwɨ (plural mɨwɨwɨ), meaning "people," but they were given various other designations by neighboring groups, among which the Yokut term cited above and the Tubatulabal ka wism appear frequently in the literature. Several other reference terms are recorded: Hodge lists Cobajais, Cobaji, Colteches, Kawis-sah, and Kubakhe (Hodge 1907: 1, 666).

KAWAIISU ENVIRONMENT

The Kawaiisu homeland straddled the Sierra Nevada-Tehachapi watershed between the San Joaquin Valley and the Mojave Desert. In elevation the territory spans some 7,500 feet from below the 1,000 feet level on the west to an altitude of 8,432 feet at the top of Piute Creek. Several passes, especially Tehachapi, Oak Creek, and Walker provided natural routes through the area. In May, 1776 Garcés traversed one of them--though there appears to be some controversy as to which one--when he emerged from the Valley and continued eastward to the Mojave River. Garcés recorded stopping at a rancheria of people of a different language from the Noches (Yokuts) and Quabajais (Kitanemuk?), and whom the Jamajabs (Mohave guides) call Cobaji... "the women told me that they regaled me (with food) because we were so needy; that their nation was generous, not stingy like that cn the west" (Coues 1900: 1, 304).

Kawaiisu were hemmed in on three sides: to the north along the line just south of the South Fork of the Kern River by Tubatulabal; to the west by southern Yokuts; and to the south by the "Tejon." Kawaiisu made seasonal trips to the desert and mountains for various foods and materials but the watershed was their fixed home.

The Kawaiisu occasionally exploited the southern half of the Panamint and Death valleys, apparently with the permission of the Panamint Shoshone who held political authority in the territory.

Their mountain territory provided seven species of oak, while the desert abounded in plants such as the mesquite and screwbean which were gathered as far afield as the Newberry Springs. The latter items, gathered on seasonal

trips into the desert did not, however, play a major role in Kawaiisu economy. Following their foraging trips into the desert, Kawaiisu always returned to their mountain villages. While maintaining a strong recognition for their home base, Kawaiisu had knowledge of regions and resources far beyond their boundaries, indicating that they moved about to satisfy their needs. Conversely, when neighboring groups entered Kawaiisu territory in search of essential commodities, they were met with little resistence. Excepting the Yokuts to the west, relationships with neighboring communities were, on the whole, friendly, with intermarriage a not uncommon occurrence.

KAWAIISU POPULATION

No census figures for Kawaiisu exists, but Kroeber notes that "the aboriginal population may have been 500" (Kroeber 1925:603). When Zigmond was doing his fieldwork in the 1930s, he could find only 45 Kawaiisu speakers, and they were scattered throughout southern California, with no more than nine persons in any one locality (Zigmond: Ms. 4).

KAWAIISU MATERIAL CULTURE

Various types of basketry were employed by the Kawaiisu in the gathering and preparation of food. Seed beaters, burden baskets, and containers of various sizes for collecting acorns, seeds, nuts, berries, and roots, winnowers and hoppers formed an impressive inventory. Stone implements were mainly the bedrock mortar and pestle, the portable metate and accompanying mano, and the obsidian knife.

Birds and animals were usually hunted with the bow, and hunters sometimes used decoys and blinds. Several types of nets, traps, brush fire surrounds, and deadfalls were employed to snare game. First kills were celebrated in a ceremonial using the "wild chrysanthemum." During this event a "brotherhood" was established between the hunter and animal by mixing sand from the animal's track with the hunter's food. Several men were usually involved in a hunt, but the one whose arrow actually brought down the deer received the head and hide. Otherwise, the flesh was evenly apportioned (Cappannari 1960:18, 138).

Hunting bows were commonly made of juniper wood backed with sinew. For hunting large game a three piece arrow was used, while small game and birds were hunted with arrows of one or two pieces.

Three types of structures were common in a Kawaiisu village. The tomokahni or winter house was built on a ground-level circular base with vertical forked poles, usually of willow and bound together at the top to form a smoke hole. Transverse poles were lashed both inside and outside vertical shafts, and the intervening space was tightly filled with brush. Covering of tule and bark made the structure waterproof, while a tule mat served as a door. A fire pit was built in the center of the structure, and occupants would sleep with their feet toward it.

The havakahni was an open, flat roofed "shade house" used in the summer by women engaged in a variety of tasks. The tivikahni or sweat house

was located near water. Small storage granaries for acorns, nuts and seeds were common village features, as were circular brush enclosures. The latter served as windbreaks for temporary encampments, or, when built on a large scale, as areas for ceremonials and festive occasions.

Various other miscellaneous artifacts included: cordage (made from the fiber of milkweed, pondweed, nettle and slippery elm); stone arrow straighteners heated when required; small stone bowls and pestles used for mixing and serving purposes; flutes and bowls made of elderberry wood, clappers made of split cane, and rattles made of deer hooves or cocoons.

The skins of wildcat, rabbit or young deer were treated by soaking the rawhide in a solution of deer brains and pine nuts. When dried, the hide was scraped to remove hair and then worked between the hands to make it soft. When not being nursed, infants might be placed in a cradle, of which there were two types, one oval and the other Y-shaped. The latter could be stuck into the ground and rocked. They were usually made of willow (except that sandbar willow was not employed for this purpose since, according to myth, quail had lost all her children until she stopped making their cradles of this material).

KAWAIISU TECHNO-ECONOMICS

The Kawaiisu had a hunting and gathering economy. The varied character of the terrain ensured a wide diversity of fauna and flora. Occasionally they pruned strands of wild tobacco and fired dry brush in late summer, but beyond these, gathering techniques predominated. Zigmond provides a list of some 312 plant species with native names; of the 233 species to which utility was attributed, 112 provided food and drink, 94 medicine, 87 miscellaneous products and services, and 27 had supernatural and mythological connotations (Zigmond 1941).

Despite the large number of plant nutrients, there were times when they were not always available. There were lean periods, especially if a major food source such as oak bore a meager crop. Attempts were made to conserve foodstuffs and thus to afford sustenance during non-productive periods, but poor yields could reduce stores to a dangerous level.

Some foods, such as spring greens and certain kinds of seeds, were consumed as they were gathered. Others required pounding or grinding, leaching (acorns and buckeye nuts), boiling (usually stone boiling), parching (with live coals), and roasting in a pit oven or in hot ashes.

Deer meat was a favorite food but a large number of faunal species, including small and large game, rodents, birds, and insects also were eaten. Some animals, like the chuckwalla, could be obtained in the desert. Caterpillar, the pandora moth, and the white worm found in dead trees were commonly eaten. Other protein sources included skunk, grizzly bear, rattlesnake, buzzard, bat, roadrunner, eagle, crow and grasshopper. Sometimes fish was added to the diet, but it was a minor dietary item because there were few fish-bearing streams in the region. Fish were caught by poisoning or with hooks made of bone.

KAWAIISU IDEOLOGY AND PSYCHOLOGY

In common with a number of other indigenous communities the dramatis personnae of Kawaiisu mythology invariably consists of animals who, with a few exceptions, speak Kawaiisu. Occasionally, humans appear in the legends, but the central figure is usually the cunning, foolish and lecherous coyote. Kawaiisu origin myths concern the origin of fire, of sexual intercourse and of hunting. The latter explain how the Kawaiisu came to be recognized as great hunters.

Kawaiisu mythology is also replete with supernatural beings, of whom the most commonly experienced is the ɨnɨpɨ (soul). Every human being and animal has its own, which is identifiable and indestructible. The ɨnɨpɨ may wander during sleep, or leave the body of an individual on the point of death and act in such a way as to announce the forthcoming demise, or manifest itself in various forms, including the human one. Any superhuman behavior on the part of a member of the group was recognized as an ɨnɨpɨ.

In ghost form ɨnɨpɨ may return to taunt those among the living who mistreated him in life, or he may simply return as a mischievous being.

Ya h e lera is another supernatual being. Indistinguishable from ɨnɨpɨ he inhabits the cave which leads to the underworld. Rock baby, the creator of some pictographs, inhabits rocks. To see or hear him is an omen of doom.

Dreams and visions were interpreted as conveying power or of bearing messages for good or evil. Visions might also be deliberately sought, as in the case of the hunter who, in talking to the mountain, could persuade it to permit him to see deer. A hunter could accomplish the same end, however, by scattering acorns, eagle-down or beads. Like dreams and visions, signs and omens might portend ominous events. Any unusual or unexpected sight or sound was tu waru yido - a sign or premonition of death.

Certain taboos and ritual practices accompanied the life crises of puberty, marriage, preganancy, birth and death. While not specifically associated with the life cycle period, the tolache figured significantly among Kawaiisu ceremonials. (Toloache involved the use of the hallucinogenic *Datura metaloides*).

With the onset of menstruation, young women abstained from eating meat, fat and salt. At this time, too, instruction would begin. Marriage was monogamous, and was contracted on the acceptance of gifts made by a suitor to a young woman and her family. There appeared to be no rules of residence among the Kawaiisu. Post marital location depended on circumstances and might be easily changed. During pregnancy a woman observed many of the same taboos as pertained to puberty. Other avoidances included abstaining from foods and objects which symbolized closure, eating the feet of animals lest her infant be born feet first, and stepping over a mole tunnel lest her child be born blind. She might prepare herself for delivery by beating her stomach with nettles and by taking cold baths every evening. After delivery a mother was made to lie on a structure of earth and "wild chrysanthemum" placed over heated rocks, where she would be bathed with a solution of "wild chrysanthemum."

Death was attributed to either natural causes or to sorcery although they might be interrelated. The body was wrapped in a tule mat, placed in a rock cleft, and covered over with a split burden basket and rocks. Burial took place on the day of death. The family of the deceased usually moved to another location following the burning of the house. People avoided mentioning the deceased's name as they avoided his burial spot. It was believed that the spirit could linger for some time around familiar places. In time, however, it would journey to the spirit world, following a trail eastward across the desert.

Consistent with mortuary practices elsewhere, commemoratory ceremonials for several persons were held at irregular intervals. Several tribes or representatives of such would assemble and be assigned space within a circular bush enclosure. Images made of brush and bark and representing the dead were dressed in clothing previously worn by them. These images were carried into the closure on pole frames and amid the wailing of women were thrown into the fire pit located in the center of the enclosure. Beads, piñons and other items were also thrown in. In the evening there was dancing and general celebration for all except the mourners who remained spectators to the occasion. A feast and payments to celebrants concluded the occasion as it also terminated the mourning period. Thereafter the mourners could return to a normal existence, and if widows were among them they were free to marry again.

The Toloache Ceremony involving both young men and women seems to have taken place one or two years after puberty. An emetic made from the root of jimsonweed was prepared and then administered to the participants by an elder. Prior to imbibing, young women had to observe some of the puberty and pregnancy taboos mentioned earlier and to subject themselves to hair washing in a solution of wild chrysanthemum. After imbibing, a participant was made to lie on a bed and to remain there under the constant supervision of some older person. The participant remained in a trance until the next morning and sometimes longer. During this time, relatives and friends celebrated by singing and dancing, and by scattering seeds, beads and berries about the area. On the following day the participant was made to vomit by drinking warm water.

Toloache encouraged visions which might in some instances demand immediate action by the participant or those who had appeared to him. Around the age of 14, young people might also undergo the ant-ordeal. They would swallow live ants wrapped in balls of eagle down and then lie quietly for a day in the sun. At the end of the day, they would drink warm water which encouraged them to vomit. Like the toloache, the ant-ordeal was considered important preventive therapy.

KAWAIISU COMMUNICATIONS

Linguistically, the Kawaiisu language belongs to the Numic division of Uto-Aztecan. Gayton, in her analysis of folktales, states that the Basin mythologies area make inroads into California..."the penetration becomes the dominant factor in the mythology of the Tubatulabal, and of the Kitanemuk, Serrano, and Chemehuevi so far as known" (Gayton 1935: 595). Comparative

data and studies made of trait distributions suggest the inclusion of Kawaiisu in this language group.

Concerning the composite nature of Kawaiisu culture, some of the same studies show the Kawaiisu to participate in the traits of the typical Great Basin pattern; in other aspects to follow cultures of central California, and in still other respects to partake of cultural patterns from contiguous peoples living along the Sierra Nevada from Oregon to southern California (Gifford 1918; Kroeber 1941; Voegelin 1938).

While studying the feasibility of six potential routes for a railroad in 1853, Lt. R. S. Williamson observed Indians, presumably the Kawaiisu, harvesting carrizo grass along the Canebrake and Kelso Creeks (Zigmond: n.d. 2). By the time of his investigation, Kawaiisu country supported a variety of colonizers. Trappers had long exploited the region's resources but they were soon followed by stockmen and farmers and, in the early 1850s by gold miners. Zigmond, quoting from one historical source, says that there was a mad rush of prospectors which "surpassed everything that had preceded it" (Zigmond:n.d. 2). With these intrusions, the Kawaiisu habitat became dotted with mining claims around such locations as Havilah, Piute, Claraville, and Sageland. Conflict between Kawaiisu and migrants into their territory occasionally took place, but the physical penetration of the land was not--at least in the beginning--the usual basis for dispute. More immediate conflict ensured over the alleged thievery by the Indians, especially of cattle and horses for food, and the stealing of women by incoming Caucasians. During this frontier period, however, some stable interracial marriages occurred. One of the early "goldseekers was Hamp Williams, a half-breed Cherokee," who married Refugia, a Kawaiisu girl (Walker 1971:8). Born about 1850, Refugia outlived her husband and provided Zigmond with ethnographic data as late as 1937. Zigmond found that the names of some pioneers were borne by a few of his Kawaiisu informants. There are probably others, but only future research will reveal them, as it may also contribute to a further understanding of Kawaiisu culture.

HISTORY

NARRATIVE OVERVIEW

L. Weinman-Roberts

NARRATIVE OVERVIEW: INTRODUCTION

This overview is intended to give background to the historical sites brought together in the Cultural Resource Synthesis. Thus, historical topics which relate to existing sites far outweigh the subjects which lie outside them. For example, as important as they are, topics such as labor history, women's history, and local political history are barely touched upon. The scope of this report is limited. Data pertinent to the individual sites have been reserved for the section, "The Historical Sites," which follows the overview. The sites have each been assigned a number during this project, and these are placed for easy reference at appropriate points in this overview.

EXPLORATION AND EARLY SETTLEMENT TO 1840

SPANISH PERIOD

Although Juan Cabrillo brought Alta California into the Spanish Empire in 1542, it was not until 1769 that this northern extremity of the Spanish colony was occupied. The California coast's exposure to Russian or English occupancy was the main reason the Spanish policymakers in Mexico City planted missions and presidios in Alta California. Then, the task of transporting residents to the coastal stronghold of Monterey prompted Spaniards to venture out onto the California deserts in search of an overland route by which to take them. Ship travel along the California coast was extremely hazardous and time consuming, scurvy being an accepted condition to sailors and passengers. Pedro Fages, in 1769 an army lieutenant and in 1770 Governor of California, had arrived in California aboard a ship in 1769 which was 110 days on its way around the tip of Baja California to San Diego. Its crew was so ill with scurvy that the men could not even lower their boats to land. Three years later Governor Fages entered the Mojave Desert, or at least some scholars speculate that he did, in a chase after military deserters out of San Diego. Having traveled along the San Jacinto Mountains to a place near Riverside, he went north to the San Bernardino Valley, over the mountains to the Mojave Desert, and thence to the San Joaquin Valley. It is noteworthy that the first Spanish governor of Alta California rode across the western Mojave.[1] We unfortunately know so little of his 1772 movements that no historical sites can be associated with the trip.

FRANCISCO GARCÉS

The Fages venture to the Mojave associates with military discipline and survival of the coast's occupation force. The second Spaniard to enter

and, indeed, to cross the Mojave Desert was associated with the drive to get residents to the coast. His name was Francisco Garcés, and he was attached to a mission at San Xavier del Bac established by the Jesuit Order. When the Jesuits were expelled from the whole of the American Spanish Colony in 1768, the Franciscan Order was sent in to replace them in the northwestern part of New Spain. Garcés, like Father Kino and other priests of the frontier, was completely dedicated to his calling and willing to press his intellectual and physical being to its limits to serve God. Garcés was a member of the historic trail-breaking party of Captain Juan Bautista de Anza, a party expected to find an overland route for supplies, livestock, families and missionaries from New Spain to the coastal presidios, missions and towns of Alta California. Fray Pedro Font, diarist for the trail-breaking group, left a day-to-day account. He wrote of how Garcés could assemble a mob of Indians, distribute a few trinkets, draw forth a banner showing the Virgin Mary with baby Jesus, and then effect conversions on the spot. In 1774 Garcés traveled with Anza over the Colorado Desert to the California coast and returned. On Anza's second expedition, which set out in December of 1775, Anza left Francisco Garcés at the Colorado River with a companion friar and a few Indians for servants and with instructions to explore the region and acquaint himself with the local Indians. Taking a broad view of his command, as would Americans in their exploratory ventures a few decades later, Garcés traveled north along the Colorado River to the site of the Mohave Villages near present-day Needles.[2] Here he decided to explore a route to California directly west, and he asked and received aid for this journey from the Mohaves whom he called Jamajabs. Several of them accompanied him as guides since they knew the watering spots between the Colorado River and the sink of the Mojave River so vital to survival on that leg of the trip. The other notable member of his party was a runaway from the Mission San Gabriel in California, Sebastian Tarabal, a man Anza had picked up as a guide for his expedition in 1773.

Sebastian was himself a pioneer, a pioneer in the Indian movement to go east to escape the white European who had invaded his homeland of Alta California. His escape route had been the Mojave Desert. Other Indians would follow him as the Spaniards settled the inland valleys such as San Bernardino Valley setting up adjuncts to their mission system called *asistencias* and commandering local Indians to live and work on the mission lands as *neophytes* or apprentice converts to the Christian religion. Sebastian's story is so dramatic that it would serve as material for the Bureau of Land Management interpretive program, and a sketch of it is included here. He came from Baja California in 1771 and lived at the Mission San Gabriel with his parents and wife. There he labored, lived at a bare subsistence level, and served at the lowest level of harsh mission life. The Spanish habitually settled new regions with men alone, men who according to habits acquired in the reconquest of the Spanish peninsula itself, could appropriate native women for sexual alliances through the right of just war and conquest. When Sebastian witnessed the wife of an Indian chief in the San Gabriel region appropriated and the chief decapitated for interfering, he made the decision to take his wife and parents and leave. On a moonless night in August 1773, they made their escape, traveled by night to the rim of the desert, and set out across it. All perished except Sebastian who walked in among the Yuma Indians two weeks later, a withered scarecrow.[3] Anza, upon hearing of his feat, called him into duty as a guide, and in 1776

Anza left Sebastian to serve Garcés at the Colorado River. Sebastian and the Jamajabs guided Garcés across the eastern Mojave on the old Mohave Indian Trail. The Garcés Diary and a map of his exploration of 1776, which is in the Spanish Archives at Seville, leave much of geographical nature up to the reader. Elliot Coues, who translated his diary, judged that the trail took Garcés along the route that later became the Old Government Road. A more recent interpretation, and one which has gained the acceptance of desert scholars, argues that the Indian guides led Garcés by a series of watering holes south of this latitude, a route which would have taken him along the present route of the Union Pacific Railroad to the southern edge of modern Soda Lake and the sink of the Mojave River.[4] Three days later, March 11, 1776, Garcés apparently arrived at the site of the future Camp Cady (site 1, see section "The Historical Sites" which follows this overview) in the western zone. His diary reads:

> I came to some *rancherias*, Indian villages so poor that they had to eat no other thing than the roots of rushes. They are the Beneme nation and there were about twenty-five souls. I gave them of my little store and they did the same with their tule roots, which my companions the Jamajabs ate with repugnance. The poor people manifested much concern at their inability to go hunting in order to supply me, inasmuch as it was raining and very cold; they were entirely naked.[5]

Garcés named the river he found the Arroyo de los Martires, and on March 12 he camped on it or close to the river basin known as Forks-of-the-Road (site 2), where in the nineteenth century a trail would fork off to the north leading to Santa Fe and Salt Lake City. His diary described it as a cold place where they killed a horse to eat and where one of the Jamajabs turned back. Hardships were upon them as they neared present-day Daggett and they camped somewhere between it and Barstow.[6] Dix Van Dyke suggests that Garcés then cut across the desert just east of Barstow and made camp near present-day Helendale. March 17 the Garcés Party met five Jamajab Indians traveling the opposite direction. They had come from a trading trip which took them to the San Gabriel Mission and had corn with them. Still following the river, Garcés dispatched Sebastian and one Jamajab to find inhabited *rancherias* ahead. March 18 Sebastian returned, and Garcés arrived at a *rancheria* of some forty members of the Beneme nation. He observed that he was going below the 35th parallel and thus begged the Indian guides to take him to the west since his goal was San Luis Obispo near the California coast. The Jamajabs, however, knew only the trail along the river and refused to change course. That day the party feasted upon hares, rabbits, and acorn pudding, welcome fare since the diary seems to tell us they were starving even though Garcés never really writes this. Continuing along the Mojave River, Garcés writes for March 19:

> I went one league south-southwest and reached the dwelling of the captain of these *rancherias*. He gave me a string of white seashells that was about two yards long. His wife sprinkled me with acorns and threw the basket, which is a sign of marked

> attention. Then she brought out some seashells and sprinkled me with them as if she were tossing flowers. Then his second wife came and expressed her sentiments with the same attentions. I responded in the best way I could, astonished that among such rustic people there should be so expressive a show of feelings as their pouring out the shells, their greatest treasure.[7]

The following day Garcés took a reading, finding his position to be 34°18'. This could have been either at the Victor Narrows or between Victorville and Oro Grande; he writes:

> arriving at a *rancheria* of about seventy souls I was received with great joy. On my arrival some howled like wolves, and others made long harangues in a very high key.[8]

Two captains and the other men gave him white seashells and the women sprinkled him and his mules with acorns. This has been identified as Atongaibit (site 75), an Indian village or *rancheria*. Apparently, it lay along the river between the foot of the mountains and present-day Victorville. The following day Garcés crossed the environs of Hesperia and ascended the mountains to the site of Las Flores Ranch. Here he recorded finding a *rancheria* of five huts, another with a population of eighty, and of trees, ravines, and low lying hills. Following the West Fork of the Mojave River up Saw Pit Canyon, Garcés reached the boundary of the desert, and on March 22 he crossed Cajon Pass and saw the Pacific Ocean in the distance.

Garcés interpreted Anza's orders given to him at the Colorado with exploratory zeal, and his enthusiasm had carried him across a desert route which would one day establish a shorter route to the coastal missions and presidios. At the same time he had acquainted himself not only with the Colorado River Indians but with the Beneme nation who lived in the area contiguous with the Mission San Gabriel grazing lands. In spite of these contributions his reception at the Mission San Gabriel was less than enthusiastic. He asked for an escort to continue his journey, and the corporal in charge refused him. Commander Fernando Xavier de Rivera y Moncada, military governor of Alta California, also refused him an escort, although he did allow him one horse from the expedition. Rivera y Moncada made it clear that he did not want Garcés in his domain and even less did he want the Indians who accompanied him. He commanded that the Jamajabs, whom he heard had come to trade, be seized and taken far out into the desert. Fortunately, they had already left so the order could not be carried out.

On March 24 Garcés wrote in his diary:

> In every nation, even advanced ones, it is common policy to deny passage to those who are going to favor one's enemies; but since communication between the Colorado River and the coast is a necessity, how are the Spaniards to go through if the nations of one area are at odds with those of the

> other? The King or Sovereign ordered that all Indians, even those unbaptized, be admitted into the presidios with displays of good-will. How, then, without thwarting His Majesty's intentions, can orders be given to seize them. The law of nations permits trade between one people and another. What reason, then, can there be to stop the harmless and long-established commerce of the river people with those of the sea, consisting as it does in some white shell beads? If we preach to the heathen a law of peace and charity, how can we think of sowing discord?[9]

The faithful Garcés set out on his second trip which would take him into the western Mojave on April 9, 1776. Passing near to present-day San Fernando, Castaic, and the San Francisquito Canyon he recorded a lagoon. We may assume this was Lake Elisabeth, and he recorded that he found a *rancheria* there:

> where according to the signs, had been Captain Faxes [Fages]. The Indians were very affable, and the women cleanlier and neater than any I had seen before of this same Beneme nation. In the evening came Indians from the north known to the Jamajabs by the name of Cuabayay. Probably Shoshonean as they lived between the Fresno River and Fort Tejon.[10]

Leaving the periphery of the desert, Garcés headed north over the Tehachapi Mountains to the San Joaquin Valley. He recrossed the Tehachapis at Tejon Pass on May 11 and then descended to the desert floor. He is believed to have stopped at Willow Springs (site 3); although, if he emerged from the mountains near Mojave Station as his translator Coues suggests, this may not have been the case. May 19 his diary records his arrival at the Mojave River near 34°37'. He retraced the trail he followed in March as far as the Pozas San Juan de Dios wells two days distant from where he first discovered the Mojave River, and continued on to the Colorado River.

UNDER SPANISH RULE

Spanish goals continued to be those of finding a shorter route between Sonora and Monterey and of establishing inland presidios in order to protect their grazing animals from raids. Raids eminating from the Mojave Desert penetrated as far as the Ventura and Santa Barbara missions, as letters written by the padres from those missions to the officials in New Spain document.[11] In 1781 Commander Rivera was sent to Sonora to recruit settlers and to lead them to the Quechan (Yuma) villages, across the Colorado Desert, and to the coast. His pack animals arrived at the Yuma crossing in need of rest and they grazed on the native mesquite beans, an important Yuma food item. This irritant may have been the last straw for the Quechans (Yumas) who had been disappointed with the Spanish stronghold

among them. They arose to massacre every Spanish man, sparing only the women and children. So ended the lives of both Commander Rivera and of Garcés; Rivera their antagonist and Garcés the Indian's trusted and respected friend all the years he had been among them.

In 1806 the Mission San Gabriel received an able administrator from Santa Barbara, José María Zalvidea. Before taking office, and in the same year, he went on an exploratory trip which took him into the western Mojave, in all probability seeking locations for second line missions and taking a look at the source of recent raids on the mission's grazing animals. He crossed over the mountains from Santa Barbara, skirted the northern foothills of the San Bernardino Mountains, and near present-day Hesperia at the *rancheria* Atongai on the Mojave River he baptized two men and three women, an event hailed as the first Christian conversion in the western Mojave. He may have followed the Mojave Trail over to the San Bernardino Valley as his trail is described as following the river up to Guapiabit (site 17) on the Las Flores Ranch, to Summit Valley, Coyote Canyon, and to Muscupiabit near Camp Cajon.[12]

Raids continued to draw the Spanish to the western Mojave. In 1810 it was reported that one Spanish corporal led fourteen expeditions against the Indians, some out into the desert. In 1816 a Spanish expedition reported finding the bones of three children somewhere between Victorville and Barstow. In 1819 Lt. Gabriel Moraga took a force of fifty men out into the western Mojave to punish the Indians for a slaughter of twenty-one men at the Mission San Buenaventura at the time of the Passover. Fr. Joaquin Pasqual Nuez, the diarist, wrote that they followed the Mojave River to Soda Lake, but there the horses gave out and they were forced to return.[13] On the Mojave River above the Narrows at Victorville another Spanish party found the remains of seven neophytes and stopped to give them a Christian burial.[14] Thus, the Spanish entered the western Mojave on several occasions. The Quechan (Yuma) massacre closed one entrance to the desert, and the Spanish could not master the Mojave Trail. Perhaps this was why in 1821 the Spanish contracted for the Coco-Maricopa Indians from the Gila River area to bring in the mail by way of present-day Blythe and San Gorgonio Pass. The trail was good for horses and may have come through the Morongo Valley, western Mojave. Lulu O'Neal, who has written of that region, claims the transaction stimulated missionary activity in the Morongo Valley.[15]

COMMENTS AND RECOMMENDATIONS

Local interest in the historical sites associated with the first white men to enter the desert is high. Local histories abound with accounts of Garcés, and it would appear that every valley would claim his presence. An attempt should be made to mark some of these sites even though approximate locations are all that can be expected.

NOTES

1. George W. Beattie, Heritage of the Valley (Pasadena, CA: San Pascual Press, 1939), p. 2.

2. Herbert Eugene Bolton, ed., Historical Memoirs of New California by Fray Francisco Palair, O.F.M., Vol. IV. (Berkeley: University of California Press, 1926), p. 77.

3. "Sebastian." In: Edward M. Ainsworth, Beaconing Desert (Englewood Cliffs: Prentice Hall, 1962).

4. Dix Van Dyke, "A Modern Interpretation of the Garcés Route." Annual Publications Historical Society of Southern California, XIII, 4(1927), pp. 353-359.

5. Elliot Coues, ed. and trans., On the Trail of a Spanish Pioneer: Garcés' Diary 1775-1776, Vol. II. (New York: F. P. Harper, 1900), pp. 239-240.

6. Terry Suss, "Activities Along the Mojave Indian Trail: Aboriginal Trade-Military Occupation." M.A. Thesis, Department of History, University of California, Riverside, 1974. p. 70

7. Coues, *op. cit.*, p. 244.

8. Coues, *ibid.*, p. 245.

9. Quoted in Suss, *op. cit.*, p. 74.

10. Coues, *op. cit.*, p. 247.

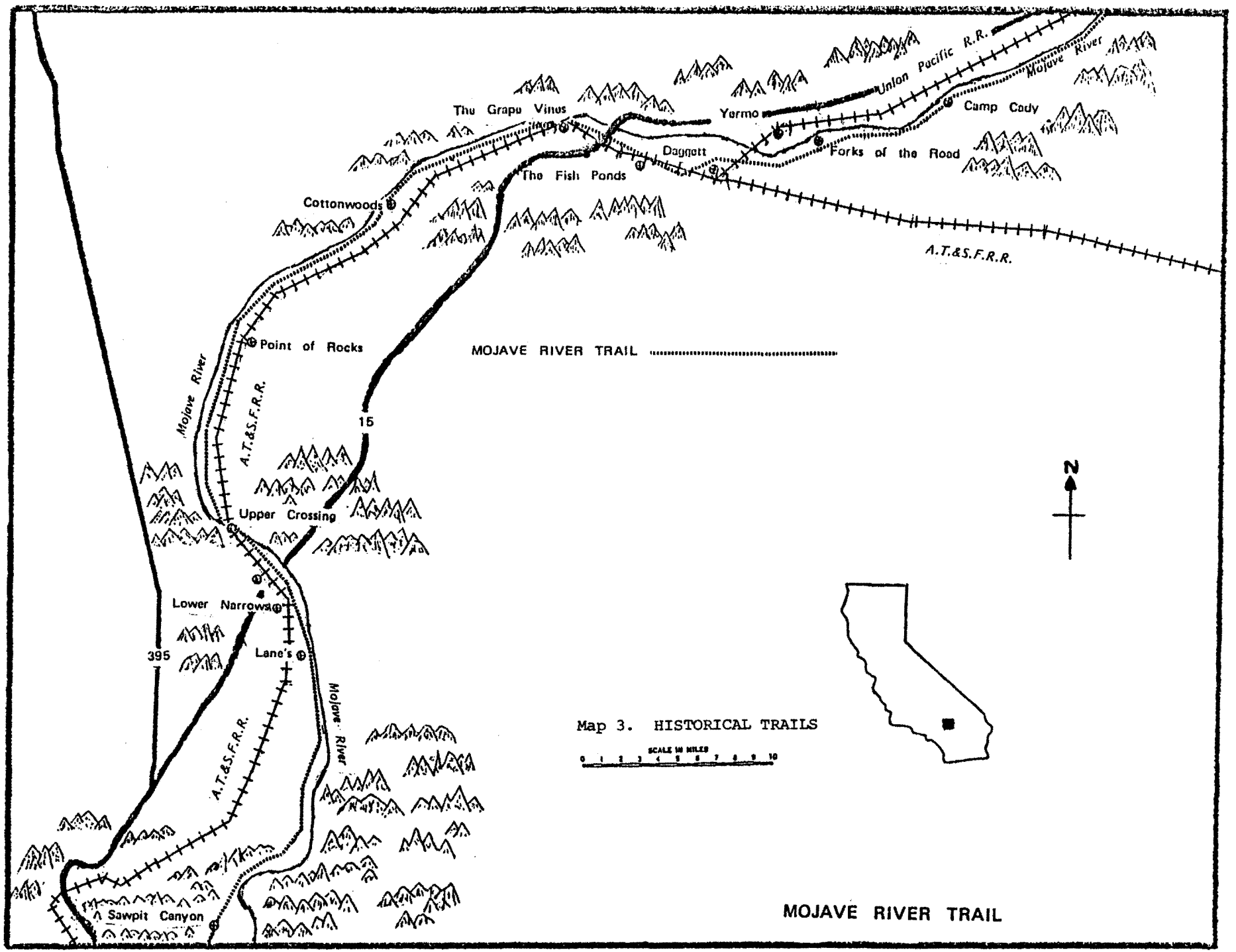
11. Fr. José Francisco Senan to Gov. de la Guerra y Norrega, May 30, 1819. California Miscellaneous Documents, Vol. 2, Santa Barbara Mission Archives.

12. Beattie, *op. cit.*, p. 4.

13. Dennis G. Casebier, The Mojave Road (Norco, CA: Tales of the Mojave Road Publishing Company, 1975), p. 21.

14. Beattie, *op. cit.*, p. 7.

15. Lulu R. O'Neal, A Peculiar Piece of Desert, The Story of California Morongo Basin (Los Angeles: Westernlore Press, 1957), pp. 21-25.



Map 3. HISTORICAL TRAILS

MOJAVE RIVER TRAIL

THE MEXICAN PERIOD

Early in 1822 Governor Sola of Alta California was notified that the revolutionists, who had been struggling for independence from Spain since 1810, had succeeded. Sola swore allegiance to the Mexican Empire in April, and all the Spanish colonial institutions in California fell under the Mexican flag. For the western Mojave Desert this would mean administrative changes for the nearby mission lands, and these changes culminated in complete secularization by 1836. Secularization meant that all the neophytes would be permitted to leave, the mission lands would be available for private use, and the mission church would be a parish church. A second influence on the desert at this time was an outgrowth of the independence of the American colonies. As they freed themselves from British rule and restraints on travel, the Americans headed west by land and sea. In 1822 a "reckless breed" of trappers had come overland beyond the Mississippi to the Spanish town of Santa Fe, and in 1826 one of them crossed the Colorado River and entered the Mojave Desert (see Map 3).

JEDEDIAH STRONG SMITH

Jedediah Strong Smith was the first white man to travel from the Mississippi to the Pacific on a transcontinental route. Before leaving St. Louis, he, David E. Jackson, and William L. Sublette had formed a new company out of Ashley Company interests. Anxious to know the vast new district they had acquired, Smith was selected to look into the trapping possibilities of the far west and perhaps even to examine the ports in California. During Smith's sojourn in California, both he and Harrison Rogers, a member of his party, kept daily records. Smith's journal did not imply that he had any plans to go to California; nonetheless, he reached the Colorado River October 4, 1826, and followed it south to the Mohave villages. November 10, guided by runaways from the missions, he set out across the desert. He described the eastern zone as complete barrenness, saw Soda Lake, and entered the western Mojave. As a refuge from the heat, Smith had his men dig holes in the sand in which to rest. He called the river he found the Inconstant River since it so often ran beneath the surface. His guides took him to the Mojave Trail, to the river's source, traveling up the West Fork to Sawpit Canyon and over to the San Bernardino Valley. He arrived November 26, 1826, at San Gabriel Mission leaving no historical sites or physical evidence of their presence.[1] The map Smith later drew was lost.[2] Upon his arrival at the Mission San Gabriel, he was welcomed by the padres, but Governor José Maria Echeandia rejected him in much the same spirit that the military governor had treated Garcés. Provincial authority had been threatened and fear of intruders was well founded. As the next decade would show, Mexican authority over California was eroding. Smith and the mountain men who followed him hastened the day when Americans would come and fly their own flag over California. They made their contribution, whatever may have been their intention, to the westward expansion of the United States.

Smith was issued a passport and required to leave California by the way he had come; so, in the spring of 1827, he recrossed Cajon Pass but headed northwest skirting the San Gabriel Mountains and crossing over Tejon Pass to the southern San Joaquin Valley.[3] Smith's route to California was followed by George C. Yount in March, 1827 and by James O. Pattie the same spring. Both suffered attacks by the Mohaves. When Smith himself returned to the Mohave

villages in August, 1827, he was unaware of these attacks and thus left himself and his men open for similar treatment. As he crossed the Colorado River, the Indians killed ten of his eighteen men. Smith escaped and again entered the western Mojave by way of the Mojave River, but this time traveling at night. Near what is believed to be present-day Baker his party found friendly Indians and traded with them. At a point further up the river they found a second village and again traded. Smith wrote that he proceeded to near the head of the Mojave River (probably near Oro Grande), left the Mojave River, and cut directly across to the gap he could see in the mountain range ahead. He, thus, was the first to turn to the south-southwest and make the shorter crossing to Cajon Pass. Near the foot of the mountains his party came across vast cattle herds owned by the San Gabriel Mission. Smith ordered his men to kill enough cattle to satisfy the needs of the party, later explaining the necessity to the mission fathers. Purposely avoiding contact with the governor, Smith stayed at the mission *asistencia* in the San Bernardino Valley, and after five days took the six men who stayed on with him back over Cajon Pass and to the San Joaquin Valley.[4]

THE SPANISH TRAIL

Other mountain men followed Smith's trail into the Mojave Desert: Ewing Young came in 1829. With Kit Carson and the rest of his company, he forded the Colorado River, and made his way in six days along the Mojave River to Cajon Pass. He was a trapper on his way to the beaver streams of the San Joaquin Valley. Once the trail had been blazed commercial interests in New Mexico recognized its possibilities, and merchant Antonio Armijo is credited with taking the first caravan of pack animals across the Mojave in 1830. According to his brief diary, he crossed the Colorado River (he called it the Rio Grande River) and passed through the western Mojave coming by way of Amargosa River and Bitter Springs. He traveled along the Mojave River for seven days and then headed for Cajon Pass covering the entire trail from Santa Fe in eighty-six days. He returned in less than half that time. Traders William Wolfskill and George C. Yount traveled the entire distance in 1830-31 and stayed to trap in California. The firm of Smith, Jackson, and Sublette commenced trade over the desert Spanish Trail in 1831, but when Jedediah Smith was killed on the trail in the same year, the company dissolved.

Annual carvans of pack animals traveled between Santa Fe and Los Angeles; yet, according to Leroy and Ann Hafen who published *The Old Spanish Trail Santa Fe to Los Angeles*, not a single diary of the regular animal merchant caravans during the years 1831-48 has been found.[5] Incomplete though it is, the following include some of those who used the trail during the Mexican Period and entered the western Mojave: Don José Aveita's commercial caravan in 1833-34; Jacob P. Leese who drove 450 horses on the trail in the fall of 1834; the William Slover and Isaac Pope party who immigrated with their families to California bringing the first wagons across the desert probably traveled the Spanish Trail-Cajon Pass route in 1837; the José Antonio Salazar caravan in 1839-40; the Workman-Rowland party in 1841, accompanied by a Dr. Lyman; and Francisco Estevan Vigil's caravan of 1841-42.

The Warren-Roske Report, Part I, "Trails and Wagon Roads, 1776-1880," catalogs major stops common to the Spanish Trail and the Mojave Road. Significantly for this report they include the following: Burton's (site 4), Upper

Crossing (site 5), Lanes (site 6), Points of Rocks (site 7), The Cottonwoods (site 8), The Grape Vines (site 9), Government Station (site 10), The Fish Ponds (site 11), and Forks-of-the-Road (site 12).[6] At the Forks, one branch of the trail went north to Santa Fe, but as Mormon travel increased, changed its route to the direction of Salt Lake City. The South Fork led to the Mohave villages near Needles. Both were considered a route to Alta California and both called by the term Spanish Trail.

Perhaps the most famous of Americans to come into the western Mojave and travel the northern Spanish Trail was John C. Fremont. This enigmatic figure was a lieutenant in the United States Army's Corps of Topographical Engineers. Adept at surveying, he was directed to examine the Oregon Trail and return to Vancouver. Instead he went south to Sutter's Fort on the excuse that he was searching for the River San Buenaventura, a river that was known by many people at that time not to exist. After a rest at Sutter's Fort, he moved south in the San Joaquin Valley and crossed Tehachapi Pass. He was led by the experienced Kit Carson and Tom Fitzpatrick, traveled well-blazed trails, and made few original discoveries. However, as he passed along the Mojave River on his way back to the Rocky Mountains of Colorado, he gave the river a variant of the name which has lasted to the present, The Mohahave. He also recorded that the Spaniards had called it Rio de las Animas. Fremont's attractive literary style and the consequent publication of his reports made his expedition famous. He included a passage about Antelope Valley which reads:

> Instead of green, the hills were purple and orange, with unbroken beds into which each color was separately gathered. A pale straw color with a bright yellow, the rich red orange of the poppy, mingled with fields of purple, covered the spot with a floral beauty, and on the border of the sandy desert it seemed to invite the traveler to go no further.[7]

Fremont kept a daily log, and according to it on April 21, 1844, he reached the Mojave River near Oro Grande and camped there. The next night he camped at Helendale (site 13), April 23 at or near Barstow,[8] and April 24 at either Fish Ponds or Forks-of-the-Road.

During the Spanish period, and especially in the Mexican period, the missions spread their authority and extended their ranching activities far beyond the confines of the lands formally assigned to them. The San Gabriel Mission established a cattle ranch in the San Gorgonio region, and its cattle grazed in the Morongo Valley. When Hugo Reid contributed an article to the *Los Angeles Star* in 1852 entitled "Letters on the Los Angeles County Indians," he reflected Mexican as well as Yankee values. He wrote that the Indians in the Morongo Valley zone were Serranos and inferior to the Gabrieliño Indians. Mission Father Juan Caballeria described them as stupid in mind and body and slothful. But the Morongo Basin Indians were known to their neighbors as Moro or Morongo and were respected by them. The Morongo Valley Indians were never forced to live at the mission, but close contact with Spanish institutions nevertheless changed their lives.[9]

HORSE THIEVES

Secularization of the California missions ushered in the era of large scale Mexican Land Grants and the vast properties of the San Gabriel Mission passed into civil, private hands. Yet, none of the private ranchos encompassed land in the western Mojave. The San Bernardino Valley *asistencia* was abandoned as were mission ranchos, and the Indians were released to make their way in a world alien to them. A good number of them turned to the only way they saw open to them for survival, lawlessness. Some Indians joined marauders and came to live on the banks of the Mojave (site 14) and some on the desert. Their favorite booty was horses driven off ranchos peripheral to the western Mojave.

Throughout the Spanish and Mexican periods and well into the American period, ranchers and farmers on land accessible to the western Mojave suffered raids on their herds of cattle and horses. Prior to European occupation the Indians had preyed on each other. The Mohaves, for example, were known to steal women and children from the Chumash and Gabrieliños on their way home from coastal trading trips; thus raids on peoples west of the mountains were customary. The Franciscan Fathers arrived in the 1770s with only a few head of cattle. They numbered in excess of 300,000 head by the time of secularizaztion, and near Cajon Pass over 60,000 cattle and some 5,000 horses grazed. Since the Indians were not herdsmen, the cattle meant little to them, but the horses served them in hunting, in fighting, and in traveling and could be traded at great profit if taken east. Large raids began early, and some of the biggest and best known were lead not by an Indian, but by an American mountain man, Thomas L. "Peg-Leg" Smith. Smith crossed the desert, probably by the Mojave Trail, in 1828-29 taking the season's furs to market in Los Angeles. Having made an assessment of rancho stock, he then returned to the Ute Indian tribe who lived near St. George, Utah. There he and Chief Walkara organized a successful California raid, returning that year with over 400 horses and mules from the San Gabriel Mission ranchos. The *Californios* pursued them across Cajon Pass and Apple Valley, but they escaped after ambushing their pursuers at Rock Corral northeast of Lucerne (site 15).[10]

Walkara's profitable round-ups continued and he was feared from California to New Mexico not only for his raids on ranches but because he trafficked in native squaws with the trappers (site 21). In the earliest raids, Walkara reportedly took horses from the San Bernardino area without anyone following him; however, by 1840 the residents were complaining that "the moon has come again and with it the dread Py-Utahs," and were organizing posses to go after him.[11] A steady decline in the fur trade as the first trappers had known it caused the mountain men of the 1840s to look for other fields of enterprise. They sold meat to trading posts, served as guides, and lived near Indian villages; and as they put it, they also collected horses from California. One such man was Old Bill Williams, and he worked not only with Walkara but with a number of other Utes. Not only the Yankees, but men such as Juan Jesus Villapando in 1832-33 led bandits across the desert. He was captured on the Mojave River by Antonio Avila. Jean Batiste Chalifoux stole many horses in 1837-38. One of the customers was the respectable trader at Santa Fe, W. H. Ashley, who was always in need of both horses and mules.

The most written about raid took place in 1839-40 when Walkara joined forces with a half dozen whites, men like Jim Bridger, Peg-leg Smith, and Jim Beckwourth. Along with 150 Indians they crossed the western Mojave,

went through Cajon Pass, and swept down on the San Bernardino ranches. Some accounts claim they visited every ranch in southern California. About 3,000 of the *Californios'* best horses and mules were driven away. Knowing they would be overtaken after they got to Cajon Pass, Walkara sent most of the raiders out into the desert with the horses. He and a few Indians hid in the willows at a watering place just over the summit. The Spanish stopped to rest, as he assumed they would, and as they slept the Utes crept up and took away their horses (site 18). The following year they were back again: American trappers, New Mexicans, French Canadians, and Indians, including former Mission Indians. They gathered horses from all over southern California including the abandoned San Bernardino *asistencia* as they made their way to a rendezvous in Summit Valley. The horses were driven up the Mojave River Valley so that they could graze along the way, but due to the relentless pace they had to keep to elude the pursuing *Californios*, the raiders lost 1,500 animals to the desert and even more before they reached Bent's Fort on the Spanish Trail. Jim Beckwourth was credited with a horse thieving trip by way of the Mojave Trail again in 1844. The Mojave River was vital to the success of these raids, and it was customary to divide the booty into several herds as they climbed the canyons out of San Bernardino Valley so that in a day or two the herds could meet at an appointed spot on the river to graze. Strays from these raids multiplied in Victor Valley and reportedly these were finally gunned down in 1948 by low-flying aircraft.[12]

In 1845 Don Benito Wilson, who lived on Jurupa Ranch, led three expeditions against the Indians at the request of Governor Pio Pico. He was an *alcalde* and called up a company of eighty-one men. The party, which included a sizeable pack train, rendezvoused on the Mojave River, traveled downstream for four days, and there saw four Indians. Although Wilson only intended to take prisoners, one Indian was immediately recognized as the famous bandit, Joaquin, due to a brand on his lip and a cropped ear. Wilson shot him, but Joaquin managed to discharge a poisoned arrow in the same instant before he died. Wilson was treated and survived to lead the party down the river to a rocky hillside and a day-long fight with the Indians. This site is judged to have been in the hills east of the first Camp Cady site (site 16). Wilson returned home with his wounded. His second campaign was in the Cahuilla country southeast of San Gorgonio Pass, but his third took him again into the western Mojave Desert. His twenty-one men surrounded an Indian village, and when the Indians gave fight, they killed all of the men and forced the women and children to return with the whites. They were found to have been neophytes and could speak Spanish. In 1848 Walkara made another successful sweep taking over 5,000 horses in a raid that raised dust on Cajon Pass that could be seen for thirty miles. The raiding party was pursued, but they managed to drive their herds across the desert and then as far away as Texas, Wyoming, and Colorado to sell them. After this raid, Peg-leg Smith reportedly retired, but Walkara continued to drive his stock over the Mojave until his death in 1855.[13]

COMMENTS AND RECOMMENDATIONS

During the period of Mexican rule the western Mojave served first as a point of entry for westward bound Yankee fur trappers with no apparent political goals. However, by the 1840s they had joined forces with marauding Indians to attack cattle ranches, the economic mainstay of California under Mexican rule. John C. Fremont, the surveyor, was a figurehead for those who wanted to annex

California to the United States. The western Mojave historical sites created during the Mexican period nearly all relate to the deterioriation of authority and the soon-to-come Mexican Cession.

NOTES

1. Harrison Clifford Dale, The Ashley-Smith Explorations and the Discovery of a Central Route to the Pacific, 1822-1829. (Cleveland: Arthur Clark Co., 1918), p. 183, and Dale Lowell Morgan, Jedediah Smith and the Opening of the West. (Indianapolis, New York: Bobbs-Merrill, 1953), pp. 200-201.

2. Elizabeth von Till Warren and Ralph J. Roske, "Cultural Resources of the California Desert, 1776-1880: Historic Trails and Wagon Roads," BLM, DPS, 1978. Authors write that Smith's data was penciled in on a Fremont 1844 map located in the archives of the American Geographic Society and that Smith also sent the data to General William Clark in a letter. I, p. 22.

3. Warren and Roske, *op.cit.*, III, p. 21.

4. Robert G. Cleland, This Reckless Breed of Men. (New York: Alfred Knoff, 1950), pp. 92-93.

5. (Glendale, CA: Arthur H. Clark, 1954), p. 175.

6. Warren and Roske, *op. cit.*, I. pp. 25-26. See also Section II for parties listed here that used the Spanish Trail.

7. Quoted in Barbara Mitchell, "Pathfinders of Antelope Valley," Antelope Valley Spectator, III(2) February, 1964, p. 18.

8. L. Burr Belden, "State in 1840s Reflected Great U.S. Expansion," Sun-Telegram, July 15, 1951.

9. O'Neal, *op. cit.*, p. 21.

10. "A Century of Indian Raids 1769-1867." Historic Portal, 1973, p. 1.

11. Quoted in LeRoy Hafen, The Mountain Men and the Fur Trade of the Far West, II (Glendale: Arthur Clark, 1965-1972), p. 341.

12. "Century of Indian Raids," *op. cit.*, p. 2, and Hofen, *op. cit.*, pp. 341-346.

13. G. W. Beattie, Heritage of the Valley, (Pasadena, San Pasqual Press, 1939), pp. 62-65.

ECONOMIC, SOCIAL, COMMERCIAL, AND DEVELOPMENT HISTORY 1840s TO PRESENT

American Migrations of the 1840s

During the 1840s, a good number of Americans immigrated to California from the Midwest. Most came by the overland trails, and many crossed the Mojave Desert by way of the Spanish Trail. This also was called the Sante Fe Trail. Several factors lay behind this phase of westward expansion: frontier settlement had already reached the waterless plains known as the Great American Desert, a depression in 1837, and the knowledge that trails had been blazed by the fur men. Further, the United States had already laid claim to the Oregon Territory, and in many minds California would naturally fall to the United States as well. Only a few of the first settlers took along wives, but by the end of the 1840s reports by John C. Fremont and letters home from the earlier settlers encouraged men to bring their families and move to the Mexican province. In 1846 a train of immigrants known as the Donner Party perished in the snow-bound mountains near Lake Tahoe, the worst western tragedy since the Yuma massacre. This would have a direct affect upon travel across the western Mojave Desert, as the news electrified immigrants setting out for California in the late fall when snow endangered and closed the northern trails.[1]

Penetration by the mountain men, permanent settlement by Americans, and the growth of coastal as well as overland trade did culminate in annexation of California by the United States in February, 1848. The Cahuenga Capitulation on January 13, 1847, actually ended the conflict which was led, in part, by men who participated in the western Mojave's history: John C. Fremont, Kit Carson, and Lieutenant Edward F. Beale. In January, 1847 a Mormon Battalion arrived in California, but too late to take part in the war. A detachment of the Mormons was assigned to guard Cajon Pass that spring from the continuing menace of marauding horse thieves from the desert. On April 12 some of the Mormon soldiers, who had completed their term of enlistment, set out for Salt Lake with 135 mules and one wagon. Although this was not the first wagon to cross the western Mojave, it was, nonetheless, a pacesetter. When the Mormons returned to establish a colony in 1851 in San Bernardino, they used wagons and began a long-standing wagon route across the western Mojave. On April 15, 1847, the last Mexican pack train set out for New Mexico. Spreading out for a mile in length, it made its way along the Mojave Trail to Forks-in-the-Road and then turned north. The Americans, who in 1848 possessed California, continued to use the Spanish Trail. One was Orville C. Pratt, a West Point lawyer, who made the trip and kept a record. He entered the western Mojave region October 18, 1848, found the Mojave River on the 19th and dug for water. Complaining of lice and the heat, he made a march of thirty miles on the 21st, "as far as our road lay up the Mojave Creek and camped at a point where the trail leaves the Creek."[2] This was believed to be at the site of present-day Oro Grande. On the 22nd he reached Cajon Pass and got news of the discovery of gold at Sutter's Creek.

The discovery had been made in January of 1848, and Sutter had done his best to keep it secret. However, by October a good many men had already become rich on their diggings, and in 1849 the stampede for California was on. A Mormon, Jefferson Hunt, led one party across the western Mojave. He was

one of those soldiers of the Mormon Battalion who had returned to Salt Lake by the Spanish Trail in April 1847. In 1848 the church had sent him back to San Bernardino Valley to obtain prices on cows and seeds. Thus, Hunt had two trips behind him when he agreed to lead an immigrant train of gold seekers in late 1849 out of Salt Lake to Los Angeles. The train consisted of 106 wagons; and those who remained with Hunt all of the way and obeyed company rules crossed the Mojave Desert safely, reaching Chino Ranch December 22, 1849. This was Hunt's first trip across the western Mojave with a wagon train, and at the Upper Narrows (site 19) they were forced to dismantle the wagons and carry their parts and contents piecemeal on the pack animals.

The saga of those who chose not to stay with Hunt is a legend of anguish. A man named Williams had a map of a short route which would cut off 500 miles from the trip to the goldfields, and both the Bennett Party (which included families) and a group of young men who called themselves the Jayhawkers decided to take it. It led some of them across Death Valley, some across Antelope Valley, and some perished on the desert. Perhaps the best known account is that of Lewis Manly.[3] The Bennett Party chose Manly and John Rogers out of their group to go ahead. The remaining twelve members of the party were to wait for them at a well in Death Valley. The two made it to Rancho San Francisquito (Boquet Canyon), and eventually returned with pack animals and relief. Only the Bennett and Arcane families were left. The others had set out and some died on the desert. John E. Wolff, *Route of the Manly Party of 1849-1850 in Leaving Death Valley,* traces and identifies the camp sites of Manly and Rogers, camps then used by the Bennett and Arcane families as they later crossed the Antelope Valley to safety (site 3). The worst problems for the Jayhawkers were in the desert southwest of Death Valley. When Manly and Rogers passed them in mid-January many of them felt that they would never reach California. They gave Manly the names and addresses of relatives asking him to let them know of their fate. In Antelope Valley the Jayhawkers' hopes rose. On January 23 one of them, Sheldon Young, wrote, "The country begins to have a different look. We are now in hopes of getting out soon."[4] Of those who left the Bennett Party and struck out on their own, we have a second-hand account of the Wade family which recites that they traveled south, found the Mojave River, and followed the Spanish Trail to Cajon Pass. To historians, the Death Valley ordeal of the Bennett Party is common knowledge; however, this dramatic episode is little known to the average American and belongs in the history of the western Mojave when interpretive talks are prepared.

When the Mormons decided to establish a colony in San Bernardino Valley, Jefferson Hunt again led the way from Salt Lake. Traveling from March to June in 1851 his train consisted of 150 wagons with 520 persons. On June 9 Charles C. Rich, Amasa Lyman, Hunt, and Joseph Matthews reached the Lugo Ranch in San Bernardino Valley, having left the main caravan near present-day Helendale (site 13).[5] A few days later the caravan with over a thousand animals reached Cajon Pass and began the month-long job of disassembling their wagons and lowering them down the steep cliffs. These Mormons had avoided the Upper Narrows used by Hunt in 1848, taking a detour some six miles west of the Spanish Trail. This route had already been worked out by freighters working for Phineas Banning and William T. B. Sanford (site 20).[6]

TRADE: RAILROAD SURVEYS

A Pacific railroad finally realized for Americans their long search for a northwest passage and a commercial route to China. The Great American Desert idea planted in the minds of easterners by Zebulon N. Pike, explorer of the Southwest in 1806, had long held up the idea of such a route. However, with the settlement of Oregon and the discovery of gold in California there was much incentive for building the line not only for commerce but to protect the stream of immigrants going west from the Indians. The federal government appropriated money for land surveys in the early 1850s and interest grew in the southern railroad route, a route that had never received much backing until 1852 even though Congress had been studying the Railroad West Project since 1849. In 1853 Secretary of War, Jefferson Davis, organized four surveys to ascertain the most practicable route to the Pacific: north between the 46th and 49th parallels; central between the 38th and 39th parallels; at the 35th parallel (the Senator Gwin Route); and at the 32nd parallel (Gila Route).[7] Of interest to this study is the exploration near the 35th parallel which was placed under Lt. Amiel Weeks Whipple. His orders read to go west in the direction of Walkers Pass and thence to the Pacific. A second survey related to the western Mojave is that of Lt. Robert Stockton Williamson. The Corps directed him to explore several partial routes to connect with lines near the 32nd and 35th routes. In general, he was to survey land west of the lower Colorado River.[8] Funds were allotted in March, 1853 for the United States Army Corps of Topographical Engineers to do the surveys. Concurrently, a merchant-trader of New Mexico, Francis Xavier Aubrey, made plans on his own to explore the 35th parallel route to Los Angeles.

Lt. Williamson's independent survey party assembled in Benicia, California, and was composed of Lt. J. G. Parke, Lt. G. B. Anderson, Dr. A. L. Hierman, naturalist, I. W. Smith, civil engineer, W. P. Blake, geologist, C. Koppel, artist, C. Preuss, draftsman, and Lt. George Stoneman in charge of a twenty-eight man military escort. Setting out July 10, 1853, the party traveled south in the San Joaquin Valley and examined five possible passes over the Sierra Nevada finally deciding that Tah-ee-chay-pah and Cañada de las Uvas were the best. Meanwhile, Lt. Parke found and reported upon San Gorgonio Pass. According to his instructions, Lt. Williamson was to follow up his work on the passes by running a line to the mouth of the Gila River. However, since little was known of the Mojave Desert which lay in between, Williamson decided to conduct a survey which, according to Albright, lay "to a point in the desert approximately half-way between the Sierras and the Mojave; returning he would strike out over the mountains to the Mojave, and from that river connect with the line previously surveyed."[9] Mounting the Sierra Nevada, he viewed the arid basin and a little north of east he saw a system of isolated peaks and short ridges which he called Lost Mountains. It was toward this chain that he directed his survey. Having gone about thirty miles east of the base of the Sierra and finding but few streams and springs, he turned back to San Francisquito Pass. Lt. Williamson went again to the Mojave River, turned west, and then ran a line connecting with this point of departure. He returned to camp and then set out for the Mojave River traveling along the base of the eastern line of the mountains. Fifteen miles out he reached Johnson River and named it. His party tried for gold, but seeing no slate rocks such as usually bear gold, they gave up this idea. From there he traveled a day and a night before reaching the Mojave River. On October 18, Williamson wrote:

> About sunset a small running stream was unexpectedly found....we rested till evening.... the party advanced and lit up the trail by piling up dry shrubs and igniting them.... As the day began to dawn in the east, and the outlines of the mountains beyond the Mojave River became visible, we reached the Old Spanish Trail, now better known as the Mormon Road, leading from the Great Salt Lake to San Bernardino and Los Angeles.[10]

He made base camp at the river and sent Lt. Parke out to run a line following the Mojave River upward while he followed the road for thirty-six miles and then turned north to Cajon Pass. Lt. Parke, going east, found the country so rough he could not believe any railroad would cross the mountains near the headwaters of the Mojave River. Williamson set out once more, and this time he descended the Mojave following maps which showed it flowing to the Colorado River. He took with him the entire escort since the Indians at the Colorado were known to be numerous. He followed the river for two days observing the desert from high points of land, then left the river and traveled into a region he described as destitute of water or grass. Thus, he satisfied himself that the Mojave did not flow into the Colorado, a significant contribution.

The history of the Morongo Valley is closely associated with that of San Gorgonio Pass. In 1853, when Williamson visited it, he claimed he had never heard of a white man in the Morongo Basin before him. Blake, the geologist, described it as a grassy valley with one adobe house, that of Mr. Pauline Weaver, at the summit of the Pass. In his report Lt. Williamson summarized that the pass name was taken from the Spanish rancho "Rancho San Gorgonio" since it was in the grant of Governor Pio Pico granted to Powell (Pauline) Weaver, Col. Isaac Williams, and Wallace Woodruff in 1845.[11]

Lt. Whipple received orders to go west along the 35th parallel from the Mississippi in May, 1853. He had already seen the west as a member of the Boundary Survey Commission in 1850-52. February 20, 1854, he reached the Colorado River at the junction known as Bill William's Fork. His survey party proceeded up the valley of the Colorado River on a well-beaten Indian trail to the Mojave villages. There Whipple reportedly abandoned what he had left of his wagons. After some time at the villages, the party selected one Cai-Rook, a sub-chief, to guide them to where the Mojave River met the Mormon Road. Traveling with an instrument wagon and pack train they crossed the eastern Mojave and March 8 came upon the Mojave River twelve miles west of Soda Lake. Whipple described it as a "beautiful stream of fresh water from ten to twenty feet wide and a foot deep at a place where it issued from the sand."[12] Following the river they struck a recent trail believed to have been made by the Williamson party. On March 9, 1854, Whipple's log read:

> This evening our Indian guide repeated the object of the Mojaves and their chiefs in sending him with us. "The road," said he, "is good. Water is sufficient. Mules do not die of thirst. Mojaves have a good heart, and are friends to Americans. We want you to write these things to your great chief, that his people may come and buy our corn and flour, and vegetables. Let them, in return, give us clothing and knives. If they need assistance, Mojaves will

> afford it, and will guide them where water and grass may be found."[13]

On March 11 a survey party ahead of Whipple reported it had lost a Mexican herder to an Indian attack, presumably the Pai-Utes. He and his three animals had fallen behind the party. Four armed Mexicans, Baldwin Mollhausen, a German who joined the expedition, and others went looking for him. Smoke gave away the location of the attackers, but when the posse reached the campsite the Mexican had been killed and his horse eaten by the Indians. Heads and limbs of the mules which had been gnawed at by the Indians lay scattered about, and the clothes of the victim were visible. The next day after traveling twelve miles, Whipple came to the Mormon Road (Spanish Trail). Their guides returned to the Mojave villages. Whipple's log described the level country in the neighborhood of the Spanish Trail. On March 13 the party struck the much-traveled Mormon Road with fresh wagon tracks going north. On the 14th Whipple recorded that they traveled fourteen miles southwest to where the road to Cajon separated from the Mojave Valley. Here they left the stream which he judged to be 150 feet wide and took the short cut to Cajon Pass as they were out of supplies.[14]

Of the Indians in the western Mojave, Whipple had little to write but did record that:

> From the Mormon Road to the base of the Sierra Nevada are scattered the wilder portions of the Cahuillas who frequently make depredations on the frontier ranchos of California.

Formerly, he judged, all the tribes had belonged to the California Missions which leads us to believe he had little information about the native population.

Francis Xavier Aubrey, the Santa Fe merchant, wanted to open up the west to commercial travel and establish Indian defense trails. He had grown up in Quebec, and at eighteen years of age (1843) left home to seek his fortune. In St. Louis he got work in a retail store, then borrowed money to go into the Santa Fe trade. In 1847 he made an unprecedented two trips to New Mexico. He was noted for fast long-distance riding and for energy and endurance. He soon tired of these trips and wanted to go to San Francisco; so between 1852 and 1854 he made two trips to the Bay Area driving New Mexico sheep west for the booming California market. It was his habit to explore the country along the way looking for possible railroad and wagon routes on his eastward trips. November 16, 1852, he left Santa Fe with ten large wagons, 3,500 sheep, 100 mules and horses, and traveled the southern route through Tucson to Los Angeles and on to San Francisco. He sold his stock readily, left Stockton for his return trip June 20, 1853, and set out in search of a route along the 35th parallel. He crossed the Sierra Nevada via Tejon Pass and entered the western Mojave Desert on July 11, 1853, the day after Lt. Williamson had left Benicia on his assignment in the same general area. Aubrey kept brief diaries of his trips which were published by the Arthur H. Clark Company in 1938. The following synopsis of entries relative to this study are taken from this source.

July 13 he traveled thirteen miles east and struck the Mojave River, good water, grass, and cottonwoods. He made twenty miles the next day going east along the river finding abundant timber and grass and on the fifteenth

left the Mojave to his right and traveled northeast. He saw no Indians in the western zone. In October he was in Albuquerque; he headed up a party and drove 50,000 sheep to California. There he met Lt. Amiel Whipple and gave him a copy of his journal. In 1854 he made a similar return trip over Tejon Pass and onto the western Mojave, arriving in Santa Fe August 18. That same day he entered a bar, argued with a hot-headed citizen, and was stabbed to death. Aubrey left notes to advise that the Tejon was about on the 35th parallel but that the Cañon de Uvas was much the best place for a railroad pass.[15]

Other federal agencies had gotten busy with surveys that reached into the western Mojave as soon as the Treaty of Guadelupe-Hidalgo was signed. The Boundary Commission worked near it in the early 1850s, and in 1852 Col. Henry Washington erected a baseline monument on Mt. San Bernardino, a fixing point for surveys made in the southern part of the state. In 1855 funds were available from the General Land Office to survey the western Mojave (site 23). The scope of this study does not permit a perusal of their field log books, however, a secondary source tells us that Col. Henry Washington worked in Morongo Valley. He crossed east and north of the "Maringa" Indians and missed their camp at Big Morongo Canyon. Four miles from the Oasis of Mara he saw a pile of rocks containing a bunch of Indian arrows, and he recorded Indian trails which in turn appeared on maps published in 1856. In 1855 Washington's survey party ran across Old Woman Springs (site 22). Alex P. Greene later ran section lines in Morongo Valley.[16]

In the 1860s the first transcontinental railroad was under construction destined for completion at Promotory, Utah, where its east and west segments would meet. At the same time the Union Pacific Railroad, Eastern Division, looked for a route for a second transcontinental railroad to the south along the 32nd or 35th parallels. Surveys were undertaken so that the data might be placed before Congress and subsidies be attained to finance its building. General William J. Palmer, Director of Surveys, worked in the Mojave Desert in January and February of 1868. His engineers found a good bed south of the Old Mojave Road in the eastern Mojave, crossed the Mojave River, and took their line directly to Tehachapi Pass.[17] His line was about where the Southern Pacific later ran between Daggett and Needles. At the same time, Palmer staked out a connecting route with San Diego which took him into Morongo Valley. In his notes he envisioned a line along the long depression westwardly by a very gradual ascent for twenty miles with an almost imperceptable inclination to the summit of Morongo Pass where it would attain an estimated elevation of 2,300 feet. In 1869 when his report was published, it claimed the 35th parallel line was favored over the 32nd for several reasons: better climate, away from the "Apacheria," greater elevations and better views, and rich mining activity except on the "unproductive desert." The Mojave River was described as dependable, and it was planned that pipes would convey water from the western to the eastern Mojave all the way to the Colorado River if necessary.

NOTES

1. Beattie, *op. cit.*, pp. 79-82.

2. Hofen, *op. cit.*, p. 357.

3. Death Valley in '49 (Ann Arbor: University Microfilms, 1966).

4. Quoted in John Caughy, "Southwest from Salt Lake in 1849," Pacific Historical Review VI(1) June, 1937, p. 156. This excellent account and the sources it comments upon could be used to expand on the sketch presented here. See Warren-Roske Report for other firsthand accounts in Section III.

5. L. Burr Belden, "First of Mormon Settlers Reached Valley Century Ago," Sun-Telegram, June 3, 1951.

6. Beattie, *op. cit.*, p. 83.

7. George L. Albright, Official Explorations for Pacific Railroads, (Berkeley: University of California Press, 1921). p. 43.

8. *ibid.*, p. 134.

9. *ibid.*, p. 139.

10. U. S. War Department, Pacific Railroad Reports. V. 5, p. 62.

11. O'Neal, *op. cit.*, p. 93.

12. Quoted in Albright, *op. cit.*, p. 116.

13. Pacific Railroad Reports V. 7, Part I, p. 124.

14. *ibid*, and Baldwin Mollhausen, Diary of a Journey..., (London: Longman, Brown, and Co., 1858) pp. 298-305.

15. Philip St. George Cooke, William H. C. Whiting and F. Xavier Aubrey, Exploring Southwestern Trails 1846-1854; (Glendale: Arthur H. Clark, 1938), pp. 353-379.

16. O'Neal, *op. cit.*, pp. 14, 29, and 36.

17. Casebier, *op. cit.*, p. 155.

TRAILS AND WAGON ROADS

At the same time the railroad surveys of the early 1850s were being carried on, traffic on the Spanish Trail, or Mormon Road as it was by then more commonly called, flourished. Sheep, pack trains, and wagons used it, and in 1855 Jules Remy and Julius Brenchley led a scientific expedition for the French government across the western Mojave on that trail.[1]

By far the most important figure of the decade for trail development in the western Mojave was Edward F. Beale. Beale joined government services early and at fifteen was in the Navy. During the California takeover, he fought with John Fremont and Kit Carson and in 1852 was appointed Superintendent of Indian Affairs for California. He was then in Washington, and on his trip west he too explored a route for a railroad to the Pacific. Following the Amargosa Desert route into the western Mojave, he struck the Mojave River at the Forks-in-the-Road and went from there to Cajon Pass. The following year he was raised to Brigadier General and managed to construct Fort Tejon in Cañon de Uvas. One very important reason for its construction was to check horse thieves. In 1855 he acquired Rancho La Liebre in Tejon and raised cattle, but two years later he turned his attention to roads. This was because he was appointed superintendent of a wagon road survey from Fort Defiance to the Colorado River along the 35th parallel. In conjunction with this task he commanded the well-known Camel Corps, and he was partially responsible for its existence. In 1836 Major George H. Crasman had suggested to the government that they use camels for military service. Jefferson Davis became Secretary of War in 1853 and he favored a camel experiment and got through an appropriation bill of $30,000 to import camels for the military. Thus, in June, 1857, when Edward F. Beale set out to survey a wagon road, he tested twenty-five camels on a desert crossing. Beale's tedious trip to the Colorado is outside this study. At the Colorado River the camels were swum across in groups of five, marched along the route paralleling Whipple's route of 1854, and into the Mojave River Valley. The caravan stopped at Camp Cady, Forks-of-the-Road, Fish Pond, Grapevine, Cottonwood, Point of Rocks (Helendale), and here turned west crossing the Mojave River near present-day Bryman. Marching on the mesa alongside the river, they reached Lane's Crossing. At Helendale, Beale sent two of the camels on to Los Angeles and hence to Wilmington. Reportedly, one of these camels, upon arriving at Wilmington, refused to drink water even though it had been without water for ten days.[2] The other camels crossed Antelope Valley to Beale's Tejon ranch. Beale reported:

> The camels are now keeping up with the train, and came into camp with the wagons. My fears as to their feet giving out, as I had been led to believe from those who seemed to know, have so far proved entirely unfounded, though the character of the road is exceedingly trying to brutes of any kind. My dogs cannot travel at all upon it, and after going a short distance run to the wagons and beg to be taken in. The camels, on the contrary, have not evinced the slightest distress or soreness; and this is the more remarkable, as mules or horses, in a very short time, get so sore-footed that shoes are indispensible.[3]

In 1859 Beale crossed the western Mojave once again leading a party of animal drivers (no camels) and a work force of 35 to 50 men.[4]

Wagon traffic grew considerably in the late 1850s. Phineas Banning and David Alexander, partners in the hauling business at San Pedro Harbor, inaugurated long, mule-drawn freight trains going from the Los Angeles Basin to Salt Lake City in 1855. These went west over Cajon Pass and then crossed the western Mojave. Miners and other travelers going the economy class sometimes traveled in the wagons. In 1858 the Indians, alarmed at the number of intruders on their road, increased their attacks, and in 1858 a few families from Iowa on the Santa Fe Trail about 100 miles east of the Colorado River suffered a heavy attack. In reaction, Brig. Gen. Clarke in command at San Francisco of the Department of California, War Department, instructed Lt. Col. Hoffman, Sixth Regiment, to establish a post to hold back the Mohaves and to punish them. Hoffman took his company to San Pedro, thence to Cajon Pass, and across the western Mojave to the Colorado River. After a skirmish with the Indians, he marched his companies back across the desert and left them at Banning. On Clarke's orders Hoffman picked up four additional companies and took them to the site of Fort Mojave by way of the lower Colorado River. He had his two companies in Banning join him there with another march across the desert. By May 1859 Fort Mojave became an active fortress, and the safety it offered immigrants and wagon trains further stimulated traffic into the western Mojave. By the 1860s traffic in wagons alone across the Mojave may have reached 2,000. An enlisted man, Eugene Bandel, wrote letters home to Germany describing the desert he crossed and complained:

> The heat by day is unbearable, the soil mostly sandy, and, except in places on the river level, very dry. The plateaus and mountains at some distance from the river are either entirely rocky or covered with a top surface of sand and stone. Vegetation is most limited as to species. The mesquite and the cactus alone are worth mentioning. From the fruit of the former, the Indians make a good flour of a very sweet taste. The cactus grows in a straight round stem as thick as a man's body and often to the height of twenty feet. In the animal kingdom, there are rattlesnakes, as well as other varieties of snakes, and countless lizards.
>
> It seems impossible to me that these cowardly Indians with their bows and arrows (without metal points) would risk resisting us. It is possible they might sneak near, by night, and steal our beasts of burden or even kill a few of our command; yet they would never expose themselves to our bullets by day....[5]

Fort Mojave may have subdued the Mohave Indians who were settled argiculturists, but it did not harness the neighboring Pah-Utes in the eastern Mojave, a hunting people. In 1860 their attacks on whites, such as the murder of Robert Wilburn in the Mojave River Valley January 23, 1860, and the murders of Thomas S. Williams and John Jackman at Bitter Springs in March, stirred public indignation to the point where General Clarke took action. He sent two companies out under Capt. James H. Carleton to punish the Indians and to attack any Indians found on the desert.[6] Some ten miles

down the river from Forks-in-the-Road where the Mojave River surfaces, Carleton built a base camp which he shortly named Camp Cady (site 1). During the campaign, Carleton's troops ranged widely over the desert and went south to the western zone and into the Granite Mountains. July 1, 1860, the Pah-Utes came to Carleton seeking a peace treaty. Following this, two redoubts were established outside the western Mojave and Camp Cady was abandoned.

By this time a former mountain man, John Brown, Sr., had moved to San Bernardino. In partnership with Henry W. Willis, a Superior Court Judge, and George L. Tucker, he obtained a twenty year charter from the State Legislature to build and operate a toll road through Cajon Pass. This would take the place of the shortened version of the Spanish Trail pioneered by Phineas Banning's brother-in-law, Stanford, and used by immigrants since 1851. Thus, with protection from the Indians and a dependable supply road, some of the first stock ranchers and agriculturists came into Victor Valley. One was John Brown, Jr., who took advantage of the Homestead Act to settle on a ranch on the Mojave River named Rancho Verde (site 25). The Brown Road pioneered a shorter route through to the Barstow area much like the present Stoddard Well Road. Eighteen years later Brown and his brother sold the toll road out to Tay and Lawrence. In the 1860s regular stage service was in operation along the Mojave River. The journalist-historian, L. Burr Belden, described wagon travel in this period when he wrote:

> There were long trains of westbound covered wagons hauled by multiple yoke of oxen or by mule teams. The wagons usually were used in bringing families and a minimum of household furnishings to occupy the broad acres of California's valleys. To these slow, plodding wagon trains a station was welcome. It had limited supplies of staple groceries, generally a forge and someone who could shoe animals, and often a small chest of medicinal supplies.
>
> These way-points were in no sense hotels. Travelers slept in, or under their wagons, cooked at campfires or in stoves aboard the wagons.[7]

Still another trail was blazed by Powell (Pauline) Weaver, whose adobe stood in San Gorgonio Pass. Weaver was miner and frontiersman and kept his road a secret. It was secret. It was said to have led up the Morongo Valley to Yucca Valley, then on to Twentynine Palms and ultimately to the Colorado River (site 36).[8]

In 1860 an exciting gold discovery was made in Bear Valley by William F. Holcomb. Soon miners constructed a wagon road down the northerly side of the mountains to lower freight costs, and it ultimately reached Brown's Road at the Verde Ranch (site 26). With the outbreak of the Civil War, troops were removed from Fort Mojave and the fort closed; however, with an active quartermaster depot at Camp Drum, Wilmington troops and supplies crossed the desert in good number going to posts in Arizona. In 1863 posts along the Mojave Road were restaffed. One reason for stationing soldiers on the desert was to stop volunteers who might be going east and south to join the Confederate Army. One report told of a group of volunteers for the Confederate Army setting out

from Visalia, going south through Walker's Pass, and across Antelope Valley. Along the way they left a few burned houses whose occupants were supposedly Yankees.[9] Shortly after the end of hostilities in 1866 the Army redoubts were again abandoned. Indian attacks flared up anew in the western Mojave, citizens in San Bernardino protested, and the forts were again garrisoned on what was then being called the Government Road. Camp Cady was moved a mile west to higher ground and adobe structures erected. Still, the attacks persisted. At this time, Lt. Ord and his squadron were besieged by Indians in a western Mojave mountain range which now bears his name. Dr. M. E. Shaw, a surgeon, was murdered when riding in an Army ambulance east of Camp Cady, and five men were killed in a punitive expedition under Lt. Hartman, south of present-day Daggett.

Even in the 1860s Indians from the western Mojave made forays into southern California and stole horses. In 1866 they massacred the owner of the Rancho San Pasqual and one of his employees. The year before Los Angeles newspapers carried a story about a plot to sack San Bernardino and carry the loot to Baja California. The several hundred men involved were to have assembled on the Mojave Desert for the foray.[10]

In 1866 three cowboys were killed by Indians at the Las Flores Ranch in Summit Valley, precipitating what has been termed the last Indian fight in southern California (site 27). The thirty-two day campaign ended the major problem of Indian marauders, but in 1869 still another white man was killed near Las Flores Ranch. One last clash remained, that of the much written about hunt for Willie Boy (site 28).

COMMENTS AND RECOMMENDATIONS

Much attention has been given to the period of wagon roads and trails. Some historians feel the Mojave Road itself constitutes a site. The portion between Cajon Pass and Camp Cady lies in the western Mojave zone and is thus to be included (site 29). Two other road sites of historical significance lie in the study zone: Rabbit Springs (site 14) and Black Canyon (site 30).

NOTES

1. Warren and Roske, *op. cit.*, III, p. 17.

2. C. Cambridge, "Camels of Uncle Sam," Mohahve III, pp. 45-46.

3. Terry Suss, *op. cit.*, p. 91.

4. Warren and Roske, *op. cit.*, II, p. 81.

5. Eugene Bandle, Frontier Life in the Army 1854-1861, (Glendale, CA: Arthur H. Clark Co., 1932), p. 271.

6. Dennis G. Casebier, Carleton's Pah-Ute Campaign. (Norco, CA: Dennis Casebier, Pub., 1972), p. 12. This provides a scholarly history of the campaign and of early Camp Cady.

7. Sun-Telegram, July 21, 1963.

8. Warren and Roske, *op. cit.*, II, p. 20.

9. Sun-Telegram, January 6, 1952.

10. Robert G. Cleland, Cattle on a Thousand Hills. (San Marino: The Huntington Library, 1941), pp. 96 and 136.

DESERT RAILROADS TO DESERT AUTO ROADS

July 1, 1862, President Abraham Lincoln signed the Pacific Railroad Bill, which provided for funds to build a road to the Pacific Coast. This was completed in May, 1869 when the rails of the Central Pacific and the Union Pacific met at Promontory, Utah. The formation of the Central Pacific brought together four men destined to control the railroads of California and indeed the state itself for close to two decades. They were Collis Huntington, Mark Hopkins, Charles Crocker, and Leland Stanford. Since federal subsidies for the Pacific Railroad ran more than $60 million in government bonds and 20 million acres of land, the Big Four, as they were called, emerged in 1869 as the biggest railroad entrepreneurs in the west. They had already chartered the Southern Pacific Railroad in 1865 to appear as a competitor to their other enterprises. Under its name they monopolized the coast around San Francisco and ran a line down the San Joaquin Valley buying up smaller lines along the way. Their Valley Line went over Tehachapi Pass to Mojave and south to Los Angeles. By the time the western Mojave was in line for a railraod to take traffic east and out of the state, the Southern Pacific had a web of tracks in California. They monopolized freight and travel, and any exit or entrance by a competing railroad across the Mojave Desert would be carefully monitored, or better said, blocked out.

The negotiations which lay behind the first road to cross the desert involved several midwestern lines. The Atchison and Topeka Railroad chartered in Kansas in 1859 was the first to plan a new railroad into California somewhere along the line of the Santa Fe Trail. They built west from St. Joseph and Topeka but halted at Albuquerque to re-examine the desert ahead and to contemplate the Octopus--the Southern Pacific Railroad--and its reaction to an encroachment on its California monopoly. Meanwhile, in 1866, an Act of Congress created the Atlantic and Pacific Company, authorizing it to build west along the 35th parallel to the Colorado River and then by the most practicable route to the Pacific Ocean.[1] After building to Missouri, they fell into default, and their rights fell eventually into the hands of the St. Louis and San Francisco Railway Company. Atchison, Topeka and Santa Fe personnel, still bogged down in Albuquerque, negotiated with the St. Louis and San Francisco personnel for the charter of the Atlantic and Pacific and the rights they had by it to build to the Pacific Ocean and to receive land grants from the government along the way. In January, 1880 the Atchison, Topeka and Santa Fe succeeded in securing a half of the Atlantic and Pacific stock and launched construction west under the name Atlantic and Pacific. But the Southern Pacific had not slept through this series of negotiations; instead Collis Huntington had secretly purchased a controlling interest in the St. Louis and

and San Francisco Railway which still held the other half of the Atlantic and Pacific stock. He was thus in a position to block and control any work undertaken by the Atlantic and Pacific. To preserve the Big Four's network in California, Huntington chose to delay the Atlantic and Pacific road building between Needles and the coast. Southern Pacific already had tracks over Tehachapi Pass and through Mojave and Palmdale since these stops were on her San Joaquin Valley line to Los Angeles. During the delay, Southern Pacific constructed a line from Mojave southeast and to the Colorado River along the 35th parallel following the specifications of the Atlantic and Pacific charter. The specifications included use of American made steel rails. These tracks had to be ripped up and relaid. The Santa Fe meanwhile pushed on out west into Arizona Territory, and to the banks of the Colorado River where they began construction of a bridge some twenty miles south of Needles. July 12, 1883, the tracks of Atlantic and Pacific and Southern Pacific connected at Needles. Other agreements over transfers and connections had to be worked out, but in the end Southern Pacific was satisfied that it had kept competitors out of California. Santa Fe was not, and thus offered to purchase the new Southern Pacific line between Needles and Mojave. To everyone's surprise the deal was closed on August 20, 1884, and the 242 miles of Southern Pacific trackage went to Atchison, Topeka and Santa Fe for $30,000 a mile. Santa Fe also leased facility and trackage rights between Mojave, Oakland, and San Francisco.

Santa Fe had not made a crack in the Southern Pacific monopoly without reason. Cause lay in the fact that in 1879 the Atchison, Topeka and Santa Fe Railroad had obtained a land grant from the Mexican government to build a railroad from Sonora to the Gulf of California termination at the boundary line with the United States. This snow-free access to the California coast and shipping opportunities there gave Santa Fe something to deal with at the bargaining table. As a trade off, Southern Pacific obtained a connecting line to the Mexican railroad and Santa Fe got the desert tracks. Towns and sidings developed between Barstow and Boron, such as Hinkley and Kramer. At the last, a branch line ran northward to Johannesburg in the Randsburg mining district. In 1911 Santa Fe rebuilt one of its famous Harvey Houses at the Barstow station (site 60) which by then with its railroad round house and small repair shops was the nucleus of a growing town. Thus, western Mojave access played an important role in breaking the monopoly Southern Pacific held not only on railroads, but on politics, shipping, courts of justice, and on major decisions made in every hamlet in California.

Before the Post Office Department established the Parcel Post system in 1913, the populace used express companies. Among these companies, Wells Fargo figured prominently on the western Mojave. Like others, it used the fastest means of transportation available such as a combination of railroads, stages, and horses to move its consignments. In 1869 the Southern Pacific Railroad purchased a large share of Wells Fargo stock, and from then until 1897, one and usually two of the Big Four were members of its nine person board of directors. For this era the following Wells Fargo agencies are listed followed by the source of information.

Mojave, 1879	Wells Fargo & Co's Express List of Offices, Agents, and Correspondents, Corrected January 1, 1879. (No information)
Calico, 1883	J. H. Kincaid & Co., agents. Wells Fargo & Co's Express List of Offices, Agents, and Correspondents. (San Francisco, 1883).
Daggett, 1883	R. H. Wood, Jr., Agent. Wells Fargo & Co's Express List of Offices, Agents, and Correspondents. (San Francisco, 1883).
Lancaster, 1886	W. H. Storey, Agent. Wells Fargo & Co's Express List of Offices, Agents, and Correspondents, 1886.
Barstow, 1887	George R. Gooding, Agent. Wells Fargo & Co's Express List of Offices, Agents, and Correspondents. January 1, 1887.[2]

The second railroad of this era to come into the western Mojave was an outgrowth of the pressure in San Diego for a rail line to connect the town with national commerce. The Santa Fe at this time was still building out from Albuquerque under the Atlantic and Pacific charter. In 1881 a citizens' committee from San Diego incorporated itself as the California Southern Extension Railroad Company and proposed to build a road to meet the Santa Fe somewhere in southern California. California Southern ran their tracks north from San Diego, past Oceanside, Temecula Canyon, then north to San Bernardino. Thence, the track bed was prepared on an older roadbed in Box Canyon in Cajon Pass and went east. Meanwhile, the Atchison, Topeka and Santa Fe began work on tracks extending from Waterman Junction (later called Barstow) to Box Canyon. Stops in the western Mojave included Newberry, Daggett, Barstow, Hodge (formerly Hicks), Oro Grande, Victor, and Summit.[3] This final link not only brought San Diego into the transcontinental system, it also took the Santa Fe route to the Pacific. The main line from Los Angeles to Chicago went north through Cajon Pass to Barstow and then east to Needles. Customers of the future would have a choice of rail service out from the east to California: Santa Fe or Southern Pacific. A rate war followed wherein rates dropped as low as $1 from Missouri to Los Angeles. As a result, California experienced the "Boom of the 80's." Thousands of midwesterners moved into California for good, and real estate development gave birth to a host of new towns. Where water would support people, this trend even effected the western Mojave as is seen in the birth of Hesperia.

In 1900 Collis Huntington passed away, opening up an opportunity for E. H. Harriman, leader of the Union Pacific Railway, to acquire a large block of Southern Pacific stock. Harriman thus controlled Southern Pacific. One of the first contenders for trackage in his new sphere of influence was Senator William A. Clark of Montana, a copper king, who had recently bought the Los Angeles Terminal Railway. It had access to the San Pedro Harbor from the west end of Terminal Island. Clark was starting surveys to connect this railroad

with trackage to Salt Lake. The struggle between these two forces is included in Myrick's *Railroads of Nevada and Eastern California,* Vol. II, pp. 626-645. Finally, a truce was called and a compromise agreement in July, 1902 allowed Clark's work to proceed. The line ran southwest from Caliente, where work had ceased in 1901, to Daggett. There the line would connect with the Santa Fe and use its facilities to Barstow and on over Cajon Pass. By December, thirty miles of track and twelve more of grading were completed northeast out of Daggett, and in April the two grading camps, one settling out from Caliente and the other from Daggett, were but forty miles apart. In the summer of 1905 the crews suffered so from the heat and from sandstormms that they had to suspend work during the middle of the day. Two hundred and fifty teams of mules and six hundred men were working north from Daggett. The tracks met on January 30, 1905, at Dry Lake, Nevada, and regular service started in May. Wells Fargo got express privileges from Harriman, and a mail service between Salt Lake and Los Angeles was initiated which cut a full day off delivery.[4] The railroad dropped the name San Pedro when that harbor community was incorporated into Los Angeles. In 1922 the line was purchased by Union Pacific with its headquarters main division point and roundhouse at Yermo.

Widescale mining operations got underway at Calico north of Daggett in 1880; thus, as the transcontinental railroads lay their rails but a few miles south, some reaction could be expected from the miners. The Southern Pacific tracks built out from Mojave reached Waterman Junction on October 23, 1882, and on November 13, 1882, the trains were running east into a stop called Calico. Calico was on the south side of the Mojave River seven miles south of the mining camp. In order to avoid confusion the station name was changed from Calico to Daggett in the spring of 1883. That year was a big one for the Calico mines from the standpoint of both silver and borax. Borax was exploited first in the area by William T. Coleman and Company and later by F. M. Smith and his Pacific Coast Borax Company. In 1884 ores from the Silver King Mine were hauled seven miles to the company's fifteen-stamp mill on the Mojave River in sixty-ton train loads. These were wagon loads, three wagons each pulled by teams of twenty mules each. A year later the owners of the Oro Grande Mining Company decided to build a branch railroad to connect Daggett to the town of Calico. At Daggett the railroad would connect with the Atlantic and Pacific Railroad.[5]

A spur road was planned to the Snow Bird Mine via Barber Mill. Surveys were begun over the ten mile road, but before it got underway, Calico began to slump and a fire destroyed the Oro Grande Mining Company mill. Finally in 1888, after the Oro Grande Company had completed a second new mill, it built a narrow guage railroad from the Waterloo Mine to its new sixty-stamp mill. Powered by two small saddletank locomotives the train took the loaded ore cars to Daggett and returned to Calico with loads of timbers from Flagstaff, Arizona, and other supplies. Transportation costs were reduced from the $2.50 per ton charged by the mule-team operators to seven cents per ton. The Oro Grande Company sold out to the Waterloo Mining Company of Wisconsin and the Calico railroad was included in the sale. The Waterloo operation failed, and in 1903 the narrow guage rails were removed. When Walter Knott restored Calico ghost town, a new Calico and Odessa Railroad came into being, built and operated by Shafe-Malcom Enterprises.[5]

The borax properties in the Calico district were the next to warrant a railroad. In the late 1880s the borax was hauled by twenty-mule teams down

Mule Canyon and into the Atlantic and Pacific Railroad station at Daggett. A steam traction engine was tested in 1894, but it was not until 1894 that Francis Marion "Borax" Smith began to build a narrow gauge railway to span the eleven miles between the town of Borate and Daggett. The train was powered by two Heisler locomotives called the Francis and the Marion and maneuvered the steep grades to give successful service to Smith's borax mines.[6]

Prior to World War I travel in automobiles began. Auto stages replaced the horse-drawn stages in Antelope Valley. A dirt road paralleled the Santa Fe tracks east to Needles and was called the National Old Trails Highway. Postwar many more automobiles were on the road, and a shortened version of the Santa Fe Trail or Old Mormon Trail to Salt Lake was popular. It became the Arrowhead Trail and credit for its construction goes to Arthur L. Doran, a Barstow resident who served for many years as county supervisor. During the 1920s crews came out to the desert and surfaced both of these trails to the state border. The National Old Trails Highway became U. S. 66, and is now U. S. 40. The Arrowhead Trail became U. S. 91 and now U. S. 15. In the mid-1920s, the 91 highway was routed directly from Yermo to Barstow. Earlier it had joined U. S. 66 at Daggett. Erection of a viaduct carrying the highway traffic to Las Vegas changed the nature of the business district in Barstow by creating a second cluster of stores.[7]

NOTES

1. Southwest Pacific Railroad Company, Atlantic and Pacific Railroad Company, Statutes, Conveyances, and Documents (New York: Stockholder Job Printing Office, 1867). *passim.*

2. Wells Fargo Bank Museum, 475 Sansome Street, San Francisco.

3. Donald Duke and Stan Kistler, Santa Fe-Steel Rails through California (San Marino: Golden West Books, 1963), pp. 10-17.

4. George Kirk, "A History of the San Pedro, Los Angeles, and Salt Lake Railroad." Ms., A. B., Pomona College, 1934, pp. 44-47.

5. David F. Myrick, Railroads of Nevada and Eastern California, Vol. II. (Berkeley: Howell-North Books, 1963), pp. 814-822.

6. *ibid.*, p. 823.

7. California Interstate Telephone Company, Romantic Heritage of the Mojave Valley, 1961; Burr L. Belden, "Waterman Junction," Sun-Telegram, Sept. 13, 1963.

MINING FRONTIER AND MINERAL DEVELOPMENT

INTRODUCTION

In the historic period the first miners to be in the western Mojave Desert were those passing through on their way to the goldfields of northern California. They were immigrants such as the Jayhawkers who came across the Antelope Valley in 1850. Gold was discovered at Holcomb Ranch near Big Bear in the 1860s, and,as noted above, those miners built a road to Verde Ranch in Victor Valley. Mining in the Slate Range was active in the years 1860-65, and we read of various prospectors on the desert after that date. One of note was John W. Searles who discovered borax on the surface of a large lake in 1862, later known as Searles Lake. Although north of the subject Mojave zone, the impact of these first borax mines was felt when the borax was hauled south and through the zone. Some years later twenty-mule team wagons were hauling borax into the town of Mojave and packing machinery and supplies back up north (site 2). The Eagle Borax Company, south of Furnace Creek, started up sometime between 1875 and 1880. Ed Styles hauled the first four loads from it out of Death Valley and into Daggett. William T. Coleman had borax hauled from his deposits in the Amargosa area to Daggett as well. He hired Charles Bennett to run a freight line over the same line laid out by Styles: Saratoga Springs, through the Avawatz Mountains, past Cave Springs, Garlic Springs, Coyote Holes, Hawleys, and into Daggett. When Bennett's contract came to an end, Coleman hired J. W. S. Perry and ordered him to triple capacity of the tonnage. Perry pioneered a twenty-mule team route commencing at Mojave and going northeast.[1] Many of the old photos we have of the twenty-mule teams were taken not in Death Valley but among the hills northeast of Mojave, where the picturesque scenery caught the photographer's eye.

Gold and silver mining in the western Mojave developed in the 1880s, although there are reports of earlier existing mines. The 1880 boom continued on into 1885 when the depreciation of silver set in. The expenses of desert mining were so great that when the price of silver fell below sixty five cents an ounce in the late 1880s, even the richest mines closed down production. Thanks to the Sherman Silver Purchase Act of 1890, the industry revived; however, too much silver came onto the market and it again neared collapse. People went back in the 1890s looking for gold; this surge continued past the turn of the century, then dwindled. In addition to the precious metals, mining in borax, copper, tungsten, iron, and nonmetals established the western Mojave as a major contributor to California's mining industry in the early decades of the twentieth century. Then, the Great Depression sent the unemployed into the desert in 1930s to renew their efforts in locating gold. Magazines began to carry the success stories, and old trails led claim seekers back once more into the hills. Some struck it richer than any before them.

The Mojave Desert is a good example of an area where mineral deposits have occurred in clusters of large varieties of mineral ores. According to James Hill's *Mining Districts in the Western United States,* when such a mineralized area is discovered and locations have been made upon it, a miners' meeting is called, regulations are adopted beyond the simple state and federal regulations, and the geographical limits of a district are

defined. The name for the district settled upon at the meeting does not always correspond with the locality, but the district is formed in order to have an easily accessible record for claims. The federal government keeps no list of claims, nor does the state, and the county recorder's files are not always organized in a manner that make them easy to work with. The district records help in this regard. Many districts are subdivided into smaller units referred to as camps. Since deposits are as a rule found in mountain ranges, many of the districts bear the names of mountains. The districts are known for the metal most importantly produced in each. Hill's catalogue of mining districts relative to the western Mojave zone in 1912 includes the Mohave, Rosamond, Alvord, Blackhawk (Silver Reef), Grapevine, Fremont Peaks, Kane Springs, Morongo, Ord, Oro Grande, and Silver Mountain districts.

At present a desert-wide study is underway authored by Dr. Gary Shumway and Russell Hartill, California State University, Fullerton, and Larry M. Vredenburgh of the Bureau of Land Management. They will inventory many of the hundreds of historic mine sites on record for the western Mojave or direct the reader to sources of such an inventory. This historical overview will have as its purpose a brief narrative background to give meaning to mine sites recommended as points of interest and to give meaning to mines which added substantially to the history of the western Mojave zone. In addition to historical site sheets, the sources for this section have been periodicals, interviews, and publications of the California Division of Mines. For organization purposes the mine sites are discussed under four headings: Barstow-Daggett, Victor Valley, Morongo-Johnson Valley, and Antelope Valley. Some overlap is present; however, the table on sites will provide exact locations wherever possible.

BARSTOW-DAGGETT

Silver mining in the western Mojave during the 1882-93 period centered notably upon the Calico Mining District (site 34) and secondly upon the Grapevine Mining District. Waterman Mine (site 35) at the latter lay just north of Barstow, but west of the Calico District. It had a colorful owner and thus has received much attention in popular literature.

This research came upon several gold producing mines worthy of Class II investigations. Some initial discoveries of gold were made at Coolgardie Mine (site 38) north of Barstow in the early 1900s, and for the next few decades dry placers operated there. Southwest of Coolgardie was a minor dry placer gold camp, Murphy Mine, and between Lane Mountain and Black Mountain in the same area north of Barstow a well-known watering place for miners was located. It was known as Murphy's Well and lay close to Pumice Quarry (site 46). From the wells, trails led to numerous prospecting locations. Goldstone City (site 39), now a ghost town, lay just south of the present Camp Irwin Military Reservation border, and it served mines nearby in the 1880s. Its biggest gold boom was between 1915 and 1920.

Back in 1860 Charles Alvord found black manganese laced with gold in Spanish (Mule) Canyon (site 40) in the Alvord Mountains. Afterwards, there was gunplay; Alvord would not divulge where he had seen the gold, and he was murdered. This, the first Alvord mine, was never found. However, pro-

spectors were successful in the 1800s in locating valuable quartz veins in the mountains which bear Alvord's name. The Alvord Mining District (for which records are on file for a number of claims and where a mill was at work in the 1890s) should be looked into as a possible resource on mining which included gold. However, according to recent surveys, only stone buildings remain.[2] The Ord Mining District (site 47) dates back to a gold rush in the Ord Mountains in 1865. In 1900 it was a large and intensively worked complex. At that time it was described as a group of 23 claims, silver, copper, and gold producers, nine miles from Daggett. The Ord mines were then owned by H. L. Drew and Captain J. B. Osborne of San Bernardino who had invested $60,000 in their development. By December, 1907, seven of the claims had been purchased by Los Angeles and Pasadena investors.[3] Meanwhile, the Ord Mountain Gold Company was pushing development and working a large force of men on two shifts.[4] A town site had been surveyed near the mine and named Ord after the same desert surveyor and Civil War general for whom the mountain was named.[5] This important district has not been designated as an historical site by any local group, but it bears some on-site investigation for the remains of the mine, or town, or both.

Between 1894 and 1903 borax grew in importance in the western Mojave, and the Pacific Coast Borax Company built a large plant in Daggett.[5] In 1904 indications were that the borax boom would continue for fifty years and that the borax would be concentrated and packed at Daggett thus creating a going industry for this desert town, but as it turned out production soon dwindled.[6] During the boom, the area on the north side of the Mojave River could boast the greatest production of borax in the United States, and at Marion (site 42) there was a large borax roaster. Borate (site 43), a booming mining town in the Calico Hills, is also a point of interest. Alf's Blacksmith's Shop (site 45), closely associated with the borax industry, opened in Daggett in 1890. Paradise Springs lay twenty miles northeast of Barstow, and inside the Camp Irwin Military Reservation, was used by prospectors in the area, as was Lane's Well (site 44). Before leaving the Barstow-Daggett area, mention should be made of the Fremont Peak group of mines northwest of Barstow (Fremont Peak Mine, Tillie Rand Mine, Silver Dome Mining Company, and the White Butte Feldspar Deposit) and the Surprise District just north of Barstow.

NOTES

1. Jack Branstetter. Antelope Valley Spectator, September, 1963, pp. 5-7.

2. Letter, L. Vrendenburgh to L. Weinman, September 7, 1978.

3. Citrograph, October 20, 1900, and December 7, 1907; U. S. Geological Survey Bulleton 507, p. 126.

4. Lauren A. Wright, et al., "Mines and Mineral Deposits of San Bernardino County," California Journal of Mines and Geology, XLIX (1) January, 1953. pp. 49-192. The William Well Placer Mine is located at T32S, R47E.

5. "Data Bearing Upon Construction of a Line of Railway from the City of Los Angeles...to Utah" circa 1908, p. 30

6. Citrograph, December 24, 1904; Myrick, pp. 324-325. The stamp mill came into general use only a few decades before the gold mining boom on the Mojave Desert, as some were constructed for the northern California mines about 1850. The mill is designed to mill quartz, and the first mills consisted of only a battery, platform in front, and a few plain riffles or iron bars placed on the bottom of the sluice box. Quicksilver was placed in the box to catch the finer gold. The framework made up of the stamps and an iron plate were lowered into the mortar block and a casing fastened to it. On the front were screens and at the back a feed opening. The stamp stems were made of oak, weighed up to 400 or 500 pounds, were raised 12 to 14" high and then dropped onto the ore.

Almarin B. Paul, "The Evolution of the Stamp Mill," Overland Monthly XXV, 149 Second Series (May, 1895). pp. 522-530.

VICTOR VALLEY

Gold mining began in the Oro Grande District in 1868, but only in 1880 did the claims warrant a ten-stamp mill at Victor. The mill was on a site now used by Charles Pfizer and Company and was dismantled in 1907. The Oro Grande Mining and Milling Company established a town nearby the mill. In 1889 the Black Hawk Mines (23 in number) formed the Black Hawk Gold Company of Los Angeles (site 48).[1] Some seventy gold claims had been recorded in 1904, among them the important Red Top Mine (site 49), the Sidewinder Mine (site 31), and the Keystone Mine (site 33) on the south slope of Stoddard Mountain. The 1890s brought a silver boom, and the successful Embody (Althea) and Carbonate silver mines in the Oro Grande District led to the construction of smelters at both Oro Grande (one of 80 tons) and at Victor.

Superior grade marble was discovered in 1886 and shipped to all parts of southern California during an era marked by classical revival architecture that demanded marble-faced public buildings. The inferior marbles were burned into lime, much of which was used by the Golden State Portland Cement Works in their product. Prior to construction of real cement plants, two crude kilns fueled by cottonwoods from along the Mojave River extracted lime in the area of Victor. Golden State Portland Cement had begun production at Oro Grande in 1910 and was bought and modernized by the Riverside Cement Company in 1923. Southwestern Portland Cement opened a Victorville plant in 1916 and was joined by the Victorville Lime Rock Company and the Permanente Cement Company in Lucerne Valley. The use of marble and dimension stone diminished with the use of cement and terra cotta in building construction as the dates of cement company development imply. Riverside Cement itself closed down in 1928 and did not reopen until 1942. After World War II the plant was completely modernized, the first plant in the United States to use x-ray analysis to control its product. Ornamental rock has also been mined in Victor Valley (site 52).[2] The discovery of limestone in the main shaft of the Carbonate silver mine set off a limestone boom in the valley. Limestone has numerous commercial uses in itself; but, due to its susceptibility to acid solutions, it hosts deposits of numerous valuable metals.[3]

The Silver Mountain Mining District (site 50), endowed with a variety of mineral deposits but notably gold and silver, developed northeast of Oro Grande. The mines included the Oro Grande, the Morrow, the Ozark, Branch Mine, and Western States Mine.

Victor Valley saw a spectra of mining activities which varied from gold and silver to tungsten, cement, and gem stones. Exploration for one ore often meant stumbling upon another. This happened when the Carbonate Mining Company was at work in their mine near Oro Grande in January 1889. Their workers discovered that the carbonate ore contained a remarkable proportion of free gold, so the company invested $10,000 to process gold.[4]

The oil excitment reached its peak shortly after the turn of the century. A standard rig was erected at Victor and set up five miles west of town in May 1901. Although this came to little, preparations were underway in 1903 on a 4,000 acre lease. By May, one well was 775 feet deep and the Silver Mountain Oil and Mining Company had optimistic reports out to their stockholders. But again no strike was made. The so-called "oil lands" were explored unsuccessfully for coal in 1907.[5]

As a final point of historical interest, the Oro Grande Cemetery (site 53) commemorates the resting place of some of the boom time gold miners.

NOTES

1. Redlands Citrograph, May 11 and November 9, 1889.

2. L. A. Ingersoll, Century Annals of San Bernardino County (Los Angeles, 1904), p. 282; Mohahve 000. p. 59; Wright *et al.*, p. 161; California Division of Mines, MIS XV, 7 (July 1962).

3. Ron and Peggy Miller, Mines of the Mojave (Glendale, CA: La Siesta Press, 1976), p. 37.

4. Engineering Mining Journal LII, 52, p. 79.

5. Citrograph, May 25, 1901, January 24, 1903, March 21, 1903, and May 19, 1906.

MORONGO VALLEY MINING

The mining history of the Morongo Valley received some of its first documentation in the San Bernardino *Guardian* during August of 1870 when it headlined an article, "Charley Clusker Strikes Again." The report was about the discovery of an old Jesuit Mine about forty miles east of San Bernardino somewhere in the Morongo Valley area. Some reports say it was found in the 1930s on Cottonwood Creek, three miles west of Oasis Ranch and thirty-eight miles from Big Pines. Even though no important mines were in operation in the 1870s, miners were out there looking.

A prospector named Tim Lee, famous for having located the famous Waterman Mine north of Barstow, filed a location notice for a mine he called "White Lead" some twelve miles northeast of Baldwin Lake. No one has ever found it. An article in the *Havilah Miner* of April 19, 1873, complained about the Desert Station facilities at Kane Springs (site 54), a place where miners went for supplies then and in the 1890s. The earliest mention of a notable mine is that of the Rose Mine (site 51) in the Morongo Mining District. Word of mouth has it that it operated during the Spanish days and worked in the 1860s. It was a heavy producer in the 1890s and up through 1903, shown on maps during the 1904-08, and may still appear on some.[1] The Morongo District was at its production peak in the 1890s. One of the mines, the Morongo King, was often reported upon in the newspapers. Judge Campbell was president of the Morongo King Company. It had a ten-stamp mill in May of 1894 and a large force of men running it day and night. The day it started up it took out $400 in gold. The company invested heavily in the mine and classed it as a steady business enterprise.[2] The Lava Beds Mining District lies just south of Lavic Siding in the Lava Bed Mountains, north of Sunshine Peak. It came into prominence in 1891 when a silver vein one hundred feet deep was discovered. The district included a number of claims: the Tip Top Mine, Meteor, Mammoth Chief, Desert Queen (Queen of the Desert), Sunshine Mine and Mill, the Imperial Lode Mine, the Rising Sun Mine, and others. According to geologists, no good silver ore is found without copper in some form. The Lava Bed District demonstrated this when silver mining turned to copper in the mid 1890s (e.g. the Tintop Mine). The Lava Beds have been pointed out by desert buffs as sites where caches have been left, even Spanish treasure, so this area may be of interest to tourists on that count. Rattlesnake Canyon (site 56), known for its mining activity in the past, is now best known for its scenic deposits of quartz on the mountainsides. Larry Vredenburgh suggests that several sites worthy of fieldwork are on the Emerson Lake Quadrangle. One, the Green Hornet Mill site, was probably the mill for the Los Padres Mine. It lay in the Dry Lake Mining District north of Emerson Lake and presently has an extra sensitive seismograph installed by Lawrence Livermore Laboratories in Palo Alto. North and east of the Green Hornet Mill site is the Emerson Mill (site 37) where there are apparently stone ruins and the remains of a mill that Mr. Emerson used to refine his gold ore in the 1920s to the 1940s.[3] The Fry Mountains were mined heavily in the early twentieth century, and mines there included the Cumberland or High Hope Mine, the Elsie Mine, Gold Peak Mine, Johnson Mine, Red Hills Mine, and the Copper Strand.

Following the gold and silver boom of the late nineteenth century tungsten was found in this zone. The Shooting Star Mine near Rattlesnake Canyon produced marginal tungsten ore in 1916-18. It was reopened in 1949 and

produced ore until 1952, sending the ore to the Jaylite Mill in Barstow. Turquoise, too, was extensively mined between Yucca Grove and Silver Lake, not only by prehistoric Indians, but also in historic times between 1898 and 1903.[4] Iron was mined actively in 1945 at the Bessemer Mine northeast of Old Woman Springs. Much of the iron ore was shipped to Japan. The Morris Iron Lode Deposit, owned by Kaiser Steel, was also active in 1945.

NOTES

1. James Roscoe, Southern California Treasures (Fort Davis, Texas: Frontier Book Co., 1969), pp. 8, 9, and 63; BLM, DPS, Rec. Site Sheet 168.

2. Redlands Citrograph, May 11, 12; June 8, 9, 1895.

3. Letter, L. Vredenburgh to L. Weinman, September 7, 1978.

4. Wright *et al., op. cit.*, pp. 91, 97, and 171.

ANTELOPE VALLEY

In 1965 the Hid-Wa Mining Company in Antelope Valley reported that they had located an old Indian mine thirty-five miles from Lancaster. Old settlers corroborated the fact that it had been known but had disappeared a century before. Hid-Wa rushed in equipment, warned off curiosity seekers, and began to look for mercury and molybdenum, since by 1965 these were more profitable for the company than gold.[1] Thus, productive mining has a long history in Antelope Valley. We next are reminded of its potential when C. C. Parry, geologist to the survey team of William J. Palmer, in the 1860s predicted that miners would find productive mineral ledges in the western Mojave Desert. He wrote of porphyritic rocks of every variety of texture and composition, of the different associated minerals, and suggested that exploitation was bound to come.[2] It did in the 1890s, but mining declined after the turn of the centry and did not boom again until the 1930s.

The Standard Hill and Soledad Mountain discoveries set off the early boom in the 1890s. Both of these areas lie between Mojave and Rosamond. Prospectors found the Queen Esther Mine on the north slope of Soledad Mountain in 1894, and Col. Seeley W. Mudd worked it for the Guggenheims until 1910. During that period, it produced $1,200,000.[3] The same year the Standard Group boasted the first discovery of gold in the Mojave District when George Bowers found the Yellow Rover vein on the southwestern face of Standard Hill, sometimes called Elephant Butte. Soon after, other veins of gold and silver on Standard Hill were discovered such as the Exposed Treasure and Desert Queen. About 1900 these were consolidated under the Exposed Treasure Gold Mining Company, and in 1901 the company set up a twenty-stamp mill and a sixty-ton cyanide plant. Mojave Consolidated Gold Mines purchased them in 1912 and Standard Mining and Milling Company bought them in 1921. Until 1940 ore from them was shipped to the Tropico Mill ten

miles to the southwest. In 1956 it was estimated that these mines had yielded $3,500,000, the Exposed Treasure vein being credited with most of it.[4] In 1896 E. T. Baker discovered the Elephant Group (Hope, Excelsior, and Elephant-Eagle), twelve unpatented claims in all, five miles southwest of Mojave. One rich part of the vein known as the "hot spot" produced a three and one-half ton lot of ore containing gold valued at $7,000. The ore was mined from 1896-1920 and was shipped to Selby, California, for processing. A cyanide mill was completed about 1930, and mining was continuous until 1942 when the War Production Board shut down operations. Work resumed in 1948 under a system of leases.[5] In 1958 Governor Goodwin J. Knight owned the Elephant Group. The Wegmann or Karma Mine on the northwest slope of Soledad Mountain was also discovered in 1896 and was worked almost continuously until 1960. Wegmann built a twenty-stamp mill at the mine in 1904. The higher grade ore shipped out during the first seven years of production contained on the average some 50 ounces of silver per ton.[6] In 1902 Wegmann had developed the Yellow Dog vein. It produced gold and silver and was located on a small hill a few hundred yards west of Standard Hill. In 1922 a high-grade quartz vein was discovered and the Yellow Dog Mining Company was formed which operated until 1947. In 1970 an observer reported the mine to be nothing but shambles, and owners of stock certificates had to look upon them as worthless (see Appendix).[7] The most important gold mine to begin work in this earlier period was the Tropico Mine (site 57). Its history dates back to the 1870s and spans both the early and late mining periods.

Although mining continued in the Antelope Valley from the 1890 boom years through the depression, the second boom which occurred in the 1930s was so dramatic that it attracted more attention than the first. George Holmes, its figurehead, was sixteen when he worked as a mulcher in some of the earlier mines including the Elephant Mine mentioned above. He returned to the desert in 1932 as did a host of unemployed and made a discovery which led to the opening of the Golden Queen Mine (site 58). During this period, a large number of placer deposits were mined; however, we have no way of knowing how high the amounts ran since miners could spend the gold as they mined it. In 1935 the prospecting excitement centered about Middle Buttes, northwest of Rosamond. This is a low rhyolitic group of hills, and in January 1934 Clyde Westfall found a piece of rich float ore there. He showed it to T. L. Brite, Brite's two sons, and Clifford Burton. After a lease and then a patent were obtained on the property, Burton supplied the money for development taking back a half interest in the lease. A year later surface ore yielded $20,000 in gold. In May 1935 Ernie L. Blanck bought a one-third interest in the mine for $100,000 and thus the Burton, Brite, Blanck Mine enterprise was underway. It was located in the southeast part of the Middle Buttes.[8] For example, Walter Trent leased the property adjacent to the above mine and with his associate Clyde Garrett prospected it and found gold which led to the development of what was called the Middle Buttes Mine. In one instance Clyde Garrett made $10,000 from one carload of ore. Then he sold out to Trent, and Trent eventually gave up the lease to George Holmes. Holmes managed to recover further pay dirt and sent his ore to the Tropico Mill for processing. The Cactus Queen was a big producer on the southwest part of Middle Butte and in 1958 was owned by Clifford G. Burton.

In the 1940s there was still great hope for a revival of mining in the Mojave District. A manuscript found in the Bancroft Library that was

circulated during that decade claimed that there were millions in sight if only the right people could get hold of the mines and build a modern reduction plant. The Los Angeles County Board of Supervisor printed an offering in 1942 of sales opportunities among the southern California mines. It included the Blue Bird Gold Mine four miles south of Mojave where it boasted 300 foot shafts and four levels with about 1,000 feet of drifts and crosscuts equipped with gasoline hoists, portable compressors, and drills. The Brantley Mine, which produced both gold and silver and lay three miles south of Mojave, was also up for sale as was the Cactus Mine in the Rosamond District southwest of Mojave. This mine had extensive underground workings. The Golden Queen Mine, the Standard Group, Tropico Mine, and the Yellow Dog Mine, all with a history of successful gold and silver mining, were advertised for sale.[9] The existing literature indicates that they did not find buyers for another decade or more. The primary cause for the slump in mining was the War Production Board's Limitation Order L-208 issued in October 1942 which closed down all mines producing non-strategic metal ores. Its purpose was to release miners so that they could work in essential mines to serve the war effort. (See Part 3093 "Gold Mining" and telegram sent to Tropico Gold Mine in Appendix.)

Exploitation of non-metals has also figured importantly in the history of Antelope Valley. Clay Pits (site 59) were found on the north side of Tropico Hill in the late 1870s by L. A. Crandall, the first prospector of note at that famous mining site. Two principal types of clay have since been found in the valley: bentonite, or oil-well drilling mud, and kaolinite. The deposits were centered mainly near Rosamond and in the dry lakes. Oil drilling mud (which led to commercial interest) came from the dry lakes. Located in 1900, it was mined vigorously during the 1940s and shipped out until about 1954. In 1948 the federal government began using the dry lakes for military sites. Thus, by 1954 all the major lakes were inside military reservations and mining had ceased (see Edwards and George Air Force Base histories below). The largest of these deposits was the Muroc Clay Deposit (Bager Placer Claim) about twenty-one miles east of Mojave. This patented placer claim took in 160 acres and was first developed by William H. Allen who purchased it for $25,000 sometime around 1928. The clay was marketed wholesale for $15 to $17 a ton and used as an absorbent in refining petroleum products. A smaller deposit was exploited at Buckhorn Lake, thirteen miles east of Rosamond. This rotary clay was shipped to the Antelope Materials Company mill at Rosamond, ground to finished product, and shipped to the oil fields.

Borates, occurring in the form of colemanite, were discovered in 1913 by Dr. J. M. Suckow while he was drilling a new well for his homestead. The Suckow Mine or West Baker Mine became a unit of the Pacific Coast Borax Company and operated intermittently until 1951.[10] All borons are found underground and often are discovered when drilling for water. Sodium borate lay in thick beds a hundred feet deep and in some of the deposits extends 600 to 700 feet in width. Crystals of kernite were found embedded in the clay at a third mine known as the Mudd Mine, since Seeley Mudd bought it in 1948 from Pacific Borax. Under Mudd's administration it produced into the 1950s. The Boron Mine just north of the subject zone turned from underground workings to the open pit method in 1957.[11] The town of Boron housed the workers at the Pacific Coast Borax plant.

Between Willow Springs Road and Oak Creek Road the limestone and cement industries have flourished. In 1954 and 1955 the California Portland Cement Company built their Creal Plant. Limestone for the plant was quarried from large deposits along the eastern edges of the Tehachapi Mountains. Additional deposits of limestone were owned by the company adjacent to Willow Springs Road. Rockhounders found Gem Hill in the heart of an extensive mineralized region near here dotted with abandoned gold, silver, and copper mines.

NOTES

1. High Desert Spectator (April, 1965), pp. 34-35.
2. Report, 1868, p. 227.
3. Rascoe, *op. cit.*,p. 216. This source is relied upon for chronology in the paragraph below.
4. B. W. Troxel and Paul K. Morton, "Mines and Minerals Resources of Kern County, California," County Report 1 (San Francisco: California Divisions of MInes and Geology, 1962), pp. 120-123.
5. *ibid.*, pp. 105-106, 164.
6. *ibid.*, pp. 125-126.
7. Letter, C. L. Johnson to stockholder Beatrice Roberts, September 24, 1970, in ERA files.
8. Rascoe, *op. cit.*, pp. 227-230.
9. In "Mines and Mineral Resource," 200, UCLA. Special Collections.
10. Troxel, *op. cit.*, p. 39.
11. Waldemar T. Schaller, Borate Minerals from the Kramer District, Mojave Desert, California. (Washington, D.C.: Government Printing Office, 1930), pp. 1-5.

COMMENTS AND RECOMMENDATIONS

Mine owners in the western Mojave Desert would not welcome the designation of historical point of interest for their properties. Mines, like swimming pools, are considered an attractive nusiance. The shafts present a danger. Fencing is most unsatisfactory since the isolated nature of the mining leaves vandals alone to do as they wish. Dorene Burton Settle, one of the present owners of Tropico Gold Mine, tells of fences they have constructed that have been gone in a weekend. Even wrought iron gates have been cut down by aceytelene torches. The patroling necessary to maintain

fences is not feasible. On the other hand, these old mines are valuable historical resources and should be protected from the impact of unwanted visitors and from wanton destruction by future development. Few people in Los Angeles know of their nature, and a recreational program which includes them for public viewing would be highly educational. Mining techniques used in the 1890s through the 1930s demonstrate an era with little technical change in mining methodology. For example, men had to climb down as far as 850 feet on near vertical ladders and bring up injured men strapped to boards by reclimbing that ladder. Thus we have a paradox: how to preserve and to use an historical site and at the same time not attract the attention of vandals who not only destroy but also stand to harrass mine owners with law suits claiming compensation for injuries sustained while encroaching on private property. From field studies a few model resources could be selected and a positive program of preservation initiated. BLM should seek a park or other public agency to buy the Tropico Mine and Mill, preserve it, and open it to the public as an historical site, or work out a land exchange.

SETTLEMENTS

MOJAVE VALLEY

Mining activity and the impact of the railroads contributed importantly to the settlement of the western Mojave region that spreads out from the Barstow-Daggett metropolis. Agriculture is judged as relatively unimportant, yet it lent to considerable development in the areas where groundwater was close enough to the surface to be used for irrigation. In addition, great storage basins of water lie underground.

Estimated Capacity of Underground Basins
Acre Feet

District				
Forks to Victorville	90,000	220,000	410,000	670,000
Victorville to Hodge	160,000	320,000	480,000	640,000
Hodge to Barstow, including Hinkley Valley	290,000	590,000	900,000	1,200,000
Total above Barstow	540,000	1,130,000	1,790,000	2,510,000
Barstow to Daggett	50,000	110,000	160,000	220,000
Daggett to Fault	150,000	350,000	560,000	770,000
Total below Barstow	200,000	470,000	720,000	990,000

Note: Voids on which this is based are 18% in river wash and 8% in old alluvium above Victorvile, 15% Victorville to Forks-of-the-Road Fault below Barstow and 11% below the fault.

California, Department of Public Works, Division of Water Resources, Bulletin 47, Mojave River Investigation, Sacramento, 1934. TABLE 38.

Water has been the most important factor in the settlement of the Mojave Valley, and the underflow available to Barstow or Daggett is enough to supply 31.2 million gallons per day. The quantity now pumped is below that figure; nevertheless, local residents feel some controls should be placed on the pumping. Normally the surface flow disappears at about Victorville to flow as an underground stream to 32 miles northeast of Barstow. However, in years of large runoff the surface flow may continue past Daggett. In 1938 the runoff took water as far east as Baker. Below Daggett the water encounters the Fork-of-the-Roads Fault, which extends three and one half miles east of Yermo to Newberry. Water percolates through this fault, but because the alluvium waste of the fault is more porous than that to the west, the distance from the surface to the water is some 40 feet lower than west of the fault. Thus, the fault acts as a dike and impounds a large lake of water underground west of the fault to Daggett. The distance to underground water varies from year to year in the Barstow area: from about 10 to 100 and even 300 feet. Underground storage basins in this area are huge.[1]

In the Mojave River Valley the first settlements were at the stations along the trail, and these were selected because they were located where the land was moist and the water flowed in such a way as to allow cultivation of hay to feed the cattle and mules of the freighters. When Lt. Eric Bergland led an expedition onto the desert in 1875 to explore the possibility of diverting the Colorado River so as to irrigate the eastern Mojave Desert, he mapped these stations. Those falling into the western zone included: Lane's Upper Crossing at the Lower Narrows where the river was then 100 feet wide and three feet deep, and going north, Point of Rock (Helendale), Cottonwoods (Hicks), Grapevine (Barstow), Forks-of-the-Road (eight miles northeast of Daggett), and Camp Cady. Later, Fish Ponds became one of these stations when stages traveled more directly from Cottonwoods to Fish Ponds.[2] Fish Ponds was located on the river between Grapevine and Forks-of-the-Road. Bergland wrote of no irrigation practices in 1875 even though some ditches were actually in use along the river at the time. The vegetation, hay in particular, grew in moist lands without irrigation.

These isolated stations could hardly be called ranches, yet they marked the beginning of ranching and were followed by early settlers who preempted the land, taking possession of both the land and water rights by squatters rights. Irrigation ditches appeared near the Lower Narrows of the Mojave River in the early seventies, and in the same decade some were constructed on the West Fork near the Upper Narrows. While some farmers filed for water rights, others did not. The earliest water claim was made in 1861. Among those recorded was that of a promoter who filed a claim for "1,000,000 miner's inches to be diverted from the river near Hicks (now Hodge) by a canal to be 400 feet wide on top, 250 feet wide on the bottom, 10 feet deep, and to have a grade of three feet per mile, for irrigating ten townships (230,400 acres) of land below Daggett."[3] The San Bernardino water commissioners turned their attention to Mojave River irrigation rights in 1879 when they met on the banks of the river, located six ditches near the Lower Narrows, assigned them names and numbers, and allotted them amounts of water to be diverted.

After 1900 and following the mining and land booms of the 1880s and 1890s, agricultural development and settlement in the western Mojave was gradual but steady. Ranches appeared east of Barstow, around Helendale,

and in the Hinkley Valley-Harper Lake districts. Large numbers of homesteads were filed but relatively few were developed as ranches or for agriculture. Many were located in places where no underground water was available, and others homesteaded only to hold onto property making only the minimum amount of improvements in order to retain title to speculate on the land. In the lower Mojave Valley in particular many homesteads were later abandoned. As time went on, good wells were found in the middle Mojave Valley west of Barstow. The water table lay at a depth ranging from five to thirty feet, so a number of settlers devoted their efforts to small-acreage crops using their own private wells. Alfalfa became the most important crop, and Chilean, Hairy Peruvian, and Smooth Peruvian varieties were, and still are, grown. The Hinkley District produced hay and had its share of settlers. Cady Ranch prospered from its numerous artesian wells. During the rabbit craze, or the decade of the 1930s when rabbits were grown and sold in southern California in such profusion for skins and meat, alfalfa was in great demand for use by the commercial rabbit growers. The hay was largely marketed in the San Bernardino Valley and at prices reportedly above average. Gross agricultural areas on the Mojave River bottom above Victorville as recorded in 1929 reached 12,000 acres.

During the 1890s boom in mining around the Daggett-Barstow area, the Silver Valley Land and Water Company organized with the intent to divert the underflow of the Mojave River to the Calico Mining District. The company did some construction in the vicinity of Fish Ponds, but was unable to finance the venture. The Southern California Improvement Company went to work in 1893 and attempted to irrigate land near Daggett and Minneola (site 65).

In 1910 the Mojave River Land and Water Company organized to develop and sell land along the Los Angeles and Salt Lake Railroad below Yermo. Brining in water proved too much for them, and in 1916 they reorganized as the Yermo Mutual Water Company with $160,000 in capital stock. Two hundred thousand dollars had already been spent, 16-inch wells over 100 feet deep constructed, and pumps and several miles of concrete-lined ditches put in. In 1929 only 200 acres were under irrigation, but plans were underway to put in alfalfa and deciduous fruits. Buyers and settlers were slow to come.

Watering places determined the locations of ranches, and Thompson's *Routes to Desert Watering Places* published in 1921 interestingly suggests very few ranches as water sources for highway travelers. An exception was the Ausland Ranch two miles south of Goldstone, a source only if someone was at the ranch to operate the pump or if water had been left standing in the storage tank. In the general area of Barstow, Thompson listed a cistern at Todd, non-flowing wells at Barstow, Minneola, Yermo, Daggett, and at two other locations in the Daggett area. Newberry had two cisterns, and springs by the same name were to the southwest of Newberry Mountains. Kane Springs lay to the south of these in an adjacent range of mountains and Aztec Springs and Sweetwater Springs were to be found on the north side of Ord Mountains. Willis Well (site 61) and Taylor Springs were also in the vicinity. North of the Calico Mountains he recorded Flowing Well, a well on the west side of Coyote Lake, and Coyote Well to the south. Lanes Well lay to the northwest of Calico.

Range cattle were on the land in the Mojave Valley in the 1870s, and

prior to the time when Southern Pacific laid its tracks across the desert (later purchased by Santa Fe) up to 40,000 head of cattle grazed loose on public lands there. Charles Mitchell, Sr., came to the Mojave Valley when he was two, and his father homesteaded all the land he could on the east side of present-day Barstow. He grew alfalfa without irrigation and helped with other farmers to build the first one-horse span bridge over the river bed. In the 1910 flood the bridge sank deeply into the river, and in 1915 it sank again, but in the latter instance only three feet. In the 1890s the leading cattlemen on the western Mojave were Swortoff and Gentry. They ran cattle through Twentynine Palms, Old Woman's Springs and up to Bear Valley in the summer. Mr. Mitchell feels he can supply all the names of the old ranchers, men such as: Al Hawes, Sturnecle, Van Dyke, L. C. Suckie, Snodgrass, and Smith.[4] Much other history of early residents was collected for the publication, *Once Upon a Desert*, edited by Patricia Keeling.

Pat Mitchell (Charles Mitchell, Jr.), president of the recently formed High Desert Cattlemen's Association, recalls the year of the last big cattle drive. It was 1938, and he was eight years old. That was when they took 3,000 head of cattle from Fort Irwin to Red Mountain. Then they picked up another 2,000 at Red Mountain, Cantil, Johannesburg, Ridgecrest, and China Lake. Another 2,000 were gathered near Victorville. All these cattle were taken to Four Corners or Kramer Junction and loaded on a train.[5] Train tracks, highways, and finally military installations ended the big cattle drives on the desert. The establishment of Fort Irwin and the Marine bases in the 1940s were the turning points in the grazing industry. Mitchell leased grazing rights on Camp Irwin for ten years post-war after Camp Irwin shut down; but he complained, on fifteen days notice he had to move his cattle off once again. Today a ranch like the Mitchell's sells off 100 to 150 head a year. Many of their neighbors are simply backyard ranchers with one or two cattle who have moved away from the city and decided to grow their own food. This spokesman maintained he reflected the opinion of many in his association.

Sheep grazing has also been an industry in the Mojave Valley. Sixty-five thousand head of sheep at a time have grazed around the Barstow area. Basque sheep herders have a virtual monopoly on sheep grazing and for close to a hundred years have brought their herds onto the western Mojave. Juan Arachi, now a resident of Mojave, led drives from Mojave, through the Owens River Valley, to Bridgeport in the fall, and from there shipped out the fat ones. In the Barstow area they now unload sheep at Harper's Lake, graze southeastward, and load out of Barstow. They are trucked in, lamb on the desert, fatten up on the desert grasses, and are trucked out. They come from as far away as Montana, Colorado, and Idaho and return there for their summer feed. Rancher Mitchell observed, "Those animals do nothing but ride." But sheep grazers have also had to curtail their herds, so that now instead of the 40,000 that grazed in the 1950s only 30,000 come on the desert. The Basques for many years prevented overgrazing of the land. By waiting until the plants seed before they unload their herds, the sheep can stomp in the seeds insuring regrowth. In addition, they rotate grazing areas. Recognizing the importance of preserving the turf, the Basques claim they would run off any among them who broke code.

Today, Barstow is the most important population center in the Mojave

Valley region. It had its beginnings in the days of mule freighting and covered wagons when the stations mentioned above served travelers along the trail. Two such station stops were in the Barstow area: Grapevine, north of the Mojave River (at the old junction of Highway 91 and the road to Mojave) and Fish Ponds (close to present-day Nebo). In the 1860s shortcuts led to the south at a spot between Point of Rocks and present-day Helendale and from Fish Ponds past Stoddard Wells to Victorville. In those days the district around Barstow's location was known as Grapevine due to the wild grapes. The Grapevine Station was run by a man named Miller who supplied travelers with hay, groceries, and hardware. In 1880 Robert W. Waterman and John L. Porter stopped at Grapevine while on a prospecting trip, a trip that led to the development of Waterman Mine just to the north. The Waterman Porter Mill was located south of the mine, a settlement grew there known as Waterman, and in 1884 when Southern Pacific built their tracks from Mojave to Needles they listed a station at Waterman. Fish Ponds Station on the east was the last stopping place common to both the Old Government Road and to the Salt Lake Trail since the two trails parted at Forks-of-the-Road to its east. Lafayette Mecham moved his newly located store at Camp Cady to Fish Ponds in 1870 or 1871, and Mecham's sons discovered some of the silver in the Calico Mountains.[6]

When the California Southern Extension Railway tracks made a connection with the Santa Fe Mojave-Needles Line, this junction was named Waterman Junction. In 1886 it was renamed Barstow after William Barstow Strong, president of the Santa Fe Railroad. The same year the Waterman and Porter quartz mill was turning out $15,000 in silver bullion a week, and the city directory listed the following by trade.

Baber, A. J. miner
Baker, O. H., miner
Banks, J. A., waiter
Beach, M. E. merchant
Beatly, J. M., merchant
Berry, N. W., laborer
Bugbee, P. J., miner
Davis, F. E., engineer
DeBow, Samuel, bookkeeper
Deen, C. R., miner
Dickson, James, railroader
Duffy, C. A., blacksmith
Elliott, W. R., merchant
Fox, Chas., farmer
Francis, Robert, conductor
Gruwell, Green, teamster
Hawkins, Thomas, barber
Heeb, N. F., laborer
Hine, A. B., conductor
Hisom, F. H., machinist
Howard, G. E., R. R. agent
Hughey, A. C., millman
Iler, W. S., laborer
Kelly John, R.R. employee
Kenney, A. F., cook
Macdonald, Jerome, millwright
Malon, J. E., railroader
Maloy, M.J. laborer
Maro, A. W., engineer
Martin, Norman, engineer
McAllister, James G., laborer
McDerment, Hugh, fireman
McDonnell, John, farmer
McNally, J. L., assayer
McPhee, James, millwright
Modie, J. C., stockraiser
Morrow, N. L., miner
Nickless, Wesley, miner
Parker, J. L., farmer
Parsons, F. C., clerk
Pore, Eli, miner
Porter, J. L., miner
Potts, J. E., machinist
Preble, C. B., clerk
Pritz, Jacob, laborer
Rhinehart, J. T., clerk
Rogers, R. R., clerk
Ross, J. K., fireman
Scribner, Eben, miner
Seibert, Daniel, farmer
Shephard, George, stockraiser
Thomas, E. W., laborer
Twaddell, Thomas, merchant
Wagner, O. F., farmer
Waterman, W. S., merchant
Waters, A. L., waiter
Wilkins, D. J. teamster[7]

In the 1880s Santa Fe determined to develop offices, a roundhouse, and shops at some mid-desert point between San Bernardino and Needles. It already had a two-story depot at Daggett, and word had it that the new railroad center would be established there. Real estate made a spectacular price rise in the center of Daggett convincing the Santa Fe management that they could just as well locate in nearby Barstow. By the turn of the century Barstow was an important freight consolidation point, and the community was sandwiched between Santa Fe's freight tracks on the south and passenger tracks on the north. It had a two-story depot, a roundhouse, and a Harvey House. In 1910 much of this burned, and after World War I the community moved up the hill with its main street aligned with the National Old Trails Highway. Even the town's residences were moved, and in the 1920s Barstow's new town claimed the biggest garage west of Albuquerque. Barstow continued to grow, a strategic location that served as a crossroads for railroads and highways alike (site 68). During World War II it was crowded with military men from the bases nearby and in the 1940s incorporated as a city.

Other communities arose at this crossroad area where miners stopped, ore was shipped out, and water from the Mojave River could be tapped. Daggett, named after Lt. Gov. John L. Daggett, was a small community ten miles west of Barstow and on the tracks of the Southern Pacific when its tracks came through in 1883. It served as an outfitting center for the miners at Calico and a repair center for their narrow gauge railroad (sites 7 and 66). Just northwest of the junction of the Old Spanish Trail and Old Government Road, the small town of Otis was founded in 1902. The name was later changed to Yermo, meaning desert; and since it was near the Calico silver and borax mines, it maintained enough of a population to stay on the map. By the time Francis Marion Smith closed his borax mines to the north, Yermo was a railroad stop for the Union Pacific.[8]

In the 1920s Arthur L. Doran, a member of the Fred Harvey organization, began contracting for road building. He built the Arrowhead Trail from Barstow to Las Vegas, and Yermo served as a base for many of the animals and equipment used in the work. With World War II the government located the Holding Reconsignment Point for the military with great underground storage facilities a few miles from Yermo. After the war the Reconsignment Point was added to the Marine Corps Depot of Supplies a few miles out of Daggett. A repair facility was authorized for the Depot in 1958 and completed in April 1961. The current organization is designated as Repair Division, Marine Corps Logistics Support Base, Pacific. It maintains, repairs, rebuilds, stores, and distributes supplies and equipment and has the largest payroll in the area.

NOTES

1. San Bernardino Sun, n.d., Barstow Public Library, Clipping File.

2. U. S. Geographical Surveys West of the One Hundreth Meridian, War Department, 1876-1877.

3. David G. Thompson,"The Mojave Desert Region, California," USGS Water Supply Paper no. 578, (Washington, D.C.: General Printing Office,

1929) p. 46. The material below is drawn from this report unless otherwise noted.

4. Written statement by Charles A. Mitchell, 1977. ERA files.

5. Interview, Pat Mitchell, October 14, 1978. The material below is drawn from the Mitchell interview and written statement by his father.

6. Burr L. Belden, "Barstow Develops when Railroad Needs More Land," San Bernardino Sun-Telegram, April 26, 1953.

7. Patricia Keeling, ed., Once Upon a Desert (Barstow: Mojave River Valley Museum, 1976), pp. 6-7.

8. Belden, *ibid.*; California Interstate Telephone, Romantic Heritage of the Mojave Valley, 1961

VICTOR VALLEY

Victor Valley is one of fifty valleys that make up the Mojave Desert. For purposes of this discussion the areas nearby, Apple Valley and Lucerne Valley, will be considered as in the Victor Valley.

Stray prospectors from the Mother Lode discovering rare metal in the hills south of the present Victorville were initially responsible for populating this area, most prominently, John Brown, Jr., homesteading the Rancho Verde at present Victorville. By 1870 the California Overland Stage Company with a mail contract was stopping in the valley at the Mojave River. Thoughts of community settlements did not stray far behind.[1]

On July 10, 1869, 35,000 acres of land in thevicinity of present Hesperia were purchased for $44,000 from the United States Government Land Office in the name of Max Strobel. On August 2, 1871, Strobel turned the desert parcel over to a group of Germans in San Francisco who intended to subdivide and colonize it. The Germans associated themselves in 1872 as the 35th Parallel Association with offices in San Francisco. For the time being, however, development did not proceed.[2]

Concurrent with Strobel's acquisition of desert land, a few stockmen were locating in the Victor Valley, wherever water was available. Within a few years, development expanded from small irrigation ditches from springs or the river to a number of private irrigation and colonization projects involving several thousand acres. Increased interest in area mining and cattle-raising, along with these colonization projects, were spurs to settlement, but the real catalyst came in November 1885 when the California Southern Railway linked Barstow and San Bernardino via the Cajon Pass.

The route for this line was the inspiration of Fred T. Perris, San Bernardino County Surveyor. Over thirty years before, the railroad survey by Lt. R. S. Williamson, a government engineer, had indicated that the only route through the Cajon Pass necessitated a 3.4 mile tunnel through a hog-

back in West Cajon. The tunnel was begun early in 1875, but only a mile was dug before the effort was abandoned because of a lack of money. Perris, however, took visiting railroad officials up the Morongo and then through Old Woman Springs and the Lucerne Valley to descend East Cajon. This lower pass did not require a tunnel. It stood to reason that settlement would be inspired along the railroad line.[3]

The first townsites to benefit from the railroad were Hesperia and what would eventually be called Victorville. The latter area, from 1878 to 1885, had only been a river camp recognized by the name of Mormon Crossing. By 1885 when the railroad rolled through, there were probably only two structures anywhere near Morman Crossing, a log cabin to the east belonging to a man named Rogers and a cattle ranch to the north owned by a J. C. Turner. With the coming of the Santa Fe, the railroad established a telegraph station at Mormon Crossing, officially naming the area Victor, in honor of Jacob N. Victor, construction superintendent of the Cajon project.

A small community developed relatively quickly around the railroad track and telegraph station. A few stores, a blacksmith shop, and two saloons were the beginning of Victor's business district.[4] Hesperia had a little slower start.

After fourteen years of inactivity toward fulfilling its goal of colonization, the 35th Parallel Association sold out on April 10, 1885, to Julius Finck, who within six days sold out to a man named McNeil, who, on May 6, 1886, sold out to the Hesperia Land and Water Company. The Hesperia company was made up of the founding fathers of Ontario, California--B. M. Widney, William B. Chaffey, and George Chaffey, Jr.

The name given to the new company and town site was probably borrowed from the old Roman idiom, "to the West." The town was obviously planned to mirror the staid sobriety already at work in Ontario. Included in every property deed was the stipulation that if liquor was ever sold, served, or given away--even in the street fronting the parcel--the land would automatically revert to the company. The town was laid out in 40 blocks of 26 lots each, most lots measuring 25 by 142 feet. Standard lots ran for $50 or more apiece, with 10.4, 11.0, 22.0 and 25.0 acre lots also available.[5]

The sobriety intended for the community was not necessarily evident in promotional tactics. Overland Santa Fe trains brought cars of land-seeking tourists to Hesperia where they were greeted by pitchers of pink lemonade and land barkers making their pitches from raised platforms. Guady lithographs of the "Future Hesperia" depicted thriving residential and commercial districts. The story goes that the more unscrupulous promoters brought oranges from the San Bernardino Valley and created "orange groves" by wiring the fruit to Joshua tree limbs, within sight, but at a convenient walking distance of the train. Because many speculators had never seen either tree, it can be assumed that some desert groves were sold.[6]

Also to benefit from the coming of the railroad was the Victor Valley's oldest settlement, Oro Grande. Located on the Old Spanish Trail, Oro Grande began as a gold camp--the first major gold discovery in the western Mojave--in the 1870s. Until the coming of the railroad, however, Oro Grande was just a camp; no settlements existed in the Victor Valley that could properly be called towns.[7]

Never reaching the prominence of either Victor or Oro Grande, another stop created by the railroad in 1885 was Helendale. Known originally as Point of Rocks, the station's name was changed by a Santa Fe executive in honor of his daughter, Helen. Helendale developed into an agricultural/ cattle community, which it has remained.[8]

As the railroad created and sustained interest in other parts of the Victor Valley, the Hesperia land boom continued. The Southern Pacific had large holdings in the Victor Valley and heavily promoted Hesperia, commanding higher prices for their land than they would have in Los Angeles. Water was brought into the area from Deep Creek in the San Bernardino Mountains via a seven mile, fourteen inch steel pipe which ended in a reservoir.[9]

Finally in October 1887, after land had been sold to buyers as far away as England, the Los Angeles *Herald* reported that New York capitalists had bought out the Hesperia Company for approximately $1.5 million, and planned to:

> ...erect a hotel to cost $75,000 and a sanitarium to cost $25,000, the plans for which are already made.
>
> Fifteen miles of cement sidewalks will be made and half a dozen reservoirs constructed. A bank with a capital of $100,000 has also been decided upon....They will irrigate on the percolating principle practiced in Fresno with such satisfactory results and will enter upon raising deciduous fruits and the manufacture of raisins, which grow to perfection.... The fruit planting on the purchased land will be on the largest scale ever started in the world.[10]

As Hesperia appeared on the verge of blossoming, so did other areas in the Victor Valley. Through 1888 and 1889, there were successive rich strikes of free gold, asbestos, soapstone, and carbonate at Oro Grande, as well as silver at Old Woman Springs. Mining was done to a lesser extent in the Lucerne Valley, where in the early part of the decade a miner's trail up Cushenbury Canyon was improved to handle freight wagons with supplies for building the first dam at Big Bear Lake. The dreams of Hesperia, no matter how grand, simply could not keep up with this real, physical development.[11]

Successive winter floods in 1888 had wiped out the water pipeline, and before it could be permanently repaired, the desert heat withered the young orchards and vineyards. Ranchers and townspeople, attracted by promotion and promise, became discouraged and moved away. Within a few years the land reverted to desert, with one of the town's few remaining artifacts, the $75,000 hotel, left boarded up and deserted.[12]

Through 1890 and 1891, more large gold strikes were made at Oro Grande, while riches of another kind were coming to the Lucerne Valley.[13] Col. Henry Washington had passed through the Lucerne Valley in 1857, but without giving

the area a name (Washington was, however, responsible for naming the cottonwood oasis to the east Old Woman Springs, after seeing an old squaw there). It was not until 1897, though, that Lucerne Valley enjoyed its first European resident when James Goulding set up camp on November 22. The year before A. R. Swarthout had filed on some land to act as a summer cattle range, under the name Box S Ranch. He never developed water on the land, however, and relinquished it. Goulding eventually took over the original Swarthout parcel, maintaining the Box S monicker.[14]

Stock grazing was certainly not new to the Victor Valley by the 1890s. Jedediah Smith had reported seeing cattle on the north side of the mountains in 1827 and huge herds of sheep had been driven up the Mojave Road in the 1870s. It was in Lucerne, however, that stock-raising would become an important industry.

Mining continued in the Victor Valley through the end of the century. At the Verde Antique quarry, seventeen miles northeast of Victor, a handsome sulphur yellow and lime green marble veined in chocolate and cream was being mined. The quarry's name was derived from the ancients' term for dark green marble veined in black. In the 1890s, the old Palace Hotel in San Francisco sought the most attractive marble available to redecorate its interior, and among the stone selected were samples from Verde Antique.[15]

In 1901 the town of Victor changed its name to Victorville because the United States Post Office claimed confusion with Victor, Colorado. By now Victorville had become the largest community and trading center in Victor Valley, its growth gaining impetus from increased railroad and road travel, mining, and agriculture.

A new era of Victorville's development began in May, 1901 when oil excitement struck the Victor Valley. Thousands of acres of land in the valley were located for possible oil production and a test well, managed by the Magnetic Oil Company, was sunk at Victorville. Evidently the test well produced little; nevertheless, in January, 1903, the Silver Mountain Oil and Mining Company of Indianapolis leased 4,000 acres near Victorville for twenty years. By March, 1903, despite discouragements, the search for oil had continued. Oil sand had been reached at 775 feet, but its quality and quantity were questionable.[16]

By 1907 the Victorville "oil lands" had been taken up by Riverside capitalists. In August coal was discovered on this property, only a little more than four feet below the surface. The coal strike raised more, apparently futile, hopes the oil would be found.[17]

While established Victorville sought a new destiny in oil production, a new community was forming in the Victor Valley. Its Indian name translates to Happy Valley, but that name had evidently been garbled into Apple Valley by 1902, before the planting of orchards. Holcomb Valley prospectors had passed through this area, but settlement did not begin until the turn of the century.[18]

Another farm community, Adelanto, began in 1917. E. U. Richardson, inventor of the Hotpoint electric iron, was the guiding force behind settlement of the area, and it was he who named the town. Adelanto comes from the Spanish, "progress."[19]

Like its neighboring communities, the Lucerne Valley also took a start toward a new horizon with the new century. In June 1912 the gradual transition from cattle-raising to alfalfa agriculture as the areas's economic base began. The first alfalfa was planted by Fullerton physicians, F. J. Gobar and Miller. Since Washington had passed through in 1857, the area had never officially had a name. Now it took one, Lucerne, after a European term for alfalfa.[20]

Victorville residents found themselves in the midst of a boom of a new sort in the 1910s and 1920s when the motion picture industry discovered its false-front buildings and business district boardwalks. Hundreds of westerns, especially those of William S. Hart, were shot in Victorville and vicinity.[21]

In the 1910s both Apple Valley and Lucerne Valley became profitable sites for dude and resort ranches. With gold mined out, Oro Grande turned to cement production in 1914. Apple production began in Apple Valley in 1920. In 1922 the National Old Trails Highway from Cajon summit to Victorville was paved, spurring further growth in the Victor Valley.[22]

Setbacks were suffered during the depression, but Victor Valley revived with World War II. The establishment of George Air Force Base largely stablized and boosted the economy of the entire valley area. Today the Victor Valley thrives with cement production, turkey-raising at Stoddard Jess Ranch, and the Mojave River Fish Hatchery (site 24), which is fed from underground flow like that at Stoddard Well. Since 1954 even Hesperia has revived, and is now a viable, healthy desert community.

NOTES

1. Van P. Wilkenson, "Victor Valley's Silvery Lining," Desert Magazine, February 1972.

2. Edmund C. Jaeger, "The Ghost Town that Refuses to Die," Desert Magazine, August 1954, pp. 10-11; Emma Pierson, The Mojave River and Its Basin, Glendale, CA, 1970, pp. 116-117.

3. L. Burr Belden, "Overland Trains Reach City After Pass Surmounted," San Bernardino Sun-Telegram, May 25, 1952; Interstate Telephone Company, Romantic Heritage of the Victor Valley, 1969, unnumbered pages.

4. *ibid.*, Federal Workers Project, California (New York: Hastings House, 1939.

5. Interstate Telephone Company, *op. cit.*;; Jaeger, *op. cit.*

6. L. Burr Belden, "Fantastic Boom of 1880s Sees Many Swindles," San Bernardino Sun-Telegram, June 1952.

7. L. Burr Belden, "Victor Valley Scene of Early Cattle Ranges," San Bernardino Sun-Telegram, June 30, 1963; L. Burr Belden, "Oro Grande Has Golden Origin," San Bernardino Sun-Telegram, July 14, 1963.

8. Interstate Telephone Company, *op. cit.*

9. "Homesteaders and Hucksters," BLM, Desert Planning Staff Files, Riverside; Jaeger, *op. cit.*,, p. 11.

10. Jaeger, *op. cit.*, p. 11

11. Redlands Citrograph, September 8, 1888; October 20, 1888; and January 26, 1889; Interstate Telephone Company, *op. cit.*

12. Jaeger, *op. cit.*, p. 11.

13. Redlands Citrograph, February 1, 1890 and March 14, 1891.

14. L. Burr Belden, "Lucerne Starts with Cattle, Soon Adds Alfalfa," San Bernardino Sun-Telegram, June 16, 1957.

15. Eugene L. Controtto, "Where Green Marble Was Mined," Desert Magazine, August 1958.

16. Interstate Telephone Company, *op. cit.*

17. Redlands Citrograph, May 25, 1901; January 24, 1903; March 21, 1903; August 24, 1907.

18. Ellsworth A. Sylvester, "Interview with Hattie and Harry Garden and Their Son, Glen," Mohahve II, 1965; Interstate Telephone Company, *op. cit.*

19. Interstate Telephone Company, *op. cit.*

20. *ibid.*, Belden, "Lucerne Starts with Cattle."

21. Interstate Telephone Company, *op. cit.*

22. *ibid.*; Belden, "Oro Grande"; Sylvester,

LUCERNE-MORONGO-YUCCA VALLEY

Homesteading and ranching dominated settlement in the southern half of the Johnson-Morongo and southeast Stoddard planning units. Maps prepared by the Desert Planning Staff show evidence of grazing in the 1870s here by a line drawn northeast from the Mojave River Forks south to the Granite Mountains, north of Soggy Lake, east to the boundary of the Marine Corps Training Center, and south to take in all of the Morongo and Yucca valleys. Lucerne, the westernmost valley, lies north of the San Bernardino Mountains and east of Victor Valley. It and the other valleys served stockmen from the San Bernardino Mountains as winter grazing land for over a decade before actual settlement began. Peter Davidson is credited with being the first homesteader. He settled at Rabbit Springs (site 14) and lived there until his death in 1902.

About 1897 Albert Swarthout began a cow camp at Box "S" (S for Swarthout) Spring and began to brand his cattle with the Box S. In 1897 he moved his stock east to Cottonwood Oasis and Old Woman Springs and took them up to Holcomb-Bear Valley for summer grazing. November 22, 1897, James Goulding, a mining engineer from Colorado, camped at Lucerne Valley, looked for good water, and chose a site which became the famous Box S Station. Goulding was interviewed by Burr Belden of the San Bernardino *Sun-Telegram* in 1957 when Goulding was 96 years of age.[1] Goulding's first well served as a station for wagon trains and travelers of all sorts; and when a new dam was under construction at Big Bear Lake, long lines of wagons drew in for supplies. He sold ham and eggs for $2.00 and had them draw their own water. Stage service to Big Bear by way of Cushenbury Grade also depended on his station. In 1957 most of the old Box S buildings were being used as apartments. Goulding built himself a stucco house and sold off most of his land to developers. He was relaxing and enjoying his old age at the time of the interview. Box S Ranch was described as a working ranch in 1909 and lay twenty-four miles east of Victorville.[2] In the mid-1880s, when the first dam was under construction at Bear Valley, the Cushenbury Road was begun out of Lucerne Valley into the Bear Valley area. Cushenbury Springs and Cushenbury Grade were named after a miner of the 1870s, the locator of those springs. Jim Johnson kept an overnight station and store at Cactus Flats, and for him Johnson Grade was named. The name Lucerne Valley was given to the area in 1912 by Dr. F. J. Gobar, a Fullerton physician, who homesteaded a half section of land near Rabbit Springs because he liked the climate. Gobar and his sons sank a well and made experimental plantings of grains and fruits. In 1913 they harvested the valley's first alfalfa. Having only pitched tents for housing in 1912, they soon eyed a house a mile or so away once lived in by Peter Davidson, and moved in. Later in the year they were surprised when Davidson showed up to claim ownership, but friendship rather than a quarrel ensued. The Gobars brought in cattle, started up a dairy, and even operated a milk route up into Bear Valley. When county roads were constructed the one leading into the ranch was named Gobar Road. Max Lewis, a subdivider of the 1920s, marked out small farms and gave the name Lucerne Valley wide publicity even though the post office still read Rabbit Springs. After this, many ranches and poultry farms appeared. Following World War II, further subdividing provided surburban homes for people from Los Angeles who sought out desert living.

Henry Kaiser found an excellent limestone deposit at the foot of Cushenbury Grade, and after World War II he built the Permenente Cement Plant in Lucerne Valley. Santa Fe built a spur line to it.

Morongo is a valley some seven miles long and two miles wide lying to the east of Lucerne. It is supplied by water drained from Big and Little Morongo Creeks of the San Bernardino Mountains. As with the Mojave River, the water from these sources sinks into the ground, runs underground, and reappears on the lower side of the valley. Here it produces marshy areas and springs. The history of the area peripheral to this valley goes back to when the Rancho San Gorgonio was granted by Governor Pio Pico to Powell (Pauline) Weaver and others in 1845. It included present-day Beaumont and Banning. In 1853 Dr. Isaac Smith bought Weaver's portion, and in 1860 Weaver's son was born in the Pass. Five years later the Fort Yuma-Los Angeles Stage Line ran through San Gorgonio Pass, but this routing changed to a stop in San Bernardino in 1862 when gold was discovered on the Colorado

River and transportation needs changed. In 1859 prospectors were in Morongo Basin, and General Land Office maps gave it mention. Lulu R. O'Neal writes that the first white settlers came to Morongo Valley in 1873. They were the de Crevecour families.[3] The de Crevecours ran cattle and sheep around Little Morongo Creek and to the east, and Ben de Crevecour was the first white child to be born in the Morongo Valley. He later became a law enforcement officer in Riverside County and was among those who hunted down Willie Boy. Mark "Chuck" Warren took over the ranch in 1884 and became the best remembered pioneer figure in the valley (site 62). After Warren's death, William V. Covington ran the ranch and homesteaded adjoining property to bring the ranch's size up to 640 acres. Covington built a mill, intended to process ore, but sold the ranch instead. Since Covington retained water rights to the adjacent stream, future occupants did not use the mill. Two other homesteaders filed claims in 1889 adjoining the Warren Ranch: Joseph W. Preston and R. J. Martin. Other early homesteaders were William and Sarah Shay (site 63). In 1891 President Benjamin Harrison reserved timbered lands in this area and included Morongo Valley as far north as the road leading to Victorville or present State 247. Homesteading thus ended until 1911 when claims could be filed again. The Morongo Valley Inn opened in 1925, and in 1935 Harry Hess laid out the first subdivision. Southern California Edison brought in electricity in 1946, and the Morongo Valley *Chatterbox*, a weekly newspaper, came out in 1950.

Yucca Valley, a village, grew up at the crossroads of the Twentynine Palms Highway and another leading to The Pipes (T1N, R4-5E). The latter was an old wagon road and probably led the oldest homesteader to the valley in 1888. He was William L. Burton, and he filed on the whole of Section 2, Township 1 South, Range 5 East. In 1910 pioneer methods still prevailed when Mary O. Pierce traveled in by covered wagon and filed on the southeast quarter and southwest quarter of Section 34. Charley A. and Joseph H. Heard filed on two quarters of Section 34 the same year. Ranches spread out from Yucca village in the 1920's, and in 1931 a store opened. By 1935 there were ten families in the vicinity. Guy Richards and Fred Storey began a subdivision of the village in 1946, electricity came in, and population density soared as people discovered the health-giving properties of this high desert area. *The Desert Spotlight* began a short run as a publication in 1946. Fifteen miles north of Yucca Valley a Giant Rock rises abruptly from the desert floor, and since one Frank Critzer hollowed out a two-room house in it, it has attracted attention as a somewhat historic point of interest (site 64).

NOTES

1. June 16, 1957. The material on Lucerne Valley which follows is from this source.

2. Walter C. Mendenhall, "Some Desert Watering Places in Southeastern California and Southwestern Nevada." USGS Water Supply Paper no. 224. (Washington, D.C.: Government Printing Office, 1909).

3. A Peculiar Piece of Desert: the Story of California's Morongo Basin. (Los Angeles: Westernlore Press, 1957), p. 111. Unless otherwise specificed, the data on Morongo and Yucca is from this source.

ANTELOPE VALLEY

Antelope Valley has had more settlers and more history than any other part of the western Mojave. For these same reasons the valley is of least concern to this study since most of the land is privately owned and thus not a prime responsibility of the BLM. The narrative which follows here is but a sketch, however, it lays the needed background for some important historical sites which lie in the area.

An important factor in the history of this area is the presence of the San Andreas Fault Rift Zone. In the historic period the most severe earthquake felt in the area was on January 9, 1857, when the earth opened up a fissure twenty feet wide and forty miles long. Observers recorded that the sides then came together with such violence that a ridge was formed ten feet wide and several feet high. While creep averages 1.5 cm a year along the fault in the San Joaquin Valley, in the Leona Valley and in the western Antelope Valley there is no creep, so a dramatic release must periodically come.[1] The first settlers came into the area in the 1860s. They clung to the foothills south of the Tehachapi Mountains for their ranching activities. In the 1870s sheep poured into the Mojave by way of Antelope Valley. In dry years they came from as far as San Diego and San Bernardino and sought summer pasture as far north as they could travel before it was time to return south again for the winter feed. Between 1868 and 1876 freighters like Remi Nadeau brought silver and borax across the west end of the valley and through Willow Springs. At that time there were many wild animals such as antelope, bear, deer, and coyotes. Early settlers killed the antelope for meat and hides. Extremely tame, they ran in the mountains in the summer and when it snowed, came down to the valley. Between 1882 and 1885 heavy snowfall in the valley caused the death of about 30,000 antelope. It is said that the antelope were afraid to cross the Southern Pacific Railroad tracks to seek shelter and food and that this resulted in their starvation; however, this has never been documented. Other antelope suffered attack by coyotes and wildcats. During the 1880s, Antelope Valley was used for winter and spring grazing by cattle that were moved into the surrounding mountains for the warm summer months. Harry Butterworth had thousands of head roaming the valley, and young cowboys such as Ted Atmore and Rawley Duntley rounded up the herds. Early in the 1890s some of the ranchers about Del Sur, Fairmont, and Neenach attempted to grow grain by dry-farming methods. Success depended on the winter rains, and it was reported that 750 carloads of wheat were shipped from the region in 1893. During the most prosperous years as many as two hundred mules and horses could be seen lined up on Tenth Street in Lancaster feeding or waiting their turn to unload grain. Ranchers planted wheat, barley, and other grains on 60,000 acres skirting the foothills; so much was harvested that the price went down to 75 cents a hundred weight.

Following upon the railroad competition of the 1880s, much interest was shown in irrigating and settling Antelope Valley. Between 1890 and 1895, six irrigation districts were formed. Most were located on the upper slopes of the alluvial fans. Of all these, only the Littlerock Irrigation District was really successful. There 1,300 acres were planted in almonds and prunes by the Alpine Springs Colony who lived in Littlerock. At Manzana, another irrigation district, the resident colony planted many acres of almonds and grapes for the raisin industry. Manzana Colony began development in 1887, and its plowed acreage extended for nearly six miles along

the hills of western Antelope Valley. Sources in King's Canyon supplied water for its irrigation system. Farm houses went up and water pipes were laid. Colonies at Neenach and Fairmont nearby farmed dry grains, and the Almendro Colony southeast of Neenach planted fruit orchards. These colonies had religious interests and a strong community spirit. A portion of the tree land customarily supplied profits given over to the colonizing superintendent who in turn was responsible for the church, school, and library.[2] Beginning with the 1893-94 season there was an eleven-year period of very low rainfall. The cattle and sheep were driven north, trees died, and most of the colonists left. In 1910 less than 5,000 acres in the valley were irrigated. During this period, however, it was discovered that flowing wells could be drilled in the vicinity of Lancaster by drilling to depths of 200 to 500 feet. More than 300 wells existed in 1908. Gasoline engines were used to pump water from the wells, and this was the beginning of a great alfalfa industry in the valley. Jackrabbits thrived on the lush vegetation, so between 1905 and the early 1920s, annual drives were held to reduce their population and save the crops. Although land use was an issue between cattlemen and alfalfa farmers, the available literature tells us little about these shoot outs.

Between 1905 and 1913 the Los Angeles Department of Water and Power built the Los Angeles-Inyo aqueduct across the valley bringing Owens River water to Los Angeles (site 67 and 78).

A Southern Antelope Valley Colony, begun in 1895, had a somewhat different history than the colonies mentioned above. In that year land was cleared near Big Rock Creek and several hundred acres of fruit trees were planted, but the colonists were unable to get clear title to their land and the settlement was disbanded. A second Big Rock Creek settlement left a greater mark on the valley's history even though it lasted only from 1914 to 1918. It was a socialist experiment called Llano del Rio (site 69). The noted author, Aldous Huxley, came to live and write in one of the Llano del Rio houses in 1938 (site 70). In 1956 the 300 acre Hidden Springs Ranch at Valyermo became the Saint Andrew's Priory and Monastery, home of a party of monks who fled from Communist China (site 71). Although of recent origin, this Priory could be considered as a point of historical interest due to the background of its monks.

The history of Lancaster, Palmdale, and Rosamond began in 1876 when the Southern Pacific took its San Joaquin Valley tracks into Los Angeles by way of Antelope Valley. Southern Pacific drilled an artesian well along side the depot of present-day Lancaster, and this demonstrated the presence of water to Mr. M. L. Wickes, a realtor. He bought sixty sections from the railroad at 50 cents an acre and had the town surveyed and recorded on February 16, 1884. He named Lancaster after his home town in Pennsylvania. The Western Hotel (site 72), originally a two-story family residence, predates this by ten years. The town was well advertised and soon had a livery stable, the hotel, and a store occupied by Mr. Glencross on Antelope Avenue between Ninth and Tenth Streets. W. H. Storey was listed as agent for the Wells Fargo and Company's Express services. Southern Pacific had a tank house and shacks for their employees. Lancaster grew steadily claiming a newspaper, *The Lancaster News*, in 1885 (later the *Ledger-Gazette)* and a high school in 1912. In 1912 the *Ledger-Gazette* building burned, destroying all its files and many valuable records and photographs.

It is reported that Palmdale got its start when a wagon train settled in the area. Germans, Swiss, and other ethnic groups came to locate at what is now approximately 27th Street East and Avenue R. This settlement was called Palmenthal, but in 1919 the name was changed to Palmdale. A community center grew consisting of a livery stable, blacksmith shop, stores, school, post office, and land office. It was located a short distance from the railroad. The old stage coach line from San Francisco to New Orleans ran along about the same path as the railroad. In 1899 Palmdale moved to a location closer to the railroad, but mainly because the new site had a better water supply. It centered around Eighth Street East and Q-6 Street. Adjoining Palmdale another settlement got underway in the 1880s near the Quartz Hill area where the Goddes and other pioneer families homesteaded. The Goddes family is credited with introducing almonds, and in their first decade, blessed with heavy rains, succeeded in raising wheat and barley. The drought put an end to dry farming. In 1913 Guy Earl acquired much of the land around Quartz Hill and planted pear and prune trees. These were not overly successful, and the land was later used for dude ranches developed by the Penn Phillips Company. It was more recently subdivided for homes.[3]

Rosamond, to the north of Lancaster on the Southern Pacific line, was another depot, and settlement began on the northwest quarter of Section 21 with railroad section houses and a freight shed. It was not until 1907 that C. C. Calkins purchased the townsite hoping it would serve as a boom town for workers on the Los Angeles-Inyo Aqueduct. Since Rosamond lay at such a distance from the work and had little to offer laborers as compared to the older Mojave, the venture failed. Meanwhile, Charles M. Stimson of Los Angeles who held the mortgage on the land had given it to the Union Rescue Mission of Los Angeles. The Mission foreclosed on the mortgage in 1916, but development did not come until 1935 when the Mission installed a water plant and California Edison brought in lighting. The Mission sold lots and presented the town with Wayside Chapel. A few buildings remain from Rosamond's early days: a frame house at the corner of Highway 6 and Center Street built by John Stucky in 1903; Rosamond's first school built by a black man, Charles A. Graves, in 1907 or 1909; and the Indian Lodge built by Ezra Hamilton in 1909.

Rosamond was named for the daughter of a Southern Pacific official. Some fourteen miles west of Lancaster is a castle built by John Shea (site 73) in 1926-28. Its design and the people who lived in it and used it make it a resource by which to study conspicuous consumption of the 1920s and American-Hollywood values of that era. The Antelope Valley dry lake potential for roadbeds and landing strips have ultimately brought the valley as much or more renown than ranching or mining. Miners found that sailboats with wheels served as good transportation across the lake beds, and in 1902 a speed record was set in such a conveyance. During the 1920s many other speed records were set on Rosamond and Muroc Dry Lakes. On Sundays crowds of up to 500 came to race hopped-up cars. On one Sunday six youths were killed during the races. A Ford chassis rigged up with sails would tack back and forth at speeds up to sixty miles an hour providing additional diversion. In 1930 Warren McClatchie's single motor plane broke the world's endurance record being refueled from a car speeding below on the surface of Rosamond Dry Lake. Early day pilots made extensive use of the lake bed for takeoff and landing. Even the famous round-the-world flyer, Wiley Post, made an emergency landing on Muroc Lake in 1935. [4]

The largest dry lake, called Muroc until 1949, served as a surface road very early in California's history. On November 5, 1953, the Antelope Valley *Ledger-Gazette* published a photograph of what appeared to be the tracks of a two-wheeled Spanish ox-drawn carreta and the cleft hoofprints of oxen. The blast of jet engines being run up had blown away the dry lake bed sand to reveal them. This indisputable evidence of historical use is followed by speculation, the possibility that John C. Fremont and his company camped on the same dry lake in 1844 while en route to Los Angeles from Tehachapi Pass. Freighters and stage lines may have crossed the dry lakes. In 1876 Southern Pacific came across Tehachapi Mountains and established shops in the community of Mojave. Their tracks were some twenty miles west of Muroc Dry Lake. However, in 1882 Santa Fe extended its tracks from Barstow to Mojave to meet the Southern Pacific tracks. In doing so the Santa Fe tracks crossed Muroc in a southwesterly direction and then turned northwesterly to the junction at Mojave. The Santa Fe tracks opened up the area around Muroc Dry Lake to homesteaders in the 1880s, land without water except small springs. In 1910 Clifford and Ralph Corum and Clifford's wife Effie settled on a 160 acre watering stop established by Santa Fe on the west side of the dry lake. They came as well drillers and named their place Rod after Lake Rodriguez. Together they recruited contract settlers. Clifford signed them up, and Ralph cleared the land and dug their wells. The stop was variously known as Yucca, Rodrigues, and Rod. Mrs. Corum determined to have a post office there and the Corum name was popular. However, it was already in use elsewhere. The spelling was reversed and the station called Muroc. Settlers soon applied the name to the lake as well.[5] At that time, Corum could be described as a scattered community of about forty people who farmed alfalfa and raised turkeys. In the 1920s they worked in the nearby boron mines. In 1934 the most widely published individual in the history of Antelope Valley bought 360 acres of desert on the edge of Rosamond Lake. She was Florence Laine Barnes, better known as Pancho Barnes (site 74). By the 1930s use of the dry lakes for racing brought the attention of the Air Force to Muroc's 65-square-mile surface. In 1933 they began to use this natural landing field, and their base there eventually caused the greatest population explosion the valley had ever known.

The first recorded use of the area around the huge dry lake by the military was in September 1933. At that time Henry "Hap" Arnold was serving as interim commander of March Field, California. He sent a survey party to the area east and south of the dry lake to mark out a bombing and gunnery range on government held land for use by pilots from March Field. After the range was laid out, a small detachment of men acted as caretakers. They established East Camp almost due east of the community of Muroc, across the dry lake bed, and near some springs. In 1934 and 1935 a small barracks and mess hall were built. Units from fields other than March made use of the lake bed, and in 1938 the entire United States Army Air Corps, with all 200 of their flyable aircraft, came to Muroc Lake for an air meet. Recognizing the usefulness of the boming and gunnery range at Muroc, President Roosevelt issued Executive Order No. 8450 on June 20, 1940, transferring some 56,000 acres of public lands in the vicinity of Muroc Dry Lake to be "withdrawn from all forms of appropriation under the public land laws including the mining laws...for use of the War Department as a bombing and gunnery range." By then "Hap" Arnold was Chief of Staff of the Army Air Corps and in a place to exert influence. Construction of permanent buildings began, but not at East Camp. The location selected was approximately

one mile south of the community of Muroc as it was close to the Santa Fe Railroad and on relatively level ground. The site was named the Muroc Bombing Range, but in a little over a year it would serve even more importantly as a haven for planes patrolling the California coast and looking for Japanese submarines. Permanent army personnel then moved to Antelope Valley, and formed the nucleus for the high density population pattern which would follow.[6]

NOTES

1. S. D. Tormley and M. W. Allen, "Descriptive Catalog of Earthquakes... 1769-1928," Seismological Society of America Bulletin XXIX (1939), p. 35.

2. Mary F. Strong, "Spring Splendor in Antelope Valley," Desert Magazine XXXV (4) (April, 1972), pp. 22-25.

3. O. L. Hydle, Quartz Hill Yesterday and Today (Quartz Hill: Hydle, 1971); Wells Fargo and Company's Express, Lists of offices and agents and correspondents (San Francisco, 1886), p. 12.

4. Emma Pierson, Kern's Desert. (Bakersfield: Kern County Historical Society, 1956), pp. 64-67.

5. Edwards Air Force Base, Historian Ted Bear's Files.

6. *ibid.*

WORLD WAR II

Although gas rationing caused a sharp decline in civilian travel to the desert, thousands of recruits saw the western Mojave while in uniform. Marines from the Holding Reconsignment Point swarmed into Barstow, as did militarymen from Camp Irwin and bases to the east. Mojave minerals were in great demand: tungsten, potash, manganese, antimony, lead, and zinc mines enjoyed another boom of prosperity. New markets for the borates stemmed from its use in jet and missile fuel, and Boron on the northern limits of the western Mojave would soon become the site of a huge open-pit mine operation and, post-war, of an eight million dollar processing plant. However, of greatest interest to this study was the rapid growth of Army Air Force activities at Muroc Bombing Range. Before the day Pearl Harbor was bombed had ended, two army units had arrived to remain for several months: the 41st Bombardment Group and the 6th Reconnaissance Squadron. Two more units arrived Christmas Eve, and in the opening months of the war some 90% of coast patrolling was accomplished by the units based at the Muroc Dry Lake. July 23, 1942, the Range was transferred to the Fourth Army Air Force, Hamilton Field and redesignated Muroc Army Air Base. During the war, the south end of the lake was used for training of P-38, B-25, and B-24 crews. Props for this training included a 650-foot realistic model of a Japanese cruiser of the Mogami class which bomber crews bombed

with practice bombs. Pilots and crews from other bases in southern California used the life-sized model for strafing, identification, and skip bombing practice.

In 1942 the first United States jet aircraft took off from the Muroc Dry Lake bed (site 55) and from this same base the Army Air Corps in cooperation with the aircraft manufacturers tried out for the first time such aircraft as the Lockheed F-80 "Shooting Star," the Republic-built F-84 "Thunderjet," the Convair B-43 bomber, and North American's B-45 bomber. The first plane to fly through the sound barrier took off from here on October 14, 1947, piloted by Captain Charles Yeager, USAF. Within a week of this historic flight the strange looking Northrop "Flying Wing" arrived at Muroc to begin tests. On June 5, 1948, the Flying Wing crashed during an experimental test flight. It was piloted by Capt. Glen W. Edwards. In his honor the base was redesignated Edwards Air Force Base on December 8, 1949.

By this time the lake was referred to as Rogers Dry Lake and assessed to support, when dry, up to 250 pounds per square inch of pressure on its surface. Winds eroded its surface, heat chipped and cracked the clay, and by fall the lake resembled a huge quilt. But winter rains would come, the wind blow the water back and forth across the lake bed and fill in the cracks. With rising temperatures the lake bed would become again glass-smooth. Even our heaviest aircraft can land without fear of sinking into the lake bed. Rogers Dry Lake is called the largest natural landing field in the world, and it is resurfaced annually at no cost. In 1951 the Headquarters Air Force Flight Test Center was activated at Edwards and it was expected that Edwards Air Force Base would become the main flight test center for the Air Force. All of Rogers Dry Lake, except the railroad right-of-way used by Santa Fe, lies within the air base boundaries.

The Santa Fe tracks bisected the lake in such a way as to allow a four-mile runway north of the tracks and a eight-mile runway south of the tracks. Edwards sought an unobstructed twelve-mile runway. The tracks were relocated from Rogers Dry Lake to a line between Boron and Sanborn, a distance of 25.76 miles, and at a cost to the Air Force of approximately $9,000,000.[1]

NOTES

1. All source material for this section came from the historian's files, Edwards Air Force Base. The file contains an interesting letter written by the Assistant General Manager, Engineering, Santa Fe Railroad, to Edwards Air Force Base in 1977. He mentioned the re-routing of the line in 1951 and observed that, "The reason for this line change was simply to reduce our operating mileage between Barstow and Mojave."

George Air Force Base in Adelanto was first called the Air Corps Advanced Flying School when the base was born in June, 1941. It had various names, and was finally called George Air Force Base in honor of Brig. Gen. Harold H. George. Pilots, bombadiers, and, importantly, glider groups per-

fected their training here during World War II. Since the war the base has been assigned to several different commands, has stored aircraft, and has housed fighter groups and supersonic jets. Today, George Air Force Base has one of the largest missions in Tactical Air Command with more than 130 tactical fighter aircraft assigned. The base historian, Sgt. John Cooley, is not aware of any historical sites on the base itself nor has this study revealed any.

CENSUS DATA

Determining precise population figures for the turn-of-the-century Mojave area is difficult for a number of reasons. The tabulated returns for the United States Population Censuses are in statistical form, and the smallest unit for which we find tabulated results is the county. Districts, towns, and individual cities are not listed separately; thus, we have no indication as to what part of the county the enumerated people were located. The 1910 United States Census was an exception to this format, but for California only. In this case, the counties are broken down into townships, precincts, and wards. Unfortunately, determining the exact location of many of these places would entail a time frame outside the scope of this report.

A Manuscript Census is available for the years prior to 1900. The 1890 manuscript was destroyed by fire, leaving the 1880 manuscript as the best data source accessible for turn-of-the-century population figures. The western Mojave region presents an additional problem, remoteness. Some areas, although known to be populated in 1880 (i.e., the Antelope Valley area of Los Angeles County), were never enumerated. In this case, estimates, generated from later censuses and secondary sources, would seem to be the best means available for determining the populations of areas never enumerated.

Attached herein are tabulated population figures from the 1880 manuscript with one example of occupation types. The Mojave (Kern County) figures are the only ones that definitely fall into the five-zone area of Antelope Valley, Johnson-Morongo, Kramer, Stoddard, and Calico. The other figures--those of San Bernardino County--are for enumerated areas that may or may not fall within the five-zone area. The only way to determine exactly whether these locations are, in fact, located within the five-zone area would be to make an exhaustive study of old maps and peripheral historical sources.[1]

NOTES

1. See also Frank Norris and Richard L. Carrico, "County Population Statistics--California Desert Population Area" (Appendix A-1), in A History of Land Use in the California Desert Conservation Area. BLM, DPS, August, 1978.

MOJAVE (KERN COUNTY)

92 people
18 Females
1 prostitute, 1 visitor, 16 at home, keeping house, etc.
74 Males
1 barkeeper, 2 gardeners, 6 laborers, 3 R.R. engineers, 2 hotel cooks, 2 blacksmiths, 3 hostlers, 1 stable keeper, 1 millwright, 3 miners, 1 hotel waiter, 1 hotel steward, 1 dishwasher, 1 dry-goods merchant, 1 teamster, 1 stockherder, 1 R.R. section foreman, 1 R.R. laborer, 1 coal-heaver, 1 R.R. fireman, 1 brickmaker, 1 car inspector, 1 stage driver, 1 agent for? 1 R. R. depot agent, 1 shoe maker, 1 cook at station, 1 clerk for ?, 1 washing clothes, 1 engineer, 6 station keepers, 1 (?) illegible), 22 sons, etc.

MOJAVE, BEAR VALLEY, AND MOUNTAIN (SAN BERNARDINO COUNTY)

246 people
71 Females
175 Males

SAN GORGONIO AND SAN TIMOTEO (SAN BERNARDINO COUNTY)

465 people
180 Females
285 Males

BELLVILLE (SAN BERNARDINO COUNTY)

254 people
59 Females
195 Males

COTTONWOOD (SAN BERNARDINO COUNTY).

22 people
5 Females
17 Males

MARTIN'S VOTING PRECINCT (SAN BERNARDINO COUNTY)

112 people
51 Females
61 Males

THE HISTORICAL SITES

The historical sites illuminated through the literature search have been cited in the Narrative Overview. In order to avoid repetition, little or no descriptive data was included about them there. In the following discussion the treatment is uneven. Data for sites with a long and colorful history have been distilled; data for lesser known sites have been supplied in full or in greater part. One purpose of the data has been to strengthen argument for further study by the field crews undertaking inventory work on the western Mojave. Another has been to back up the recommendation made for each site in the Cultural Resource Management Summary. It brings to light the heritage value of each site and should prove useful to an interpretive program. Informational yield of the physical remains is discussed in a general way in the section Future Management Options.

All of the culture resource sites brought together here are numbered. Those same numbers are used to identify the site in the Cultural Resource Management Summary (where they are located and receive recommendations for preservation), in the text of the Narrative Overview, and on the historical site map. (Map 4)

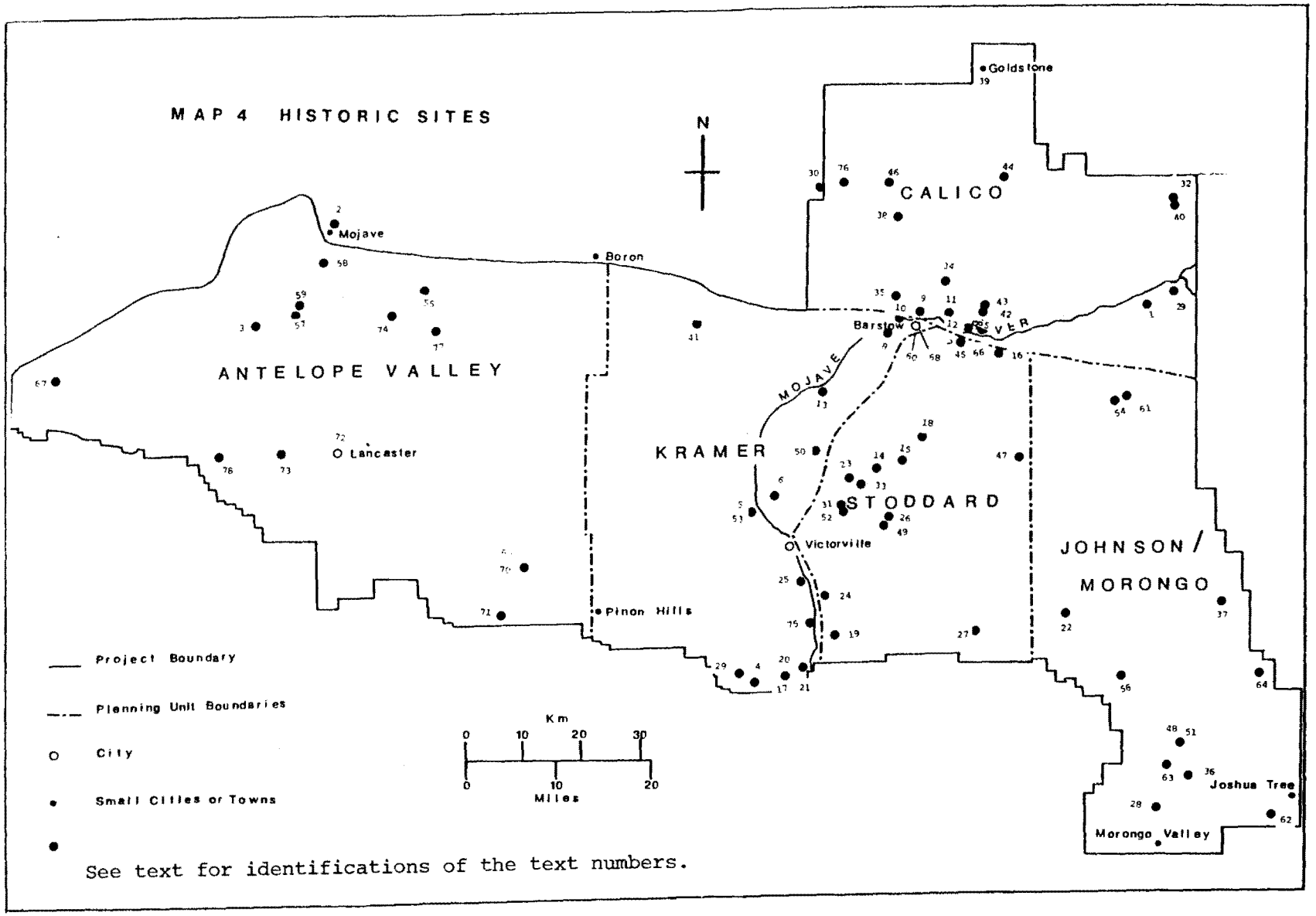
1. CAMP CADY

During the late 1850s and early 1860s, the Indians of the Mojave region not only attacked whites but disrupted the mail route. Merchants and traders in Los Angeles had built up a lucrative trade with southern Utah and Arizona, and repeatedly demanded troops, redoubts, and forts to protect the overland routes. Finally, in 1860, under the orders of General Clarke, Commander of the Pacific Military Division, a series of redoubts and forts were begun in the desert. In spring of that year, Major James H. Carleton, Company K of the First Dragoons, established a fort at Forks-in-the-Road, and named it after his friend, Major Albebarle Cady, Sixth Infantry, Fort Yuma, California.

Camp Cady was founded as a temporary fort to be used until the Indians were quieted. It was located at one of the few points along the Mojave River where the water flows on the surface the year around, strategically located on the road to Fort Mojave, and only nine miles from the point where the Salt Lake Trail left the river.

The original camp of adobe and brush huts served as a base from which Carleton's troops could range the desert searching out Pah-Utes to chastise for the murder of immigrants earlier in the year. With retribution complete, Camp Cady was ordered abandoned. On July 3, 1860, Carleton's men set out for Fort Tejon. Although regular troops were withdrawn, the camp site continued to be used by the military as a stopover point when conveying supplies to Fort Mojave.

Camp Cady was one of many installations which, at this time, suffered a removal of troops. The outbreak of the Civil War necessitated the shift of federal troops in the west to service in the east, but it also coincided



See text for identifications of the text numbers.

with an increased need in those areas from which troops were withdrawn. Throughout the war, increasing numbers of small ranches and stations were established along the Mojave. With greater contact between whites and Indians, Pah-Ute attacks became more frequent. Because of the war, however, military officers considered protection of desert trails a low priority.

It was not until 1864 that the army found it necessary to send volunteers into the region to check the boldness of the Indians. Finally in early 1865 Colonel James F. Curtis, Fourth Infantry, California Volunteers, recommended the re-establishment of regular army at Camp Cady. On April 23, 1865, troops were stationed on the old site.

Camp Cady housed mostly infantry during 1865 and early 1866, with only a few horses available for escort duty. Before the arrival of regular army, the government stores had been burned by Indians, but now, since it was impractical for infantry soliders to do much desert scouting, most time at Camp Cady was spent in building. Under the command of Captain West, Company C, Fourth Infantry, 35 small adobe houses were built by January, 1866. In March, however, the camp was again ordered to be abandoned, the result of mustering old soldiers after the Civil War.

No sooner was Camp Cady deserted than Indian depredations began anew. Within two months, soldiers were back at the site where they would remain in small and irregular numbers through 1867.

Because Cady's original site had inadequate space for drill grounds, General Ord, Commanding General of the United States Army, decided to change the camp's location to a site one-half mile west of the old camp. Enlisted men were put to work building the new camp in June, 1868, with the last troops moving in in November.

As at the old site, adobe brick was the primary building material. Distinguished from the primitive conditions at the old camp, however, structures at the new Camp Cady were floored and had shingled roofs. No permanent bunks were erected, since troops were usually under orders to move out at a moment's notice. There were a few tables in the barracks, but no fixtures. Corrals of sheep and cattle provided fresh meat, and a cookhouse with a 100-loaf capacity oven serviced all troops.

Despite continued Indian aggression, the force at Camp Cady was reduced to approximately twenty men in 1869. In 1870, General Price of Fort Mojave negotiated a peace treaty with the various area tribes. Federal troops completely abandoned Camp Cady in March, 1871, and the property was sold to two local stockmen named Cartwell and Winters.

Life had been hard at Camp Cady; boredom and isolation had led to a high desertion rate throughout the camp's existence. Desert conditions that had been rough on soldiers were also rough on the camp itself. Ivanpah was becoming a boom town at the time of Cady's demise, so freighters stripped the camp of lumber to be used in the mining town. Ruin was completed in 1896 when remaining timbers were used in building sheephuts at the nearby Cady Ranch headquarters. Time and desert winds have left little else. The ranch is now privately owned, reportedly by Jean and Harold Gibranson of

Victorville. Field assessment should consider this a candidate for the National Register of Historic Places. The old and new camp sites need to be looked at. Garcés and other early travelers may have camped here.

L. Burr Belden, "Camp Cady, Army Post on Mojave, Guards Southland," San Bernardino Sun-Telegram, December 23, 1951.

Dennis G. Casebier, "The Battle at Camp Cady" (Tales of the Mojave Road, No. 2), Norco, 1972.

Dennis G. Casebier, "Carleton's Pah-Ute Campaign" (Tales of the Mojave Road, No. 1), Norco, 1972.

Waitman, Leonard, "The History of Camp Cady," Historical Society of Southern California Quarterly, V. 36, March-December, 1954.

2. 20-MULE-TEAM BORAX TERMINUS

At Mojave, Kern County, the Southern Pacific Railway served as a terminus for the 20-mule-team borax wagons that operated between Death Valley and Mojave from 1884 to 1889. The route ran over 165 miles of mountain and desert trail from the Harmony Borax Mining Company Works, later acquired by the Pacific Coast Borax Company, the the railroad loading dock in Mojave. A round trip required twenty days. The ore wagons hauled a payload of up to 24 tons. They were designed by J. W. S. Perry, borax company superintendent in Death Valley, and built in Mojave at a cost of $900 each. New borax discoveries near Barstow ended the Mojave shipments in 1889. This is now private property.

3. WILLOW SPRINGS

This is an historical waterhole in the western Antelope Valley. The site was heavily used by Indians as evidenced by the many artifacts found there. Father Garcés visited the oasis in 1776 while returning to the Colorado River. John C. Fremont, Kit Carson, and other explorers camped here, and in 1850 both the Lewis Manly and the ill-fated Jayhawker Party probably stopped here on their way to Los Angeles from Death Valley. Later the springs were a way-station for Indian horse thieves and in the 1870s for stage lines such as the Los Angeles-Havilah, Inyo stage lines, and in particular those of Remi Nadeau. Nadeau transferred silver ore of the Cerro Gordo mines to Los Angeles and San Pedro. At this time stone buildings were erected to serve as a station for the freight lines.

In the mid-1890s, Ezra Hamilton, a tile manufacturer from Los Angeles, purchased a clay pit on Crandall's Hill northeast of the springs, and in 1896 he discovered a rich vein of gold ore there. Hamilton used some of money from his mine to purchase 160 acres of the Willow Springs Oasis from the Beale Estate for $3,500. At that time all that remained at Willow Springs was the ruins of an old stage depot and the walls of the horse corrals beside the springs. Hamilton's original plans for Willow Springs were to build it into a health resort. His attractive stone cottages of

native rock provided comfortable year-round living for people suffering from consumption. Health seekers came from all over the United States. He tried many ventures with the springs area such as cultivating silk worms he imported from Japan. He eventually developed the old stage stop into a community for the men working in his gold mine. The town had electricity, an ice plant, cold storage, public baths, an entertainment center, a hotel, and homes for miners. In nearby Rosamond, Hamilton built a luxurious hotel. Some buildings were in use in 1962. This California Historical Landmark should be preserved.

4. BURTON'S STATION

Listed by Warren and Roske as a major stop on the Mojave Trail during the American period, post-1848. They state that it was not clear where Burton's was and that it may have been at Victorville or established as Godfrey's Ranch.

5. UPPER CROSSING

Near Oro Grande, this is referred to by some as the Lower Narrows. Fremont reached the Mojave River here approaching from the west. Jedediah Smith left the river here in 1827 and headed for Cajon Pass, thus trailblazing a short cut for Spanish Trail travelers who later established it as a segment of the Santa Fe Trail (Mormon Trail). A gravestone marked "Hill, 1842" was reported here by the San Bernardino *Daily Sun,* November 29, 1940. Jefferson Hunt also led his party of 40 miners to this point and headed for Cajon. During the American period it was an important wagon stop. The station was located on the south side of the river between 1865 and 1872.

6. LANE'S STATION

J. H. Lane had a store here on the Mojave River near Oro Grande that served wagon trains and stage coaches. It overlooked a ford used to cross the river west of Lower Narrows. The 1862 flood made it an island and in this same decade John Brown, Jr., established a regular wagon train station at Lane's. A photograph taken by R. D. Hereuse of Lane's in 1864 may be found in the Bancroft Library. It shows a log cabin, a lean-to, a split rail fence, and a wagon. The Turner Springs Ranch developed at Lane's and is now the property of Adelanto Springs Ranch.

7. FONT'S GARAGE

This building was originally situated near the north end of the Mojave River bridge on the Daggett-Yermo Road where it was used as a roundhouse for narrow gauge railroad equipment operated by the Waterloo Mill and Mining Company to haul ore from Calico. In 1906 it was moved to its present site and used as a livery stable. The first operator was perhaps E. T. "Bud" Hillis. Howard Hill arrived in 1908 and operated the livery stable for many years. Acquired in 1917 by Robert M. Campbell, it was converted to a

garage for automobiles and later to a grocery store even though it still had a dirt floor. The garage was largely vacant from 1929 to 1941, although a cement floor was poured during plans for a poultry processing plant which never materialized. Font's Garage started business about the end of 1946 and still operates there.

8. COTTONWOOD STATION

This major stopping place on the Mojave Trail was often mentioned in logs and diaries. Warren and Roske locate it as eighteen and one-half miles from Fears in Cajon Pass.

9. GRAPEVINE STATION

Located in the Mojave River bottom, this important wagon train station abounded in grapevines and was owned by Ellis Miller. The abandoned Lee Mine lay near it. Thus, during the mining boom of the 1880s, a Grapevine Mining District was established and the station was a stopping place for travelers and miners. Food, supplies, a saloon, and resting place were available. The Waterman mill, which lay west of the Grapevine Station, became a trailway stop called Waterman Junction. As traffic increased, the stop and town which grew up around it were renamed Barstow. The old Grapevine site now lies on the northern limits of the town.

10. GOVERNMENT STATION

A wagon train stop shown, according to Warren and Roske, on Bancroft's 1868 map and on Farley's 1861 map.

11. Fish Ponds Station

This natural pond of the Mojave River abounded with fish when Americans first crossed the desert, and it became an important stop on the Mojave Trail. Lt. Whipple recorded his stop here in March 1854. Lafayette Mecham possessed the wagon station at Fish Ponds and raised hay and grain for travelers, repaired wagon, and supplied leather to mend harnesses. Later a general store was reportedly here. Mecham's son, Frank, co-discovered the bonanza Silver King Mine in the Calico Hills. The station became prominent during the mining boom of the late nineteenth century, and a mill was built at the site in 1883. The *Calico Print*, July 7, 1883, reported that William Raymond, owner of the Garfield Mine in the Calico Mountains, made arrangements to have his quartz mill shipped from Nevada and placed in operation at Fish Ponds. This was reprinted in the *Engineer and Mining Journal* under "San Bernardino County," in 1883 (p. 54). During World War I, it was the site of a school. It is now the site of the Marine Corps Supply Center east of Barstow and close to Nebo. The ponds were about where Camp Irwin Road turns away from Highway 91; however, they no longer exist.

12. FORKS-OF-THE-ROAD

This point in the Mojave crossing was where the Old Government Road (which closely followed ancient Indian trails) headed east, while the Santa Fe Trail (Mormon or Salt Lake Trail) headed north to join the Amargosa River route. It is believed to have been a Garcés campsite. Lieutenant Whipple's party recorded it March 13, 1854. Warren and Roske report from their sources that in 1864 it was John Haven's claim, known as the Old Grocery, and in Part I, p. 26, speculate upon various citations which refer to this location.

13. POINTS OF ROCKS

John C. Fremont recorded a stop here, and as ox teams and wagon trains came through the desert in the 1840s they found this adobe station listed in numerous journals as the Old Grocery. It was a favorite noontime halt for travelers. In 1851 the 150 Mormon wagon train recorded this stop. This and Lane's stop were the only settled places until Verde Ranch developed in the 1860s. Point of Rocks became a part of Nickerson's (Nicholson's) Ranch.

14. RABBIT SPRINGS

The springs are caused by a group of seeps along a low fault line. Artifacts found here indicate that it was an Indian campsite in historic and prehistoric times. In the 1870s Scotchborn Peter Davidson homesteaded land in the Rabbit Springs District north of present-day Lucerne Valley settlements. He was past middle age when he settled in the valley and lived there until his death in 1902. Davidson's at Rabbit Springs was an important way station where mail for miners and prospectors was left in a washtub until they could come by and claim it. Davidson served meals to travelers and heated his cabin with a fireplace made of native rocks.

In the 1880s and 1890s, Rabbit Springs was an important crossroads. From it roads went west to Victorville by way of Deadman Point, north to Daggett, northeast by way of Kane Spring to Newberry, east by way of Old Woman Springs to the Dale Mining District, and southeast by way of the Box S Ranch and Cushenbury Grade to Big Bear.

15. ROCK CORRAL

Peg-Leg Smith and the horse thief Walkara were said to have ambushed the *Californios* here in 1828 and to have escaped unharmed.

16. CAMP CADY HILLS

Location is not clear. In 1845 the Benito Wilson party fought Indians here.

17. GUAPIABIT

This Summit Valley Indian village site was visited by, and documented in the diary of José Zavidea in 1806. Here he baptized three men and three women. Lt. Gabriel Moraga and his diarist Fr. Juaquin Nuez stopped here in 1819. Further baptismal activity was recorded for 1821 when 19 men, 16 women and 11 children received the sacrament.

Jedediah Smith recorded passing this village in 1826. In 1866 desert Indians killed three cowboys at Guapiabit. Archaeological fieldwork was begun here in 1939, disclosing what seemed to be circular house pits and providing many artifacts for study.

18. HERCULES' FINGER

Hercules' Finger is a 60-foot tall, finger-like granite monolith in the Cinnamon Roll Buttes area. It has very steep, smooth sides that make it difficult to climb.

A small battle was fought near Hercules' Finger in 1840. Horse thieves from southern Utah, led by Chief Walkara of the Ute Indians, and accompanied by mountain men Peg-Leg Smith, Jim Beckwourth, and Old Bill Williams, raided southern California ranchos, stole between 3,000 and 5,000 horses, and proceeded to drive them through the desert. Several posses of California vaqueros were in pursuit. One posse, 23 men under the leadership of Ygnacio Palomares, found the horse thieves, but unfortunately rode into an ambush. Only eight returned.

19. UPPER NARROWS

In 1849 Hunt ordered his wagon train to dismantle here so that the pack animals could carry all goods piecemeal from this point up the mountain and down into the San Bernardino Valley.

20. WEST CAJON

Called El Cajon de los Negros, this rugged wagon route was developed by William T. Sanford, Phineas Banning's brother-in-law, in 1850. It served immigrants going to Los Angeles but would not do for transport of mining machinery needed for the gold mines north of Baker. Sanford accordingly cut a new road leading from Oro Grande to Cajon. West Cajon was used by the first large Mormon train in 1851. Marker here should include this data.

21. SAWPIT CANYON ROUTE

The Old Mojave Indian Trail followed the Mojave River into the San Bernardino Mountains at Sawpit Canyon and thence to the summit. The Ute Chief Walkara reportedly used the canyon route in his forays across the mountains and into the San Bernardino Valley.

22. OLD WOMAN SPRINGS

This was the second watering place to bear this name. The first was the present Cottonwood Springs which lies about a mile east of this Old Woman Springs. Cottonwood was originally given the name by Col. Henry Washington who camped there in 1856 while he was running the San Bernardino base line east from Mt. San Bernardino. As his party approached, a band of Chemehuevi Indians left the spring, but an old squaw, too weak to travel, was left behind. The second Old Woman Springs, about 16 miles east of Lucerne Valley and just south of the Lucerne Valley-Yucca Valley road, became an important crossroads. It was on the northern and best wagon road between the Victorville area and the Dale Mining District, a supply point and overnight stop. Reportedly, George C. Lee, who made the first mineral discovery in the Barstow region, was killed here by Indians while on a solitary mining expedition. The springs have been the center of an area dedicated to homesteads and winter cattle range since settlers came into the Lucerne Valley region. In 1909 it boasted a ranch house, orchards, and nine acres of alfalfa in its environs. At the present time, it is part of a private cattle ranch.

23. STODDARD MOUNTAINS

These mountains northeast of Victorville were an early survey point and later exploited for mining. Sheldon Stoddard's Well lies to their east. A cutoff for the wagon trains went through this area in the 1870s before the railroads were built.

24. MOJAVE RIVER FISH HATCHERY

In 1947 the Mojave State Hatchery took over two irrigation wells eight inches in diameter and set about creating this facility, one of the largest in the state. Here, water comes from the ground at just the right temperature for trout: 60°F. Standing water is 40 to 50 feet deep in the underground lake below the hatchery, but its wells go down 200 feet. The fishery pulls 300 gallons of water per minute from each of its wells, using three or four wells at a time. The hatchery is not the largest pumper from these water sources, as both the cement plant and the Jess Stoddard Ranch pump more. The trout at this facility come as small fry since they are hatched at a plant near Fillmore. Here they grow until they are large enough to be released in mountain streams.

25. VERDE RANCH

The ranch was first settled in the 1860s; since it was located in an area of fertile land, population around it grew. It served as a rendezvous point for the whites before the last big Indian fight at Chimney Rock. In the 1870s it was the terminus of the John Brown Toll Road coming through Cajon Pass and a supply point for travelers. Marked by lush green meadows and large cottonwood tree forests, it now contributes to the Mojave Narrows Regional Park, the Spring Valley Lake Estates, and the Kemper-Campbell Ranch.[9] The Campbell family bought into the land in the 1920s.

26. DEADMAN'S POINT

This well-marked formation of huge rocks is at the base of the Granite Mountains at the west end of Lucerne Valley. Although the orgin of the name is not clear, it was often used in describing trails since it was a distinguishable landmark. For example, in 1860 the Santa Ana Canyon Trail for pack animals served Holcomb Valley residents. Gold was discovered, and in 1860 the miners sought to build a wagon road to lower freight costs and to make possible the transport of a boiler or steam engine. A new road was built northward to a terminus at Verde Ranch, and it was described as going down Holcomb Creek, over Coxey Meadows, and to Deadman's Point. At this location it moved northwestward, over the southern part of Apple Valley, and to Verde Ranch.

27. CHIMNEY ROCK

This natural rock formation on the northeast edge of Rabbit Dry Lake is the site of the last Indian fight in southern California. In the spring of 1866, when 26 Paiute Indians were camped beside the Mojave River at the Victorville Narrows, one of their scouts reported that white men were encroaching on their hunting grounds in Little Bear Valley in the San Bernardino Mountains. Leaving their families at the Narrows, they went upriver to Las Flores Ranch and killed three men, Ed Parish, Ned Bemis, and Pratt Whitesides. A year later, the Indians returned to the mountains and again attempted to drive out the whites. This time they burned a sawmill at Blue Jay and fought a pitched battle with the owner, Frank L. Talmage, and other settlers. Talmage killed the Indian chief and the Indians retreated, dragging their dead and wounded with them, thus leaving tracks or indentations for the whites to follow. The Indians clearly had reason to resent the occupation by whites in this area as the mountains had long been their food-gathering area for annual supplies of acorns, nuts, and deer meat.

From the whites' point of view, the Indians had to be dealt justice, and a posse was formed which first made headquarters at Verde Ranch and then tracked the Indians to their stronghold at Chimney Rock. The whites made a poorly coordinated daybreak attack, so many of the Indians were able to escape. However, in the battle which followed and lasted several days, the leader was killed and the remaining followers either killed or routed. The thirty-two day campaign aroused such protest from San Bernardino and Los Angeles that the desert forts were again activated. The action brought to an end conflicts between Indians and white men in the San Bernardino Mountains.

28. WILLIE BOY SITE

The Big Morongo Oasis was the location of the first permanent American settlement in the Morongo region, a cattle ranch, in 1876. In 1909, this ranch served as headquarters for a posse that chased Willie Boy, an Indian outlaw who fled with a girl captive across the desert, ostensibly to cross the desert wastes and reach his own people at Twentynine Palms. The hunt centered in the Lucerne Valley and Morongo Valley regions and is told by Harry Lawton's *Willie Boy: A Desert Manhunt*, published in 1960.

29. MOJAVE ROAD

Earliest access route to California across the subject desert, this road has a long and varied history which has been followed in Dennis Casebier's *Mojave Road*, published in 1975. From Los Angeles to its terminus in Prescott, Arizona, a wagon master reported in 1859 that it took 286 days. The Mohave Indians led Garcés and Smith across the western Mojave on this road and up into the San Bernardino Mountains, thus laying the foundations for the ox trails and wagon roads which followed with the stations described elsewhere in this report. Railway surveys led to a 35th parallel crossing after the 1870s by Americans, however, the path along the Mojave River leading from Forks-in-the-Road to the mountains in the south still follows closely, in part, the routes of our major highways of today.

30. BLACK CANYON

This well-defined wash with sandy bottom shows no evidence today of a trail or of a stage road having once passed through it. Historic petroglyphs made by A. Tillman in 1872 are present in at least two places in the canyon. In 1873 silver was discovered in the Panamints to the north, and this led to the introduction of a stage road between Surprise Canyon and San Bernardino. Myerstein and Company began regular stage service here on November 15, 1874. The canyon now lies largely in Southern Pacific land.

31. SIDEWINDER MINE

High on Sidewinder Mountain is the Sidewinder Mine, one of the largest gold producers in the Victorville-Barstow area. Work began in the 1880s and continued intermittently until 1942 when it was closed by War Production Board Order L-208. The mine was reopened in 1950. Sidewinder ore was shipped to Victorville and processed on a ten-stamp mill erected in 1887. A cyanide mill was built near the mine in 1928, but later was dismantled. This mine appears constantly in the literature and on the maps of the western Mojave and was declared to be the largest gold mine operation in the Barstow-Victorville area. Field crews should examine it for possible use as an historical resource. Also, western movies have been filmed in the area.

32. ALVORD MINE DISTRICT

The Alvord gold mine 35 miles northeast of Daggett was hailed in the *Calico Print* of July 7, 1883, as an outstanding producer. A mill for the mine was purchased that year and the *Engineering and Mining Journal* reported it to be of ten stamps. As with the site mentioned above, this site needs field study. It is in the southern part of Alvord Mountains, six miles north of Manix.

33. KEYSTONE MINE

This mine, on the south slope of Stoddard Mountain, was an outstanding producer in 1900 and continued to produce for years after. Some assays ran as high as $800 a ton. Wright *et al.*, in their study of mines in San Bernardino County, found it important. A field check of what remains should be made.

34. CALICO GHOST TOWN/MINING DISTRICT

The discovery of the Comstock Lode at Virginia City in 1859, followed by its spectacular development during the 1860s, certainly breathed an interest in mining into residents of the eastern mountains and desert region of southern California. Completion of the transcontinental railroads, beginning with the Central Pacific in 1869, enabled more men to seek their fortune in the west. Throughout the 1860s and 1870s, mineral wealth was discovered at such eastern California locations as Blind Spring Hill, Cerro Gordo, Panamint City, and Darwin.[1]

The first recorded prospecting in the Calico region of the western Mojave occurred in 1875. An old prospector named Lee chanced upon such a rich silver ledge that it was first believed to be quicksilver. Lee dropped out of sight soon after his discovery, believed to have been killed by Indians near Old Woman Springs (site 22).[2]

In the fall of 1880, a man named Parker who, along with R. W. Waterman, operated a mill near the site of Barstow, relocated Lee's old claims. Spurred by Parker's relocation of the Lee claims, a group of prospectors, Charles Mecham, John McBride, and Larry Sylva, probed the area around the old Lee claims and discovered horn silver in Wall Street Canyon in the Calico Mountains. This find inspired a rush of prospective miners to the area.[3]

Among those that followed the lure of silver in the spring of 1881 were Hues Thomas and S. C. Warden. Grubstaked by San Bernardino County Sheriff John C. King, Thomas and Warden, on April 6, 1881, located claims which they began to develop as the Silver King Mine. With the Silver King, development of the Calico District began in earnest.[4]

As more miners came to try their luck in the area, a town began to take shape on a narrow mesa between the Wall Street Canyon on one side and the combined Garfield and Odessa canyons on the other. The town was named by a miner's committee. "Silver Gulch" and "Buena Vista" were nominated choices, but a persuasive speaker campaigned for "Calico," a name that recalled the unique bright, splotchy patterns of the nearby terrain, and won. The winning name proved especially fortuitous to area miners, for the calico-like areas proved the best to prospect. These multicolored rock patterns comprised the Tertiary sequences of continentally deposited sedimentary rocks, intruded by volcanic rocks, and hosted bonanza deposits of silver and gold.[5]

The Calico District was ideal for small-time, independent miners. Deposits were shallow and ore could be sent down chutes by gravity, negating the need for expensive equipment. These qualities certainly acted as a

catalyst to Calico's growth.[7]

An example of this growth would be that, in July 4, 1881, there were only three men living in Calico and the only housing was a cramped cabin owned by Allison, one of the discoverers of the Oriental Mine. By the spring of 1882, however, approximately 100 people, ranchers turned to mining for the most part, were living on Calico's narrow mesa.

In July, 1881 J. B. Whitfield and others staked the claim which would become the Burning Moscow Mine. By April, 1882 E. Summers' new five-stamp mill was ready to run on Moscow ore. At the same time, ore from the King Mine was being transported forty miles south along the Mojave River to the Oro Grande Mining Company's mill--situated about twenty miles north of Cajon Pass--which had been constructed in 1878 to service neighboring Silver Mountain District ores. The greatest hindrance to stamp mills in the Calico District was a lack of fuel. A ten-stamp mill at the Calico mines had decimated the cottonwood groves along the Mojave River, leaving only greasewood for home fuel supply.[8]

Sickness in camp and intense desert heat during summer, 1882 slowed temporarily the development of the Calico District. By fall, however, prosperity returned as more professional miners arrived and smaller properties were consolidated, thus leading to a higher efficiency. Many new claims were made, among these the Snow Bird, east of Calico.[9]

In October, the fledgling town of Calico got its own newspaper, the weekly *Calico Print*. John Overshiner of San Diego was the journal's founder and editor. The *Print* published faithfully until summer of 1887.[10]

A high pitch of excitement and optimism at Calico in fall, 1882 was due to the approach of the railroad. The railroad was the solution to local fuel shortages for the stamp mills, the transportation of ores, and the inaccessibility of building materials. The Southern Pacific reached Waterman's from Mojave on October 23, and a Calico station was established on November 13. The Calico station was located on the south bank of the Mojave River, about seven miles from the townsite. In spring, 1883, the station changed its name from Calico to Daggett.[11]

Although the appearance of the railroad brought in a glut of new miners, it also offered some much-needed security to the town of Calico. The town itself began to take physical form, with five saloons, three restaurants, stores, assay offices, hotels, boarding houses, a school, and a community hall lining its thoroughfare, Wall Street. Accommodations for miners ranged from frame and adobe homes in town to tents, shacks, caves, and dugouts in the hills and canyons.[12]

The railroad was largely responsible for lending Calico some physical permanence by hauling lumber and other building materials across the desert. Without these supplies, lodging in Calico had tended toward the Hyena House, a hotel composed of barrel stave walls and niches in the rocks for rooms. Chili beans and whiskey were available at every meal.[13]

The year 1882 not only saw Calico take shape as a town, but also witnessed the geographical definition of the district. Mines came to be dis-

tributed within an area about five miles by two miles wide that lay northwestward. The large mining operators were confined to three areas within the belt. The central group, within a mile northwest of the Calico townsite, contained the Silver King, Oriental, Falls (Sioux), Burning Moscow, and Red Cloud mines on the steep banks of Wall Street Canyon. "East Calico" included the Odessa, Garfield (opened December, 1882), Bismarck, and Blackfoot mines in the vicinity of Bismarck and Odessa Canyons. "West Calico," to the west and northwest of the townsite, was represented by the Burcham, Langtry, Union, and Waterloo mines. In all, the Calico District comprised fifty distinct mines.

The Silver King maintained its prominence in the Calico District. The Director of the Mint reported that by the end of 1882, the mine had developed to a depth of 250 feet, with almost 500 feet of drifts and crosscuts. Railroad carloads of Silver King ore had been sold to the San Francisco mint at an average of $300 per ton. Next in importance was the Oriental mine, managed by veteran miner Judge James Walsh. The Mint's report on the Calico District went on to say that "in all these mines the ore contains scarcely anything but silver in spar, and in the shape of chloride, bromide, verde plate (green silver), and horn silver." Silver was then worth about $1.14 per ounce.[14]

For all the development in the towns and mines of Calico, mills for processing ore and recovering silver were still a problem for the desert mines. For the most part, ore was still hauled in horsedrawn wagons to mills on the Mojave River where water power could be utilized. It might be noted here that not only in milling was the scarcity of water felt in Calico. For use in the townsite, water was hauled from wells near Calico Lake and sold for ten cents per gallon in the townsite.[15]

The recovery process for Calico silver was the "continuous pan" or Boss process, by which ore pulverized in stamp mills flowed as pulp through a series of pans in which it was chlorinated, and then amalgamated for recovery of the silver. On Calico District silver, this method recovered as much as 95% of the silver from the purest chloride ores, and about 75% to 80% of the silver from deeper, sulfide-bearing ores. Salt for the chlorination came from south of Danby (100 miles east of Calico), and coal for fuel came from New Mexico.[16]

Smaller claims were often worked "chloriding," an arrangement by which lessees operated mines as individuals or in small groups, reimbursing one-quarter to one-fifth of the mill proceeds to the owner. Because most lessees tried to mine exclusively only the richest ores, "chloriding" tended to be inefficient and hindered maximum development of the mines. In the "chloriders'" defense, however, it was economically impractical to mine low-grade ores because of the high price of hauling and milling. The rate for hauling from Calico to mills on the Mojave River was $2.50 per ton and the charge for milling was $11.00 to $14.00 per ton, even though the cost of milling was only $3.00 to $5.00.[17]

Calico, both as a town and as a mining district, suffered a series of setbacks in 1883. First, a typhoid epidemic struck the area at a time when there was only one doctor and an inadequate supply of drugs. Riders were sent to San Bernardino for more medicine, but there were several fatalities, nevertheless.[18]

May, 1883 marked the beginning of the borax excitement in the hills to Calico's east. Miners deserted their silver digs and rushed through Mule Canyon to locate borax claims three miles east of Calico. The discovery of borax near Calico made the Mojave region of San Bernardino County, along with adjoining portions of Inyo and Kern counties, the world's foremost source of borax and its derivatives. While other mining has periodically boomed and busted in the Mojave, there have been few years when bonanza returns from metallics have equalled the steady output of borax.[19]

Before its discovery in the Calico District, borax in the form of ulexite or "cotton balls" had been reclaimed from the marshes and salt flats of Nevada. In the Calico hills, an "ancient lake bed had been tilted and elevated so that the borax bearing layers were exposed like ledges, and for the first time could be followed down as any other mineral."[20] It was also here that the borate colemanite was discovered, named after pioneer borax producer, William J. Coleman.

Development, already slowed by a typhoid epidemic and the borax discovery in the neighboring hills, suffered another setback at Calico townsite. In fall, 1883, fire destroyed most of the business section. The silver mines were still producing well, however, and the town was quickly restored.[21]

Productivity of silver in the Calico District peaked during 1884-85. As many as 2,500 people lived in the district. Originally a haven for small, independent groups of miners, Calico mining began to become big business in 1884. Early that year, the Oro Grande Mining Company, under the directorship of principal owner C. M. Sanger of Milwaukee, acquired first the Oriental Mine and then the Silver King Mine and Mill. By 1885, the Snow Bird (East Calico) and Waterloo (West Calico) mines were added.[22]

Under the Oro Grande Mining Company, mining shifts were operated night and day, seven days a week. Miners earned $3.50 for each nine-hour shift. Two 60-ton trains of three wagons, each hauled by 20-mule teams, made regular deliveries of ore to the company's 15-stamp mill on the Mojave. The cost of this transportation averaged at $2.50 per ton, with total expenditures (mining, milling, etc.) working out to $18 per ton. Shipments from the mill generally totalled $40,000 to $50,000 per month.[23]

To facilitate the transportation of ore from the mines, surface tramways were installed at the Mammoth, Occidental, Silver Odessa, and Sioux mines, leading from mine entrances to ore houses or main dumps. One hundred yards of the Sioux tramway was nearly perpendicular and was powered by a hand windlass. At the Odessa Mine, a turntable was set at the ore bin because the canyon was too narrow for turning a team.[24]

In March, 1885, the Oro Grande Mining Company organized the Daggett and Calico Railroad Company, with the purpose of running a railroad line from the mines at Calico to intersect with the Atlantic and Pacific Railroad, successor to the original Southern Pacific operation, at Daggett. Surveys of the ten-mile road were made, but no further work was done.[25]

The citizens of Calico applied for a patented townsite in 1885, but because the site had never been officially surveyed, the patent was denied.

By the time a survey was completed, the town was a ghost.[26]

Through 1885 and 1886, however, the town was booming. A correspondent of the *Mining and Scientific Press* reported on March 14, 1885, that despite a lack of conveniences, population was still swelling:

> The only water supply is that hauled two miles from Evans' well, and costs 3 to 5 cents per gallon. Wood is $10 per cord. Board, $7 to $8 a week. The Occidental and Whitfield House are the only hotels, and they are pushed to their utmost capacity to accommodate the travel that is arriving daily.[27]

Throughout its boom period, Calico was probably the only mining town in California where brothels were situated in the middle of the business district, rather than on the edge of town.[28]

By 1886, the town of Calico was at its zenith. Population ranged between three and four thousand, a new schoolhouse had been built (Calico's public school had been established in October, 1884), and the town boasted a cemetery, 24 saloons, and 24 gambling houses. For the refined, there were church services and the "May Day Ball and Ice Cream and Strawberry Festival" in the town hall.[29]

Unique among the other mining towns of the western Mojave, Calico had a Chinatown. The record is unclear as to when the Chinese came, but they were firmly established by the mid-1880s. Like many southern California communities, the white residents of Calico would have preferred that the Chinese settle elsewhere, but the aliens had found a niche for themselves as cooks for the town's restaurants and boarding houses. The Chinese isolated themselves in a camp just east of the townsite. Calico's Chinatown had as many as forty residents who ran laundries and did domestic work. Chinatown itself had its own restaurant and three or four boarding houses. The Chinese stayed in Calico until it was a ghost.[30]

Mining activity in the Calico District declined after 1885 as the price of silver dropped. The profitability of silver mining in the United States had suffered greatly before the Calico discoveries, when the country's monetary standard shifted from bimetallism to gold. The price of silver had subsequently dropped from approximately $1.33 per troy ounce to $1.13 in 1881, when development began in Calico. During Calico's years of peak productivity, 1884-85, the price of silver had hit about $1.10, and began to decrease steadily after these years. To compound the economic liability of lower prices for their silver, Calico miners were now having to mine deeper, leaner ore--a process which was not only more expensive but came at a time when their efforts netted less revenue.[31]

As Calico silver mining suffered, so did the townsite. Fire struck again in September, 1887, destroying 135 buildings. Only two structures were spared and losses totaled about $100,000. The town was again reconstructed, but this time with every third or fourth building made of adobe

to act as a firebreak. The adobes were built from the townsite's native red clay and included rusted nails and blobs of half-molten glass from the two fires.[32]

Calico silver mining was stimulated in late 1888 when the Oro Grande Company finally laid a narrow gauge railroad from the Silver King and Waterloo mines to the company mills at Daggett. The new railroad reduced the haul to the mills from $2.50 to 12 cents per ton.[33]

The mill at Daggett was a new, efficient, $250,000, 60-stamp affair. It had begun in 1887, burned to the ground, and was rebuilt in time to service ores from the new railroad. The mill fire, and then the second townsite blaze, had been interpreted as Calico's death knolls by the *Print*, which had by now closed shop.[34]

In February, 1889, the Oro Grande Mining Company sold its Calico interests to another Wisconsin firm, the Waterloo Mining Company. In June of that year, *Mining Review* reported that:

> Of the annual silver product of California, amounting now to about $3,000,000, seventy percent comes from this county, most of it from the Calico District. Owing to the destruction by fire of several large mills in Calico and neighboring districts, the output of bullion has been much less in that region of late than it otherwise would have been. The low price of silver, coupled with the impoverishment of the ores in the Calico country having meantime tended to further restrict production.[35]

Silver mining was everywhere temporarily encouraged in 1890 with the passage of two Congressional Acts, the Bland-Allison Act and the Sherman Purchase Act, which allowed the Federal Government to purchase silver for monetary use. The price of silver rose greatly, but the acts were soon defeated. Nevertheless, the promise of revived bimetallism was a boon to the Calico District until 1892. Production increased at all the working mines, with, at one point, 700 men working in the district, 150 stamps operating in mills, and $200,000 per month in bullion being produced.[36]

In 1891, the Waterloo Mining Company built a branch of their railroad line eastward to the ore bins of the Silver King Mine. This line serviced both the Silver King and Waterloo mines, with a daily combined total of 150 tons of ore. At the same time, the Silver King Mining Company of London was operating a 30-stamp mill with ore from its Odessa, Oriental, and Occidental mines.[37]

As silver mining was encouraged by the promise of bimetallism from 1890-92, the steady production of borax in the Calico hills really began. William T. Coleman and Company had acquired the richest borax areas in the 1880s, but actual mining waited until Coleman was bought out in 1890 by Francis M. Smith. Men from other Smith operations in Death Valley and Nevada were transferred to the Calico hills.[38]

Smith established Borate, a company town, at the upper end of Mule Canyon. Calico served as the post office and recreation center for the stag community of Borate. During the 1880s, the Calico townsite had served similar functions for Bismarck, a small camp that grew up around the Bismarck and Humbug mines. Children walked to the Calico schoolhouse and mail came to the Calico Post Office--to be forwarded to Bismarck in leather pouches carried by a dog named Dorsey.[39]

After a temporary stabilization, the price of silver began to drop again. Prices plunged drastically from the $1.05 of 1890, forcing the Waterloo Mine to close in March, 1892. The railroad line closed and 130 men lost their jobs. In 1894, the Waterloo and Silver King companies consolidated and it was hoped that this might be the key to bringing the Calico mines once more to full operation--perhaps a naive hope at a point when silver had plummeted to 64 cents. The Silver King closed operations in 1896.[40]

In May, 1899, the Waterloo properties were leased, and small-scale mining lasted for four years. Nevertheless on September 2, 1899, a Redlands *Citrograph* reporter wrote Calico's obituary:

> Calico, once the biggest mining camp in southern California and a large producer of silver, long ago fell into decay, and has now passed entirely out of existence. It is no longer known even as a school district, owing to a lack of school census children.

In 1902, Calico's wooden buildings were moved to augment the towns of Yermo and Daggett. In 1903, the narrow gauge railraod was taken up.[41]

Silver prices rose for a time after World War I due to industrial and international monetary demand, and once again small-scale sporadic mining picked up in the Calico hills. In 1926, the Zenda Gold Mining Company acquired the assets of the Waterloo Mining Company and began working the Silver King property. The venture failed and Zenda closed shop, laying off 47 men in November 30 when silver prices dropped to 32 cents.[42]

Small-time operations have worked sporadically in the Calico Hills over the years, but this area which once produced between $13 and $20 million in silver, according to the California Division of Mines, is likely to remain a "ghost" mining district.[43]

The reconstructed ghost town, due to the many original foundations and adjacent mines, should be on the National Register of Historic Places as a District.

1. F. H. Weber, "Silver Mining in Old Calico," Mineral Information Service, May, 1966, pp. 71-80.

2. David F. Myrick, Railroads of Nevada and Southern California, Vol. II (Berkeley: Howell-North Books, 1963), pp. 815-816.

3. *ibid.*; Muriel Wolle, The Bonanza Trail (Bloomington, Indiana: University Press, 1955), p. 142; Harold O. Weight, "The Man Who Bought a Ghost Town," Desert Magazine, July, 1953.

4. Weber, *op. cit.*, pp. 71-80.

5. Myrick, *op. cit.*, pp. 815-816; Wolle, *op. cit*, p. 143; F. Harold Weber, Jr., "Silver Deposits of Calico," Desert Magazine, January, 1967.

6. "San Bernardino County Silver," California Journal of Mines and Geology, Vol. 49, p. 128; Weber, *op. cit.*, pp. 71, 74.

7. Cora L. Keagle, "Mother of a Ghost Town," Desert Magazine, May, 1938.

8. Myrick, *op. cit*, pp. 815-816; Weber, *op. cit*, p. 73.

9. *ibid.*

10. "Death Valley Ghost Towns," BLM Desert Planning Staff files; "Old Calico, Model Ghost Town," BLM Desert Planning Staff files.

11. Myrick, *op. cit.*, p. 816.

12. Wolle, *op. cit.*, p. 143.

13. "Old Calico, Model Ghost Town"

14. Weber, *op. cit.*, p. 74.

15. *ibid.*

16. Weber, *op. cit.*, p. 74.

17. *ibid.*, p. 76.

18. *ibid.*, p. 76.

19. Wolle, *op. cit.*, p. 143; "Death Valley Ghost Towns"; L. Burr Belden, "Borax Discovery Unlocks Fabulous Mojave Wealth," San Bernardino Sun-Telegram, December 7, 1952.

20. Harold O. Weight, "Hunting Rock in the Calicos," Desert Magazine, January, 1948.

21. Myrick, *op. cit*, pp. 816-817.

22. *ibid.*, pp. 816-817.

23. *ibid.*

24. *ibid.*; Herman F. Mellen, "Reminiscences of Old Calico," Historical Society of Southern California Quarterly.

25. Myrick, *op. cit.*, p. 817.

26. Wolle, *op. cit.*, p. 144.

27. Weber, *op. cit.*, pp. 72-77.

28. "Old Calico, Model Ghost Town"

29. *ibid.*; L. Burr Belden, "Calico Booms as County's Biggest Mining Center," San Bernardino Sun-Telegram, November 2, 1952.

30. Belden, "Calico Booms"; Stan Kellogg, "Calico-Old and New," Desert Magazine, November, 1967.

31. Weber, *op. cit*, pp. 72-77

32. Weight, "Hunting Rock"; Weight, "Man Who Bought"; Kellogg; Redlands Citrograph, September 10 and October 1, 1887.

33. Weber, *op. cit*, p. 77.

34. Myrick, *op. cit.*, pp. 821-822.

35. Redlands Citrograph, June 20, 1889.

36. Weber, *op. cit.*, p. 77.

37. Myrick, *op. cit*, p. 822.

38. "Death Valley Ghost Towns"; L. Burr Belden, "Borax Operations Move to Calico"; Giant Company Formed," San Bernardino Sun-Telegram, January 4, 1953.

39. Belden, "Borax Operations Move."

40. Myrick, *op. cit*, p. 822; Weber, *op. cit.*, p. 77; Redlands Citrograph, May 12, and June 23, 1894.

41. Weight, "Hunting Rock."

42. Myrick, *op. cit.*, p. 822; Weber, *op. cit.*, p. 78.

43. Myrick, *op. cit*, p. 822.

35. WATERMAN MINE

Robert Whitney Waterman and John L. Porter drove their team into Grapevine Station on a prospecting trip in the fall of 1880. Three and a half miles north of the station, several prospectors had done some work, and while looking over the area Waterman and Porter took samples. Some months later when the samples were assayed, they were shown to be rich in silver, so the miners returned to the area and on December 7, 8, and 9, 1880, located ten claims covered with outcrops. The last prospector to have examined the outcrops prior to Waterman and Porter was George Lee, and his

heirs would one day make a claim in his behalf.

According to a manuscript found in the San Bernardino County Museum, which appears to be a copy of an interview, mine development was started prior to Christmas, and the richest ore was about 150 feet south of the shaft on the 100-foot level. It yielded $890 per ton. A mill site was selected on the north side of the Mojave River about one mile west of the Grapevine Station, and a town grew including buildings for married employees, bunk and boarding houses, a store, post office, and school. The town was known as Waterman. Southern Pacific tracks reached it about New Year's of 1883, and the California Southern tracks came in to form a junction there in 1885. In 1887, the Waterman mine was closed down due to the decline in silver prices. Moveable houses, the school, and even the post office were taken across the river and the name of the new town there was soon changed to Barstow.

The Waterman ten-stamp mill had been built in San Francisco, shipped by sailboat around the point of lower California, up the Colorado River to Ehrenberg, and hauled into Arizona. Waterman and Porter hauled it by team to the mill site. Sixteen-mule teams hauled ore from the mine to the mill and returned with water and fuel for a boiler that created steam for the mine hoist. Approximately $1,700,000 in silver was mined before closure in 1887. The mill also processed ores from Calico mines when they first produced since it was the only mill in the area. Success at the Waterman Mine attracted large numbers of prospectors to the area and they spread out in camps down river to Fish Ponds. Among the men was Frank Mecham who is credited with the discovery of Calico.

George Lee's heirs could not let all this activity go by without a fight. They claimed Lee had made first claim on the Waterman Mine and the profits were clearly theirs. Lee had subsequently disappeared or been killed. The heirs filed their grievance against Waterman in court, but could not prove Lee was dead. They did bring in a skeleton found on the desert; however, it was found to be that of a Paiute squaw. The case was finally settled in Waterman's favor since Lee's death was still speculative in nature. Waterman had borrowed money from his brother to fight the case and when his brother died, Waterman's sister-in-law claimed a share of the mine's profits and took that to court. This second litigation went on until after both principals were dead and was finally settled in the State Supreme Court for the benefit of their heirs.

During his lifetime Waterman was identified as a millionaire, and politicians put him up as Lieutenant Governor. When Governor Washington Barlett died after six months in office, Waterman became Governor of California.

The Waterman Mine is still privately owned, fenced off, and not open for field inspection. However, it is an important historical landmark with a colorful background and deserves recognition, preservation, and close attention.

36. PIONEERTOWN

Pioneertown is a western set built for the filming of western movies and used in the heyday of the Roy Rogers, Gene Autry and Cisco Kid pictures. The houses' architecture follow an early settlement theme, and their origins are obscure. While some reports claim them all to be Hollywood creations, others find them a mixture of creation and of historic houses moved onto the set from the surrounding countryside. If so, they may date back to the 1860s and 1870s. Critical on-site fieldwork by architectural historians can probably clear this up. The area is that traversed by the Pauline Weaver Trail which led from somewhere out of the Morongo Pass zone to Colorado. Bancroft called this trail the Morongo Pass Route but did not mention Weaver who supposedly blazed it but kept it silent. Local residents claim that stage coaches stopped at the site of Pioneertown, that sheep herders ran sheep through from Morongo Valley up the canyon, ruining vegetation, and that the mail route ran through and actually stopped at the post office we see here. It is claimed that the mail route went from Old Woman Springs by Pipes Canyon, through Pioneertown, and down the canyon to Morongo Valley. The road from Yucca Valley to Morongo was only paved a decade or so ago. Water here is only 80 feet below the surface, but government owned. Thus water is scarce and the fire hazard high. This site needs fieldwork and further assessment. The stone pinnacle landscape and sense of history in the area make it a visitors' point of interest.

37. Emerson Mill These stone ruins remain at the mill used in the 1920s. They lie in the mountains on Emerson Road, Dry Lake Mining District

38. COOLGARDIE CAMP Dry Lake

Little of interest remains at this placer mining district, north of Barstow. Prospectors discovered gold here in 1896, and at the peak of activity some 600 persons were at Coolgardie. This rush declined at 1900 and most of the miners had left by 1915. However, it was one of the few placer mining districts on the desert. Operators used dry washes and concentrators to recover the gold since there was not enough water to operate a wet concentrating mill. The principal operator was the Coolgardie Mining Company, and it operated a battery of gasoline-powered dry washers. Between 1900 and 1915, the output was estimated as worth about $100,000.

In 1909 Coolgardie was described as a small settlement, the cabins of the miners being scattered over several square miles of dry-placer workings. During the 1920s and 1930s, some miners returned. The deposits were in a broad valley, and the gold was apparently derived from veins in granitic rocks that are in the east and northeast. By 1958, all that remained were mounds of rock and gravel and the roof of a collapsed cabin bearing the words, "Old Coolgardie Camp."

39. GOLDSTONE GHOST TOWN

The town developed in response to several claims that were filed in the area. Gold was first discovered here in 1881. The town went through several booms; the biggest was between 1915 and 1920 after high grade gold ore was discovered in December, 1915 and assayed at $200 a ton. The gold was in a three-foot quartz vein along a fault between shaly limestone and siliceous shale. The mines included those of the Goldstone Mining Company, Red Bridge

Gold Mines Company, Belmont Mine, Merrick or Gold Crown Group, Reward or Montana Mine, the Gold Divide, and Rio Hondo Mine. The camp died just befor World War II; however, several wooden cabins and a mine headframe reportedly remain. Historical archaeological resources may be strewn around the area here, and careful fieldwork is necessary in order to determine the type of preservation plans, if any, to be followed.

40. SPANISH CANYON, ALVORD MOUNTAINS (Mule Canyon)

The Old Spanish Trail passed through here in the 19th century. In the 1860s Charles Alvord found signs of gold, got into a dispute with his companions, and refused to show them where the gold lay. Later Alvord was murdered. Although many searched for the gold, none found it. The rock formations and flora here are exceptions and combine with the history to make this of interest to recreational and interpretative programs.

41. KRAMER HILLS

This series of low rolling hills along Highway 395 lie in an area highly mineralized. A wide variety of different minerals, including gold, were exploited here, but it is claimed none of the ore was of high yield. Important here were the Shaherald-Herkelrath mine and the Kramer Hills magnesite deposits. Reportedly no buildings remain; however, field crews should survey the area for possible historical resources.

42. MARION

Borax discoveries were made in the Calico District in 1883, and the claims were dispersed among a large number of individuals. William T. Coleman of San Francisco managed to acquire many of the claims, but when he ran into financial difficulties in 1888, Francis Marion "Borax" Smith came into the area from Nevada and bought Coleman out. Smith had borax holdings in Teel's Marsh, Nevada, but these were nearly exhausted. He combined the whole of his borax industry under the name Pacific Coast Borax Company, and in the 1890s centered his operations in the Calico borax mines. The Atlantic, Pacific and Santa Fe Railroad served the area, and in 1898 Smith began work on a narrow gauge railroad which ran between the towns of Borate and Daggett. At the last it connected with the A & P Railway. Marion was a company town on the Borate-Daggett Railway and known for the large borax roaster or calcinator plant built there. This treated the ore before forwarding it to the refinery at Alameda, California.

43. BORATE

This town grew up around Smith's borax mines in the Calicos north of Daggett. Miners lived here close to their work and mined ore which they then loaded into wagons. Twenty-mule teams took the ore down steep and tortuous Mule Canyon to Daggett and to the A & P Railway 12 miles away. In 1898 a railway line was begun while had its terminus at Borate.

By the turn of the century, Smith was mining borax ore from 600-foot levels and production costs were rising. He thus shifted his interest to mines he had in Death Valley; and when a railroad was completed to that area in 1907, activity at Borate declined sharply and the town was gradually abandoned. The site should be inventoried for historic cultural resources.

44. LANES WELL

The well and mill are mentioned often in discussions of mines north of Barstow. Field assessment is needed here in order to know what remains.

45. ALF'S BLACKSMITH SHOP

This immaculately kept old wooden building is the only known complete blacksmith shop remaining in San Bernardino County. Seymour Alf established it in 1890 in Daggett, and it served miners from the Calico Mountains, but also built some of the huge 20-mule team wagons used for hauling borax. Mrs. Walter Alf, daughter-in-law of Seymour, resides next door to the shop. She maintains the building as well as a fenced area to the north where old borax wagons, farm equipment, and a host of iron tools and equipment are neatly displayed. Some of the repair tools unique to the wagon industry are still in working condition. It is listed on the National Register of Historic Places but should be a California State Historical Landmark as well.

46. PUMICE QUARRY

This pumice mine is located between Lane Mountain and Black Mountain north of Barstow. It is near Murphy's Well, an important source of water to miners in this area. The well and mine need field assessment.

47 . ORD MINING DISTRICT

The Ord Mountains (wherein this district lies) were named after Lt. E. O. C. Ord, who surveyed the Los Angeles, Channel Islands, and San Bernardino areas in 1849. Ord later became a Civil War general. He was rumored to be a grandson of King George IV of England. While on the Mojave, he led cavalrymen out of Camp Cady to fight Indians, and he and his squadron were surrounded and mauled in some hills between Lucerne and Hesperia. This resulted in the naming of the Ord Mountains. Mines in the district were developed over a period of 50 years, and produced gold-bearing copper minerals. Tunnels and cross-tunnels were dug up to 500 feet long. Mines in the Ord Mountains include the following:

North Ord Mountain District
- Columbus (Gem) borax mine

Newberry Area
- Azucar mine
- Newberry Manganese deposit
- Black Ravin (Lankin) Mn. deposit
- Northrup Mn. deposit

Turner Mn. deposit
Millet Clay deposit

West Ord Mountain District
Gold Belt mine
Pure Quill deposit
McKinney Fluorspar deposit
Green Hornet Fluorspar deposit

Central Ord Mountain (History)
Gold Banner Mine
Green Back prospect
Martha prospect
Mary Etta prospect
Ord Mountain mine
The Painsville mine
Red Hill prospects
White Dollar mine
Placer deposits
McKnight Cornishstone deposit
Maumee mine

East Ord Mountain
Ford mine
Hoover mine
Grandview mine
Ord Belt mine

(Source: Larry Vrendenburgh, BLM, DPS).

Ore deposits here could be mined in the future, and a field assessment of the cultural resources in this active mining complex could tell us what resources should be preserved and protected from that impact.

48. BLACK HAWK MINING DISTRICT

The Redlands *Citrograph* printed on May 11, 1889, that a company of London capitalists had taken hold of the Black Hawk Mine and had raised money for an 80-stamp mill. Alexander Del Mar of Holcomb Valley owned a quarter interest in the mine, was instrumental in organizing the company, and supervised the work. The following November, the 23 Black Hawk mines formed one company called the Black Hawk Gold Company of Los Angeles.

49. RED TOP MINE

This mine in Fairview Valley yielded over a half a million dollars in gold during the 1890s. Fairview Valley lies northwest of Apple Valley.

50. SILVER MOUNTAIN MINING DISTRICT

The district includes the Oro Grande Mine, Branch Mine, Western States

Mine, and the Riverside Cement Quarries. It is located northwest of Oro Grande and in the Silver Peak and Quartzite Mountain areas. The mines here are a source of construction material--cement, lime, and marble. Field-work could supply further information and assessment of historical resources.

51. ROSE MINE

This mine is said to have operated during Spanish days and again in the 1860s, but was most active in the period between 1885 and 1916. It is located in the Morongo Mining District on the eastern foothills of Black Mountain. A sizeable town grew up by it with a stamp mill, cyanide plant, store, and assay office. The San Bernardino *Courier* reported in 1891 that it was then owned by Smart and Watts. A new shaft had been started, the ore was of rich quality, and the pannings were going at $200 a ton. A high percentage of iron (nearly 40%) was cited as reason for a good smelting proposition. In 1892, the Rose Mine was turning out about $150 in a day of 12 hours. Only free gold was being extracted, and half of the gold reportedly went off in the tailings. The tailings in the dump were run through a concentrator once it was built, and the concentrates treated by the cyanide process or sent to a smelter. The mill, ore house, whim house, and other buildings were described as large and convenient. By the early 1960s, observers reported that nearly all of the buildings had been torn down. This may have been to reduce taxes. The mine is listed on the California Inventory of Historical Resources, 1976, as a Point of Historical Interest. Field study could clear up the extent of the remaining structures and their value as historical resources.

52. VERDE ANTIQUE QUARRY

This quarry is located 17 miles northeast of Victorville in the Sidewinder Mountain area. The outcropping of ornamental rock known as Verde Antique had a good market in the 1890s and into the 20th century. Classical revival architecture generated a demand for this polished stone which simulated marble. The stone was a sulphur yellow and lime green veined in chocolate and cream. Verde Antique was an ancient term for dark green marble veined in black. Stone from the quarry was used in the old Palace Hotel in San Francisco for its interior. On-site information is needed before any assessment of the values here can be made.

53. ORO GRANDE CEMETERY

This is a final resting place of nearly 2,000 persons. Many were buried here during the gold mining boom of the late 1800s. This is a Point of Historical Interest on the California Inventory of Historical Resources, 1976.

54. KANE SPRINGS

This way station/settlement at Kane Springs served travelers and prospectors in the 1870s. The *Havilah Miner* reported on April 19, 1873, on the facilities:

> With the exception of a clean bed, Desert Springs Station is the biggest bilk of a place that we ever struck. Everybody with whom we came in contact entertained ideas of this character and expressed them in very fiery terms. That is, they coupled the infernal regions in their remarks. The bar was well stocked with NOTHING except bad whiskey and stale, highly watered claret which was modestly dispensed to gentlemen who were accustomed to having the genuine article...

In 1892, one Charles Koehn operated a supply station there. He had a rock house which may still be extant. He dispensed mail from the station from 1893 to 1898, and stage companies operating on the Randsburg Road changed horses at Koehn's station. In 1896 and 1897 Koehn was milling ore from the surrounding area in his ten-stamp mill and freighting the ore in his own equipment.

55. MUROC DRY LAKEBED

In 1941 General "Hap" Arnold became interested in the English-built Whittle gas turbine engine and its use in an airplane. Reports were commissioned and the decision was made to produce three airplanes, jet airplanes, as soon as possible. Bell received the contract and as work progressed on their XP-59A (later P-59), it was evident that a remote site for testing the airplane would be required in order to maintain secrecy. Muroc Dry Lakebed was selected and a site about five miles to the north of the community of Muroc. There the closely guarded plane was unloaded. It was shrouded in canvas and disguised with a fake propeller. Thus, the first jet flight of a United States airplane was made from the lakebed October 1, 1942. National Register of Historic Places designation is recommended.

56. RATTLESNAKE CANYON

This scenic canyon is a portion of the Bighorn Mountains. The northerly canyon banks show signs of random mineral prospects, and great banks of quartz material can be found on the mountainsides. Mica, quartz-veined granite, and schist are common. This canyon is probably of greater scenic interest than historic.

57. TROPICO GOLD MINE AND MILL

These are located northwest of Rosamond on Tropico Hill. The first recorded activity at Tropico was in the late 1870s when a Dr. L. A. Crandall noticed the different color of Tropico Hill, prospected, and discovered a deep red clay on the northeast end of the hill. The clay on Crandall Hill proved to be useful for fire clay, and in 1882 Ezra Hamilton, who owned Los Angeles Pottery Company, bought the clay pit from Crandall and renamed it

Hamilton Hill. In 1893, the nation suffered a depression, and since these business slumps affect the building trades at the very start, Hamilton suffered a slack period. He spent some of his spare time panning the clay material out of his hill and found gold. Hamilton persisted in his efforts until, in 1896, he found several veins. He and his friends registered claims: Fay No. 1, Lida, Home No. 1, and Home No. 2.. The Lida was the most successful of these, and in 1898 Hamilton built a two-stamp mill just south of its entrance tunnel. The Los Angeles *Times* carried a full-page story on December 12, 1900, when Hamilton sold one of his claims for $100,000. Two years later, Hamilton built a five-stamp mill about a mile south of the claims where the water supply was adequate. Several small buildings went up near the mill, giving the site the appearance of a mining boom town. By this time the mine had attracted public attention, so Hamilton constructed a two-story hotel in nearby Rosamond. This was still standing in 1959, although the top story had to be removed after the 1952 earthquake. By 1904 the complex consisted of at least four mines: the Fairview, Big Tree, Gold King, and the Lida. By 1907, the Lida alone had yielded more that 8,000 tons of ore which averaged 1.2 ounces of gold and additional silver per ton. However, Hamilton sold his holdings in 1904. They changed hands several times and were finally purchased and reorganized in 1909 into the Tropico Mining and Milling Company. The name came from a small community near Glendale, California, where some of the stockholders lived. The Tropico Company mined successfully into the 1930s, but, frightened by the depression, stockholders sold out to the brothers Cecil and H. Clifford Burton. In 1934, when mining had improved, the Burton's owned all of the Tropico stock.

The growth of mining in the Mojave District at this time was accelerated by the fact that the Burtons had built southern California's largest custom gold mill. In 1935, this mill received ore from 160 shippers in four mining districts. Mining helped minimize unemployment in the Antelope Valley during the later depression years. Farmers and others turned to panning gold, and some went to work at the Burton's mine and mill. In 1934, the New Deal government raised the price of gold from $20.67 to $35.00 an ounce, further encouraging prospecting and bringing a real boom to Tropico. However, in 1942, Government Order L-208 froze mining so as to channel experienced miners into the mining of strategic metals such as lead, copper, and zinc. It was a logical mandate for the War Production Board; however, it closed down gold mining. The Tropico by this time was working at the 900-foot level, and had miles of tunnels which had to be maintained. To meet operating expenses some of the rock from Tropico Hill was crushed and used for the base of air strips in the Antelope Valley. The government gave the Burton brothers a permit so that they could maintain a crew to keep the timbering intact and prevent cave-ins. In 1945, gold mining was resumed, but mounting costs of mining caused the Tropico to shut down in 1952. Milling continued until 1956. Between the years 1894 and 1956, Tropico had earned between $6 and $8 million.

The present owners are Glen and Dorene Settle, and, with the cooperation of the East Kern Valley Historical Society, they opened the mine in the 1960s to the public as an historical attraction. The Settles have preserved not only the mine, but Antelope Valley history. Old homes and historic buildings from different parts of the valley have been moved to Gold Camp, a town at the foot of Tropico Hill. The camp also devotes space to early day mining equipment, Americana, artifacts, minerals, antique cars, and Indian lore. Among the buildings are Palmdale's first schoolhouse with the original desks and books.

The Tropico Museum, an additional structure, contains thousands of historical items and supplies guided tours for the public. A mine and mill tour is also available. The extensive collection of photographs maintained in the Settle's archives should be of great value to the BLM.

Glen and Dorene Settle plan to give up their private museum and mine in the near future. An auction is scheduled for early 1979 at which the artifacts will be sold. The mine, house, mill, museum, and gold camp are presently valued at $1 to $1½ million. BLM should find a buyer who would preserve all of this for public use.

B. W. Troxel, and Paul K. Morton, "Mines and Mineral Resources of Kern County, California," County Report 1. San Francisco: California Division of Mines and Geology, 1962.

Glen A. Settle, Tropico: Red Hill with a Glamorous History of Gold. Rosamond, California, 1959.

Nancy Brown, "Burton's Tropico Mine," Antelope Valley Spectator, I(5) November 1962, pp. 7-9.

Interview, Dorene Burton Settle, October 8, 1978.

58. GOLDEN QUEEN MINE

In the California Division of Mines and Geology county report on mines, the Golden Queen Mining District is described as including the Silver Queen Vein, Queen Ester Vein, Echo, Gray Eagle, and Soledad Extension properties. Only two of the groups were mined before 1935: the Queen Esther and the Echo. The Queen Esther, discovered in 1894, yielded small tonnages of high-grade ore at first, but after a cyanide plant was installed in 1903, production increased so that by 1910, when the mine closed, ore yielding gold and silver had been valued at a million dollars. The Echo Mining Company had produced gold and silver ore with a content value of $200,000 when it was dismanteled in 1906. In the 1930s, the Echo claim was held by a man named Radovich, but he died, the title lapsed, and on July 1, 1933, George Holmes relocated the claim for a filing fee of one dollar. Holmes found a float, took it to the assay office in Mojave and left it for assay on credit as these were the days when most miners were dead broke. Martin C. Engle, assayer and postmaster at Cantil, ran the assay, finding it ran $50 in silver and $50 in gold. Holmes had the difficulty of developing his Silver Queen Vein, as it was called, with no capital. He resorted to short leases and finally to an agreement with representatives of Gold Fields American Corporation, a subsidiary of Consolidated Gold Fields of South Africa. Gold Fields paid $5,000 for a 60-day option and its engineers found a vein 30 to 50 feet wide. Thus, they exercised their option to purchase the mine for $3,170,000, $533,500 down, and the balance to be paid by a sliding gross royalty to Holmes.

The Holmes claim and adjacent claims were consolidated on the northwest face of Soledad Mountain and renamed the Golden Queen Mining Company in 1935. A 300-ton mill was erected to process the ore. By mid-1937, 300 tons of ore per day were being produced. Between 1936 and 1942 (when the War Production Board shut down the mine), the mines here had yielded

more than $6 million in gold and silver. Due to increasing mining costs after World War II, the mill was dismantled. Some ore was extracted and shipped out for processing in the 1950s; however, in 1954, most of the mining property was sold to Dr. LeRoy O. Schultz. The total output of all the groups that comprise the Golden Queen Mine since discovery of the Queen Esther Vein in 1894 is more than $10 million. The gold to silver ratio in the ore was held to be 1:5. Since the Gold Fields American Corporation built a mill and living quarters for their employees and dug over eight miles of underground tunnels, much of historic interest must remain here. These mines are privately owned, and visitors should not be encouraged to go near them. However, the BLM should be aware of this important historical resource from the era of the Great Depression.

59. Clay Pits

Clay deposits were found here in 1880 by Dr. L.A. Crandall. In 1882 Crandall sold the pits to Ezra "E. M." Hamilton who had a pottery, brick, and clay water pipe business in Los Angeles. Since Hamilton was a natural prospector, he panned out the clay. His discovery of gold led to further prospecting and eventually to the veins that would be a part of the Tropico Gold Mine. He sank a shaft at Lida Mine, searched further and discovered the Home or Tropico Vein.

60. HARVEY HOUSE, BARSTOW

In the 1890s, Barstow had a railroad roundhouse, small repair shops, and served as a junction for the Santa Fe Mojave-Needles line and the California Southern coming north from Cajon Pass. Burr Belden has described the "V" between the converging tracks as a small business district: the Gooding store, the Henderson establishment, and a wooden depot added to which was a restaurant, an early Harvey House. In 1902, Barstow suffered a severe fire destroying the roundhouse and several locomotives; another fire took place in 1910. In 1911, the present Harvey House was built. It is described on the California Inventory of Historic Places, 1976:

> ...one of the many famous hotels and restaurants which were a unique adjunct of the Santa Fe Railroad, combines the stylistic elements of classic revival, City of Santa Fe 16th Century Spanish, and Moorish elements. An outstanding example of the type of railroad-depot-hotel-restaurant combinations made famous by the Santa Fe Railroad around the turn of the century, its brick and red cinder stone structure is one of the last surviving examples of the old Harvy Houses.

The Mojave River Valley Museum has plans and blue prints.

61. WILLIS WELL

George and Mildred Willis originally came from southern Nevada where George was successfully involved in mining promotions at Goldfield and Rhyolite. One night he became involved in a fight with a drunk and the ligaments of his right arm were cut. In 1915 when the Nevada boom collapsed he had little to show for his work and headed west for a fresh start. It was not an easy task with his crippled arm. He managed to do work at ranches along the way as they traveled to California's Mojave Desert. George Willis took pay in cattle, collected some 50 head, and moved to the Ord Mountain area south of Daggett. Here they found excellent pasturage for the cattle, ample water from an underground basin, and sank a well 20 feet deep. Mildred helped as they built a 10' x 10' house. George figured out a drag mechanism whereby the rocks could be hauled by horses; still Mildred loaded and unloaded them. She had seen pictures of Scottish castles, and hoping to create a home like them, proceeded to construct a wall to protect the flower garden she envisioned. She spent ten years carrying rocks, and eventually built walls 660 feet long, four feet high and four feet thick. Mildred also watered the cattle by hand-drawn water and nursed her ailing husband. Because of his death in 1925, her dream never came true and she moved from the ranch. It is estimated that she carried over 1,372,000 pounds of stones for the wall. There are petroglyphs in the same area. The Willis well and the wall are at the foot of the northwest side of central Ord Mountain and are recorded as San Bernardino County Museum Historical site No. 195. It was first officially located by Dr. Gerald A. Smith in 1940. He was taken to the site by Dix Van Dyke, former Justice of the Peace at Daggett. The property was granted to the Museum Association on March 26, 1974. The wall and well have been described as a monument to the dream of Mrs. Willis; they also stand as historical evidence to the kind of life early ranchers of the Mojave Desert experienced.

62. WARREN'S WELL AND PIONEER PLAQUE

This well was dug by Mark "Chuckwalla" Warren and his sons by hand in 1881. It was 160 feet deep. In 1914 the well's mouth was concreted over with a steel pipe about ten inches in diameter protruding from it from which the water was pumped. Warren was not the first white man to live on the ranch at the well site as it had been occupied by the de Crevecoeur families before him. Prior to his marriage, Warren drove a horse-drawn freight line from San Bernardino to Arizona, an occupation which earned him the name of "Chuck." He and his 14-year-old bride, Sylvia, lived at Warren's Well in Yucca Valley, but later built a ranch house to the south. Here he homesteaded and built the first house in the valley. The Warren Tanks, a well-known landmark, were at the southern end of the ranch. Visitors described Warren as "bluff, hale, and strong" and extremely hospitable. He raised cattle, irrigated his grazing land, and made the ranch a famous stage stop and resting place for travelers, furnishing hay and grain, and serving meals. Warren was killed in his one and only ride in an automobile in September, 1917. In 1918 the ranch had no permanent settlers. The ranch was later taken over by William V. Covington for whom Covington Park at the site is named. Field study should reveal whether the old barn is still standing and whether foundations of the old hous remain. In 1973 the well was reached by going out Old Woman Spring Road from Twentynine Palms Highway to Crestview Drive (about a half mile),

turning right and following Crestview Drive to its end (about half a mile) and here finding the well. On November 23, 1973, Syd Sullivan reported finding part of the old windmill structure and a rather large cement and stone watering pond. The ranch was made up of some 80 acres near the well. Pioneer Plaque, dedicated to Morongo Valley Indians and pioneers, is located on the Warren Ranch. The plaque is listed on the California Inventory of Historic Places, 1976.

63. PIPES "OLD WINDMILL"

This historic watering place in the Morongo Valley area can be reached by driving north along Old Woman Spring Road to Pipes Canyon. The well is on the old Sarah Shay homestead and was used by the Barker and Shay cattle ranchers who owned it. In 1973 the windmill was still pumping water.

64. GIANT ROCK

This large granitic monolith that rises abruptly from the desert floor was once the home of Frank Critzer. In 1929 this American of German ancestry hollowed out a two-room home in the rock, built an airport and cafe, and lived there until 1942 when an explosion took his life while he was talking to sheriff's deputies. He was inside his home at the time and the 200 pounds of dynamite he had there somehow detonated. Speculation over his death moves from suicide to murder. The rock was vacant until 1947 when George Van Tassell and his family moved into the home and took over the airport and cafe. Van Tassell claimed that he had been given the secrets of life by extra-terrestrial beings. He organized the College of Universal Wisdom and built an Integretron, a machine to retard ageing based on the secrets he had learned. He died in early 1978. Numerous UFO's have been reported at the site and flying saucer enthusiasts hold an annual meeting at Giant Rock.

65. DAGGETT DITCH

The history of this waterway, also known as Minneola Canal, dates back to 1893 when the Southern California Improvement Company planned a ditch on the south side of the Mojave River. The company drove a dam made of sheet piling through the surface sands of the river bottom and into the subsurface clay. A tunnel then diverted the water to a ditch to take it to the Daggett Ranch and thence to Minneola. The proposed ditch was to be ten miles long, but it was not completed due to bankruptcy. In 1901 a co-partnership of four finished the ditch to the Daggett Ranch, a distance of four miles, and abandoned the longer section to Minneola. The Daggett Historical Society reports that the "Minneola Canal" ultimately ran the ten miles. Concrete linear construction with redwood plank cover was started in 1917 by Buel Funk and Sons, and was completed in two years to Funk Ranch one mile east of Daggett. In 1929 the owners of the ditch claimed they had spent $75,000 on the Daggett Ditch and that the previous developers had spent in excess of that figure.

66. STONE HOTEL

This old hotel in Daggett north of the Santa Fe Railroad tracks had survived three fires. The structures went up in 1880, although some unverified sources say it stood as early as the 1860s. The 1908 fire destroyed most of the two-story structure, and it was rebuilt to its present one story. Death Valley Scotty continuously reserved Room No. 7 just off the lobby. Present restoration efforts are being carried out under the joint auspices of the Daggett Historical Society and the San Bernardino County Museum System directed by Dr. Gerald Smith. It will eventually become the Daggett Museum.

The People's General Store next to Stone Hotel and seen in pictures taken in 1900 will become part of the museum. Scott's Market across the street and on the corner to the west also has a long history closely related to the above. All are Points of Interest marked by the Daggett Historical Society.

67. LOS ANGELES AQUEDUCT

Carrying water from Owens Valley to Los Angeles, this aqueduct was started in 1908 under the supervision of William Mulholland. Nearly a thousand men were brought onto the desert to construct it. They camped along an established route, dug wells for their own water supply, and kept Mojave and other desert towns busy on the weekends. Tunnels, trails, and roads amounting to over 500 miles were built to service the building project before it was finished in 1913 at the cost of over $23 million.

Glen Settle described the undertaking as follows:

> It consists of ten miles of nine-foot steel syphon, skirting the foothills; five miles of covered concrete ditch, with four small syphons and four tunnels; then the natural reservoir at Fairmount, and five miles of solid concrete tunnel extending under Elizabeth Lake. Since the first load went out of Lancaster, October 2, 1907, there has been constant hauling; sometimes as many as fifteen teams going out a day, until the freighting from here was finished about two months ago. Millions of sacks of cement, as well as hay, machinery, grain, provisions, steel, portable houses, lumber, gypsum and even pebbles and sand, comprising the loads. The usual teams were of from twelve to sixteen mules, but one 20-mule team hauled for a while, carrying five hundred and twenty-five tons of cement. At this time fifty-two carloads a month was the record.
>
> *Here Roamed the Antelope,* 1963

This point of interest winds along the foothills of the southeast edge of the Sierra.

68. OLD STONE HOUSES

In the past year, these stone houses falling into ruin have attracted much public attention in Barstow. They belong to Mrs. T. L. Cagley and are at the corner of Hutchinson and Second Streets in the old section of Barstow near the Santa Fe Station. Chinese railroad workers are said to have lived here. The group comprises three apartments in the lower tier, post and beam construction with foundation cement laid in formers and built up with stone and brick. Three units at the top of the hill are of the same construction. Two small houses at the corner appear older, are built into the hill, and are again of stone and mortar with wooden beams. The property is scattered with rubbish, the buildings vandalized, and the property may soon be condemned. Either these old houses will be lost through condemnation proceedings or saved through community effort as historical resources. Jean Tierney, Barstow Bureau, *Sun-Telegram,* is an interested party in their preservation.

69. LLANO DEL RIO

In 1914, Job Harriman, an unsuccessful Socialist campaigner and political candidate, decided that the movement needed a concrete example of successful cooperative life rather than only a political base. Obtaining stock from the Mescal Water and Land Company with a small down payment, he gathered colonists and reorganized as the Llano del Rio Company destined to be a commune of desert settlers. Socialists were a dynamic group of people in the country, especially in California prior to World War I; and when they took the unpopular stance of opposing the war, it drew them together even more. Finding recruits for his cooperative community was no problem for Harriman and in three years he gathered 900. Tents sufficed for housing the first year, then adobe brick was used and cobblestone foundations with frame walls. Community labor gangs built ditches from Big Rock Creek where Llano had secured water rights, and spread alfalfa plantings over 400 acres. Pear trees covered 100 acres, and nearly 2,000 acres were cultivated by 1917. The United States Bureau of Labor Statistics in its *Monthly Review* reported that in 1916 the colony was producing about 90% of the food it consumed. No marketable excess was produced, and even if it had been, the nearest railway connection would have been at Palmdale. In 1917 over 60 departments were cooperating in the scheme: machine shop, medical, poultry, rabbits, shoe shop, soap factory, and others comprised the list. The Llano kindergarten was the first large Montessori school in California, and 125 children attended the Llano schools in 1917. Trees were felled in the San Gabriel Mountains and laboriously brought down to the sawmill. A print shop issued two weekly newspapers and a stream of pamphlets.

The problem of water haunted the expanding population. Wells and ditches were inadequate. The colonists extended a tunnel beneath the stream bed and discharged the water into the main stream channel, but even this did not supply enough, since the flow was absorbed by permeable gravels in the San Andreas Rift Zone. A dam was planned, but engineers reported that for an adequate reservior a dam of an impossible height would be required. A thousand people could not be supported there, and a dry year could spell disaster. In December, 1917 most of the debt-ridden colonists departed for Louisiana where Job Harriman was preparing another cooperative with plenty of water. Gentry P. McCorkie, left in charge, mismanaged what was left, and bankruptcy proceedings dealt a final blow to the Llano corporation.

Blows from another source probably should have been expected: desert vandals. In 1938 Aldous Huxley, who lived in a house which had been built by the Llano settlers, wrote that within 24 hours of the colonists' departure for Louisiana, $500 worth of Llano windows had been broken. Within a week a large frame hotel and several scores of homes and workshops had been demolished and carried off piecemeal by homesteaders who he suggests, precariously, represented capitalism in the wilderness. Only the silo foundations of the cow barn remained since they were of concrete and could not be hauled away. In 1972 an observer reported that a mile south of the old hotel, ruins of the milking sheds and a silo appeared photogenic. By heading south of 165th Street and driving into the foothills, one could find a stone limekiln and a building used by the Llano colony--also photogenic.

Mary Frances Strong, "Spring Splendor in Antelope Valley," Desert Magazine, XXXV(4), April 1972, pp. 22-25, 31-33.

Robert V. Hine, California's Utopian Colonies. New Haven: Yale University Press, 1966.

Aldous Huxley, "Ozymandias, the Utopia that Failed," California Historial Quarterly, LI (2), Summer 1972.

70. ALDOUS HUXLEY HOUSE

In 1938 Aldous Huxley moved to the desert at Llano del Rio from Beverly Hills in order to bring relief to a lung ailment. There with his wife, Maria, he hosted many famous people: musicians such as Stravinsky, Edwin Hubble the astronomer, and writer D. H. Lawrence. Several of the works he wrote while living in Llano relate to the desert. *Ape in Essence* was about a man who supposedly lived in this house, and to read it is to know the house. He discussed the desert buttes and likened them to the paintings of Goya. He saw witches sitting on them as on the backs of monsters, and he saw them as representing different cloud formations. Here he also wrote *Time Must Have a Stop,* an article entitle "Ozymandias" in *Fortnight* about Llano del Rio, and *The Art of Seeing* about the Bates Method of Eye Training. He studied eye training while on the desert, improved his sight, and wrote the book to help defend his teacher, Margaret Corbett, and claimed it helped her win a lawsuit so that she could resume her teaching. Palming to relax the eyes, listening to beautiful music, and concentrating on beautiful thoughts were part of the training, and when his wife Maria lay dying he spent his last hours with her whispering to her ear the beauties of the desert which surrounded their home at Llano.

The house itself is a two-story structure built in the time of the Llano settlement circa 1916. Aldous Huxley had a studio built on the property. When the present owners, Mr. and Mrs. Caler, bought the property in 1975 the *Ledger-Gazette* (may have been the *Valley Press*) carried a four-page article on the house. Although the new owners are remodeling, the architectural style will remain the same. Field assessment should be made, however, and efforts to register this house as a California State Historical Landmark also should be made.

71. ST. ANDREWS PRIORY AT VALYERMO

In 1929 the first Chinese St. Benedict's Priory came into being in the hills north of Chunking. It survived the disruption of the Japanese invasion and the early years of World War II before being forced to sell its lands and move to Chengtu. With the advent of a Communist government in 1949, the monks were forced to give up their way of life and finally to leave China. They relocated in Valyermo, the former Hidden Springs Ranch, in 1962 where their monastery overlooks a clear lake constantly fed by hidden springs. A two-day fall festival is held here each September which attracts artists and provides income for the priory. The priory is located in the southeast corner of Antelope Valley, Fort Tejon Road at Valyermo Road.

72. WESTERN HOTEL

On November 28, 1958, the Department of Historical Landmarks made the Western Hotel a state historical landmark. According to the plaque on the monument, it was built in 1874 by a family named Gilroy. It was built as a two-story, private residence, with one large room on each floor.

The late George Thomas Webber was sent to Lancaster from England in 1880. He was a newspaperman and was sent here by the London Daily Mail to try and produce paper pulp from the many yucca trees. The process failed, but he never returned to England. For a while he prospected in Antelope Valley's westside. Then he went to Los Angeles and with his knowledge of civil engineering, helped lay out the city of Santa Monica. But his love of the valley forced him to return to Lancaster. He was amazed on his return to find the village of Lancaster had become a ghost town, and many of the buildings and homes had mysteriously disappeared. But the clapboard two-story house still stood. So with a man named Gillwyn he added to the house and about 1902 they opened for business as the Gillwyn Hotel. Later, George Webber bought out his partner and changed the name to the Western Hotel.

It was on August 31, 1906, that Myrtie Sullivan, a 39-year-old widow, and her son Frank came to Lancaster. Originally from Fillmore, Missouri, Myrtie was born August 8, 1867. Her parents James P.Gibson and Mary Jane Cass Gibson died before she was one year old. After their death Myrtie went to live with her grandparents in Ohio. She married Ed Sullivan in 1885 when she was 18 years old, but was widowed in a very few years. She was living in Los Angeles when she suffered a violent attack of pleurisy. Advised to seek the hot, dry air of the desert for relief, she arrived in Lancaster at midnight. At the depot she was directed "up the street" a few blocks to the only hotel in town, the Western Hotel. For two weeks she remained in bed at the Western Hotel, a very sick woman. In February of 1910 she and George Webber were married. At that time the aqueduct was under construction and petroleum and gas lines were being laid under the floor of the valley. The hotel was the headquarters for supervisors and crews of both of the projects. There were many more workmen than the hotel could accommodate so 24 tents were pitched on the property where the old post office now stands, and 12 more tents were put on the other side. The dining room only held 65 people and with the many workmen and travelers they had to eat in shifts. The Webbers received 25 cents for a meal and 50 cents a night for a room. There were two trains

daily through Lancaster. One went north at midnight and the other left for Los Angeles twenty minutes later.

The Western Hotel was the center of community life in Lancaster at that time. Eventually the Methodists built their first church on Date and Jackman Streets, but the hotel and its equipment were still used for church parties. The Lancaster Chamber of Commerce was organized in the dining room of the hotel in 1902 and met there for many years. Electricity was brought to Lancaster and the hotel in 1917. Trucks replaced the 20-mule teams. The hotel was the first building in town to have a bathtub.

After her son's death in 1917, George and Myrtie adopted his two small daughters. This is when the apartment at the side of the hotel was built and this was the section that was lost in the fire at the hotel January 30, 1975. In 1918 an influenza epidemic broke out. There was no doctor or hospital in town, so Mrs. Webber opened the doors of the hotel and it became a hospital. Mrs. Webber was widowed in 1934, but she ran the hotel until 1967 and lived there alone until 1971. (Source: Nancy Robinson, Ms.)

73. SHEA'S CASTLE

In 1926 John Shea, Beverly Hills real estate man, began building this home for his bride. Complete with four-foot-thick walls, lock-out towers, parapets, and steel gates, it resembled castles found in England and Scotland. For the living room fireplace Shea imported stone from Scotland. The replica reportedly cost $300,000 to build and was completed in 1928. Shortly after completion, Shea suffered severe financial losses as a result of the depression and lost the castle. His wife died. Shea killed himself. The next owner, Tommy Lee, also took his life. Following this, the castle served as a movie set and housed such greats as Roy Rogers. Popular articles appeared in magazines about the castle in the 1960s; however, its condition today is not known and fieldwork is needed to ascertain its worth as an historical point of interest. It reflects the affluence of the 1920s translated into a house.

74. PANCHO BARNES RANCH HOUSE

Pancho Barnes is perhaps the most written about and widely known figure ever to have lived in the Antelope Valley. Her ranch house is located 15 miles east of Rosamond on Edwards Air Force Base. She was born Florence Leotine Lowe in 1905 in San Marino. Her grandfather was credited as being a Civil War balloonist, the Union Army's Chief Aeronaut, and Florence (Pancho) followed along buying herself a Travelair when she was a young woman. She soon held the woman's speed record, 196 mph. Previously Amelia Earhart held the record, 184.6 mph. Pancho was hired by Lockheed as their fourth test pilot, presided over the Motion Picture Pilot's Association, and flew along with stunt flyers to make movies such as Hell's Angels. When her income was wiped out in the depression years, she traded an old apartment building for 360 acres on the edge of Rosamond Dry Lake. Here she raised cattle and hogs and operated a dairy farm, but still continued to fly and to keep in touch with the aviation greats. During the war, she remembered charging the near-by air base to

collect its garbage, feeding it to her hogs and then selling the ham back to the Air Corps. But she also developed a dude ranch resort and a club of 4,000 members at Ranch Oro Verde. The club was more commonly known as the Happy Bottom Riding Club, and in the post-war years the Air Base personnel flocked to it to escape the monotony of the base. Pancho was married four times, and on the occasion of her fourth wedding, 1,500 guests attended, bringing things at Edwards to almost a standstill. "Chuck" Yeager was the first pilot to break the sound barrier at Edwards Air Force Base and each pilot to duplicate his feat became a member of the Riding Club's "Blow and Go Club." Each time a new member qualified, a boisterous celebration was staged at Pancho's. About this time the Air Force decided that it had had enough. It declared the Happy Bottom a whore house and the whole thing out of bounds. Pancho countered with a $1.4 million damage suit for the insult and eventually walked out of court with a check for $377,000. She acted as her own lawyer. As to the notoriety the club had gained over the behavior of the girls who worked there, Pancho declared that whatever they did on their own time was their own business. Pancho stayed in business the rest of her life, operating a store, gas station, cafe and another large hog ranch.

The ranch house which lies within the confines of Edwards Air Force Base is still standing and base historian Ted Bear is considering preparation of Nomination Forms for the National Register of Historic Places for it. The condition of the ranch house is not known and field study is advised.

75. ATONGIABIT

This rancheria was visited by Garcés in 1774 and reportedly was the site of the first baptism on the Mojave Desert. It is located on the Mojave River proper before the Forks, but after Deep Creek has joined the Mojave just north of the Forks. This is primarily an archaeological site.

76. OPAL MINE

Located about 25 air miles northeast of Barstow near Black Canyon, this mine is important for interpretive purposes because of the dugout room used as an office.

77. ANTELOPE SCHOOL

Included on archaeological site record LAn-720, this school served homesteaders south of Muroc Lake in the late nineteenth century.

78. TUFA MILL

Located near Fairmont, this mill was utilized during the period of aqueduct construction, 1905-1913.



Figure 15. Casa del Desierto, the Santa Fe Harvey House at Barstow. W. E. Roberts

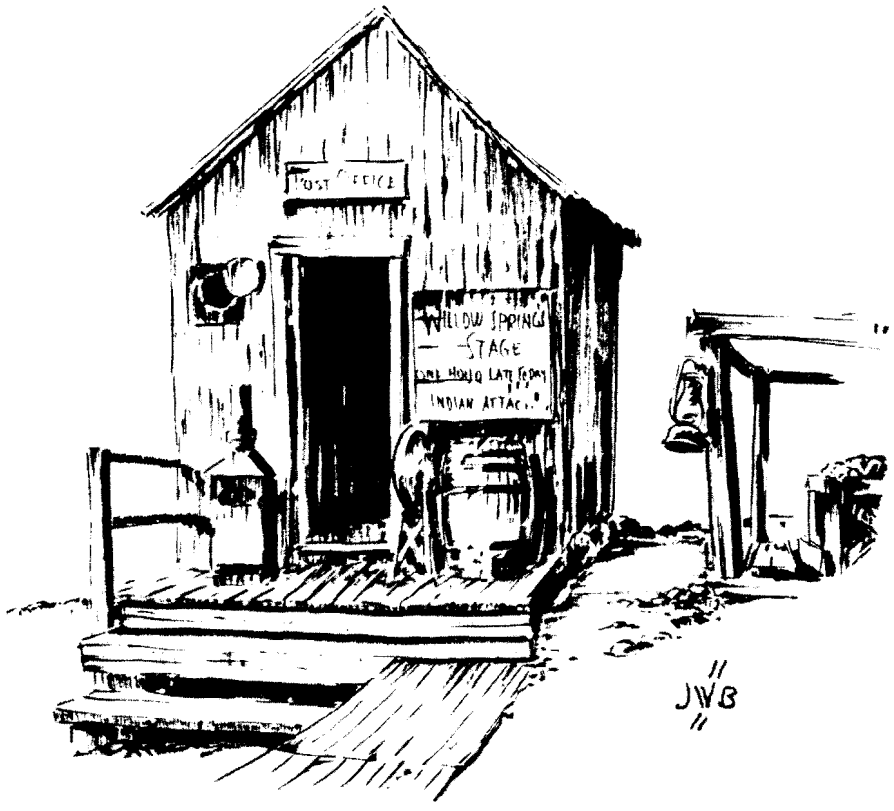


Figure 16. John W. Burgess sketch, Tropico Gold Camp.



Figure 17. Alf's Blacksmith Shop, Daggett, with Borate Wagons. W. E. Roberts

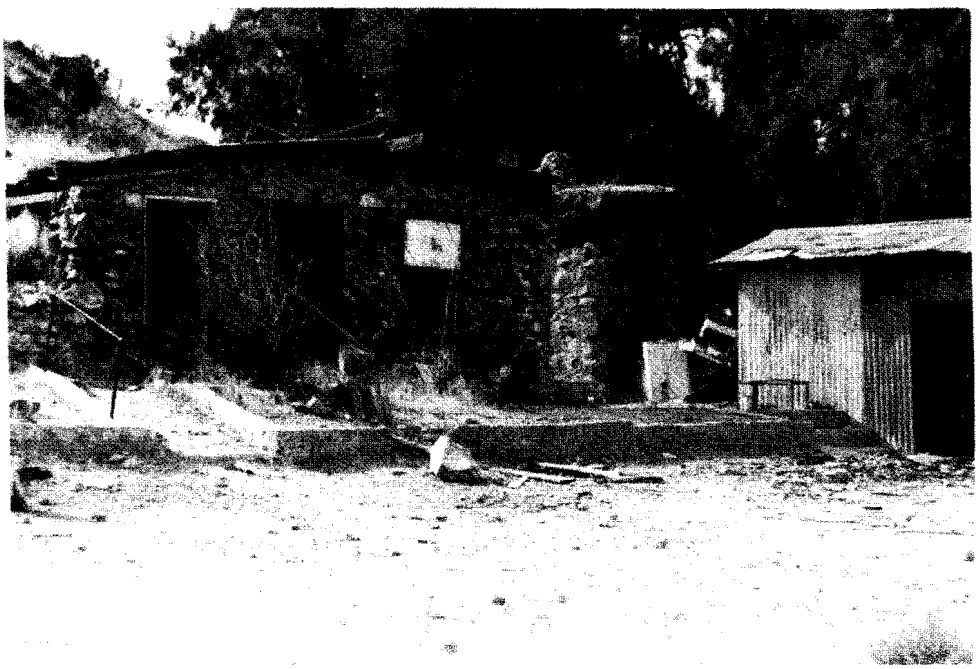


Figure 18. Chinese Railroad Workers' Stone Houses. The Chinese Workers lived in these old stone houses circa 1882, Old Town, Barstow. W. E. Roberts

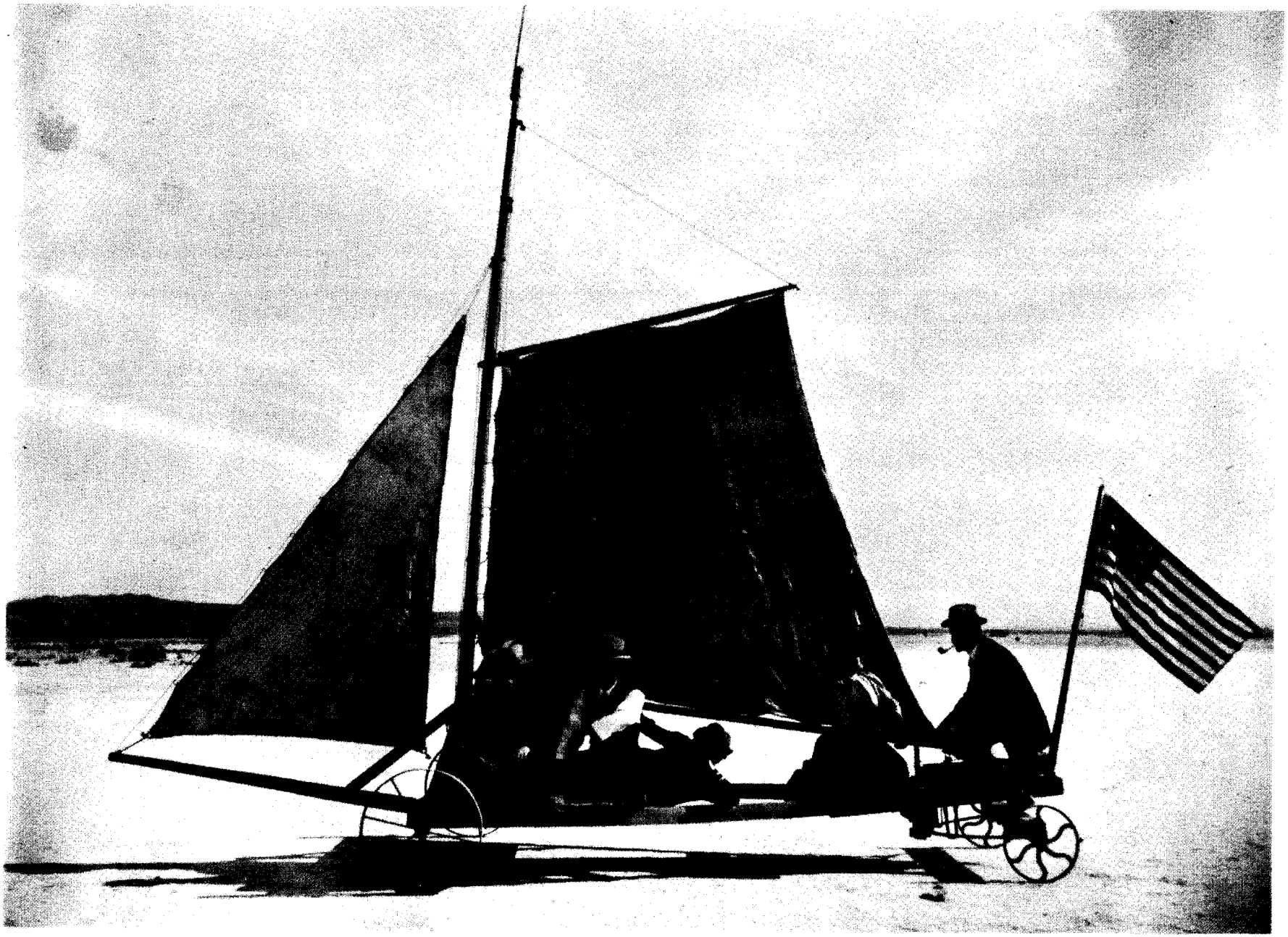


Figure 19. #2215 Desert Sailing on Rosamond Dry Lake, ca. 1905, Mojave Desert. California Historical Society/Title Insurance and Trust Co. (L. A.) Collection of Historical Photographs.

CONTEMPORARY CULTURES

ASSESSMENT OF CONTEMPORARY NATIVE AMERICAN ATTITUDES TOWARDS CULTURAL RESOURCES IN THE PLANNING UNITS

IDENTITY AND CONTINUITY - SUSTAINING SYMBOLS

Native Americans constitute a heterogenous, distinct ethnic community--a community of people who perceive themselves as holding in common a set of traditions not shared by others with whom they are in contact. Such traditions typically include "folk" religious beliefs and practices, language, a sense of historical continuity, and a common ancestry or place of origin. They, like ethnic minorities elsewhere, are concerned with maintaining their symbols of identity, among which the relationship to the land assumes a pre-eminent place. America was, after all, Indian country because the Indian was here first. Out of that simple fact has grown a host of social and political facts which make the Indian role in American society essentially separate and distinct from that of any other people.

The previous discussion identified the Native American communities who aboriginally occupied the study area and its surrounds. Historical documents record the events and processes which led to the extinction of some, and the loss to others of their political autonomy. Some of these historical events are well known, others are only now being dragged out for a somewhat unwilling public's gaze by a number of forthright Native American scholars and community leaders. As part of a larger reevaluation of Native American and European relations, Californian history is being rewritten with Native American scholars playing a vital part (Castillo 1978; Deloria 1970). What is beginning to emerge is a far more realistic picture of events in California than has hitherto been available. Among other things, one of the outcomes has been the challenging of many myths and assumptions underlying the concept of "Indian." Notwithstanding this re-evaluation of history, the socio-economic, political and psychological consequences of past history remain for many Native Americans a continuing reality. It provides the context within which their frequently ambivalent attitudes toward the dominant society--its institutions, political processes, policies and proposals--must be examined.

Part of this continuing reality is also based upon the persistence or revitalization of certain traditional beliefs and values--a situation which has led some observers to perceive Native Americans as representing the "dead hand of tradition." This notion is, of course, not unique to the Native American experience but is replicated wherever urbanized colonial powers exert political control over Third World culture groups. Anthropological research shows, however, that this perception of Native Americans has little basis in fact. An opposite view suggests that the constraints imposed by the dominant society may be the main cause of many Indian problems. Further, recent research indicates that the adaptive strategies of some segments of the community have proved successful precisely <u>because</u> they adjusted traditional values and methods of social organization to collective ends. In fact, one

of the most interesting developments in recent years has been the emergence of a tentative political theory which stresses the continuity of the Indian tribal experience, based as it is on kinship, communal values and communal objectives. For the Indian people, as the theorist argues, "the future, as the past, revolves around the continued sovereignity of Indian tribes" (Deloria 1970).

The above concepts are, however, not limited to the sphere of social relations but extend to the physical universe. Many Native Americans not only live close to nature, but also feel, intimately, that they are an integral part of it. The world appears to them neither inanimate nor empty but resonant with life; and life has individuality in man and beast and plant and in every phenomenon that confronts him. Any phenomenon may face him at any time not as an "It" but as a "thou." And in this confrontation, "thou" is not contemplated with intellectual detachment, it is experienced as life confronting life, involving his every faculty in a reciprocal relationship. Like the modern systems theorist, some Native Americans view their environment in a systemic and holistic fashion. This approach lies at the heart of Native American thinking, and in its fundamentals is congruent with the systemic approach of the scientist. Hence, the idea that Native American world view is 'primitive'--that it is essentially "unscientific"--is philosophically untenable.

In terms of this discussion, then, it should surprise no one that Native Americans, despite their loss of political control, continue to maintain ritual and symbolic ties with their ancestral lands.

In an attempt to find out how some Native Americans viewed the California desert plan, the investigator talked to as many representatives as it was possible to locate in the time allocated. The names of potential informants was compiled from suggestions made by fellow workers and information gleaned from records of tribal councils. Some 13 people were contacted including the chairpersons of two tribal councils, elected members of their councils, informal leaders and elders and others whom they recommended.

While every effort was made to talk to all these informants, synchronizing work schedules imposed limitations, and even when appointments had been made they had frequently to be postponed or cancelled because informants had incurred other commitments.

Each of the informants had, however, been contacted by telephone and the purpose of the investigation explained. This was followed by a request to schedule an interview at the informants' convenience. Only eight interviews were actually conducted. The investigator chose to conduct these interviews in an open-ended and informal manner so that issues which appeared relevant to the study area from their perspective could be determined. The informant approach was important for a number of other reasons. Past experience with federal agencies and their representatives have not always proved rewarding for Native Americans. In numerous instances they have emerged the losers, embattled and humiliated by what they perceived as insensitivity to their real needs, and ignorance of their values.

Is it any wonder, then, that they are wary of being investigated on a hit and run basis by people who dip into the community, seeking information for purposes that are perceived as serving interests other than those of the Native American community. As one informant stated it, "How come all of a sudden they want to know what the Indian thinks?" Indeed, some Native Americans found it difficult to believe that anyone would consult them about a proposal in which they had had no input. "It's another one of those things," declared one informant, "they ask the Indian for his ideas, and then they turn around and do the exact opposite." Or as another put it, "They will do what they want--whatever we say." In short, their suspicion regarding the proposed desert plan are the bitter fruits of experience.

Other limitations stemming from time constraints included the difficulty of cross validating the information received and of gaining from informants much data pertaining to specific cultural resources in the area. This lack of specifics, however, can also be attributed to the reluctance on the part of some to reveal exact locations. In the words of an informant, "Why should we say where these places are--once the information is out and is included in the report, it's public property. It can get into the wrong hands and the pothunters will have a heyday. We don't want our dead dug up. How would they like us to go and dig up Lincoln's grave?"

Respecting their views, the following description is based on what informants were willing to share.

MAJOR CONCERNS

Several informants expressed concerns over the territory enclosed within the study area itself. It was their contention that portions of it had been set aside for the use of Native Americans and especially for the homeless among them. The actual locations of these allotments were unknown, or were not being made known for reasons which at best appeared suspicious. Given the long history of broken promises and underhandedness, this attitude is probably not unfounded.

In their opinion, a complete survey, including the methods by which the territory was acquired, and the apportionment of it, should be undertaken. Implicit in this directive was the idea that if Native Americans were not to be involved in the investigation they should be at least informed of the results.

They considered, also, that for as long as the Bureau exercised control over the territory its every effort should be directed toward preserving and/or protecting the natural environment itself. The disturbance of the desert ecosystem by off-road vehicles and motorcyclists has been the source of no mean concern for some members of the Native American community. Other concerns revolved around specific cultural resources such as the protection of archaeological sites both known and discoverable, shrines, petroglyphs, burial sites, animals and plants, and minerals.

ARCHAEOLOGICAL SITES IN THE STUDY AREA

The concerns of Native Americans for cultural remains in the study area is in most cases qualitatively different from the detached interests of the professional archaeologist. Consequently some informants perceived the simple pursuit of knowledge on the part of some professionals to be at odds with Native American interests and values.

"Since," according to one or two informants, "Indians lived all over" the study area, there would be many village and burial sites, and they feared that discoveries would not be made known to them. One informant quite adamantly stated that "if any site is found, we Native Americans would want to be notified" before any excavating took place. In this regard and with respect to specific cultural resources, the only appropriate mitigation would be to involve Native Americans in all stages of the developmental project. When asked how artifacts and cultural remains should be handled upon discovery, informant opinions ranged between leaving the sites "undisturbed" to "reburial" to removing them under certain conditions for burial in a reservation cemetery. In this respect, a precedent has been set with the transferral of Serrano remains to the cemetery on San Manuel Reservation. If, however, none of these strategies could be undertaken, then adequate ethnological mitigation could be achieved only through direct negotiations with the parties concerned.

A few informants knew of the Victorville burial site; the majority, however, could give no information with regard to specific locations or were reluctant to do so. For most, however, the drastic events of the past century, and the simple passage of time, meant that the placement of many villages, cremations and burials had been forgotten. Only one informant, of Kawaiisu (Ka-hu-chi in his terms) extraction, volunteered information pertaining to specific cultural resources within the study area.

He was aware, for instance, of archaeological excavations in the west end of Antelope Valley. He also pointed out there was a large cemetery outside the town of Mojave, and burials within the confines of Edwards Air Force Base. He was concerned that work on Highway 14 might impact the Mohave burials, and that those located on the base might be similarly impacted by military personnel and activities. He regretted that access to the latter sites was so difficult and indicated that efforts should be made to ensure their preservation.

Of considerable importance for the purposes of this study was his reference to a southern Sierra Canyon which he maintained contained burials and a cave in which beaded moccasins had been found; furthermore, several grinding rocks were also located there. His description suggests that the canyon had been a place of settlement.

Regarding other village sites, he indicated that where there were springs in the study area, villages had to be located. At least three were, in his opinion, once village locations. He related that an adobe house situated at the foot of Scoty Mountain had, in historical times, been inhabited by Indians.

In providing the information on the location of these sites, the informant expressed the hope that it would be treated with confidentiality

or be employed in such a way as to afford protection of these important cultural resources. In the territory surrounding the study area, the San Bernardino Mountain area had generalized significance for informants claiming some Serrano affiliation. Several referred to Big Bear as being traditionally a sacred place. "It's still sacred," remarked one informant, "there's a seminary right on the same spot." Beyond this comment, and other more generalized ones referring to the importance of the mountains for other purposes, no further specific information could be obtained.

PETROGLYPHS

Concern for petroglyphs was expressed by a few informants but was largely limited to individuals who had a personal interest in cultural history. One stated that there were thousands of petroglyphs to be found in the study area. The Kawaiisu informant once again emphasized the importance of a Sierra Canyon in this regard. According to him, petroglyphs portraying long horned sheep and lizards are to be found in this location and at a certain spring. He added some interesting ethnographic information concerning the purposes for which such sites were used:

> The (Indians) held weddings around petroglyphs and when they went to those places, they scattered seeds around--praying and chanting at the same time--because it is sacred--like going to church.

Although the memory of the exact locations of such important cultural resources may have dimmed for other informants, the discovery of petroglyphs within the study area would undoubtedly generate considerable interest for their preservation and protection.

PLANTS AND ANIMALS

Plants and animal resources provide additional links to the traditional culture of Native Americans. Some informants expressed concern over the preservation of plants utilized for food, medicine and basketry (e.g., Gambel's Quail--*Lophortyx gambelii*, Mourning Dove--*Zenaidura macroura*, *Yucca brevifolia*, boxthorn, cottonhorn, Mormon tea--*Ephedra sp.*, creosote bush--*Larrea sp.*, cat claw--*Acacia greggii*, mesquite--*Prosopis glandulosa*, willow and Devil's claw, the *Opuntia* species of cacti). While no basket makers could be found in the area, interest in the craft is reviving; hence, the concern for preserving the necessary materials. One informant noted that there were two women in Tehachapi who still made baskets, for which, willows, meadow bunch grass, and Devil's claw were important materials. He also remarked that the spikes of cactus were used for separating foundation coils in the weaving process, and that greasewood was the main source of pitch for the basket maker. Some plants continue to be used for medicinal purposes. Again, greasewood, which seems to have multiple uses, is believed to be beneficial to human and animal ailments. It provides a remedy for impetigo and body odor. When boiled, the juice could be used to bathe the wounds of an injured animal, while a powder derived from grinding the dry leaves finely in a metate could heal an oozing

wound. The roots of the Joshua tree, "especially the red part," had similar healing properties. The bark of mesquite mixed with black clay was used traditionally for dyeing and cleaning hair. The juice of the worm willow served the same purposes.

Food plants mentioned included yucca flowers, cactus fruit, wild cabbage, choke berries, chia and mesquite beans. One informant recalled that his grandparents gathered "red berries in the desert and also certain kinds of bunch grass with lots of seeds like small wheat kernels" throughout the study area east of Mojave (a name which incidentally means grassy) and as far as Newberry Mountains. The Newberry Range, therefore, appears to have been an important traditional gathering site as were the banks of the Mojave River.

Traditionally, and for some informants today, piñon nuts remain a valued food. The main gathering areas mentioned were the west Tejon Range and the mountains of San Bernardino. "People also used to get acorns in the San Bernardino Mountains," remarked one informant, "but you can only get them now with a permit."

The ubiquitous sage had many purposes. It was used to build the fire "for burning the piñon nuts after which they were easy to break." Traditionally certain "taboos" had to be observed while the pitch from piñon nuts was being removed: "before they (Indians) burned the piñon, they would ask if any one wanted a drink of water or to go to the bathroom. No one could sit with his back to the fire or mention the name of any animal that ate it (piñon). If you did any of these things it would make the seeds harder to come out," stated an informant. And further, "if anyone went over and straddled the fire where the piñon was burning, the (piñon nuts) could pinch you." Sage was also used as toppers for water bottles, and, very importantly, was used in the construction of the sweat house. Supervised by the medicine men, the sweat house was "something like a place where people go to pray, you can't go in when you are mad or have evil thoughts, you have to go in good spirits," explained an informant.

Some respondents spoke in more general terms about the ecological change which has taken place since Euro-American settlement and development in the area, and have watched with dismay the way in which the desert "is getting torn up by bikes."

OTHER SACRED PLACES

In addition to the locations already mentioned, and which would fall into this category, one informant made brief reference to Death Mountain and Indian Hill Range as sacred for Indians. According to him, Death Mountain was the home of the "Big Lizard, who had a pointed head and measured five feet long." Indian Hill Range was also the habitat of Lizard. "Indian people didn't go into those mountains because they were sacred and it was not good for an Indian to see it was an omen," declared the informant. Suffice it to say that these areas would qualify as sacred places in the Native American view, but further research needs to be done in order to cross-validate this information and other data reported here.

SUMMARY

Discussion with Native Americans has revealed some information relevant to the question of cultural resources in the study area. In addition, these discussions revealed the expressed concerns of informants over the treatment not only of their valued resources but also of the total area under scrutiny. An interpretation of these concerns suggests that they (Native Americans) think that any activity which threatens the integrity of the land and its resources, or the values linked to them, also threatens the ability of the community to maintain itself as a distinct entity. It is hoped that these concerns and aspirations will be given due attention in the future developments of the study area.

ASSESSMENT OF CONTEMPORARY NON-NATIVE AMERICAN ATTITUDES TOWARDS HISTORICAL CULTURAL RESOURCES IN THE PLANNING UNITS

Sources for this assessment are limited and by their very nature biased since the writer was in contact, either through the literature search, field visits, or interviews, primarily with individuals and groups who contributed in some way to this report: historical societies, public agencies, Chambers of Commerce, local historians, and persons in some way connected with a site or subject. Certainly no effort was made to curtail our efforts to locate the literature. Local history is of apparent universal interest, and everyone went out of their way to contribute. I should assess this as a positive attitude toward cultural resources. On the other hand, only a very few individuals are committed to preservation. Participation in historical societies demonstrated the extent of positive commitment in the western Mojave. Three societies stand out in the zone: The Mojave River Valley Historical Museum and the society which supports it, The Daggett Historical Society, and the Western Hotel Society in Lancaster. All of these have a drive and organization which will be of great help to the BLM in future resource management. Historical societies need money, and yet the individuals who work in them are for the most part willing to donate some, if not all, of the time they contribute. Monetary stimulation might help to activate societies in other parts of the subject zone. The Morongo-Johnson area needs attention.

Mine owners, as it was pointed out in the narrative overview on mines, are concerned about the vandals and curiosity seekers who come onto their private property. The Settle's at Tropico Mine recognize what they have as a cultural resource; however, they are intensely interested in history, while we can assume most of the owners are not. In conversations with men who have prospected and mined on the desert, this writer found a sense of bewilderment in them toward preservation of the Mojave mines. They felt the mines were not original in any sense, that more interesting examples could be found in Nevada, and that preservation was impractical. Military personnel attitudes were warm, compliance understood, but as with other installations of this kind, their prime interest is to get ahead with the national defense. No historical sites located for this study stood in the way of that purpose. The ranchers are positive in their attitude toward reconstructing the history of the zone, but for them, too, getting ahead with their business of supplying the nation with meat molded their attitudes. Again, no historical sites in the zone apparently stood in the way of that purpose.

The nation's people pass through different phases in their interest toward history. One can hardly recall a time when local history was at such a height. Environmental concern peaked under President Theodore Roosevelt, then declined. We can expect the same change in attitude toward local history and the physical resources relative to it. Interestingly, the current attitude has not been strong enough to draw sufficient patronage to Tropico Mine Gold Camp and all of the museum artifacts there to support it. In summary, the attitude toward resources is positive. Only a few actively support preservation, and among the military, ranchers, and miners no opposition is present. To date, no preservation activities have encroached upon their operations. They are aware of the fact that calling attention to historical sites may increase vandalism, especially in the case of mines. Thus, historical marking is not always welcome.

ASSESSMENT OF CONTEMPORARY NON-NATIVE AMERICAN ATTITUDES TOWARDS CULTURAL RESOURCES IN THE PLANNING UNITS REGARDING ARCHAEOLOGICAL SITES PER SE

It would seem that most people in the study area are aware of archaeological sites, usually in terms of finding arrowheads or seeing rock art. It is uncertain, however, the extent to which they are aware of their values as local or national resources. Most persons interviewed stated that they should be cared for in some suitable way. The more culturally aware of those interviewed stated that it should be the government's duty (federal and local) to manage the sites. As one informant put it, "These are the places were the original ancestors of the land lived. The government ought to protect the sites." Many seemed to concur that burial sites and other "sacred places to the Indians" should be protected and preserved wherever they are located. They also acknowledged that it would be impossible to preserve all the sites in the study area due to anticipated population growth. But, if a site were to be necessarily destroyed, the concensus seems to be that the "archaeologists should remove the relics and artifacts first" and that the state or federal government ought to pay for the costs involved since that information is for the general public good.

When asked as to their interests in cultural resources, most replied they want to know first "how old a site is, how the people lived, how they hunted, and how they worshipped." It would appear that there is a growing awareness of the value of cultural resources in the study area.

FUTURE RESEARCH AND MANAGEMENT OPTIONS

FUTURE RESEARCH AND MANAGEMENT OPTIONS

INTRODUCTION

Future management options for cultural resources in the planning units will depend on two major aspects: 1) future research directions in archaeology, and 2) development in cultural resources management programs. Each of these are discussed briefly below.

ARCHAEOLOGICAL RESEARCH

It is not entirely possible to predict the actual course of future research directions as it will be implemented in the planning units. New theory always generates new research problems which in turn generate the need to recover new and different classes of information from the archaeological record than what was previously recovered. In addition, the development and use of new methods and instrumentation (e.g. infrared photography or multi-band camera/remote sensing) can recover new information perhaps previously unrecognized. Archaeologists agree that archaeology has not fully realized its potential for recognizing and studying classes of information contained in the archaeological record. The fact is that the archaeological record is large and exceptionally complex. And archaeologists have only scratched its proverbial surface in terms of what might be recovered and explained through future testing of hypotheses.

Although specific predictions about future research in the planning units cannot be reliably made, a general outlining of some possibilities can be suggested here. Essentially, the format for presenting the future research directions is the same basic one which has been used throughout this report for presenting the chronology, past lifeways, and ethnography for the planning units. It should be pointed out that much research can be carried out by using data from previous surveys and excavations, and that information should be maximally utilized as much as possible. But developments of various kinds within the planning units will cause some sites or areas to be impacted and, thus, there will undoubtedly be a future need for excavation as a mitigation measure. Whatever the source of the data, there are many outstanding avenues of research which we hope will receive analytical attention in the future. It should be pointed out that it is not feasible here to list the entire range of research areas but only to indicate in general terms the types of studies that could be implemented.

Basically, there are two kinds of archaeological research. One has been termed the study of culture history and the other has been termed the study of culture process. The best definitions of these terms is presented in the glossary of the *Airlie House Report:*

> Culture history: The chronological and spatial framework for describing the development of human societies and cultures, and the documented processes of change involved in this development. Studies in culture history are primarily concerned with defining the geographic extent, relative age, and course of development of cultures.
>
> Culture process: The general factors and mechanisms responsible for cultural change and variability. In cultural resource management studies, investigations of culture process involve providing and testing explanations, expressed in terms of explicit formulations, for cultural events which occurred in the study area (McGimsey and Davis 1977:110).

For the most part, the research to date in the study area has been concerned with culture history studies. The most articulate statement about this approach to future research for the greater study area was that made by Wallace (1962). Wallace mentions that archaeological research should be "concerned with successive groups of humans who made their living by hunting and gathering the animals and plants naturally available in the wild state." Wallace in 1962 states that there were many critical gaps in knowledge (which remain to be filled), and that "Considerably more systematic research will have to be done and a great body of detailed information built up befor it will be possible to illustrate in detail the course of human history" (Wallace 1962:178). He states that much further site survey and excavation are needed to provide for research goals: Wallace's research goals at that time were:

1) "A clearer formulation of the basic archaeological complexes with respect to content."

2) "A standard and meaningful terminology for these units."

3) "An ordering of assemblages with respect to approximate antiquity in local sequences."

4) "A plotting of the geographical distribution of the various units within the southern California deserts..."

5) "A search for cultural linkages with adjoining areas--Great Basin, Southwest, and southern California coast."

Wallace also suggests that the concept of a "Desert Culture" and whether it should be applied to the California data or not should be evaluated (he is dubious about its applicability, however). He also mentions the importance of studying the "adaptation of man and his culture to the several ecological shifts which occurred in the past" and of studying seasonal aspects of those adaptations.

These goals are still to be accomplished even as the archaeology of this area will shortly be moving into the 1980s. Wallace's aims are those of culture history which are valid ones for basic archaeology of description.

But goals of culture process are needed to be implemented in the planning units as well. And the research problems outlined below are oriented to those more important scientific aims of explaining data organization and change.

EXPLAINING ENVIRONMENTAL CHANGE

Most studies of the past natural environment of the study area have been descriptive in nature. But there has been a recent emphasis to attempt to explain the environmental change in the Mojave both in terms of the changes in climate and flora (Johnson 1977a) and in explaining changes in fauna such as the extinctions of the Pleistocene Megafauna (Johnson 1977b). Regardless of the accuracy of these studies, the attempt to explain versus just to describe is important because such studies are critically needed to assess the effects natural environmental change had on cultures occupying the study area and the extent to which culture change was produced as a response to the environmental change (humans have even been cited as contributing to the extinction of the megafauna, Johnson 1977b, an hypothesis which we assess to be unlikely, cf. Stickel 1979b). Since there are some correlations of environmental change with the introduction of new projectile forms, there are some indications that environment may have been a determinative factor causing such cultural change (cf. Hall and Barker 1975:64-65). It will be important to conduct future studies which will be aimed at assessing the roles that the late Pleistocene and the post-Pleistocene to Holocene environments played in the causes of cultural change in the planning units.

The "human environment" as a force of culture change has not been studied in the study area. The influx of people or the effects of culture contact and exchange from the Great Basin, Southwest, or coastal California, and the effects these areas may have had on local culture change remain to be established. Such analysis could adopt or reassess applicable models which have been proposed to study such phenomena (cf. Clarke 1968; Earle and Ericson 1977).

EXPLAINING HUMAN POPULATION CHANGES

There have been no studies of human population changes in the study area although there have been statements about human population levels during the various periods based on either site number and size (e.g. Wallace 1962) or on the ethnography (e.g. Ritter 1976). A great deal needs to be learned as to the actual demography of various populations in the study area and the changes in these demographies over time. Human demographies on deserts, especially with hunter-gatherers, are a major important feature of the study of world-wide human ecology. And the studies of the human populations who inhabited one of the major deserts of the world, the Mojave Desert, could greatly add to a cross-cultural understanding of human adaptations.

EXPLAINING CHANGES IN MATERIAL CULTURE

The known differences and similarities of artifacts and ecofacts have been presented in detail in the Chronology and Past Lifeways sections of this

report. But much more formal research in this area is needed. As some Mojave Desert scholars have put it:

> Dissimilarity among artifacts used or produced at various times or at different locations can be the result of a variety of causes. The discovery of these causes often leads to the formulation or testing of hypotheses explaining differences or similarities between societies. There is a great deal of research which can be done to discover causes for variation among artifacts (King and Casebier 1976).

King and Casebier (1976:45-57) suggest that variability in pottery found in their study area of the eastern Mojave may be due to the differential dependence of groups on agriculture, to the presence or absence of pottery markets, to transport, to differential sedentism, or that local painted pottery was a response to differential population distributions and their corresponding manufacture of painted wares, etc. All of these propositions can be formulated and tested in the form of hypotheses. Similar propositions were offered relative to explaining changes in projectile points over time and space:

> It is clear, then, that points cannot be viewed apart from the whole assemblage of cutting and piercing tools. Social changes such as a more dispersed settlement distribution, an increase in the use of projectile points in warfare, or an increase in trade or arrows can result in corresponding changes in the way points are hafted, the material used for them, the regularity of their form, and the shape of their edges. Other changes such as increased use of bows and arrows over hunting with snares would also effect the assemblage of cutting and piercing tools used. All of the above listed changes may have resulted from shifts in human population density and population distribution (and these can be formulated in hypotheses as part of)...the construction of a model (King and Casebier 1976).

EXPLAINING CHANGES IN TECHNO-ECONOMICS

If the general trends of Mojave Desert economy suggested by Wallace (1962:173) over time (i.e., from the Early period of "hunting, possibly some fishing and gathering," through "hunting and gathering" to the Late period's pattern of "gathering with some hunting") are accurate observations, then there is an important need to explain these shifts in human adaptive strategies over time. Hall and Barker (1975), in their discussion of the archaeological potential of the El Paso/Red Mountain planning units to the north of the study area, reaffirm this:

> ...there is a foreseeable potential for the study of interaction between an evolving environment and the adaptive systems of hunting and gathering peoples. For example, extraction of economic resources was a significant determinant of land use patterns practiced by the aboriginal inhabitants of the California Desert. Hence, possibly significant, and complementary goals for archaeological research in the planning units would be clarification of past economic systems, and the explanation of the relationship between these systems and temporal shifts in the distribution of economic resources (Hall and Barker 1975:64).

Hall and Barker (1975:64) also state that they are "reasonably certain" that technologies and subsistence-settlement patterns differed over time in the region and that these differences are attributable to "different ecological contexts." They importantly state that such differences and similarities should not just be explicated but they should be explained by testing explanatory hypotheses relative to past land use patterns, site composition, distribution, and density. They specifically suggest (Hall and Barker 1975:65) that the archaeological models of Zubrow (1971), Thomas (1971), Vita-Finzi and Higgs (1970), and any number of others can all be implemented and tested in the Mojave Desert region. It has been suggested, in addition, that the study of site location/distribution patterns could be analyzed from a perspective that could help to explain these shifts. The latter could be accomplished by:

> ...the utilization of energy flow simulation models (Odum 1971). The development of such models will require simulation experiments to determine the costs of obtaining and processing different food stuffs, as well as data concerning the potential for efficient resource acquisition at different locations (King and Casebier 1976:50).

Many other aspects of techno-economics could be productively studied in the study area as well. For instance, it has been proposed that the increased efficiency of the bow and arrow (when it was introduced or invented?) over that of the atlatl and dart led to the adoption of the former at the expense of the latter. And, according to the model, the increased use of the highly efficient bow and arrow led to the extinction of game which in turn led to changes in population distribution (Grant et al. 1968) on the greater Mojave Desert. The latter model is similar in its general intent to the carrying capacity model of Zubrow (1971; cf. Hall and Barker 1975:64-65). Such models could also be tested with hypotheses and data derived from the planning units.

Trade and exchange are other techno-economic aspects which could be productively studied in the planning units. The evidence of Southwest pottery, Great Basin projectile points, California coast and Gulf of California shell artifacts, and the indications of turquoise mining all attest to contacts/interactions between populations in the planning units and other systems. The diffusion models of David Clarke (1968:413-431) as well as the recent

models proposed by Earle and Ericson (1977), David Clarke (1971), and Getia and Boots (1978) may all be effectively tested with data from the study area.

EXPLAINING CHANGES IN SOCIAL ORGANIZATION

As stated in the Past Lifeways section of this report, the basic band model of social organization proposed by Williams (1974) is, in its general form, applicable to the study area perhaps throughout the virtual span of human occupation there. This model proposes that each population had a patrilineal, patrilocal, and an exogamous lineage-band form of social organization.

We are not suggesting here that social organization in its largest context did not change over time or space, however. For example, it has been hypothesized (for the eastern Mojave area which is quite analogous to the study area), that the social relationships ("political ties"), exchange/contact, and population density and distribution of prehistoric bands all changed and constituted an "evolution of social systems" particularly during the later period:

> In general, it appears that there was a trend toward more permanent occupation of the study area, accompanied by the growth of an increasingly independent local group. This trend represents the evolution of social systems which enabled the maintenance of increasingly larger food stores, allowing groups to live through periods when resources were scarce. The existence of stores also makes trade or political ties between different groups more important, since there is an increase in food available for exchange.
>
> Confirmation of this trend toward greater complexity of social systems and increasing permanence of residence in the study area requires further observations and testing (King and Casebier 1976:49).

It is suggested that some areas (i.e. the Antelope Valley) may have had more complex social organizations than other contemporaneous areas within the total study area (Sutton 1979b).

Hypotheses on prehistoric social organization and change could be generated and tested in the planning units of this study area as well as making use of a variety of current approaches (Deetz 1968; Hill 1968; Brown 1971; Hill and Gunn 1977; Hill 1978).

EXPLAINING CHANGES IN IDEOLOGY AND PSYCHOLOGY

Most archaeologists agree that the potential for studying and explaining the elements and distribution of the elements of rock art on the Mojave Desert has hardly been realized (cf. Rector in King and Casebier 1976:236-256; 50-51) Of all the archaeological data within the planning units, perhaps rock art has captured the imagination of the general public in terms of intrinsic

interest more than any other class of data (see Smith and Turner 1975 for the variety of design elements within the study area; see Figure 20). This extensive data can be productively studied from an art-history point of view (e.g. Smith and Turner 1975; Turner 1978). But it can also be productively studied from an anthropological-archaeological perspective. The following quote is indicative of this scientific viewpoint; that the study of this class of data can allow a greater understanding of variation within the cultural group(s) who made and used it:

> If rock art is viewed as part of the social system (i.e., cultural system) maintenance, then differences over time and space can be hypothesized as functions of corresponding differences in social system organization (King and Casebier 1976:50).

Ethnographic data indicating the ideological and psychological importance of rock art has been already noted for the general area of the Mojave Desert (see references in Rector in King and Casebier 1976:236-258; 50-51). These references indicate that rock art sites are "places of power," have special ideological "ownership,""places of value," or relative to "dreams of power." This ethnographic correlation of rock art sites with such special informative activities and places which are "owned" by select "chiefs," "shamans,""clans," or other types of groups prompted a testable hypothesis which is applicable to the study area of this report:

> Changes in the social systems present in the East Mojave Desert over time, or differences in types of ownership at the same time, can be hypothesized as the reason for the variability which is observable in the rock art of the area (King and Casebier 1976:51).

It is not suggested here that rock art is the only class of data which could be studied to explain changes in ideology or psychology in the planning units. But it is certainly a prominent candidate for such research from an anthropological perspective.

EXPLAINING CHANGES IN COMMUNICATION

The types of linguistic changes within the study area over time were discussed in the Past Lifeways section of this report for each chronological period. The study area, during ethnohistoric times, was essentially occupied by Shoshonean speaking populations. But as has been pointed out by others concerned with the Mojave Desert (e.g. King and Casebier 1976:51), there is a present research gap of knowledge concerning language differentiation, distribution, and development over time within the Mojave Desert. Although some archaeologists view this type of research opportunity with skepticism, others would take an analytical approach with an open mind towards the ability of future researchers to develop and test feasible models pertaining to the explanation of past patterns of communication and its effect on the development of cultural systems (e.g. King and Casebier 1976:57).

Artist's rendering of petroglyph panel BCC-1 as it appears today.

Figure 20. Example of Rock Art From Study Area.
(Source: Turner 1977)

SUMMARY

In summary, both culture history and cultural process types of research are needed and can be implemented in the planning units. Basic archaeological questions of chronology, cultural definition, and documenting events of cultural development over time are all badly needed for this region of the Mojave Desert. Moreover, a wide array of environmental and cultural process studies aimed at explaining cultural system variability and change are feasible given the available archaeological data in the planning units.

Since the Mojave Desert is one of the major deserts of the world, it should not be analytically neglected, as it has been, since data on past human adaptations to this environment can provide critically useful information for cross-cultural understanding of the adaptations of human populations to their environments at all times and places. Such understanding can allow the science of archaeology to generate valid scientific principles of human behavior and culture change (cf. Read and LeBlanc 1978).

HISTORICAL RESEARCH

Few travelers from southern California who cross the western Mojave have any idea of the history that was made here by explorers and trail blazers. By bringing this to public attention a greater general interest in, and respect for, the desert's heritage could be generated. One management option for the BLM would be to initiate a program of Trail/Station markers unique to the desert and with the BLM logo. In the Management Summary this writer has suggested these markers for all sites related to early trails and wagon roads. The concept could be expanded to include historical railroad sites. This task cannot be left up to local historical societies for obvious reasons, but it should be undertaken soon. The sites are difficult to locate now; in fifty years the work will be even more difficult. The markers should be helpful to the BLM Recreational-Interpretive program.

In choosing management options the BLM has a multitude of factors to take into consideration. The following suggestions are made from this historian's professional point of view. First, the BLM must importantly select out those sites which are on BLM land and which need immediate attention. Secondly, we must ask of their significance to local, state, or national history. As architectural historians have pointed out, California's only original architecture, as compared to the rest of the nation, was the Spanish. No Spanish adobes have been found on the western Mojave. This, for example, leaves us with a culture which moved west with the Americans and entered the state in the 1840s. The remains of this nineteenth century culture lie strewn over the whole of the United States, but this is not to preclude the importance of examples we have on the western Mojave. We must, however, recognize that they are probably neither unique or original, but only local. Preservation options must be tested against these historical facts and selectivity should come into play, especially when preservation may mean expenditures of large sums of public monies.

Historians know through experience that we cannot save everything. Some of the documents and physical remains of our culture must be lost forever. Because writing history employs such a variety of data bases other than physical remains (music, art, photos, movies, interviews, and everything on paper that we can draw meaning from, to name but the most obvious), we spend much of our time in post-graduate training learning how to be selective.

A third consideration is the nature of the desert. The desert cannot be adequately patrolled against the vandalism which is apparently an integral part of Americana. Calling attention to historical sites can be dangerous for the sites, and irritating to private owners. Fencing mines is evidently of little use unless guards and patrols are nearby. Perhaps in the case of mines, one or more of the exemplary mines and mills should be given all the attention needed to preserve them: fences, guards, patrols. The Tropico and the Silver Queen appear to be good candidates for this kind of preservation due to their colorful history. The Calico Ghost Town is successfully pre-

serving one in that general area. The nature of the desert is important in another respect. Granted that our technology was no different than that of the rest of the country, we must still look for local innovations which would increase the scientific value of resources found here. Field crews should take this into consideration in examining the sites.

A fourth consideration should be that of determining the gaps in our knowledge of late nineteenth century artifacts and especially tools and building materials. We have quite a bit on hand. Montgomery Ward and Company, Inc. began publication of their catalog in 1878 and Sears Roebuck and Company followed them in the 1890s. They show us much as do the host of other journals, photographs, drawings, and collections which are to be found throughout the United States. Historians like Eric Sloane and Nicholas Hardeman publish on them; they know the collections. Here in the western Mojave the best collection is no doubt that of Glen and Dorene Settle at the Gold Camp Museum. Although many of their tools may have come from Nevada, they still have a good number they collected locally. Mrs. Walter Alf has an excellent local collection. The Settle's collection will be dispersed after the end of the year in an auction, a great loss to the local area unless BLM can find a buyer who will save it for them. Did the western Mojave have a history of old-time craftsmen? Or were the occupants primarily busy with other pursuits? What of value to our fund of historical knowledge can we expect to find in late nineteenth century excavations? We must bring into play all that we already know, search exhaustively in the mining, ranching, and agricultural journals, and then be selective.

A fifth consideration might be the feasibility of a space in the Barstow BLM Way Station, or an addition to that building for curation of historical items. Even if they are unimportant for historical yield, they embody heritage and enrich interpretive work. Local residents could be enticed to contribute what they have with the promise of proper curation and recognition. This again would be selective. The BLM may have the funds to encourage and reward local historical societies to work along with them in this preservation attempt. They should be encouraged to catalog and inventory sites of local intrest, to develop a local marking system as has the Daggett Historical Society, and to apply for grants to the Institute of Museum Services and other sources of aid.

Finally, I should like to devote some space to the options open to inventory work. The scope of the literature search did not permit a systematic visit to the sites, although in the course of the search we did visit the western Mojave on several occasions. Sites were photographed, interviews conducted, and local depositories consulted. These visits demonstrated the necessity of visiting the sites in order to assess informational yield. This task requires a thorough knowledge of our wide variety of historical sources already at hand on any given subject. We need to survey our extant sources before we can assess the new evidence. If additional sites are found, then a renewed literature search should be made to clarify their origins and the history surrounding them.

The sites brought together in this report should be taken into consideration by the BLM and/or other management agencies if future development in the area might impact them. At that time, an independent study is advised so that mitigation measures to match the situation may be arranged.

In discussing research directions for the western Mojave we must look again for the areas which need it most. These are, in general, areas which require work in eastern archives and long-term intensive work in local depositories. An example of the first is that of searching for the records of the Coast and Geodetic Survey. They lie in the National Archives at Suitland, Maryland, in Record Group No. 23 under "Descriptions of Stations (GA Series), 1834-1937" and are in stack area 5. The time necessary for this research would not be great once the researcher was in Washington D.C. The work in local record depositiories is exemplified by a search for land ownership patterns along the Mojave River Valley, in Victor Valley, or other sections of the desert. Plat maps at the Riverside BLM office have been consultued; however, the old maps there have been discarded. They can, however, be found elsewhere. County records should be consulted, patented homesteads traced, old maps and tax records examined. This costly option should probably be set aside until a concrete reason for it comes forth. Mining history needs attention. A program to interview all of the old miners, mining entrepreneurs, and ranchers would be helpful. If it is to be done, it must be done soon. Research begats research as more gaps in our knowledge come to light. In line with the current public demands for preservation of local historical resources our research direction for now should logically be to consult with local historically-minded people. In a decade that interest may fade and the input from local sources lose momentum.

CULTURAL RESOURCES MANAGEMENT IN THE PLANNING UNITS

The recent management report prepared for the Society of American Archaeology (McGimsey and Davis 1977), succinctly covers a range of topics germane to the cultural resources management of the planning units. In this report the need for future management of cultural resources for both public-humanistic needs and professional scientific needs are stressed.

PUBLIC-HUMANISTIC VALUES OF CULTURAL RESOURCES

Managers of cultural resources agree that the general public can potentially derive a number of positive benefits from cultural resources. For example, the public can appreciate the aesthetic aspects of artifacts of sites such as arrowheads or petroglyphs or they can express interest by learning about the archaeology of a given area. A major form of humanistic appreciation is the "educational" value of cultural resources. Most often this is expressed in terms of intrinsic interest in the past of a given area. This aspect refers to such basic questions as when did people first inhabit this area of the United States? How did they come here? Why did they come here? How long have they lived here? What was their everyday life like? What kind of tools and artifacts did they use? How did they make them? What prehistoric animals did they eat? How "advanced" were they? How many cultures have been in the area since it was first occupied? How large was the tribal areas of these former people? Why did each culture come and go? What do the carvings in stone (i.e., petroglyphs) mean? These questions, incidentally, were the ones asked of the archaeologists conducting this project by lay persons in the study area. The fact that they were asked attests to the need for answering these basic questions since such information could greatly enrich the knowledge of people interested in the history and prehistory of this region. Non-local people have interests which can be fulfilled by information about cultural resources as well. San Bernardino County recognizes this and even has a sign apprising travelers along Highway 15 about the Calico "Early Man Site" in case they may wish to stop and learn. In order to provide for such public appreciation and enjoyment of cultural resources, a number of interpretive, educational, and recreational programs are needed in the study area. Such programs are necessarily dependent on archaeological research. Interpretive programs are needed to communicate to the public the values of past cultural resources--especially why our present culture should protect and conserve selected types of cultural resources for the benefit of future generations of Americans. Educational programs are needed to convey salient information about past culture history as well as legal aspects of conservation to a larger public which at present is virtually ignorant of the term cultural

resources let alone why they are important as a segment of our national resources. The BLM is providing for such educational programs in terms of the comprehensive reports on cultural resources of which this study is one example. It is anticipated that there will be a demand for these reports, and the BLM can assist the needed educational process by selling a suitable supply of these reports to interested institutions and scholars, as well as the general public. Such a service is fairly costly and will be dependent upon government funding.

Archaeologists and historians have responsibilities to inform the public about cultural resources, but they must also be assisted by city, state, and federal agencies of government if they are to be truly effective in that responsibility. There is a crisis at present because some segments of the general public are finding their "recreation" in either removing or defacing by vandalism archaeological sites in the study area--particularly the petroglyph sites. Programs must be developed to provide for recreational enjoyment of such cultural resources without causing damage to them. Such programs are difficult to conceive and implement since there is a wide variance of opinion, even among archaeologists, as to how the public will increasingly have access to the Mojave Desert--especially as the population in the urbanized coastal strip drastically increases over the next decade. This increased access will necessarily lead to an increase in encounters between people and archaeological sites. The challenge is: can these encounters be rewarding to the public but at the same time not be destructive to the resources? Initial positive efforts of the kind needed have been made by such individuals as Ike Eastvold of Desert Watch and such organizations as the Archaeological Survey Association or the Mojave River Valley Museum, particularly with regard to recording and protecting petroglyph sites. But the full range of cultural resources has to be conserved somehow, and that will only occur through coordinated CRM programs for research, interpretation, education, and recreation.

A special and important aspect of public-humanistic values are those of the Native Americans(see section VI above). Their values, be they religious or historical, are viewed from quite a different perspective than those of non-Native Americans (cf. section VI). And their deployment of emotions, feelings, and values to the land in general as well as to specific sites or aspects such as burials require that appropriate attention be directed to identifying their values with respect to cultural resources and responsibly providing for them as much as possible.

The Bureau of Land Management has begun these processes through the establishment of such facilities as the Barstow Way Station's displays of local

flora, fauna, and archaeology. One immediate and highly effective means for facilitating public appreciation and enjoyment of cultural resources would be a quality factual and highly illustrated booklet on the archaeology and ethnology of the desert area. For such informative publications, written in order to maximize understanding, can have much positive impact on the public's awareness and appreciation of the government's efforts to manage cultural resources.

Thus, future management options for cultural resources in the study area will have to address the increased encounters the public will have with sites and whether or not these encounters can be channeled into positive directions for the good of both the public and the resources.

PROFESSIONAL-SCIENTIFIC VALUES OF CULTURAL RESOURCES

Archaeologists and other scientists interested in our human past are faced with a number of professional concerns. Future management options in regard to cultural resources in the planning units will have to take into account these concerns. In the *Airlie House Report* (McGimsey and Davis 1977) these concerns were identified as 1) a consideration of law in archaeology; 2) cultural resources management; 3) guidelines for the preparation and evaluation of archaeological reports; 4) the need for communication of archaeological information; 5) the role of archaeology and Native Americans; and, 6) the need for certification and accreditation of archaeologists. This study has ascertained some salient points relative to each of these topics which are presented below.

The present set of laws relating to the management of cultural resources in the study area are providing some useful measures. But the existing laws are not an effective deterrent to vandalizers or illicit collectors of sites. So more stringent legislation is needed in order to more adequately protect the resources from a legal standpoint. But given the vast extent of the study area (over two million acres), and given a policing force even several times that presently available, it is not realistic or feasible to provide adequate protection for the sites in terms of human surveillance. Thus, the necessary aspect of enforcement of the laws is a virtual impossibility. A more feasible and realistic approach is to develop cultural resource management programs geared to educating the public to appreciate the resources such that they themselves will directly aid in their protection and conservation.

McGimsey and Davis (1977:110) define cultural resource manangement (CRM) as:

> The development and maintenance of programs designed to protect, preserve and scientifically study and manage cultural resources (including evidences of prehistoric, protohistoric, historic, and recent remains) and the natural resources that figured significantly in cultural systems. Developers of such programs may include governing bodies or agencies of government, academic and research institutions, and private corporations. The goal of such programs should be the conservation of cultural values and the maximum effective conservation and utilization of these resources for the public good.

The Bureau is currently addressing the CRM requirement through the inventory of the cultural resources on the land under their jurisdiction in the Mojave Desert. This is being done by conducting both Class I literature searches (such as this study) and Class II studies (or the site surveys in the field using random sampling designs, e.g. Coombs 1979. Studies estimating the variety, density, and location of the different types of cultural resources which have been partially completed in the desert are a vital aspect of the CRM process (e.g. Ritter 1976). Once these studies of inventory are completed, the relative frequency of different types of cultural resources will have been estimated. A great variety of sites are located in all sectors of the planning units. It has been argued elsewhere that each culture necessarily has a variety of loci (sites) which are an integral part of their spatial strategy for adaptation. A general site typology for cross-cultural comparisons was formulated which included 1) resource sites (e.g. a quarry); 2) circulation route sites (e.g. a pathway or an aqueduct); 3) processing/production sites (e.g. a butchering site, a chipping station); 4) modified spaces sites (e.g. an agricultural plot, a corral); 5) service center sites (e.g. a religious "shrine," a discrete cemetery); 6) habitation sites (ranging from an individual camps to hamlets, villages, towns, etc.); and 7) disposal sites (Stickel 1976; cf. Wagner 1960). Hence, scientifically the best way to manage this variety of sites in the future would be to provide for the preservation and conservation of selected samples of <u>all site types</u> represented in the study area.

This position has also been taken by the Society for American Archaeology:

> As indicated, however, the discipline of archaeology is a continuing developing field. Any particular site may therefore have <u>significance</u> for future problems. But because of society's wishes and needs for development, it is clear that not all sites can be saved, and no responsible voice in the archaeological profession has taken this position.
>
> This is the dilemma--<u>all sites have potential significance</u> relative to present or future research questions but not all sites can be preserved. A compromise solution is to attempt, using a regional perspective, to preserve or investigate a <u>representative sample</u> (of different sites) of the potentially affected resource base (McGimsey and Davis 1977:32).

This perspective is quite critical because archaeologists have disproportionately emphasized habitation sites in their excavations and in their analysis. Moreover, there has not been adequate excavation and reporting of data from even habitation sites in the planning units let alone the entire range of site types. And, knowledge about past human utilization of different sites is essential if archaeologists are to understand the entire adaptive utilization of space both synchronically and diachronically. Such knowledge of site variability would enrich the understanding of the scientific community as well as the public who would also be interested in the variety of past Native American sites. A useful interface between future archaeological research and CRM procedures would be continuous studies

of the range of variation of sites, other pertinent data, and their spatial distributions. For simultaneously, the archaeologist would better understand past settlement patterns and land use and the archaeological manager would be better able to provide for proper management of the resources by having adequate knowledge of their type, variety, scientific impact, and spatial distribution.

Although the *Airlie House Report* listed it as a separate topic from cultural resource management, guidelines for the preparation and evaluation of archaeological reports might also be included under the rubric of BLM's cultural resource management work as well. Although the BLM currently has a policy with regard to evaluating research projects proposed for land under their jurisdiction, there is an apparent need to standardize as much as possible the basic reportage of archaeological data within the planning units. This is not to say that innovations could not occur, but they should augment the basic data such as site location information, not substitute for it. This literature search determined that many past reports would be found lacking if the *Airlie House Report* criteria of evaluation were to be applied to them (McGimsey and Davis 1977:64-76). At a fundamental level, it was found that individual sites were not adequately reported on site record forms. Often times the entire form was not completely filled out. And, most importantly, the sites were not properly located with standard coordinates such as latitude and longitude or UTM coordinates. Thus, there is still a need for future CRM to insure that adequate standardization of reporting individual sites will occur. For BLM sponsored projects, in terms of reports of field surveys, test excavations, or major excavations, the reporting should be made to contain those elements of information called out in the *Airlie House* guidelines for the preparation of reports or some other generally acceptable format for the study area per se as developed by the BLM. In addition, increased efforts are apparently needed in order to insure that sites are properly reported to official data repositiories as well as project reports both from "pure" research (e.g. the Calico Project) and from environmental impact studies (e.g. Fowler et al. 1975). The BLM could consider these future management options as part of their protective permit issuance policy.

The need for communication of archaeological information was somewhat discussed above, but it is apparent that little archaeological information from the planning units has been communicated to the profession simply due to a lack of formal research in the study area. The lack of research has led to types of reporting which are less formal than in areas where numerous and well-organized projects are conducted. Those projects which the BLM authorizes within its province ought to minimally publish their results in regional journals and provide the BLM and the official data repositories with copies. Such a distribution would essentially satisfy the professional need for communication. But, in addition, there is a need for the profession to disseminate archaeological information in more efficient ways to the general public and especially to Native Americans.

The archaeological profession, via the *Airlie House Report*, has reaffirmed the necessity for archaeologists to communicate with Native Americans as much as possible, and the BLM has adopted a similar position as part of its current policy. It should be reemphasized, however, that this project

(cf. section VI) has ascertained that Native Americans in the study area ought to be apprised of projects in the early stages of their planning rather than to be notified via reports or other means after a given project has been finished. Only then could they make proper inputs and realistically expect them to be considered and respected. Thus, Native Americans are concerned about communication in archaeology. Critical items of concern on the part of Native Americans importantly include the proper handling of discovered burials, respect for power places or ceremonial places, use and access to certain tracts of land, and protection of sites from sacrilegious use or vandalism.

The last section of the *Airlie House Report* pertained to the "need for certification and accreditation of archaeologists." This is a germane subject for the CRM in the planning units as well. There is a need to regulate the persons who conduct archaeological research in order to insure that they have been 1) properly trained in archaeology; 2) they have the necessary field experience if they are directing a project; 3) they have the commitment to the profession to strive for quality research work and reporting. Many quasi-professionals are conducting archaeological research under the auspices of environmental impact studies. Consequently the results of such projects demonstrate a lack of awareness of professional archaeology which is reflected in the kinds of "analysis" or lack thereof in resulting reports. This project supports the criteria of the Society for Professional Archaeologists relative to defining Principal Investigators and other archaeological personnel on projects. A strict adherence to these criteria would undoubtedly lead to better research results in the main than those at present in California. Although it may not be an absolute, it would appear that those researchers who have pursued advanced degrees in anthropology/archaeology are the ones who produce more quality results than those "archaeologists" who do not seek such degrees. Education has, and ought to be, the primary factor in determining certification or accreditation. Advocationalists can make a positive contribution to the data base as many have already. But, with few exceptions, they must have professional sponsorship and supervision. The BLM is and will continue to assess the qualifications of persons wishing to conduct projects.

It may be seen that the study area is vast and it contains a great number of valuable cultural resources. These sites and data will require an innovative program of CRM which will address both humanistic and scientific aspects in order to provide for their utilization and appreciation by future generations of Americans.

CULTURAL RESOURCE MANAGEMENT SUMMARY

CULTURAL RESOURCE MANAGEMENT SUMMARY: ARCHAEOLOGY

This section is designed to provide a succinct summary of the results of the overview as presented in the general report on the cultural resources of the study area.

The project area encompasses a vast area of the western Mojave Desert of approximately 2.35 million acres. About half of that area (1.18 million acres) are national resource lands administered by the Bureau of Land Management with the remainder (1.16 million acres) constituting private lands. The BLM has divided this area into five planning units which are named, from east to west, the Johnson/Morongo, Calico, Stoddard, Kramer, and Antelope Valley units. Just over 50% of the four planning units other than the Antelope Valley unit are comprised of national resource lands, and hence are of the most importance to the Bureau.

In terms of this project, cultural resources were divided into prehistoric (including ethnohistoric Native village sites), and historic resources. Pertinent statements relative to the data base, significant points of past human use and occupation of the area and the value of cultural resources are made for both prehistoric and historic cultural resources below.

PREHISTORIC CULTURAL RESOURCES

Even though very little of the area had been formally and systematically surveyed by trained archaeologists prior to the initiation of this study, a relatively large number of prehistoric cultural resources are reported for the study area as a whole. Site data for the entire project area was collected and complete as of September 1, 1978; As of that date there were 499 individual archaeological sites for San Bernardino County, 186 sites for Kern County and 90 total sites for Los Angeles County. It should be pointed out that these numbers are in no manner to be interpreted as the total existing sites in each county. For as pointed out above, very little of the subject area has been surveyed and, hence, several thousand more sites are to be expected in all sectors of the project's circumscribed area. Thus, an inventory of 775 total, individual archaeological sites was made for the project. This probably represents no more than 10% of the total.

The Bureau of Land Management is currently using a 17-fold site typology designed specifically for the Mojave Desert. Given the use of that typology and the provisional interpretation of the type(s) represented at each site as can be determined through the reading of the site forms and other literature, a wide variation in site types is evidenced. Most of the reported sites have been identified as "village" or "temporary camp" sites, but utilized shelters or caves, milling stations, lithic scatters, chipping circles,

quarries, pottery scatters, cemeteries, cremation loci, intaglios, rock alignments, petroglyphs, pictographs, trails, roasting pits, cairns, and isolated finds of projectile points or other artifacts have all been made in the study area as well.

The vast majority of these sites have not been dated objectively. From initial indications, however, it would appear that these sites represent the entire span of time of human inhabitation of the Desert West. Based on the available information, a chronology was utilized in the report which recognized the following eras as applicable to site data in the study area: the Early Systems Period (50,000 B.P. to 10,000 B.P.), followed by the Mojave I Period (10,000 B.P. to ca. 4000 B.C.), Mojave II Period (4000 B.C. to 1200 B.C.), Amargosa I Period (1200 B.C. to A.D. 600), Amargosa II Period (A.D. 600 to A.D. 1300) to the final Proto-Historic/Historic Mojave Period (A.D. 1300 to contact). Thus, it would appear that the region is characterized by a complex chronology as well as site variety.

There have been all too few interpretive studies of the various cultures which sequentially developed over time in this part of the Mojave Desert. The consensus seems to be that from the earliest times right up to contact, the area was occupied by successive populations of bands of hunter/gatherers. These bands each probably consisted of 25 persons on the average. It is suggested in this study that, in the main, they could be characterized as patrilineal, patrilocal, and exogamous lineage bands. An accurate picture of their adaptive strategies for surviving in an environment which, although it fluctuated, nevertheless continued to worsen since the end of the Pleistocene, has not been established. One scholar suggests that they developed from 1) early hunting with some fishing and gathering to 2) a balanced hunting and gathering, to 3) a late ethnohistoric pattern of gathering with some hunting. Whether this scheme is valid or not remains to be seen. Ethnographic analysis for this project has determined that the known native groups in the study area included the Serrano, Kitanemuk, Vanyume, and probably the Kawaiisu and the Tataviam. However, much basic research has to be conducted in order to verify and answer the many extant critical archaeological and anthropological questions.

Two types of values of cultural resources were discussed: 1) public-humanistic values and 2) professional-scientific values. A great number of potential public values can be obtained from the cultural resources in the study area due to their age, variety, and aesthetic appeal such as the art depicted in the petroglyphs at Black Canyon. Special types of humanistic values are those of the Native Americans who have their own regards for the cultural resources in the planning units based on religious and historical grounds. Professional-scientific values of cultural resources in the study area include aspects of cultural resources management, and past and future research directions. Past archaeological research has been mainly directed to answering questions of culture history (geographical extent, relative age, and defining artifacts and course of development of cultures in the area). Recently the other major type of archaeological research has been implemented in the planning units--research concerned with culture process studies (the general factors which cause cultural variability and change). Cultural resources take on special values to scientific archaeologists interested in testing models and hypotheses relative to defining the culture processes operative in a given area. A number of potential research topics were suggested which could be implemented in the planning units in the future depending on the research interests of scholars. These topics include explaining: environmental change coupled with cultural change, human population changes,

changes in material culture, changes in techno-economics, changes in social organization, changes in ideology and psychology, and changes in communication systems over time. Special anthropological value can be placed on such research for the Mojave Desert is one of the major deserts of the world and cultural data is critically needed from it in order to provide for a cross-cultural understanding of human adaptations to all types of environments at all times on a world-wide basis.

CULTURAL RESOURCE MANAGEMENT SUMMARY: HISTORY

The assessments and recommendations for management which follow are based on a literature search and cannot be construed as completely valid until reinforced by field study. Management suggestions for the seventy-eight historic sites will be organized around the eras of exploration and trails, of mining, and of settlement. Of the twenty-one sites related to exploration and trails directly, only Kane Springs, Willow Springs, and Camp Cady could be expected to yield physical data. The later two, although privately owned, should be watched. They may meet the criteria for the National Register of Historic Places because of their association with local events tied to larger historical shifts in the overall westward movement. The other eighteen are geographically significant in that they were at one time associated with first desert crossings and with the lives of Spanish and American explorers. The BLM should consider plaques for trail and wagon station remains and place these with appropriate names and a logo and a few lines of explanatory material upon each site of this type. Such marking would maintain a sense of place and point up the historic character of the area. Following upon the exploration/trail era were the fights between ranchers of San Bernardino Valley and marauding Anglos and Indians. These encounters left behind several sites: Rock Corral, Rabbit Springs, Hercules' Finger, Chimney Rock, Willie Boy Site, and Ord Mountain. Again, these are geographical points of interest; and unless field study produces evidence of ruins or data which suggest excavation, they will not need fencing or protection. However, as with the trail stations, they need markers as described above so as to enhance our appreciation of the past.

The mining industry left at least twenty-eight sites. The best known is the Calico Mining District and its presently associated ghost town. This cluster of sites is rich in data yield and may be eligible as a Historic District on the National Register of Historic Places. The San Bernardino County Department of Parks should be urged to file the necessary forms for nomination. The Tropico Mine and Mill may also be eligible for the National Register not only because they were associated with the mining era but also because they were associated with the lives of miners important to the 1930s, Great Depression, mining revival period. These old mines have much to offer students of industrial history, and close as they are to the Los Angeles metropolis they tie in with southern California's history. Many owners' addresses were near Sixth and Hill, the hub of financial activity for Los Angeles in the 1930s. The mines need field assessment, further historical research, possible excavation, and protection from vandals. Goldstone City ruins may need fencing. Several related sites were associated with the mine: Alf's Blacksmith Shop, Font's Garage Building, the Stone Hotel, and the Oro Grande Cemetery. The first three have been marked by the Daggett Historical Society. All may be eligible for the National Register. They were associated with borax mining and are worthy of protection.

Early settlement of the western Mojave left eleven sites. Three wells were among them, and Willis Well has ruins which need field attention and possible fencing protection. Verde Ranch warrants further historical research and permission of the present-day owners to make an intensive search for possible sites. An architectural historian should examine the building foundations at Pioneertown in order to put to rest local sentiments in regard to their authenticity.

Antelope Valley has several sites important to the twentieth century settlement and industry. They are privately owned and include such buildings as the Huxley House, Western Hotel, and Shea's Castle. Management is not a BLM responsibility, yet coordination with local historical societies could help in securing permanent preservation. The homes of Pancho Barnes and the Antelope School may also meet the criteria for the National Register.

The following summary in tabulated form (Table 5) suggests a management option or sets forth the present marking for each historical site inventoried. The summary provides at a glance pertinent data for each site; however, the site data in the Cultural Resource Overview must be consulted for additional back-up. For example, if preservation is recommended, that data will draw out the historical background and suggest the reasons why it should be preserved. Heritage, association, interpretive, and historical yield values were among the criteria used in the assessment made here.

CULTURAL RESOURCE MANAGEMENT SUMMARY

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
1	Camp Cady	W and slightly No. of Barstow.	camp building ruins	Mid-19th century army redoubt	assess on field, possible National Register; plaque placed by E. C. Vitus, 1966
2	20-Mule-Team Borax Terminus	Mojave, Kern County	RR property	Teams traveled over 165 mi. from Death Valley to Southern Pacific terminal here	California Historical Landmark
3	Willow Springs	SW of Mojave	ruins & 20th century buildings	Indian, explorer, wagon train and stage stop	deserves expenditure for preservation; California Historical Landmark 130
4	Burton's Station	NW of Cajon	Site	Wagon train stop, post-1848	needs location and trail/ station marking*
5	Upper Crossing	Approximately at Oro Grande	Site	Trail blazers Smith and Fremont stop. Wagon train station	needs location and trail/ station marking
6	Lane's Station	7 mi. below Upper Crossing on Mojave River	Site	Major station on Mojave Trail	needs location and trail/ station marking; deserves expenditure
7	Font's Garage	Santa Fe St. at 4th St., Daggett	Building	Railroad roundhouse, stable, and garage	Daggett Historical Society Site 6; local interest
8	Cottonwood Station	Just up the river from Hodge	Site	Major stop on Mojave Trail	needs location and trail/ station marking

CULTURAL RESOURCE MANAGEMENT SUMMARY (2)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
9	Grape Vine Station	Just N of Barstow	Site	Wagon train station and railroad junction	needs field assessment; possible ruins; locate & install trail/station marking
10	Government Station	between Grape Vine & Fish Ponds; not clear	Site	Wagon train stop	approximate location and install trail/station marking
11	Fish Ponds Station	Marine Corps Supply center at Nebo, 8 mi. downriver from Grape Vine	Site	Wagon train stop/ stamp-mill site	locate and install trail/ station marking
12	Forks-of-the-Road	W of Pah-Ute Springs; presently NE of Daggett, S of river	Site	Mojave Trail branched south, Santa Fe Trail north	locate and install trail/ station marking
13	Point of Rocks	Below today's Helendale (Cottonwood siding)	Site	Fremont and wagon train and Panamint stage stop	approximate location and install trail/station marking
14	Rabbit Springs	Lucerne Valley	Site	Indian camp, miner's stop, crossroads	Point of Historical Interest on California Inventory 1976
15	Rock Corral	SE of Lucerne	Site	Ambush of California ranchers by Walkara	needs fieldwork; possible marking for local interest

CULTURAL RESOURCE MANAGEMENT SUMMARY (3)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
16	Camp Cady Hills	Hills E of first Camp Cady site	Site	Indian fight, 1845	field study for location & marking for local interest
17	Guapiabit	Summit Valley, Las Flores Ranch	Site	Indian village site visited by Spanish from southern California	California Inventory, 1976 Point of Historical Interest
18	Hercules' Finger	N of Lucerne Valley	Site	1840 Walkara-posse encounter	local interest; needs marking
19	Upper Narrows	Upper Mojave River N of Victorville	Site	Hunt wagon train stop	locate and install trail/station marker
20	West Cajon (El Cajon de los Negros)	Lower Swearthout Canyon to W Cajon Valley to Summit	Road site	Phineas Banning wagon train shortcut	locate and install trail/station marker
21	Sawpit Canyon Route	SW of W Fork of Mojave R; N of Devil Canyon	Road site	Mojave Indian Trail in San Bernardino Mountains	locate and install trail/station marker
22	Old Woman Spring	E of Lucerne Valley	Springs and cottonwoods	Indian camp, crossroads; early settlement	Historical Landmarks Advisory Committee, 1973; field study for ruins
23	Stoddard Mountains	-	Site	Early survey point, mining, wagon road	Install trail/station marker

CULTURAL RESOURCE MANAGEMENT SUMMARY (4)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
24	Mojave River Fish Hatchery	-	Current use	1947 to present development of trout in desert locale	None
25	Verde Ranch	-	Site	Pioneer ranch and toll road terminus	California Inventory of Historical Resources, 1976
26	Dead Man's Point	-	Site	1860 trail landmark	Install trail/station marker
27	Chimney Rock	NE edge Rabbit Dry Lake	Rock column	Last Indian fight in southern California	California Historical Landmark 737
28	Willie Boy Site	Big Morongo Oasis	Site	Posse headquarters during last great hunt for an Indian outlaw	Marking for local interest
29	Mojave Road	Connects Cajon Pass to Camp Cady in W Mojave	Site	Used by Mojave Indians, mountain men, Americans and military as vital artery	Develop as National Trail System
30	Black Canyon	NW of Hinkley	Road site	Weekly stage service, 1874 through canyon	Install trail/station marker
31	Sidewinder Mine	NW slope of Sidewinder Mtn	Not known	Outstanding gold mine of 1880; worked until 1942	Needs fieldwork/assessment
32	Alvord Mine District	NE of Daggett	Not known	Important cluster of gold mines in 1880's	Needs fieldwork/assessment

CULTURAL RESOURCES MANAGEMENT SUMMARY (5)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
33	Keystone Mine	S slope of Stoddard Mtn.	Not known	High production mine in 1900	Needs fieldwork/ assessment
34	Calico Ghost Town/ Mining District	-	Restored buildings	Town population of 3,000-4,000 in 1886 as result of silver mines	California Historical Landmark; recommend nomination as District, National Register
35	Waterman Mine	NW of Grapevine Station site on outskirts of Barstow	Mine shaft, shacks	Preceded Calico mines in zone N of Barstow; colorful history	Needs fieldwork/assessment; possible State Historical Landmark
36	Pioneertown	N of Yucca Valley	Town	Hollywood set of 1940's with possible inclusion of historic buildings	Fieldwork & architectural assessment by specialist
37	Emerson Mill	Emerson Lake Road in mountains to W	Stone ruins	Mill used by Emerson in 1920's	Fieldwork needed
38	Coolgardie Camp	No. of Barstow	Placer mine district	One of the few placer mining districts on the desert	National Register, 1976, Point of Historical Interest
39	Goldstone City	SW of Camp Irwin military reservation	Ghost town	Group of gold mines worked 1881 to pre-World War II; structures extant	Resources here need fieldwork/assessment

CULTURAL RESOURCES MA NAGEMENT SUMMARY (6)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
40	Spanish Canyon, Alvord Mountains	T12N, R3E, 12 NE of Daggett in Spanish Canyon	Colorful area	Lost Alvord Mine reportedly is here; on Old Spanish Trail	Trail/station marking
41	Kramer Hills	T9-10N, R6W	Site	Gold and other minerals exploited	Field crew assessment
42	Marion	No. of Daggett	Abandoned town	Francis Marion Smith company town, borax roaster	California Inventory, 1976; needs field assessment
43	Borate	No. of Barstow	Abandoned town	Terminus of narrow-gauge Borate-Daggett Railway during borax boom	California Inventory, 1976; needs fieldwork
44	Lane's Well	-	Mill site	Miners used this, probably in early 1900's	Field crew assessment
45	Alf's Blacksmith Shop	T9N, R1E, Daggett on 1st St. one block N of RR tracks	Structure	Tools, wagons, and accessories are rare and valuable resources	National Register; recommend nomination as State Historical Landmark
46	Pumice Quarry	T32S, R2W	Site	Mining history in colorful area	Needs fieldwork
47	Ord Mountain Mining District	SE of Daggett	Numerous mine ruins	Indian fight and mining history	Needs field assessment

CULTURAL RESOURCE MANAGEMENT SUMMARY (7)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
48	Black Hawk Mining District	ESE of Victorville	Mine ruins	Unusual capital backing and development in 1889	Needs field assessment
49	Red Top Mine	Fairview Valley	Mine ruins	Big gold producer of the 1890's	Needs field assessment
50	Silver Mountain Mining District	-	Mine ruins	Construction material mines	Needs field assessment
51	Rose Mine	Eastern foothills of Black Mtn., Morongo	Ghost town	Active mine 1885-1916 with town and mill	Needs field assessment
52	Verde Antique Quarry	On Sidewinder Mountain	Mine site	Supplied polished rock used on elegant hotels and public buildings	Needs field assessment
53	Oro Grande Cemetery	-	Existing cemetery	Gold miners buried here in 1880's	Now on California Inventory, 1976
54	Kane Springs	No. of Ord Mtns, W. of Rodman Mtns.	Settlement/ station ruins or site	Miners/ travelers/ stage coach stop since 1870's	Trail/station marker; field assessment of station ruins
55	Muroc Dry Lakebed	--	Airstrip	First jet flight take-off in US	Edwards AFB historian nominate to National Register.
56	Rattlesnake Canyon	NW of Pipes	Site	Mining prospects; scenic beauty	None

CULTURAL RESOURCE MANAGEMENT SUMMARY (8)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
57	Tropico Gold Mine and Mill	Rosamond area	Gold mine, mill, houses	Valuable mines, mill, houses, mining tools and museum pieces	Purchase by public agency and preservation for public use
58	Golden Queen	N slope Soledad Mtn.	Mines and mill	Great Depression mining district boom	Careful treatment; contact owners; field assessment
59	Clay Pits	N. side Tropico Hill	Mine site	1880 clay deposit exploitation led to major mines	California Inventory, 1976
60	Harvey House, Barstow	-	Building	One of last surviving examples of Santa Fe Harvey House	On National Register
61	Willis Well	Ord Mountains	Well and rock wall	Early rancher's wife built wall which stands here today composed of 1,372,000 pounds of boulders	Point of Historical Interest, Calif. Dept. of Parks & Recreation, 1976
62	Warren's Well/ Pioneer Plaque	Ranch 28 mi. NE of Banning; well 3 mi. E of Yucca Valley	Ruins	First homesteader in Morongo Valley/ stage/wagon stop	Plaque, California Inventory, 1976; ranch buildings need assessment
63	Pipes Old Windmill	Inside mouth of Pipes Canyon	Windmill, trough & well	Historic watering place	Needs field assessment
64	Giant Rock	15 mi. N of Yucca Valley	Rock dwelling	Tourist and UFO enthusiast attraction	Needs field assessment of rock home

CULTURAL RESOURCE MANAGEMENT SUMMARY (9)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
65	Daggett Ditch	NE of Mojave & Daggett-Yermo Road intersection, Daggett	Irrigation ditch	Waterway dating back to 1893	Daggett Historical Society Point of Interest 15
66	Stone Hotel	Santa Fe St. at 4th St., Daggett	Existing building	Dates from 1880's	Daggett Historical Society Point of Interest 1
67	Los Angeles Aqueduct	Runs NE-SW along foothills of SE Sierras	Aqueduct	Colorful history of construction problems and construction camps	Point of local interest; no marking
68	Old Stone Houses	206 Hutchinson at corner of 2nd **	Buildings	Housed Chinese railroad workers	Need field assessment; local interest
69	Llano del Rio	E of Pearblossom on Hwy 138	Ruins	Socialist commune 1914-1917	Field study for location of historical marker by BLM
70	Aldous Huxley House	175th St. & Pear-blossom Rd., Pear-blossom	Building	1938-1948 home of world-famous writer	California State Historical Landmark nomination
71	St. Andrews Priory	Ft. Tejon Rd. at Valyermo Rd., San Gabriel Mtn. foot-hills	Structure	Recent (1956) move of priest from Chinese monastery to this locale	Point of local interest

**owner: Mrs. T. L. Cagley

CULTURAL RESOURCE MANAGEMENT SUMMARY (10)

Site No.	Historical Resource	Location	Type	Historical Significance	Recommendations for Management and/or Present Marking
72	Western Hotel	557 W. Lancaster Blvd., Lancaster	Structure	Locus of Lancaster history 1874 to present	California State Historical Landmark, 1958; National Register in progress.
73	Shea's Castle	14 mi. W of Lancaster	Structure	Dates from 1926; copy of European models	Point of local historical interest
74	Pancho Barnes' Ranch House	Edge of Rosamond Lake, E of Saltdale	Structure	Pioneer aviatrix entertained aviation greats here	Recommend nomination to National Register by Edwards AFB
75	Atongiabit	On Mojave R between Hesperia & Victorville	Site	Rancheria visited by Garcés in 1774	Possible marking as Point of Historical Interest
76	Opal Mine	Near Black Canyon	Ruins	Local, industrial	Needs fieldwork
77	Antelope School	So. of Muroc	Site	LAn-720. Served homesteaders	Access for National Register· local.
78	Tufa Mill	Near Fairmont	Ruins	Used in construction of aqueduct, 1905-1913	Needs fieldwork

* see Future Management Options Section

BIBLIOGRAPHIES

BIBLIOGRAPHY: ARCHAEOLOGY, ETHNOLOGY, AND ENVIRONMENT

(Note the bibliographies for this report include cited references in the text and other works, books, papers, reports and manuscripts considered by the researchers to be relevant to the cultural resources of the study area.)

Ackerman, T. L. and S. A. Bamberg

1974 Phenological Studies in the Mojave Desert at Rock Valley. In Phenology and Seasonality Modeling, H. Lieth, Ed. New York: Sprenger-Varlag. pp. 215-236.

Alsoszatai-Petho, J. A.

1975 The East Rim Site, California (SBCM-1803) An Early Western Lithic Co-Tradition Site. Master's Thesis in Anthropology, Eastern New Mexico University.

1976 A Set of Postulates for the Study of Early Man in the Great Basin. Paper presented at the Early Man Seminar, San Diego, California. Ms. on file, Bureau of Land Management, Desert Planning Staff, Riverside.

1978 Early Man in the Manix Basin. Ridgecrest: Cerro Coso College.

Amsden, C.

1928 A Visit to the Serrano-Cahuilla Region. Masterkey 1(8): 20-25.

1935 The Pinto Basin Artifacts. Southwest Museum, Papers 9: 33-51.

1937 Lake Mojave Artifacts. Southwest Museum, Papers 11: 51-97.

Anonymous

1926 Pot of Seeds Discovered on Mojave Desert may be Ancient Civilization Sign. Pomona Bulletin (newspaper). May 2, 1926.

1959 New Discovery at Newberry Cave. San Bernardino Museum Association, Quarterly 7(2): 9.

1966 Petroglyph article. Sun Newspaper, December 8, 1966, pg. B-2.

Antevs, E.

1937 Age of Lake Mohave Culture. Southwest Museum, Papers 11: 45-49.

1948 Climatic Changes and Pre-white Man. University of Utah Bulletin 38: 168-191.

Antevs, E.

1952 Climatic History and the Antiquity of Man in California. University of California Archaeological Survey, Reports 16: 23-31.

1953 The Postpluvial or Neothermal. University of California Archaeological Survey, Reports 22: 9-23.

Apostolides, A.

1961 Swansea Glyph Site Photo Salvage Operation. Archeological Survey Association of Southern California, Newsletter 2(1): 3-7.

1968 Last Chance Canyon Survey, Kern County. Archeological Survey Association of Southern California, Newsletter 15(3): 168-178.

Armstrong, G. W.

1857 Report No. 99. In Report of the Commissioner of Indian Affairs (Accompanying the Report of the Secretary of the Interior for the Year 1856). Washington: A.O.P. Printer. pp. 232-235.

1858 Report No. 131. In Report of the Commissioner of Indian Affairs (Accompanying the Annual Report of the Secretary of the Interior for the Year 1857). Washington: William A. Harris Printer. p. 301.

A.S.A. (Archeological Survey Association of Southern California, Project Reports)

1953 Black Canyon Round Up and Annual Summer Meeting. Archeological Survey Association of Southern California (A.S.A.), Newsletter 1(1): 3.

1954a Coyote Gulch. A.S.A., Newsletter 2(1): 8.

1954b Yermo Site. A.S.A., Newsletter 2(1): 11-12.

1955 A Preliminary Report on Black Canyon Material (F. Curtis). A.S.A., Newsletter 2(3): 9-12.

1956a Archeological Assemblages of San Bernardino County (A. Babcock). A.S.A., Newsletter 3(2): 3-7.

1956b Geology of the Black Canyon Area (F. C. Gros). A.S.A., Newsletter 3(3): 5-6.

A.S.A. (Archeological Survey Association of Southern California, Project Reports)

1957 Southern Sierra Nevada Archaeology (G. Guthrie). A.S.A., Newsletter 4(1 and 2): 3-5.

1958 The Antelope Valley Indian Museum (G. Oliver). A.S.A., Newsletter 5(2): 9-10.

1960 Dig at Hewitt Fault Spring (G. Redtfeldt). A.S.A., Newsletter 7(1): 3-4.

1962 Spring Meeting at Joshua Tree. A.S.A., Newsletter 9(2): 1.

1965 Calico Expedition - First Season (R. Simpson). A.S.A., Newsletter 12(1 and 2): 9.

1966 June Field Trip to Black Canyon (C. Howe). A.S.A., Newsletter 13(3): 3.

1967a The Museum of the Buttes - Open Again (D. Cowper). A.S.A., Newsletter 14(1): 5-7.

1967b Calico Site. A.S.A., Newsletter 14(2): 10.

1970 Work at Calico (T. Clements). A.S.A., Newsletter 17(1): 1-2.

1972 Petroglyphs Near the Calico Dig (A. M. Haenszel). A.S.A., Newsletter 19(2): 14-15.

1974 The Calico Site: Geology (L. Morrison). A.S.A., Newsletter 21(1): 21-23.

1974a Preserving Petroglyphs, Pictographs (L. Morrison). A.S.A., Newsletter 21(3): 39-40.

1974b Calico - 1974 (R. Simpson). A.S.A., Newsletter 21(3): 45.

1976 Calico Mountains Archaeological Project Progress Report. A.S.A., Newsletter 23(2): 27.

Aschmann, H.

1958 Great Basin Climates in Relation to Human Occupancy. Berkeley: University of California Archaeological Survey, Reports 42: 23-40.

Babcock, A.

1956 Archaeological Assemblages of San Bernardino County. Archeological Survey Association of Southern California, Newsletter 3(2): 3-7.

Ballinger, V.

1961 The Serrano Indians, Early Inhabitants of Victor Valley. San Bernardino County Museum Association, Quarterly 9: 2.

Bancroft, H. H.

1875 The Native Races of the Pacific States of North America. Vol. IV, Antiquities.

Barbieri, J. A.

1937 Technique of the Implements From Lake Mojave. Southwest Museum, Papers 11: 99-107.

Barrows, D. P.

1900 The Ethnobotany of the Coahilla Indians of Southern California. Chicago: University of Chicago Press.

1951 Desert Plant Food of the Coahuilla. In The California Indians, a Source Book, R. Heizer and M. Whipple, Eds. London: Cambridge University Press. pp. 242-250.

Bassett, A. M. and D. H. Kupfer

1964 A Geologic Reconnaissance in the Southeastern Mojave Desert. California Division of Mines and Geology, San Francisco, California.

Bassett, A. M. and G. T. Jefferson

1972 Radiocarbon Dates of Manix Lake, Central Mojave Desert, California. Geological Society of America, Abstracts.

Baumhoff, M. A.

1953 History of Great Basin Ethnography. Berkeley: University of California Archaeological Survey, Reports 42: 1-6.

1963 Ecological Determinants of Aboriginal Californian Populations. Berkeley: University of California Publications in American Archaeology and Ethnography 49: 155-236.

Baumhoff, M. A. and J. S. Byrne

1959 Desert Side-Notched Points as a Time Marker in California. Berkeley: University of California Archaeological Survey, Reports 48: 32-65.

Baumhoff, M. A. and R. F. Heizer

1965 Postglacial Climate and Archaeology in the Desert West. In The Quaternary of the United States, H. E. Wright, Jr. and D. G. Frey, Eds. Princeton: Princeton University Press. pp. 697-707.

Beals, R. L. and J. Hester

1956 A New Ecological Typology of the California Indians. Selected Papers of the Fifth International Congress of Anthropological and Ethnological Sciences. Philadelphia: University of Pennsylvania Press. pp. 411-419.

1960 A New Ecological Typology of the California Indians. In Men and Cultures: Selected Papers of the 5th International Congress of Anthropological and Ethnological Sciences, Wallace, Ed. pp. 411-419.

Beals, R. L. and J. A. Hester, Jr.

1971 A New Ecological Typology of the California Indians. In The California Indians, A Source Book, R. F. Heizer and M. A. Whipple, Eds. Berkeley: University of California Press.

Bean, L. J.

1960 The Wanakik Cahuilla. Masterkey 34(3): 111-119.

1964 Cultural Change in Cahuilla Religious and Political Leadership Patterns. In Cultural Change and Stability, Essays in Memory of Olive Ruth Barker and George C. Barker, R. L. Beals, Ed. Los Angeles: Department of Anthropology, University of California.

1967 David Prescott Barrows: An Ethnographic Perspective. In The Ethnobotany of the Cahuilla Indians of Southern California.. Banning: Malki Museum Press. pp. 11-20.

1972 Mukats People: The Cahuilla Indians of Southern California. Berkeley: University of California Press.

Bean, L. J.

1974 Social Organization in Native California. In ?Antap: California Indian Political and Economic Organization, L. J. Bean and T. King, Eds. Ramona: Ballena Press.

1975 Power and its Application in Native California. Journal of California Anthropology 2(1): 25-33.

1976 California Indian Shamanism and Folk Curing. In American Folk Medicine: A Symposium, W. Hand, Ed. Berkeley: University of California Press.

1979 Morongo Indian Reservation: A Century of Adaptive Strategies. In American Indian Economic Development, S. Stanley, Ed. The Hague: Mouton (In Press).

Bean, L. J. and T. C. Blackburn

1976 Native Californians--A Theoretical Retrospective. Socorro, New Mexico: Ballena Press.

Bean, L. J. and T. F. King (Eds.)

1974 ?Antap: California Indian Political and Economic Organization. Socorro, New Mexico: Ballena Press Anthropological Paper No. 2.

Bean, L. J. and H. Lawton

1965 The Cahuilla Indians of Southern California. Banning: Malki Museum Press.

1967 A Bibliography of the Cahuilla Indians of California. Banning: Malki Museum Press.

Bean, L. J. and H. W. Lawton (Eds).

1973 Some Explanations for the Rise of Cultural Complexity in Native California with Comments on Proto-Agriculture and Agriculture. In Patterns of Indian Burning in California: Ecology and Ethno-history, H. Lewis, Ed. Ramona: Ballena Press.

Bean, L. J. and W. M. Mason

1962 Diaries and Accounts of the Romero Expeditions in Arizona and California, 1823-1826. Los Angeles: W. Ritchie Press.

Bean, L. J. and K. Saubel

1961 Cahuilla Ethnobotanical Notes: the Aboriginal Uses of Oak. UCLA Archaeological Survey, Annual Report 1960-1961: 237-245.

1963 Cahuilla Ethnobotanical Notes: Aboriginal Uses of Mesquite and Screwbean. UCLA Archaeological Survey, Annual Report 1962-1963: 51-78.

1972 Temalpakh: Cahuilla Indian Knowledge and Usage of Plants. Banning: Malki Museum Press.

Bean, L. J. and C. R. Smith

1978 Serrano. In Handbook of California Indians, R. F. Heizer, Ed. Washington: Smithsonian Institution.

Bean, L. J. and S. Vane

1977 California Indians: Primary Resources. A guide to Manuscripts, Artifacts, Documents, Serials, Music, and Illustrations. Socorro, New Mexico: Ballena Press Anthropological Paper No. 7.

Bean, L. J. and C. S. Wood

1969 The Crisis in Indian Health. The Indian Historian Fall(29-32): 36.

Beattie, G. W.

1933 San Bernardino Valley Before the Americans Came. California Historical Society, Quarterly 12: 111-124.

Beattie, G. W. and H. P. Beattie

1939 Heritage of the Valley. Pasadena: San Pasquel Press.

Begole, R. S.

1972 Progress Report: Bow Willow and Adjacent Areas. Ms. on file at San Bernardino County Museum.

Belden, B.

1964 Corral of the Westerners. Los Angeles: Brand Book No. 11.

Benedict, R. F.

1924 A Brief Sketch of Serrano Culture. American Anthropologist 26(3): 366-392.

1926 Serrano Tales. Journal of American Folk-Lore 39: 1-17.

Bennyhoff, J. A.

1958 The Desert West: A Trial Correlation of Culture and Chronology. Berkeley: University of California Archaeological Survey, Reports 42: 98-112.

Bennyhoff, J. A. and R. F. Heizer

1958 Cross-dating Great Basin Sites by Californian Shell Beads. Berkeley: University of California Archaeological Survey, Reports 42: 60-92.

Benton, J. S.

1975 Agave Roasting Pits. Ms. on file at Mojave River Valley Museum, Barstow.

1976 Horse and Rider Motif in Pictographs and Petroglyphs of the Mojave Desert. Ms. on file, Bureau of Land Management, Desert Planning Staff, Riverside.

Berger, R. and W. F. Libby

1966 UCLA Radiocarbon Dates V. Radiocarbon 8: 491-495.

1967 UCLA Radiocarbon Dates VI. Radiocarbon 9: 477-504.

Bettinger, R. L.

1975 The Surface Archaeology of Owens Valley, Eastern California: Prehistoric Man-Land Relationships in the Great Basin. Ph.D. Dissertation, University of California, Riverside.

Bettinger, R. L. and R. E. Taylor

1974 Suggested Revisions in Archaeology Sequences of the Great Basin in Interior Southern California. Nevada Archaeological Survey Research Papers 5: 1-26.

Binford, L. R.

1962 Archaeology as Anthropology. American Antiquity 28(2): 217-225.

Binford, L. R.

1968 Introduction. In New Perspectives in Archaeology, S. R. Binford and L. R. Binford, Eds. Chicago: Aldine. pp. 1-31.

Bischoff, J. L., R. Merriam, W. Childers and R. Protsch

1976 Antiquity of Man in America Indicated by Radiometric Dates on the Yuha Burial Site. Nature 261: 128-129.

Blackburn, T. C. and L. J. Bean

1978 Kitanemuk. In Handbook of California Indians, R. F. Heizer, Ed. Washington: Smithsonian Institution.

Blackwelder, E. and E. W. Ellsworth

1936 Pleistocene Lakes of the Afton Basin, California. American Journal of Science (5th Series) 31: 453-463.

Blackwelder, E., et al.

1948 The Great Basin with Emphasis on Glacial and Postglacial Times. University of Utah, Bulletin 38(20).

Boas, F.

1896 Anthropometric Observations on the Mission Indians of Southern California. In The Proceedings of the American Association for the Advancement of Science for 1895, Vol. 44, Salem. pp. 261-269.

Bock, F. G.

1969 A Visit to Big and Little Petroglyph Canyons. San Bernardino Museum Association, Quarterly 16(3): 1-7.

Bolton, H. E , Ed.

1925 Spanish Exploration in the Southwest, 1542-1706. New York: Charles Scribner's Sons.

1930 Anza's California Expeditions (5 volumes). Berkeley: University of California Press.

1931 Anza's California Expeditions, Volume I, An Outpost of Empire. New York: Alfred A. Knopf.

Borden, F. W.

1971 The Use of Surface Erosion Observations to Determine Chronological Sequence in Artifacts from a Mojave Desert Site. Archeological Survey Association of Southern California, Paper #7.

Bowers, G.

1969 Upper Victorville Narrows Archaeological Survey. Ms. on file at the San Bernardino County Museum.

Brainerd, G. W.

1952 On the Study of Early Man in Southern California. Berkeley: University of California Archaeological Survey, Reports 16: 18-22.

1953 A Re-examination of the Dating Evidence for the Lake Mohave Artifact Assemblage. American Antiquity 18(3): 270-271.

Brand, D. D.

1935 Prehistoric Trade in the Southwest. New Mexico Business Review 4(4): 202-209.

1937 Southwestern Trade in Shell Products. American Antiquity 2: 300-302.

Brandon, W.

1969 The California Indian World. The Indian Historian Summer: 4-7.

Brashler, J. O.

1967 Relationships between the Desert Cahuilla Indian and the Honey Mesquite. Michigan Academician, pp. 385-395.

Bright, W.

1965 The History of the Cahuilla Sound System. International Journal of American Linguistics 31(3): 241-244.

1968 A Luiseño Dictionary. University of California Publications in Linguistics 51. Berkeley: University of California Press.

1975 The Alliklik Mystery. Journal of California Anthropology 2(2): 230.

Bright, W.

1978 Two Notes on Taleic Classification: Paper read at the Third Annual Friends of Uto-Aztecan Conference, Flagstaff, June 19-20, 1975. (Copy, Manuscript No. 76-66 in National Anthropological Archives, Smithsonian Institution, Washington).

Brown, J. (Ed.)

1971 Approaches to the Social Dimensions of Mortuary Practices. Memoirs of the Society for American Archaeology No. 25, Vol. 36, No. 3, Part 2.

Broeker, W. S. and A. Kaufman

1965 Radiocarbon Chronology of Lake Lahontan and Lake Bonneville. Geological Society of America Bulletin 76: 537-566.

Broeker, W. S. and P. C. Orr

1958 Radiocarbon Chronology of Lake Lahontan and Lake Bonneville. Geological Society of America Bulletin 69: 1009-1032.

Brown, R. S.

1977 Brock's Puzzle. Rock Alignment: An In Progress Survey Report. Ms. on file, Cerritos Community College, California, and the Bureau of Land Management, Desert Planning Staff, Riverside, California.

Browne, J. R. and J. W. Taylor

1867 Report upon the Mineral Resources of the United States. Washington, D. C.: U.S. Government Press.

Bryan, A. L.

1978 Early Man in America (Circum-Pacific Perspective). Occasional Paper No. 1. Canada: University of Alberta.

Bureau of Land Management

1974 Proposed Barstow-Las Vegas Motorcycle Race. Final Environmental Impact Statement, Bureau of Land Management, Riverside.

1976 Proposed Geothermal Leasing for Randsburg, Spangler Hills and South Searles Lake. Final Environmental Analysis Record, Bureau of Land Management, Riverside.

Bureau of Land Management

1978 Request for Proposal: Class I Cultural Resources Existing Data Inventory--Cultural Resources Overview of the Calico, Kramer, Johnson/Morongo, Stoddard and Antelope Valley Planning Unit. RFP YA-512-RFP8-36, Bureau of Land Management, Riverside.

Buwalda, J. P.

1914 Pleistocene Beds at Manix in the Eastern Mojave Desert Region. Berkeley: University of California Publications. Bulletin of the Department of Geology 7(24): 443-464.

Cabelleria, J.

1902 History of San Bernardino Valley. San Bernardino: Times-Index Press.

Cady, D. G.

n.d. The Battle of Camp Cady. (Noted on the site form for SBr-2077, only information on reference).

Campbell, E. W.

1931 An Archaeological Survey of the Twenty-Nine Palms Region. Southwest Museum, Papers No. 7: 1-93.

1936 Archaeological Problems in the Southern California Deserts. American Antiquity 1(4): 295-300.

Campbell, E. W. and C. Amsden

1934 The Eagle Mountain Site. Masterkey 8: 170-173.

Campbell, E. W. and W. H. Campbell

1935 The Pinto Basin Site. Southwest Museum, Papers No. 11. Los Angeles.

n.d. Catalogue of Artifacts on file at the Joshua Tree National Monument, Twenty-nine Palms, California.

Campbell, E. W., W. H. Campbell, E. Antevs, C. A. Amsden, J. A. Barbieri, and F. D. Bode

1937 The Archaeology of Pleistocene Lake Mojave. Southwest Museum, Papers 11.

Carter, G. F.

1964 Stone Circles in the Deserts. Anthropological Journal of Canada 2(3): 2-6.

Chickering, A. L.

1938 Bandits, Borax and Bears: A Trip to Searles Lake in 1874 (Translated from French by Edmond Leuba). California Historical Society, Quarterly 17(2): 99-117.

Chittenden, N. J.

1903 Prehistoric Rock Paintings, Etchings, and Pictographs in California, Arizona and New Mexico. Overland Monthly 42: 106-110.

Clarke, D. L.

1968 Analytical Archaeology. London: Metheun and Co. Ltd.

Clarke, D. L. (Ed.)

1971 Spatial Archaeology. New York: Academic Press.

Clements, L.

1954 A Preliminary Study of Some Pleistocene Cultures of the California Desert. Masterkey 28(5): 177-185.

Clements, T.

1970 International Conference on the Calico Mountains Archaeological Site. Archeological Survey Association of Southern California, Newsletter 17(1): 1-2.

1972 The Geology of the Yermo Fan. Pleistocene Man at Calico, W. C. Schuiling, Ed.' San Bernardino County Museum Association. pp. 17-25.

Clewlow, C. W., Jr.

1967 Time and Space Relations of Great Basin Projectile Point Types. Berkeley: University of California Archaeological Survey, Reports 70: 141-150.

1976 Archaeological Resources Along the Proposed LNG Gas Transmission Pipeline from Point Conception to Arvin, and Arvin to El Cajon, California: An Archaeological Reconnaissance Report. Ms. on file, Dames and Moore, Los Angeles.

Clewlow, W. C., Jr., R. F. Heizer and R. Berger

1970 An Assessment of Radiocarbon Dates for the Rose Springs Site (CA-Iny-372), Inyo County, California. Berkeley: University of California Archaeological Research Facility, Contributions 7: 64-72.

Cochran, G. E.

1965 Shoshonean Migration into Southern California; A Hypothesis and its Treatment. Master's Thesis, University of California at Riverside.

Colton, H. S.

1941 Prehistoric Trade in the Southwest. Scientific Monthly 52(4): 308-319.

Connelly, C. M.

1974 Archaeological Impact Evaluation. Southern California Edison Proposed Generating Station in Upper Johnson Valley and Associated Transmission, Gas and Fuel Routes, Dry-lands Research Institute, U. C. Riverside.

Cook, S. F.

1939 Smallpox in Spanish and Mexican California. 1770-1845. Bulletin of the History of Medicine 7(2): 153-191.

1955 The Epidemic of 1830-1833 in California and Oregon. Berkeley: University of California, Publications in American Archaeology and Ethnology 43(3): 303-326.

1973 The Aboriginal Population of Upper California. The California Indians, A Source Book, R. F. Heizer and M. A. Whipple, Eds. Berkeley: University of California Press.

Coombs, G.

1979 Archaeology of the Western Mojave. Bureau of Land Management, Riverside, California.

Coues, E. (Ed.)

1900 On the Trail of a Spanish Pioneer: The Diary and Itinerary of Francisco Garcés in his Travels through Sonora Arizona: California 1775-1776, 2 Vols. New York: Frances D. Harper.

Couey, W. C.

1972 AVC-9: Work in Progress. Antelope Valley Archaeological Society, Newsletter 1(3-4): 3-4.

1974 Environmental Resources of Fairmont Butte California: A Proposal for Preservation. Unpublished Paper, Antelope Valley College, Lancaster.

Cressman, L. S.

1968 Early Man in Western North America: Perspectives and Prospects. Eastern New Mexico University Contributions in Anthropology 1(4): 78-87.

1973 An Approach to the Study of Far Western North American Prehistory: Early Man. Museum of Natural History, Bulletin No. 20, University of Oregon, Eugene.

Curtis, F.

1955 A Preliminary Report on Black Canyon Material. Archeological Survey Association of Southern California, Newsletter 2(3): 9-12.

Davis, E. L.

1959 A Child Burial Near Mono Lake. UCLA: Archaeological Survey, Annual Report 1958-1959: 67-70.

1962 Hunter-Gatherers of Mono Lake. Masterkey 36: 22-28.

1963 The Desert Culture of the Western Great Basin: A Lifeway of Seasonal Transhumance. American Antiquity 29(2): 202-212.

1964 An Archaeological Survey of the Mono Lake Basins and Excavations of Two Rockshelters, Mono County, California. University of California Archaeological Survey, Annual Report 1963-64:251-392.

1965 Giant Ground Figures of the Prehistoric Deserts. Proceedings of the American Philosophical Society 109(1): 8-21. Philadelphia.

1968 Archaic Eastern California. In Archaic Prehistory in the Western United States, C. Irwin-Williams, Ed. Eastern New Mexico University Contributions in Anthropology 1(3): 15-18.

1975 Associations of Early Peoples and a Rancho La Brean Fauna, China Lake, California. Thirteenth Pacific Science Congress, Abstracts of Papers, p. 371.

1975 The "Exposed Archaeology" of China Lake, California. American Antiquity 40(1): 39-53.

Davis, E. L. (Ed.)

1978 The Ancient Californians: Rancholabrean Hunters of the Mojave Lakes Country. Natural History Museum of Los Angeles County.

Davis, E. L., C. W. Brott and D. L. Weide

1969 The Western Lithic Co-Tradition. San Diego Museum of Man, Papers 6: 1-97.

Davis, E. L. and R. Shutler, Jr.

1969 Recent Discoveries of Fluted Points in California and Nevada. Nevada State Museum, Anthropological Papers 14:154-177.

Davis, J. T.

1961 Trade Routes and Economic Exchange Among the Indians of California. Berkeley: University of California Archaeological Survey, Reports 54.

1962 The Rustler Rockshelter Site (SBr-288), A Culturally Stratified Site in the Mohave Desert, California. Berkeley: University of California Archaeological Survey, Reports 57: 25-73.

Decker, D.

1973 Preliminary Report, Phase IIA, Upper Johnson Valley Generating Site: Archaeological Impacts. Ms. on file, Bureau of Land Management, Desert Planning Staff, Riverside.

Deetz, J.

1968 The Inference of Residence and Descent Rules from Archaeological Data. In New Perspectives in Archaeology, S. R. Binford and L. R. Binford, Eds. Chicago: Aldine.

Deloria, V.

1970 We Talk, You Listen. New York: Macmillan Company.

Desautels, R.

1969 Archaeological Survey Records, Archaeological Survey. By Archaeological Research, Inc., for the Bureau of Land Management (6 volumes). Ms. on file, Bureau of Land Management, Riverside.

1972 Catalogue for the San Bernardino County and Imperial County sites, Surface Collected and Excavated by Archaeological Research, Inc. Ms. on file, Bureau of Land Management, Riverside.

Donnan, C.

1964 A Suggested Culture Sequence for the Providence Mountains (Eastern Mojave Desert). UCLA: Archaeological Survey, Annual Reports 1963-1964: 1-23.

Dorin, M.

1922 The Emigrant Trails into California. Unpublished Master's Thesis in History, University of California, Berkeley.

Driver, H. E.

1937 Culture Element Distributions: Southern Sierra Nevada. University of California, Anthropological Records 1(2): 53-154.

1969 Indians of North America. Chicago: University of Chicago Press.

Drover, C.

1978 Personal Communication.

1979 Archaeological Investigations at East Cronese Lake. Paper read at the Society for California Archaeology Meetings at San Luis Obispo.

Drucker, P.

1937 Culture Element Distributions: Southern California. Berkeley and Los Angeles: University of California, Anthropological Records 1: 1-52.

Earle, T. K. and J. Ericson

1977 Exchange Systems in Prehistory. San Francisco: Academic Press.

Eastvold, I.

1976 Petroglyph Site Descriptions, Protective Strategies, USGS Coordinated. Ms. on file, Bureau of Land Management, Riverside.

Eggers, A. V.

1976 Report on Cultural Resource Survey Conducted for the U.S. Army Corps of Engineers for the Proposed Route for the Overland Transport of the Space Shuttle Orbiter from Air Force Plant No. 42 to Dryden Flight Research Center. Army Corps of Engineers, Los Angeles District.

Eggers, A. V. D., R. Robinson and C. F. Forbes

1973 A Preliminary Archaeological Investigation of the Proposed Site for the Palmdale Inter-continental Airport, Los Angeles County, California.

Elsasser, A. B. and R. F. Heizer

1963 The Archaeology of Bowers Cave, Los Angeles County, California. Berkeley: University of California Archaeological Survey, Reports 50:1-59.

Elston, R.

1971 A Contribution to Washo Archaeology. University of Nevada, Reno, Nevada Archaeological Survey, Research Paper 2.

Euler, R. C.

1959 Appendix A: Comparative Comments on California Pottery. UCLA: Archaeology Survey, Annual Report 1958-1959: 41-42.

Euler, R. and H. Dobyns

1958 Pottery Types of the Southwest: Tizon Brown Ware. Museum of Northern Arizona, Ceramic Series No. 38.

Fages, P.

1911 The Colorado River Campaign, 1781-1782: Diary of Pedro Fages, Soldier of Spain (Translated by Herbert I. Priestley). Berkeley: University of California Press. (Reprinted: Ballena Press, Ramona, California, 1972).

Farmer, M. F.

1935 A Mojave Trade Route. Masterkey 9: 154-157.

1936 Tracing Early Man in Western Caves. Hobbies 40: 102-108.

Farmer, M. F. and R. De Saussure

1955 Split-twig Animal Figurines. Plateau 27(4): 12-23.

Farrell, N.

1976 San Bernardino County Museum, Environmental Impact Report #3. Ms. on file, San Bernardino County Museum.

Fenenga, F.

1953 The Weights of Chipped Stone Points: A Clue to Their Functions. Southwestern Journal of Anthropology 9(3):309-323.

Fenton, R. N.

1870 Report No. 37. In Report of the Commissioner of Indian Affairs Made to the Secretary of the Interior for the Year 1869. Washington: Government Printing Office.

Fewkes, J. W.

1896 Pacific Coast Shells from Prehistoric Tusayan Pueblos. American Anthropologist 9: 359-367.

Flint, R. F. and W. A. Gale

1958 Stratigraphy and Radiocarbon Dates at Searles Lake, California. American Journal of Science 256: 689-714.

Font, P.

1930 Font's Complete Diary of the Second Anza Expedition, H. E. Bolton, Ed. Berkeley: University of California Press.

Foreman, G. (Ed.)

1941 A Pathfinder in the Southwest: The Itinerary of Lt. A. W. Whipple During his Explorations for a Railway Route from Fort Smith to Los Angeles in the Years 1853 and 1854. Norman: University of Oklahoma Press.

Fowler, D. D. (Ed.)

1977 Models and Great Basic Prehistory. Reno: Desert Research Institution, Publication in the Social Sciences No. 12.

Fowler, D. D., E. Budy, D. SeSart, J. Bath, and A. Smith

1978 Class II Cultural Resources Field Sampling Inventory Along Proposed IPP Transmission Line Corridors. Utah-Nevada-California. Desert Research Institute, University of Nevada Social Sciences, Technical Report No. 4.

Galvin, J. (Trans. and Ed.)

1965 A Record of Travels in Arizona and California 1775-1776, by Friar Francisco Garcés. John Howell Books.

Garfinkel, A. P.

1975 Faunal Procurement Systems and Hunting Behavior in the Cajon Pass. Unpublished Ms. on file at A.R.U., University of California, Riverside.

Gayton, A. H. and S. S. Newman

1940 Yokuts and Western Mono-Myths. Berkeley: University of California, Anthropological Records 5(1): 1-110.

Genton, R. N.

1870 Report of the Commissioner of Indian Affairs Made to the Secretary of the Interior for the Year 1869, No. 37. Washington: Government Printing Office.

Getia, A. and B. Boots

1978 Models of Spatial Processes: An Approach to the Study of Point-line and Area Patterns. London: Cambridge University Press.

Gifford, E. W.

1918 Clans and Moieties in Southern California. Berkeley: University of California, Publications in American Archaeology and Ethnology 14: 155-219.

1922 California Kinship Terminologies. Berkeley: University of California, Publications in American Archaeology and Ethnology 18: 1-285.

1932 The Northfork Mono. Berkeley: University of California, Publications in American Archaeology and Ethnology 31(2): 15-65.

Gladwin, W. and H. S. Gladwin

1935 The Eastern Range of the Red-on-Bluff Culture. Globe, Arizona: Gila Pueblo, Medallion Papers 16.

Glennan, W. S.

1964 Evidence for a Paleoeastern Culture Type in the Southwestern Great Basin. Unpublished paper, on file, University of California, Los Angeles.

1965 Unpublished Survey Notes from the Antelope Valley. On file, Antelope Valley College, Department of Anthropology, Lancaster.

1969 Cultural Development in the Mohave Desert Prior to the Lake Mohave Complex. Unpublished paper, on file, University of California, Los Angeles.

Glennan, W. S.

1970 Preliminary Investigations into Subsistence and Settlement Patterns in the Antelope Valley between 3000 and 5000 B.C. Unpublished paper, on file, University of California, Los Angeles.

1971a Concave-based Lanceolate Fluted Projectile Points from California. Masterkey 45(1): 27-32.

1971b A Glimpse at the Prehistory of Antelope Valley. Rosamond: Kern-Antelope Historical Society.

1972a The Hypothesis of an Ancient Pre-projectile Point Stage in American Prehistory: Its Application and Validity in Southern California. Unpublished Ph.D. Dissertation, University of California, Los Angeles.

1972b An Unusual Steatite Pipe from the Tehachapi Mountains. Masterkey 46(4): 152-153.

1972c The Manix Lake Industry: Early Lithic Tradition or Workshop Refuse? Unpublished paper, on file, University of California, Los Angeles.

1973 The Baker Site: An Early Lithic Assemblage from the Mojave Desert. Paper presented at the 1973 meetings of the Society for California Archaeology, San Francisco.

1974 The Baker Site (CA-SBr-541): An Early Lithic Assemblage from the Mojave Desert. Pacific Coast Archaeological Society, Quarterly 10(2): 17-34.

1976 The Manix Lake Lithic Industry: Early Lithic Tradition or Workshop Refuse? Journal of New World Archaeology 1(7): 43-62.

Gorman, F.

1969 The Clovis Hunters: An Alternate View of Their Environment and Ecology. Kiva 35(2): 91-102.

Gould, R. A.

1963 Aboriginal California Burial and Cremation Practices. Berkeley: University of California Archaeology Survey, Reports 30: 149-168.

Grant, C.

1967 Rock Art of the American Indian. New York: Crowell.

Grant, C.

1971 Rock Art in California. In The California Indians: A Source Book, R. F. Heizer and M. A. Whipple, Eds. Berkeley: University of California Press. pp. 231-243.

Grant, C., J. W. Baird and J. K. Pringle

1968 Rock Drawings of the Coso Range, Inyo County, California. Maturango Museum, Publication 4.

Greer, J. W.

1965 A Typology of Midden Circles and Mescal Pits. Southwestern Lore 31(3): 41-55.

Gruber, A.

1961 A Survey of Petroglyphs in Black Canyon. Masterkey 35: 108-115.

Gudde, E. G.

1960 California Place Names. Berkeley: University of California Press.

Gummerman, G. J. (Ed.)

1971 The Distribution of Prehistoric Population Aggregates. Prescott College, Anthropological Reports 1.

Gunnerson, J. H.

1962 Plateau Shoshonean Prehistory: A Suggested Reconstruction. American Antiquity 28: 41-45.

Haenszel, A. M.

1957 Historic Sites in San Bernardino County: A Preliminary Report. San Bernardino County Museum Association, Quarterly 5(2).

1971 Excavation of Site SBr-213. Archeological Survey Association of Southern California, Newsletter, Winter 1971.

1974 Excavation of SBr-213. Archeological Survey Association of Southern California, Newsletter, Summer 1974.

Haenszel, A. M. and G. A. Smith

1961 Mapping the History of San Bernardino Valley. San Bernardino County Museum Association, Quarterly 9(1).

Hall, M. C. and J. P. Barker

1975 Background to the Prehistory of the El Paso/Red Mountain Desert Region. United States Department of Interior, Bureau of Land Management, Riverside.

Hanks, H. G.

1883 Report on the Borax Deposits of California and Nevada. Third Annual Report of the State Mineralogists, Part 2. Sacramento: California State Mining Bureau.

Hanks, H. E.

1968 Archaeological Survey of Harper Lake. San Fernando Valley State College Anthropology Club, Journal of Anthropology, ASSAY 3: 18-25.

1970 SFVSC Archaeological Research in the Mojave Desert: A Brief Summary. Unpublished notes, Department of Anthropology, San Fernando Valley State College, Northridge, California.

1975 Rodman Mountains Petroglyphs (a National Register Nomination Form) on file BLM, DPS, Riverside.

Hare, K. F.

1976 Late Pleistocene and Holocene Climates: Some Persistent Problems. Quaternary Research 6(4): 507-517.

Harner, M. J.

1956 Thermo-facts vs. Artifacts: An Experimental Study of the Malpais Industry. Berkeley: University of California Archaeological Survey, Reports 33: 39-43.

1957 Potsherds and the Tentative Dating of the San Gorgonio-Big Maria Trail. Berkeley: University of California Archaeological Survey, Reports 37: 35-37.

1958 Lowland Patayan Phases in the Lower Colorado River Valley and Colorado Desert. Berkeley: University of California Archaeological Survey, Reports 42: 93-97.

Harrington, J. P.

1917-1918 Kitanemuk Notes: Ms. #6029-6030, Material Culture, Social Structure, Religion, Linguistics, Mythology, Music, Ethnobotany, Ethnozoology and Ethnohistory. Approx. 4000 slips and 50 pages. On file, Smithsonian Institution National Anthropological Archives. Smithsonian Institution, Washington, D.C.

Harrington, J. P.

1918-1920 Chemehuevi, Uncatalogued Linguistic Notes. 23 boxes, approximately 15,000 pages. On file, Smithsonian Institution National Anthropological Archives. Smithsonian Institution, Washington, D.C.

1927 Researches on the Archaeology of Southern California. Smithsonian Miscellaneous Collections 78(1): 106-111.

1933 Report on Fieldwork on the Indians of Monterey and San Bernardino Counties. 49th Annual Report of the Bureau of American Ethnology for the years 1931-1932. pp. 2-3.

n.d. Cahuilla Notes; Ethnohistorical and misc. notes. 1 box, approx. 200 pages. On file, Smithsonian Institution, National Anthropological Archives, Smithsonian Institution, Washington, D.C.

n.d. Chemehuevi, misc. texts with interlinear translations. 5 boxes. Ms. #4707, on file, Smithsonian Institution, National Anthropological Archives, Smithsonian Institution, Washington, D.C.

n.d. Ethnographic and Linguistic Notes on file at the Smithsonian Institution, Washington, D.C.

Harrington, M. R.

1957 A Pinto Site at Little Lake, California. Southwest Museum, Papers 17.

Harvey, H. R.

1967 Population of the Cahuilla Indians: Decline and its Cause. Eugenics Quarterly 14(3): 185-198.

1968 Cahuilla Settlement Patterns and the Time Perspective. Unpublished Ph.D. Dissertation in Anthropology, Harvard University, Cambridge, Massachusetts.

Haury, E. W.

1950 The Stratigraphy and Archaeology of Ventana Cave, Arizona. Albuquerque: University of New Mexico Press.

Haynes, C. V.

1969 The Earliest Americans. Science 166: 709-715.

Heintzelman, S. P.

1857 Report on Southern California Indians. In 34th Congress, 3rd Session, House Executive Document 76, Serial No. 906. Washington, D.C.: Government Printing Office. pp. 34-58.

Heizer, R. F.

1941 Aboriginal Trade Between the Southwest and California. Masterkey 15: 185-188.

1946 The Occurrence and Significance of Southwestern Grooved Axes in California. American Antiquity 11: 187-193.

1951 A Cave Burial from Kern County (Ker-185). University of California Archaeological Survey, Reports 10: 29-36.

1960 California Population Densities, 1770 and 1959. Berkeley: University of California Archaeological Survey, Reports 50: 9-12.

1964 The Western Coast of North America. In Prehistoric Man in the New World, J. D. Jennings and E. Norbeck, Eds. Chicago: University of Chicago Press.

1965 Problems in Dating Lake Mojave Artifacts. Masterkey 39(4): 125-133.

1966 Languages, Territories and Names of the California Indian Tribes. Berkeley and Los Angeles: University of California Press.

1968 The Indians of Los Angeles County. Hugo Reid's Letters of 1852. Edited and Annoted by R. F. Heizer. Los Angeles: Southwest Museum, Papers No. 21.

1978a California Handbook of North American Indians (Vol. 8), W. C. Sturtevant, Gen. Ed. Washington, D.C.: Smithsonian Institute Press.

1978b Native Forces and Native World View. In California Handbook of North American Indians (Vol. 8), R. F. Heizer, Ed. Washington, D.C.: Smithsonian Institute Press. pp. 649-653.

Heizer, R. F. and A. J. Almquist

1971 The Other Californians: Prejudice and Discrimination under Spain, Mexico, and United States to 1920. Berkeley: University of California Press.

Heizer, R. F. and M. A. Baumhoff

1956 California Settlement Patterns. In Prehistoric Settlement Patterns in the New World, G. R. Willey, Ed. pp. 32-44.

1959 Great Basin Petroglyphs and Prehistoric Game Trails. Science 129: 904-905.

1961 Wagon Jack Shelter. In "The Archaeology of Two Sites at Eastgate, Churchill County, Nevada." University of California, Anthropological Records 20(4):119-138.

1962 Prehistoric Rock Art of Nevada and Eastern California. Berkeley: University of California Press.

1970 Big Game Hunters in the Great Basin: A Critical Review of the Evidence. Berkeley: University of California Archaeological Research Facility, Contributions 7: 1-12.

Heizer, R. F. and C. W. Clewlow, Jr.

1973 Prehistoric Rock Art of California (2 Vols.). Ramona: Ballena Press.

Heizer, R. F. and T. R. Hester

1978 Great Basin Projectile Points: Forms and Chronology. Socorro, New Mexico: Ballena Press.

Heizer, R. F. and M. A. Whipple

1951 The California Indians. Berkeley: University of California Press.

Hester, T. R.

1973 Chronological Ordering of Great Basic Prehistory. Berkeley: University of California Archaeological Research Facility, Contributions No. 17.

Hester, T. R. and R. F. Heizer

1973 Review and Discussion of Great Basin Projectile Points: Forms and Chronology. Berkeley: University of California Archaeological Research Facility.

Hewett, D. F.

1954 General Geology of the Mojave Desert Region, California. In Geology of Southern California, R. H. Jahns, Ed. California State Division of Mines, Bulletin 170 (Chapter 2: Geology of the Natural Provinces): 5-20.

Hewett, E. L.

1947 Chuckwalla, A Cahuilla Indian Word. El Palacio 54: 128.

Hicks, F.

1958 Archaeological Investigations in the Yucaipa Valley. San Bernardino County Museum Association, Scientific Series 3: 2.

Hidy, L.

1971 Harper Dry Lake, California, A Survey and Site Report. San Bernardino County Museum, Quarterly 19(2).

Hill, J. N.

1968 Broken K Pueblo: Patterns of Form and Function. In New Perspectives in Archaeology, S. R. Binford and L. R. Binford, Eds., Chicago: Aldine.

1978 Individuals and Their Artifacts: An Experimental Study in Archaeology. American Antiquity 43(2): 245-257.

Hill, J. N. and J. Gunn (Eds.)

1977 The Individual in Prehistory. Studies in Variability in Style in Prehistoric Technologies. New York: Academic Press.

Hill, K. C.

1967 A Grammar of the Serrano Language. Ph.D. Dissertation, University of California, Los Angeles.

Hodge, F.

1910 Handbook of North American Indians North of Mexico (2 Vols.). Bureau of American Ethnology, Bulletin 30. Washington.

Hoffman, W. J.

1878 Miscellaneous Ethnographic Observations on Indians Inhabiting Nevada, California and Arizona. United States Geological Survey, Annual Report No. 10.

Holman, M. and D. Chavez

1977 Archeological Survey of the Elk Hills/Sohio Pipeline Project in Central California. In Elk Hills/Sohio Pipeline Connection Conveyance System Environmental Impact Statement. Department of the Navy. Ms. on file, Bureau of Land Management, Barstow.

Hooper, L.

1920 The Cahuilla Indians. Berkeley: University of California, Publications in American Archaeology and Ethnology 16(6): 315-380. (Reprinted 1972, Ballena Press, New Mexico.)

Howard, H.

1955 Fossil Birds from Manix Lake, California. U.S. Geological Survey, Professional Papers No. 264J. pp. 199-205.

Howe, C.

1956 Two Shelters in Black Canyon. Ms. on file, Bureau of Land Management, Riverside.

Hubbs, C. L.

1965 La Jolla Natural Radiocarbon Measurements. Radiocarbon 7: 96-97.

Hubbs, C. L. and R. R. Miller

1948 The Great Basin, Emphasis in Glacial and Post Glacial Times. University of Utah, Bulletin 38(20): 18-166.

Hunt, C. B.

1954 Desert Varnish. Science 120(3109): 183-184.

Hunt, A. P.

1960 Archaeology of the Death Valley Salt Pan. University of Utah, Anthropological Papers 47.

Ivie, P. J.

1976 Assessment of the Impact on Archaeological Resources of the Los Angeles County Sanitation Districts Proposed Storage Pond for Secondary Effluent Disposal for the District 14 Water Renovation Plant, Antelope Valley, California. Ms. on file with 6510 ABG/DEPD, Edwards AFB.

Jefferson, G. T.

1968 The Camp Cady Local Fauna from Pleistocene Lake Manix, Mojave Desert, California. Master's Thesis, University of California, Riverside.

Jennings, J. D.

1957 Danger Cave. University of Utah, Anthropological Papers No. 27.

Jennings, J. D. and E. Norbeck

1964 Prehistoric Man in the New World. Chicago: University of Chicago Press.

Jensen, P.

1976 The Leaf-Shaped Projectile Point in Early Western American Prehistory. Ph.D. Dissertation, University of California, Davis.

Johnson, D. L.

1977a The Late Quaternary Climate of Coastal California: Evidence for an Ice Age Refugium. Quaternary Research 8: 154-179.

1977b The California Ice Age Refugium and the Rancholabrean Extinction Problem. Quaternary Research 8: 149-153.

Johnston, F. J.

1973 The Serrano Indians of Southern California. Banning: Malki Museum Press.

Kaldenberg, R.

1976 Barstow Way Station Landscaping Topsoil Site (Survey). Ms. on file, Bureau of Land Management (BLM), Riverside.

1977a San Bernardino County Free Use Permit (Survey) (#04-060-FP4-3). Ms. on file, BLM, Riverside.

1977b Cultural Resource Inventory (Survey). Ms. on file, BLM, Riverside.

1977c Cultural Resource Inventory for Public Improvements (Survey). Ms. on file, BLM, Riverside.

1977d Cultural Resource Survey, Newberry Springs Area. Ms. on file, BLM, Riverside.

1977e Archaeological Clearance of Mineral Material Sales Site. Ms. on file, BLM, Riverside.

Kaldenberg, R.

1977f Willow Spring Graving Improvement (Survey). Ms. on file, BLM, Riverside.

1977g Cultural and Natural Resources Investigation, Southern California Edison Company 12 KV Extension No. 70, Little Morongo Valley, San Bernardino County, California. Ms. on file, BLM, Riverside.

1977h Archaeological Survey of Asphalt Mix Site, Yermo, California. Ms. on file, BLM, Riverside.

1977i Cultural Resource Inventory (Case File R07098), Newberry Springs Area. Ms. on file, BLM, Riverside.

1977j Cultural Resource Clearance for Case CA-060-SR7-13. Ms. on file, BLM, Riverside.

1977k Archaeological Survey for CA-060-SR7-13. Ms. on file, BLM, Riverside.

1977l Cultural Resource Survey of the Windmill Site (R-2511). Ms. on file, BLM, Riverside.

1977m Cultural Resource Inventory for Rattlesnake Grazing Allotment Fence. Ms. on file, BLM, Riverside.

1977n Continental Telephone Line Right of Way to the Proposed Daggett Solar Energy Plant. Ms. on file, BLM, Riverside.

1978a Pierce Ranch 12 KV Distribution Line, Archaeological Survey, Little Morongo Canyon. Ms. on file, BLM, Riverside.

1978b Archaeological Clearance of Hicks Pipeline and Extension of Right-of-way, Little Morongo Valley, California. Ms. on file, BLM, Riverside.

1978c Archaeological Clearance of Statement for Geological Drill Sites on El Mirage and Superior Dry Lakes. Ms. on file, BLM, Riverside.

1978d An Archaeological Reconnaissance on Three Proposed U.S.G.S. Drill Sites in Cuddeback Dry Lake Playa. Ms. on file, BLM, Riverside.

1978e A Cultural Resource Examination of a Proposed Right-of-way Amendment in Grapevine Canyon. Ms. on file, BLM, Riverside.

1978f Archaeological Clearance for Irwin Road Realignment. Ms. on file, BLM, Riverside.

Kaldenberg, R.

1978f An Archaeological Survey of the Lint Mining Claims. Ms. on file, BLM, Riverside.

1978g Archaeological Clearnace of 215 Acres Near the Yermo Marine Supply Center. Ms. on file, BLM, Riverside.

1978h Archaeological Clearance of 300 Acres in the Nebo Area of the Marine Corp Supply Center. Ms. on file, BLM, Riverside.

1978i Archaeological Survey in the Cinnamon Roll Hills Area. Ms. on file, BLM, Riverside.

1978j Harper Lake Fence Line Archaeological Survey. Ms. on file, BLM, Riverside.

1978k Cultural Resource Survey for the Pacific Crest Trail. Ms. on file, BLM, Riverside.

19781 Blackwater Well: Preliminary Results of a Text Excavation and Survey in the Northern Mojave Desert. A Data Report Presented to the 1978 Society for California Archaeology Data Sharing Meetings, San Bernardino County Museum. Ms. on file, BLM, Riverside.

1979 Personal Communication.

Keaton, J. R., G. T. Jefferson and P. Hamilton

1979 Field Guide to Selected Geomorphic, Stratigraphic and Structural Features, Wisconson Lake Manix and the Manix Fault Zone. (Prepared for informal field trip February 24, 25, 1979).

Kelly, I. T.

1936 Chemehuevi Shamanism. In Essays in Anthropology Presented to Alfred L. Kroeber in Celebration of His Sixtieth Birthday, R. H. Lowie, Ed. Berkeley: University of California Press. pp. 129-142.

n.d. Notebook of Chemhuevi Field Notes-Ethnography. University of California Archives No. 138, Anthropology Document 17.

Kelly, J. V.

1976 New Evidence of Early Man in the Southern Part of the Mojave Desert, California. Paper delivered at the Americanists' Congress, Paris, 1976. Ms. on file, San Bernardino County Museum.

King, C.

1974 The Explanation of Differences and Similarities among Beads used in Prehistoric and Early Historic California. In In ?Antap: California Indian Political and Economic Organization, L. J. Bean and T. F. King, Eds. Ramona: Ballena Press Anthropological Papers 2: 77-92.

1978 Protohistoric and Historic Archaeology. In Handbook of North American Indians (Vol. 8), R. F. Heizer, Ed. Washington, D.C.: Smithsonian Institution.

King, C. and T. Blackburn

1978 Tataviam. In Handbook of North American Indians (Vol. 8), R. F. Heizer, Ed. Washington, D.C.: Smithsonian Institution.

King, C. and D. G. Casebier

1976 Background to Historic and Prehistoric Resources of the East Mojave Desert Region. U.S. Department of the Interior, Bureau of Land Management, Riverside.

King, T. F.

1972a Preliminary Report: Archaeological Research in the Cinnamon Roll Hills, San Bernardino County, California. Ms. on file, Bureau of Land Management, Riverside.

1972b Nation of Hunters? New Views of California Indian Societies. The Indian Historian, Winter: 12-16.

1976a The Archaeological Implications of the Paleobotanical Record from the Lucerne Valley Region, Mohave Desert, California. Master's Thesis in Archaeology, University of California, Los Angeles.

1976b Archaeological Implications of the Paleobotanical Record from Lucerne Valley Area of the Mojave Desert. San Bernardino County Museum Association, Quarterly.

Klimek, S.

1935 Culture Element Distributions: I, The Structure of California Indian Culture. Berkeley: University of California, Publications in American Archaeology and Ethnology 37: 1-70.

Kowta, M.

1965 Excavations of the Christensen Webb Site, Menifee Valley, 1963-1964. San Bernardino County Museum Association, Quarterly 13: 2.

1969 The Sayles Complex. Berkeley: University of California, Publications in Archaeology 6.

Krieger, A. D.

1962 The Earliest Cultures in the Western United States. American Antiquity 28(2): 138-143.

Kroeber, A. L.

1907 Myths of South Central California. Berkeley: University of California, Publications in American Archaeology and Ethnography 3: 29-68.

1908 Ethnography of the Cahuilla Indians. Berkeley: University of California, Publications in American Archaeology and Ethnology 8: 29-68.

1909 Notes on Shoshonean Dialects of Southern California. Berkeley: University of California, Publications in American Archaeology and Ethnology 8: 235-269.

1925 Handbook of the Indians of California. Bureau of American Ethnology, Bulletin No. 78.

1938 Cultural and Natural Areas of Native North America. University of California, Publications in American Archaeology and Ethnology 38.

1962 The Nature of Land-holding Groups in California. Berkeley: University of California Archaeological Survey, Department of Anthropology.

1967 Handbook of the Indians of California. Berkeley: California Book Company, Ltd.

1973 Elements of Culture in Native California. In The California Indians, A Source Book, R. F. Heizer and M. A. Whipple, Eds. Berkeley: University of California Press.

Laidlaw, R.

1978 Personal Communication.

Laird, C.

1975 Encounter with an Angry God, Recollections of My Life with John Peabody Harrington. Banning: Malki Museum Press.

1976 The Chemehuevis. Banning: Malki Museum Press.

Lamb, H. H.

1977 Climate: Present, Past and Future (2 Vols.). London: Methuen.

Lanning, E. P.

1963 Archaeology of the Rose Springs Site, Iny-372. Berkeley: University of California, Publications in American Archaeology and Ethnology 49(3): 237-336.

Lawton, H. W.

1960 Willie Boy. Paisano Press.

Lawton, H. W. and L. J. Bean

1968 A Preliminary Reconstruction of Aboriginal Agricultural Technology among the Cahuilla. The Indian Historian 1(5): 18-24.

Leadabrand, R.

1965 Through the Rosamond Mining District, Let's Explore a Byway. Serial, Westways Magazine, Feb. 1965. pp. 5-7.

Leakey, L. S. B., R. D. Simpson and T. Clements

1968 Archaeological Excavations in the Calico Mountains, California: Preliminary Report. Science 160: 1022-1023.

Leakey, L. S. B., R. D. Simpson, T. Clements, R. Berger, J. Witthoft, and W. C. Schuiling

1972 Pleistocene Man at Calico. San Bernardino County Museum Association Press.

Lee, R. B. and I. De Vore (Eds.)

1968 Man the Hunter. Chicago: Aldine.

Leonard, N. N.

1977 An Archaeological Assessment of Three Job Sites within the Hesperia County Water District, San Bernardino County. Ms. on file, Archaeological Research Unit, University of California, Riverside.

Leonard, N. N.

1978 Personnal Communication.

Leopold, E. B.

1970 Late Wisconsin and Modern Pollen Rain at Searles Lakes, California. Supplement to the Abstracts of the First Meetings of the American Quaternary Association. pp. 11-12.

Levy, E. J.

1978 Cultural Resources Examination of USGS Drill Sites for Playa Saline Deposits of the Western Mojave Desert. Ms. on file, Bureau of Land Management, Riverside.

Lewis, H. T.

1972 The Role of Fire in the Domestication of Plants and Animals in Southwest Asia: A Hypothesis. Man 7: 195-222.

1973 Patterns of Indian Burning in California: Ecology and Ethnohistory. Socorro, New Mexico: Ballena Press, Anthropological Paper No. 1.

Longacre, W. A. (Ed.)

1970 Reconstructing Prehistoric Pueblo Societies. A School of American Research Book. Albuquerque: University of New Mexico Press.

Lowe, O.

1876 Notes upon the Ethnology of Southern California and Adjacent Regions. Annual Report upon the Geographic Surveys West of the 100th Meridian. Appendix H, 14: 321-327.

Lowie, R. H.

n.d. Shoshonean Tales. Journal of American Folklore 37(143-144).

Luomala, K.

1963 Flexibility in Sib Affiliation Among the Diegueño. Ethnology 2(3): 282-301.

Lusich, P., Henderson, Mueller and Associates

1977 Draft Environmental Impact Report, Aqueduct City, Mojave area, Annexation to Mojave Utility District. Bakersfield, California. Ms. on file, Bakersfield Community College.

Manner, R. A.

1974 Southern Paiute and Chemehuevi: An Ethnological Report. Garland American Indian Ethnohistory Series.

Marshall, J. P. and R. H. McKinlay

1976 Archaeological Survey and Excavation Report of the Proposed Southern California Edison 500 KV Tower Locations. Ms. on file, Bureau of Land Management, Riverside. California File #63.

Martin, P. S.

1963 The Last 10,000 Years: A Fossil Pollen Record of the American Southwest. Tucson: University of Arizona Press.

Martin, P. S. and P. J. Mehringer, Jr.

1965 Pleistocene Pollen Analysis and Biogeography of the Southwest. In The Quaternary of the United States, H. E. Wright and D. G. Frey, Eds. Princeton: Princeton University Press. pp. 433-451.

McCown, B. E.

1954 Yermo Site. Archeological Survey Association of Southern California, Newsletter 2(1): 11-12.

1957 Lake LeConte Survey. Archeological Survey Association of Southern California, Newsletter 31: 24-31.

1958 Archaeological Survey Reports on Dry Lakes. San Bernardino County Museum Association, Quarterly 5: 4.

McCulloh, T. H.

1965 Geologic Map of the Nebo and Yermo Quandrangles, San Bernardino County, California. Scale: 1:24,000. Unpublished ms.

McGimsey, C. R. and H. A. Davis

1977 The Management of Archaeological Resources: The Airlie House Report. Special Publication of the Society of American Archaeology. Washington, D.C.

McGinnies, W. G., B. J. Goldman and P. Paylore

1968 Deserts of the World. Tucson: University of Arizona Press.

Mehringer, P. J.

1966 Some Notes on the Late Quaternary Biogeography of the Mojave Desert. Tucson: University of Arizona, Geochronology Laboratory, Interim Report No. 11.

1967 The Environment of Extinction of the Late Pleistocene Megafauna in the Arid Southwest United States. In Pleistocene Extinctions: The Search for a Cause, P. S. Martin and H. E. Wright, Jr., Eds. New Haven: Yale University Press. pp. 247-266.

1977 Great Basin Late Quaternary Environments and Chronology. In Models and Great Basin Prehistory, D. Fowler, Ed. Desert Research Institution Publications in the Social Sciences No. 12. pp. 113-168.

Mehringer, P. J. and J. C. Sheppard

1978 Holocene History of Little Lake, Mojave Desert, California. In The Ancient Californias, E. L. Davis, Ed. Natural History Museum of Los Angeles County Press, Science Series 29: 153-166.

Meighan, C. W.

1959 Californian Cultures and the Concept of an Archaic Stage. American Antiquity 24: 289-305.

1965 Pacific Coast Archaeology. In The Quaternary of the United States, Part III, H. F. Wright and D. G. Frey, Eds. Princeton: Princeton University Press.

Meinzer, O. E.

1921 Map of the Pleistocene Lakes of the Basin-and-Range Province and Its Significance. Washington, D.C.: Geological Society of America, Bulletin 33: 541-552.

Mendenhall, W. C.

1909 Some Desert Watering Places in Southeastern California and Southwestern Nevada. United States Geological Survey, Water-Supply Paper 224.

Merriam, C. H.

1908 Totemism in California. American Anthropologist 10: 558-562.

1955 Studies of California Indians. Los Angeles: University of California Press.

1962 Studies of California Indians. Berkeley: University of California Press.

1966 Ethnographic Notes of California Indian Tribes. Berkeley: University of California Archaeological Survey, Reports 68(1): 1-166.

1967 Ethnological Notes on Northern and Southern California Indian Tribes. Berkeley: University of California Archaeological Survey, Reports 68(2): 167-256.

Milankovitch, M.

1920 Theorie mathematique des phonomenes thermiques produits par la radiation solaire. Paris: L'Ecole Polytechnique.

1930 Mathematische Klimalehre und Astronomische Theorie der Klimaschwankungen, Berlin: Handbuch der Klimatologie, 1 Band 1, Teil A.

Miller, R. D. and P. J. Miller

1975 The Chemehuevi Indians of Southern California. Banning: Malki Museum Press.

Minshall, H. L.

1976 The Broken Stones. San Diego: Copley Press.

Momyer, G. R.

1937 Indian Picture Writings in Southern California: Where to Find Them. San Bernardino: Harris Co.

Moriarty, J. R. III

1966 Culture Phase Divisions Suggested by Typological Change Coordinated with Stratigraphically Controlled Radiocarbon Dating at San Diego. Anthropological Journal of Canada 4(4): 20-30.

Moriarty, J. R. III

1969 The San Dieguito Complex-Suggested Environmental and Cultural Relationships. Anthropological Journal of Canada 7(3): 2-18.

Morrison, R. B.

1965 Quaternary Geology of the Great Basin. In The Quaternary of the United States, H. E. Wright, Jr. and D. G. Frey, Eds. Princeton: Princeton University Press. pp. 265-285.

Mortland, C. A.

1974 Archaeological Impact Evaluation of the Southern California Edison Proposed Generating Station, Upper Johnson Valley and Associated Transmission, Gas and Fuel Routes. Ms. on file, Bureau of Land Management, Riverside.

Moseley, M.

1955 A Small Cave in Morongo Valley-El Grieta. San Bernardino County Museum Association, Quarterly 3: 20-22.

1958 Hidden Valley. San Bernardino County Museum Association, Quarterly 5(4): 5-14.

Moseley, M. and G. A. Smith

1962 Archaeological Investigations of the Mojave River Drainage. San Bernardino County Museum Association, Quarterly 9: 3.

Nakamura, N. N.

1966 The Baker Site: A Non-Projectile Point Assemblage at Pleistocene Lake Mohave. Ms. on file, UCLA, Archaeological Survey.

Norwood, R. H. and C. S. Bull

1978 A Cultural Resource Overview of the Eureka, Saline, Panamint, and Darwin Region; East Central California. Ms. on file, Bureau of Land Management, Riverside.

Oberteuffer, O. L.

1942 The Saga of John Searles. Desert Magazine 5(12): 11-14.

O'Connell, J. F.

1967 Elko Eared-Elko Corner Notched Projectile Points as Time Markers in the Great Basin. Berkeley: University of California Archaeological Survey, Reports 70: 129-140.

1971 The Archaeology and Cultural Ecology of Surprise Valley, Northeast California. Ph.D. Dissertation, University of California, Berkeley.

O'Connell, J. F. and R. D. Ambro

1968 Preliminary Report on the Archaeology of the Rodriguez Site (CA-Lan-194). Lassen County, California. University of California Archaeological Survey, Reports 73: 95-194.

Odum, H. T.

1971 Environment, Power and Society. New York: Wiley-Interscience.

Oliver, G.

1978 Personal Communication.

Ore, H. T. and C. N. Warren

1971 Late Pleistocene-Early Holocene Geomorphic History of Lake Mojave, California. Geological Society of America, Bulletin 82: 2553-2562.

Oswalt, W. H.

1966 The Cahuilla Gatherers in the Desert. In This Land was Theirs: A Study of the North American Indian, W. H. Oswalt, Ed. New York: John W. Wiley.

Pacific Science Association

1975 Pacific Science Congress. Record of Proceedings, 1. Abstracts of Papers.

Patencio, F.

1943 Stories and Legends of the Palm Springs Indians as told to Margaret Boynton. Los Angeles: Times-Mirror Press.

n.d. Unpublished notes collected by Margaret Boynton. Palm Springs, California: Archives of the Desert Museum.

Payen, L. A.

1979 Artifacts or Geofacts at Calico: Application of the Barnes Test. In Peopling of the New World, J. E. Ericson, R. E. Taylor and R. Berger, Eds. Socorro, New Mexico: Ballena Press (In Press).

Peak, A. S.

1974a Assessment of Archaeological Resources: California State Department of Transportation Freeway Project of 13.8 miles on Highway 58, East of Mojave, Kern County. For the California Foundation for Archaeological and Anthropological Research. Under Contract to the California State Department of Transportation, Contract #F-9697.

1974b Preliminary Report on the Test Excavations of Archaeological Site CA-Ker-322, Kern County, California. For: The California Foundation for Archaeological and Anthropological Research, under contract to the California State Department of Transportation, Contract #F-9697, Federal Antiquity Permit No. 74-Ca-062.

1976 Final Report on the Test Excavations of Archaeological Site Ca-Ker-322, Kern County, California. Ms. for the California Foundation for Archaeological and Anthropological Research. Under contract to the California State Department of Transportation, Contract #F-9697, under Federal Antiquity Permit No. 74-Ca-062.

Peck, S. L.

1955 The Diffusion of Pottery in the Southwest. Masterkey 29: 130.

1957 Archaeology of Seep Spring. San Bernardino County Museum Association, Quarterly 4: 4.

1958 A Comparison of Ceremonial Practices Among the Serrano and Pass Cahuilla Indians. San Bernardino County Museum Association, Quarterly 5: 4.

n.d. The Cache Creek and Horse Canyon Excavations. Ms. on file, University of California, Los Angeles, Archaeological Survey.

Pendergast, D. M. and C, Meighan

1959 Folk Tradition as Historical Fact, A Paiute Example. Journal of the American Folklore Society 72.

Pederson, C.

1956 Inscription Canyon. A Report on the Petroglyphs of Black Canyon. Archeological Survey Association of Southern California, Newsletter 3(2): 9-27.

Pourade, R. E. (Ed.)

1966 Ancient Hunters of the Far West. San Diego: Union-Tribune Publishing Company.

Powell, J. W.

1886 Notice of Work of Dr. W. J. Hoffman Among the Indian Tribes of California and Nevada with Special Reference to Gesture, Language and Pictographs. Bureau of American Ethnology, Annual Report 4: XLIII.

Powers, S.

1877 Tribes of California. Contributions to North American Ethnology 3. Washington: U.S. Geographical and Geological Survey of the Rocky Mountain Region.

Prather, B. G.

1964 Palm Springs Cahuilla Indians. San Bernardino County Museum Association, Quarterly 12: 1.

Prewitt, T. J.

1966 An Archaeological Survey of Coyote Basin, San Bernardino County, California. Ms. on file, San Diego State College.

Price, C.

1954 Tehachapi Camps and Cairns. Archeological Survey Association of Southern California, Newsletter 2: 10.

1957 The Phillips Site. Archeological Survey Association of Southern California, Newsletter 2(2): 9-10.

Read, D. W. and S. A. Leblanc

1978 Descriptive Statements, Covering-laws, and Theories in Archaeology. Current Anthropology 19(2): 307-317.

Rector, C.

1976 Rock Art of the East Mojave Desert. In Background to the Historic and Prehistoric Resources of the East Mojave Desert Region. Bureau of Land Management, Riverside.

1978 Preliminary Report on SBCM-616. Unpublished Ms. on file, A.R.U., University of California, Riverside.

1979a Preliminary Report on 5000 Year Old Footprints from the Mojave River, California. Paper read at the Society for California Archaeology Annual Meetings, San Luis Obispo, California.

1979b Personal Communication.

Redfeldt, G.

1960 Dig at Hewitt Fault Springs. Archeological Survey Association of Southern California, Newsletter 7(2): 3-4.

1979 Personal Communication.

Riddell, F. A.

1951 The Archaeology of Site Ker-74. Berkeley: University of California Archaeological Survey, Reports 10: 1-28.

Ritter, E. W.

1975 Archaeological Information on the Proposed Shadow Mountains Exchange, San Bernardino County, California. Ms. on file, Bureau of Land Management, Riverside.

1976a Archaeology. In Final Environmental Analysis Record for Proposed Geothermal Leasing in the Randsburg-Spangler Hills--So. Searles Lake Areas, California. Bureau of Land Management, Riverside.

1976b Archaeological Survey, Kramer Sodium Prospecting Property. Ms. on file, Bureau of Land Management, Riverside. California File #76.

Ritter, E. and F. C. Berg

1978 An Archaeological Reconnaissance to the Flanks of Antelope Valley, California. Ms. on file, Bureau of Land Management, Riverside.

Robinson, R. W.

1972a A Salvage Excavation of an Alliklik Cemetery, Green Valley, California. Unpublished paper, on file, Antelope Valley College.

1972b A Brief Overview of the Prehistory of the Antelope Valley. Transcription of a presentation originally made to the Hi-Desert Group of the Los Angeles Chapter of the Sierra Club, October 24, 1972.

1972c A.V.A.S. Crew Salvages Unique Burial. Antelope Valley Archaeological Society, Newsletter 1(3-4): 5.

1973a Report on the Burial at Cache Creek. Antelope Valley Archaeological Society, Newsletter 2(3): 5-6.

1973b Report by Roger Robinson. Antelope Valley Archaeological Society, Newsletter 2(9): 4-5.

1977 The Prehistory of Antelope Valley: An Overview. Kern County Archaeological Society, Journal 10(1): 43-47.

1978 Personal Communication.

Robinson, R. W., A. V. D. Eggers

1974 An Archaeological Investigation of the Avek Dam Project: First Phase. EIR prepared for the Antelope Valley-East Kern Water Agency. Ms. on file, Bureau of Land Management, Riverside.

Robinson, R. W., M. Q. Sutton and A. V. D. Eggers

1974 An Archaeological Investigation of the Avek Dam Project: First Phase. Environmental Impact Element prepared for Boyle Engineering Co. On file, Antelope Valley College, Lancaster.

1976 Investigations at Lan-298: A Re-evaluation of Cultural Traditions in Antelope Valley, California. Paper presented at the 1976 meeting of the Society for California Archaeology, San Diego.

Rogers, M. J.

1929 Report of an Archaeological Reconnaissance in the Mohave Sink Region. San Diego Museum, Papers No. 1.

Rogers, M. J.

1939 Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas. San Diego Museum, Papers No. 3.

1945 An Outline of Yuman Prehistory. Southwestern Journal of Anthropology 1: 167-198.

Roosma, A.

1958 A Climatic Record from Searles Lake. Science 128: 716.

Ross, A.

1978 Paleontology. In Archaeological Sensitivity Zone Mapping in the Southern California Bight, E. G. Stickel, Ed. Science Applications, Inc. La Jolla: U.S. Department of the Interior, Bureau of Land Management, Los Angeles.

Rozaire, C.

1979 Personal Communication.

Ruby, J. W.

1962 Aboriginal Uses of Mt. San Jacinto State Park. UCLA: Archaeological Survey, Annual Report 1961-1962, 4: 1-10.

1970 Culture Contact Between Aboriginal Southern California and the Southwest. Ph.D. Dissertation, University of California, Los Angeles.

Ruby, M. and T. Blackburn

1964 Occurrence of Southwestern Pottery in Los Angeles County, California. American Antiquity 30: 209-210.

Rumble, J. (Ed.)

1950 History of the Old Government Road. Redlands: San Bernardino County Historical Society.

San Bernardino County Historical Society (Eds.)

1950 History of Old Government Road Across the Mojave Desert to the Colorado River. San Bernardino.

San Bernardino County Museum

1956 Report on Petroglyphs of Black Canyon, San Bernardino County. San Bernardino County Museum Association, Quarterly 3: 3.

Sayles, E. B. and E. Antevs

1941 The Cochise Culture. Globe, Arizona: Medallion Papers 29.

Schroeder, A. H.

1958 Pottery Types of the Southwest: Lower Colorado Buff Ware. Museum of Northern Arizona, Ceramic Series 3D.

Schuiling, W. C. (Ed.)

1972 Pleistocene Man at Calico. San Bernardino County Museum Association.

1979 Pleistocene Man at Calico. San Bernardino County Museum Association (In Press).

Schulman, E.

1947 Tree Ring Hydrology in Southern California. University of Arizona Laboratory of Tree Ring Research, Bulletin No. 4.

Schwacofer, L.

1946 Mystery of Black Canyon. The Grizzly Bear 78: 465.

Schwartz, D. W., A. L. Lance, and R. De Saussure

1958 Split-twig Figurines in the Grand Canyon. American Antiquity 23(3): 30-33.

Seiler, H.

1970 Cahuilla Texts with an Introduction. Bloomington: Indiana University Language Science Monographs 6.

Serfoss, W.

1974 A Pleistocene Lake in Antelope Valley. Ms. on file, Antelope Valley College.

Settle, G. A.

1963 Here Roamed the Antelope. Kern-Antelope Historical Society.

1967 Along the Rails from Lancaster to Mojave. Kern-Antelope Historical Society.

Sharp, R. P., C. R. Allen and M. F. Meier

1959 Pleistocene Glaciers on Southern California Mountains. American Journal of Science 257(1): 81-94.

Shepard, E.

1948 Southern California Archaeology. Desert Magazine, July, 1948.

1969 Excavations at SBr-217. Pacific Coast Archaeological Society, Smoke Signals.

Shinn, G. H.

1941 Shoshonean Days. Arthur H. Clarke Company.

Shipek, F. C.

1971 Prepared Direct Testimony of Florence C. Shipek, Anthropologist, Exhibit B-50, Federal Power Commission Project No. 176. San Diego County, California.

Shipley, W. F.

1978 Native Languages of California. In Handbook of North American Indians, Vol. 8, R. F. Heizer, Ed. Washington, D.C.: Smithsonian Institution.

Shutler, R., Jr.

1968 The Great Basic Archaic. In Archaic Prehistory in the Western United States, C. Irwin-Williams, Ed. Eastern New Mexico University, Contributions in Anthropology 1(3): 24-26.

Simmons, M. P.

1974 Preliminary Report of Excavations and Survey at Silver Creek, San Bernardino County, California. Ms. on file, California State College, San Bernardino, and the Bureau of Land Management, Riverside. File #40.

1975 Preliminary Report of Excavations and Survey at Silver Creek, San Bernardino County, California. San Bernardino County Museum Association, Quarterly 23: 1.

Simpson, R. D.

1947 A Classic "Folsom" from Lake Mojave. Masterkey 21: 24-25.

Simpson, R. D.

1952a Archeological Reconnaissance-Twentieth Century Style. Masterkey 26: 140-141.

1952b A New Discovery of Early Core and Flake Tools in the Mojave Desert. Masterkey 26: 62-63.

1958 The Manix Lake Archaeological Survey. Masterkey 32(1): 4-10.

1960 Archaeological Survey of the Eastern Calico Mountains. Masterkey 34(1): 25-35.

1961 Coyote Gulch, Archaeological Investigation of an Early Lithic Locality in the Mojave Desert, San Bernardino County. Archeological Survey Association of Southern California, Paper No. 5.

1965 An Archaeological Survey of Troy Lake, San Bernardino, California. San Bernardino County Museum Association, Quarterly 12(3).

1969a A Search for Pleistocene Archaeological Evidence in the Calico Mountains of Eastern California. National Geographic Society, Research Reports for 1964. pp. 219-225.

1969b Ice Age Archaeology in the Calicos. Pacific Coast Archaeological Society, Quarterly 5(4).

1971 A Search for Pleistocene Archaeological Evidence in the Calico Mountains of Eastern California. National Geographic Society, Research Reports, 1965 Projects. pp. 231-237.

1972 Review of the Calico Excavation, Yermo, California. San Bernardino County Museum Association, Quarterly 19: 3.

1973a The Calico Mountains Site: Pleistocene Archaeology in the Mojave Desert, California. Paper presented to the 9th International Congress of Anthropological and Ethnological Sciences, Chicago.

1973b A Search for Pleistocene Archaeological Evidence in the Calico Mountains of Eastern California. National Geographic Society, Research Reports, 1966 Projects. pp. 225-233.

Simpson, R. D.

1974 A Search for Pleistocene Archaeological Evidence in the Calico Mountains of Eastern California. National Geographic Society, Research Reports, 1967 Projects. pp. 267-270.

1976 A Commentary on W. Glennan's Article. Journal of New World Archaeology 1(7): 63-66.

1976 Victorville Narrows Site Report, Las Flores Site Report. Archeological Survey Association of Southern California, Occasional Paper No. 9.

1978 The Calico Mountain Archaeological Project Summary: May 1974-May 1977. Ms. on file, Bureau of Land Management, Riverside.

1979 Personal Communication.

Smith, G. I.

1967 Field Guide to Examples of Later Quaternary Geology, Searles Valley, California. In Guidebook for the Friends of the Pleistocene, Pacific Coast Section, United States Geological Survey. pp. 1-51.

1968 Late-Quaternary Geologic and Climatic History of Searles Lake, Southwestern California. In Means of Correlation of of Quaternary Successions, R. B. Morrison and H. E. Wright, Eds. Proceedings VII Congress INQUA 8: 293-310.

1970 Late Wisconsin Lake Fluctuations in Searles Valley, California. Abstracts of the First Meeting of the American Quaternary Association. p. 124.

Smith, G. A.

1939 Circular Pits of Summit Valley (San Bernardino County) California. Masterkey 13: 169-171.

1942 Traces of Early Man at Bloomington, California. Masterkey 16: 124-127.

1950 Prehistoric Man of the San Bernardino Valley. Redlands: San Bernardino County Historical Society.

1955a Preliminary Report of the Schuiling Cave. Newberry, California. San Bernardino County Museum Association, Quarterly 3: 2-12.

1955b Preliminary Report on the Archaeological Survey of the Deep Creek Site on the Upper Mojave River. San Bernardino County Museum Association, Quarterly 2: 2.

1960 Indian Picture Writing of San Bernardino and Riverside Counties. San Bernardino County Museum Association, Quarterly 8(2): 1-36.

1963a Archaeological Survey of the Mojave River Area and Adjacent Regions. San Bernardino County Museum Association.

1963b Split-twig Figurines from San Bernardino County, California. Masterkey 37: 86-90.

1978 Personal Communication

Smith, G. A. et al.

1961 Indian Picture-Writing of San Bernardino and Riverside Counties. San Bernardino County Museum Association, Quarterly 8(3): 1-36.

Smith, G. A., W. Schuiling, L. Martin, R. Sayles, and P. Jillson

1957 Newberry Cave, California. San Bernardino County Museum Association, Quarterly, Scientific Series No. 1, 4: 3.

Smith, G. A., R. Sexton and E. Koch

1960 Juan Antonio Cahuilla Indian Chief. San Bernardino County Museum Association, Quarterly 8: 1.

Smith, G. A. and R. D. Simpson

1969 Basket Makers of San Bernardino County. San Bernardino County Museum.

Smith, G. A. and W. G. Turner

1975 Indian Rock Art of Southern California. San Bernardino County Museum Association, Paper.

Smith, R. S. V.

1976 Late-Quaternary Pluvial and Tectonic History of Panamint Valley, Inyo and San Bernardino Counties, California. Ph.D. Dissertation, University of California, Riverside.

Smith, V.

1944 Sheep Hunting Artist of Black Canyon Walls. Desert Magazine, March 1944.

Sparkman, P. S.

1908 The Culture of the Luiseño Indians. Berkeley: University of California, Publications in American Archaeology and Ethnology 8(4): 187-234. (Reprinted 1974, Ballena Press, New Mexico.)

Spaulding, A. and M. G. Glassow

1972 The Archaeology of Santa Cruz Islands. A National Science Foundation Proposal. Ms. on file, Department of Anthropology, University of California, Santa Barbara.

Steele, L.

1976 Victorville Narrows Site Report, Las Flores Site Report. Archeological Survey Association of Southern California, Occasional Paper No. 9.

Steward, J. H.

1929 Petroglyphs of California and Adjoining States. Berkeley: University of California, Publications in American Archaeology and Ethnography 24: 47-238.

1937a Ecological Aspects of Southwestern Society. Anthropos 32: 87-104.

1937b Petroglyphs of the United States. Smithsonian Report for 1936. pp. 405-425.

1938 Basin-Plateau Aboriginal Sociopolitical Groups. Bureau of American Ethnology, Bulletin 120.

1939 Some Observations on Shoshonean Distributions. American Anthropologist 41: 261-265.

1941 Culture Element Distributions: XIII Nevada Shoshone. Berkeley: University of California, Anthropological Records 4(2): 209-359.

1942 Culture Element Distributions: XVIII Ute-Southern Paiute. Berkeley: University of California, Anthropological Records 6(4): 231-354.

Steward, J. H.

1970 The Foundation of Basin-Plateau Shoshonean. In Languages and Cultures of Western North America, E. H. Swanson, Jr., Ed. Pocatello: Idaho State University Press. pp. 113-151.

Stickel, E. G. (Ed.)

1975 Archaeological and Historical Evaluation of California LNG Terminal Sites and Associated Gas Transmission Pipelines. Federal Power Commission, Washington, D.C.

Stickel, E. G.

1976 A Generalized Human System Site Typology. In The Archaeological Potential of SYMAP: A Computer Manual and a Case Application, P. Lankford and E. G. Stickel, Eds. Journal of New World Archaeology 1(4): 59-64.

1979a A General Human Systems Model for Archaeological Research. Journal of New World Archaeology (In Press).

1979b The First Californians: The Early Systems Period. San Diego Museum of Man, Papers (In Press).

Stones, A. G.

1964 Antelope Valley, Mojave Desert, California: A Geographical Analysis. Master's Thesis, University of California, Los Angeles.

Striver, M.

1964 Carbon Isotopic Distribution and Correlated Chronology of Searles Lake Sediments. American Journal of Science 262(1): 377-392.

Strong, W. D.

1929 Aboriginal Society in Southern California. Berkeley: University of California, Publications in American Archaeology and Ethnology 26.

1972 Aboriginal Society in Southern California. Banning: Malki Museum Press.

Stumpf, G.

1978a Chaparral Enduro Race (Survey)(CA-060-SR7-12(1)). Ms. on file, Bureau of Land Management, Riverside.

Stumpf, G.

1978b Temporary Use Permit for Filming Sequence (Survey). Ms. on file, Bureau of Land Management, Riverside.

Sullivan, M. S.

1934 The Travels of Jedediah Smith. Santa Ana: Santa Ana Fine Arts Press.

Sutton, M.

1976a Faunal Resources in Aboriginal Antelope Valley: A Glimpse. Unpublished paper on file, Antelope Valley College, Lancaster.

1976b Results of the Cultural Resource Survey of New Gate House Locations, Edwards Air Force Base, Ms. on File, Edwards Air Force Base.

1976c Off Road Vehicle Area I, A Cultural Resource Survey. Ms. on file, Edwards Air Force Base.

1977a Report of Cultural Resources in the NASA Space Shuttle Operations Viewing Areas. Ms. on file, Edwards Air Force Base.

1977b A Cultural Resources Survey of the Borrow Pit at the Southeast Corner of Old Hospital Road and Lancaster Blvd. Ms. on file, Edwards Air Force Base.

1977c Report on the Cultural Resources of the Los Angeles County Sanitation District 14 Borrow Pit at Paiute Ponds. Ms. on file, Edwards Air Force Base.

1977d Cultural Resources Survey of the Baskin-Robbins Store. Ms. on file, Edwards Air Force Base.

1977e A Cultural Resources Survey of the Off Road Vehicle Area East of Forbes Avenue, Edwards Air Force Base. Ms. on file, Edwards Air Force Base.

1977f Cultural Resources Report on the Army Reserve Exercise. Ms. on file, Edwards Air Force Base.

1977g Report on Cultural Resources for the Proposed Personnel Drop Zone. Ms. on file, Edwards Air Force Base.

1977h Cultural Resources Inventory of NASA Viewing Lots 4 and 5. Ms. on file, Edwards Air Force Base.

Sutton, M.

1977i Cultural Resources Survey Report on the Red Hill Borrow Pit. Ms. on file at Edwards Air Force Base.

1977j A Cultural Resources Survey of the Integrated Maintenance Facility on South Base. Ms. on file, Edwards Air Force Base.

1977k Cultural Resources Survey Report of the Integration Laboratory for Avionics Systems Testing Facility. Ms. on file, Edwards Air Force Base.

1977l Cultural Resources Report on the ILAST Project Area. Ms. on file, Edwards Air Force Base.

1977m Cultural Resources Report on the Commissary Warehouse Project Area. Ms. on file, Edwards Air Force Base.

1977n Antelope as a Resource in Aboriginal Antelope Valley. Kern County Archaeological Society, Journal 1: 5-8.

1978a Relationships Between Artifactual and Unmodified Lithics at LAn-771. Paper presented at the 1978 Society for California Archaeology Annual Meeting, Yosemite.

1978b Excavations at LAn-298: A Preliminary Analysis. Paper presented at the Society for California Archaeology Fall Data Sharing Meeting, San Bernardino.

1979a Archaeological Investigations at Ker-323 and Ker-322, Edwards Air Force Base, California. Report prepared for Archaeological Impact Services, Inc., Lancaster.

1979b Some Thoughts on the Prehistory of the Antelope Valley. Paper presented at the Society for California Archaeology Annual Meetings, San Luis Obispo.

1979c Personal Communication.

n.d.a Archaeological Investigations at LAn-765 a Surface Site in the Antelope Valley, California. Pacific Coast Archaeological Society, Quarterly (In Press).

Sutton, M.

n.d.b Archaeological Investigations at Antelope School (LAn-720): An Historic Site in the Antelope Valley, California. San Bernardino County Museum Association, Quarterly (In Press).

n.d.c Three Baked Clay Figurines from the Antelope Valley, California. Journal of California Anthropology (In Press).

n.d.d Rhyolite Revisited: Test Excavations at LAn-298, a Site in the Antelope Valley, California. Ms. with author.

n.d.e Archaeological Investigations at Ker-696: An Early Site in Antelope Valley, California. Archeological Survey Association of Southern California, Journal 3(1)(In Press).

n.d.f Archaeological Investigations at LAn-771. Ms. with author.

Sutton, M. Q., C. Forbes and S. Robinson

1978 A Possible Paleo-Indian Site complex in the Western Mojave Desert. Paper presented at the 1978 Society for California Archaeology Annual Meetings, Yosemite.

Sutton, M. Q. and R. W. Robinson

1977 Final Report on the Mitigation Procedures for the Cultural Resources on the Space Shuttle Transport Road. Environmental Impact Element Submitted to the United States Army Corps of Engineers, Los Angeles Office.

Sutton, M. Q. and J. A. Tremblay

1977 Archaeological Investigations on Seven Sites on Edwards Air Force Base, California. Air Force Publication

Swanton, J. R.

1952 The Indian Tribes of North America. Smithsonian Institute Bureau of American Ethnology, Bulletin 145. Washington: U.S. Government Printing Office.

Taylor, A. S.

1862 Traces of Old Pueblo Civilization in California. California Indianology. The California Farmer and Journal of Useful Sciences, March 1862.

Taylor, E. S. and W. J. Wallace

1947 Mojave Tattoing and Face Painting. Southwest Museum Leaflet No. 20. Los Angeles: Southwest Museum.

Thomas, D. H.

1969 Great Basin Hunting Patterns, A Quantative Method for Treating Faunal Remains. American Antiquity 34: 392-401.

1971 Prehistoric Subsistence-Settlement Patterns of the Reese River Valley, Central Nevada. Ph.D. Dissertation, University of California, Davis.

1972 Western Shoshone Ecology. In Great Basin Cultural Ecology: A Symposium, D. D. Fowler, Ed. pp. 135-153.

1973 An Empirical Test for Steward's Model of Great Basin Settlement Patterns. American Antiquity 38: 155-176.

1974 An Archaeological Perspective on Shoshonean Bands. American Anthropologist 76(1): 11-23.

Toney, J. T.

1968 Archaeological Salvage of Site 4-LAn-192. Los Angeles County, California. Ms. on file, UCLA Archaeological Survey.

Tower, D. B.

1945 The Use of Marine Mollusca and their Value in Reconstructing Prehistoric Trade Routes in the American Southwest. Papers of the Excavators Club 2(3): 15-21.

Treganza, A. E.

1942 An Archaeological Reconnaissance of Northeastern Baja California and Southeastern California. American Antiquity 8: 152-163.

1945 The "Ancient Stone Fish Traps" of the Coachella Valley, Southern California. American Antiquity 10(3): 285-294.

Troxell, H. C. et al.

1954 Hydrology of the San Bernardino and Eastern San Gabriel Mountains, California. In U.S. Geological Survey Hydrological Investigations Atlas HA-1.

True, D. L., E. L. Davis and E. L. Sterud

1966 Archaeological Surveys in the New York Mountain Region, San Bernardino County, California. UCLA: University of California Archaeological Survey, Annual Report 8: 243-278.

1966 Archaeological Survey at Indian Ranch, Panamint Valley, California. UCLA: University of California Archaeological Survey, Annual Report 9: 1-24.

Turner, W. G.

1968 Petroglyphology. San Bernardino County Museum Association, Quarterly 15: 4.

1971 The Jeffrey's Stones. San Bernardino County Museum Association, Quarterly 19: 2.

1978 Recording Petroglyphs, a 1977 Preliminary Report on the Black Canyon Project of the Mojave Desert. San Bernardino County Museum Association, Quarterly 25(3): 1-20.

Turner, W. G., E. Popiano and R. E. Reynolds

1971 Three Essays on Petroglyphology. San Bernardino County Museum Association, Quarterly 19: 1.

Turrnel, K.

1946 Southern California Desert Archaeology. Holiday Magazine Sept. 1946.

UCAS (UCLA Archaeological Survey Site Survey Projects Listed in the UCLA Archaeological Survey Annual Report 1968, Vol. 10: xiv-xv.)

1963a Project UCAS-003 Antelope Freeway, L.A. County, Survey by J. Chartkoff.

1963b Project UCAS-015 U.S. 66, San Bernardino County Survey.

1963c Project UCAS-016 Rt. 212, Salt Wells Canyon, SBr. County Survey by J. Chartkoff.

1963d Project UCAS-021 Cal. 2, San Bernardino County Survey by M. Kowta.

1964a Project UCAS-034 Fairmont Butte, L.A. County, Survey and Excavation by T. Blackburn and J. Toney.

1964b Project UCAS-050 Int. 40, San Bernardino County, Survey by D. Miller.

UCAS (UCLA Archaeological Survey Site Survey Projects Listed in the UCLA Archaeological Survey Annual Report 1968, Vol. 10: xiv-xv.)

1965a Project UCAS-085 Oro Grande Wash, San Bernardino County, Survey by C. Singer.

1965b Project UCAS-091 Rt. 46/Calif. Aqued., Kern County.

1965c Project UCAS-093 Rt. 43, Kern County, Survey by C. Singer.

1965d Project UCAS-099 Rt. 18, San Bernardino County, Survey by C. Singer.

1965e Project UCAS-102 Rt. 30, San Bernardino County, Survey by J. Chartkoff.

1965f Project UCAS-105 Rt. 138, San Bernardino County, Survey by J. Chartkoff.

1965g Project UCAS-119 Rt. 58, Barstow, San Bernardino County, Survey by T. King.

1965h Project UCAS-153 Rt. 58, Mojave, Kern County, Survey by G. Stickel.

1965i Project UCAS-154 Rt. 58, Mojave-Boron, Kern County, Survey by T. King.

1965j Project UCAS-196 Int. 40, Barstow, San Bernardino County, Survey.

1965k Project UCAS-197 Int. 40, Newberry, San Bernardino County, Survey.

1965l Project UCAS-211 Rt. 138, Los Angeles County, Survey.

1965m Project UCAS-215 Rt. 138, Palmdale, Los Angeles County, Survey.

1967a Project UCAS-264 Rt. 18, San Bernardino County, Survey by N. Leonard.

1967b Project UCAS-265 Rt. 38, San Bernardino County, Survey by N. Leonard.

1967c Project UCAS-275 Rt. 14, Kern County, Survey by J. Beaton.

1968a Project UCAS-300 LAn-192, Palmdale, Los Angeles County, Excavation by J. Toney.

UCAS (UCLA Archaeological Survey Site Survey Projects Listed in the UCLA Archaeological Survey Annual Report 1968, Vol. 10: xiv-xv.)

1968b Project UCAS-309 Victorville, SBr, Los Angeles Counties, Survey.

1968c Project UCAS 314 Mojave River, Survey.

1968d Project UCAS-315 Lucerne-Joshua Tree, San Bernardino County, Survey.

Van Dyke, D.

1927 A Modern Interpretation of the Garces Route. Historical Society of Southern California, Annual Publications 13(4): 353-359.

Vansina, J.

1965 Oral Tradition. Chicago: Aldine.

Vita Finzi, C. and E. S. Higgs

1970 Prehistoric Economy in the Mount Carmel Area of Palestine: Site Catchment Analysis. Proceedings of the Prehistoric Society 36: 1-37.

Wagner, P. L.

1960 The Human Use of the Earth. New York: Free Press.

Walker, P.

1971 A Short History of the Chumash from 1834-1900. Unpublished paper in possession of R. F. Heizer. University of California, Berkeley.

Wallace, W. J.

1955 A Suggested Chronology for Southern California Coastal Archaeology. Southwest Journal of Anthropology 11(3): 214-230.

1958 Archaeological Investigations in Death Valley National Monument 1952-1957. Berkeley: University of California Archaeological Survey, Reports 42: 7-22.

1962 Prehistoric Cultural Developments in the Southern California Deserts. American Antiquity 28: 172-180.

1978 Post Pleistocene Archaeology, 9000-2000 B.C. In Handbook of North American Indians, Vol. 8, R. F. Heizer, Ed. Washington: Smithsonian Institution.

Wallace, W. J., A. P. Hunt and J. R. Redwine

1959 An Investigation of Some Stone Mounds in Death Valley National Monument. Archaeological Research Associates, Contributions to California Archaeology 3(2): 1-11.

Wallace, W. J. and E. S. Taylor

1959 A Preceramic Site at Saratoga Springs, Death Valley National Monument. Archaeological Research Associates, Contributions to California Archaeology 3(2):1-13.

1960 Indian Hill Rockshelter, Preliminary Investigations. Southwest Museum, Masterkey 34(2): 66-82.

Warren, C. N.

1967 The San Dieguito Complex: A Review and Hypothesis. American Antiquity 32(2): 168-188.

1968 Cultural Tradition and Ecological Adaptation on the Southern California Coast. Eastern New Mexico University, Contributions in Anthropology 1(3): 1-14.

Warren, C. N. and R. Crabtree

1979 The Prehistory of the Southwestern Great Basin. In The Handbook of North American Indians. Washington, D.C.: Smithsonian Institution. (In Press)

Warren, C. N. and J. Decosta

1964 Dating Lake Mohave Artifacts and Beaches. American Antiquity 30: 206-209.

Warren, C. N. and D. L. True

1961 The San Dieguito Complex and its Place in California Prehistory. UCLA: University of California Archaeological Survey, Annual Report 1960-1961: 246-338.

Wedel, W.

1941 Archaeological Investigations at Buena Vista Lake, Kern County, California. Bureau of American Ethnology, Bulletin No. 130.

Weide, D. L. and M. L. Weide

1977 Time, Space and Intensity in Great Basin Paleoecological Models. In Models and Great Basin Prehistory, A Symposium. Reno and Las Vegas: Desert Research Institute Publications in the Social Sciences No. 12.

Weide, M.

1973 Archaeological Inventory of the California Desert: A Proposed Methodology. Bureau of Land Management, Riverside.

Weinland, J.

n.d. Unpublished correspondence to and from Rev. John Weinland, Moravian Missionary to the Morongo Reservation. San Marino, California: on file at the Huntington Library.

Wells, P. V. and R. Berger

1967 Late Pleistocene History of Coniferous Woodland in the Mohave Desert. Science 155: 1640-1647.

Whipple, Lt. A. W.

1856 Report Upon the Indian Tribes. In Reports of Explorations and Surveys to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean. 3(2) 33d Congress, 2nd Session, Senate Exec. Doc. No. 78.

White, R. C.

1953 Two Surviving Luiseño Indian Ceremonies. American Anthropologist 55(4): 569-578.

1957 The Luiseño Theory of Knowledge. American Anthropologist 59(1): 1-19.

1963 Luiseño Social Organization. Berkeley: University of California, Publications in American Archaeology and Ethnology 48(2).

1976 Religion and its Role Among the Luiseño. In Native Californians, A Theoretical Retrospective, L. J. Bean and T. C. Blackburn, Eds. Socorro, New Mexico: Ballena Press.

Wilke, P. J., H. W. Lawton, T. King, and S. Hammond

1975 The Cahuilla Indians of the Colorado Desert: Ethnohistory and Prehistory. Socorro, New Mexico: Ballena Press, Anthropological Paper No. 3.

Willey, G.

1966 An Introduction to American Archaeology: Volume One. North and Middle America. New York: Prentice-Hall, Inc.

Williams, B. J.

1974 A Model of Band Society. Society of American Archaeology, Memoir 29.

Willis, W.

1964 Unpublished notes on the Excavation of LAn-305. On file, file #UCAS-053, University of California, Los Angeles, Archaeological Survey.

Willoughby, N. C.

1963 Division of Labor Among the Indians of California. UCLA Archaeological Survey, Annual Report 60: 9-79.

Wilmsen, E. N.

1970 Lithic Analysis and Cultural Inference: A Paleo-Indian Case. Anthropological Papers of the University of Arizona 16.

Wilson, W.

1883 History of San Bernardino County, California. San Francisco: Elliott Publishing Company.

Winters, H. H.

1954 The Pleistocene Fauna of the Manix Beds in the Mojave Desert, California. Master's Thesis, California Institute of Technology, Pasadena, California.

Woodward, J. A.

1933 Archaeology. Christian Science Monitor, May 11, 1933.

Woodward, J. A. and A. F. Woodward

1966 The Carbon-14 Dates from Lake Mohave. Masterkey 40: 96-102.

Woosley, D. J.

1908 Cahuilla Tales. Journal of American Folk-Lore 11: 239-240.

Wormington, H. M.

1957 Ancient Man in North America (4th Ed., Revised). Denver Museum of Natural History, Popular Series 4.

Young, E. R.

1958 Ezra Hamilton and the Rich Red Hill. Westways, Oct. 1953. pp. 26-27.

Zigmund, M.

1941 Ethnobotanical Studies Among California and Great Basin Shoshonean. Ph.D. Dissertation, Yale University.

Zubrow, E. B. W.

1971 Carrying Capacity and Dynamic Equilibrium in the Prehistoric Southwest. American Antiquity 36(2): 127-138.

BIBLIOGRAPHY: HISTORY

The bibliographic form used in the history section of this report follows the style set forth by the University of Chicago Press, published by Kate L. Turabian, and used almost universally by historians in the United States today.

ABBREVIATIONS:

AVC	Antelope Valley College
AVPub	Apple Valley Public Library
BP	Barstow Public Library
BANC	Bancroft
CSULB	California State University, Long Beach
BLM-R	Bureau of Land Management, Riverside
HUNT	Huntington Library
SBCM	San Bernardino County Museum
UCLA	University of California, Los Angeles, Research Library
UCLA Sp. Col.	University of California, Los Angeles, Special Collections
UCR	University of California, Riverside
WF	Wells Fargo Bank

PUBLISHED BOOKS, REPORTS, ARTICLES

Ainsworth, Edward Maddin. Beaconing Desert. Englewood Cliffs, N.J.: Printice-Hall, 1962. Stories based on personal contacts, love of desert lore, and his own reading. See Chapter 4 "Sebastian" for account of Indian who fled from San Gabriel Mission and later led Anza back over Mojave Trail. UCLA.

Albright, George Leslie. Official Explorations for Pacific Railroads 1853-1355. University of California Pub., H. E. Bolton, ed., vol. XI. Berkeley: University of California Press, 1921. Excellent secondary work on railway surveys of the 1850s. Albright used Pacific Railway Survey Reports of the Whipple and Williamson survey parties which traversed the western Mojave study zone. UCLA.

Allsop, Robert (Thomas). California and its Gold Mines...Quartz Mining. London: Groombridge and Sons, 1853. Letters from this experienced quartz miner who traveled from South America to the California mines. Although the mines he visited were peripheral to the study zone, his comments on mining and geology contribute to the historical sense of the mining industry at mid-nineteenth century. HUNT.

Almond Colonies of Southern California. Los Angeles: The Almendro Colony, 1893. Promotional booklet promises 50 to 200% annual profits for investment farmers. Describes experimental orchards, artificial irrigation and a booming economy. Useful primary tool for 1890s. HUNT.

Bailey, David P. "Llano's Withered Dream," Desert Magazine, May 1963. Good political history of Llano del Rio. Largely dependent on Hine's California's Utopian Colonies.

Bailey, Paul. Walkara, Hawk of the Mountains. Los Angeles: Westernlore Press, 1954. Vivid description of Indian-mountain men raids on San Bernardino ranchos in the 1830s.

Bailey, Richard C. Explorations in Kern. Bakersfield: Kern County Historical Association, 1957. Twentieth Annual Publication brings together local history west of the study zone as well as Kern County desert, Antelope Valley.

Bailey, Richard C. Explorations in Kern. Bakersfield: Kern County Historical Association, 1959 and 1962, 22nd and 26th annual publications. Useful local history vignettes and place name data for western Mojave zone.

Bailey, Richard C. Kern County Place Names. Bakersfield: Kern County Historical Society, 1967. Useful for Edwards and Rosamond areas.

Bandel, Eugene. Frontier Life in the Army 1854-1861. Southwest Historical Series, Vol. II, ed., Ralph P. Bieber. Glendale, Ca: Arthur H. Clark Co., 1932. Working under orders of the Sixth Infantry at Jefferson Barracks, Bandel was sent under Lt. Col. Hoffman to establish a post to hold the Mojave and other Indians. His company marched from the new fort (Mojave) to Cajon Pass in April, 1859 thus traversing the west Mojave planning unit. He briefly describes this experience in a letter to his family. UCLA

Barrows, H. D. "Reminiscences of Los Angeles." Historical Society of Southern California. Annual Publications III, 57. Describes campaign under Col. Hoffman who led troops against marauding Mojave Indians in 1859.

Beale, Edward F. and G. H. Heap. A Central Route to the Pacific from the Valley of the Mississippi to California. Philadelphia and London: Lippencott, Gramboard Co., 1853. Heap, a journalist,helped write this account. Includes his illustrations.

Beattie, George W. "Development of Travel Between Southern Arizona and Los Angeles as it Related to the San Bernardino Valley," Annual Publication, Historical Society of Southern California, 1925. pp. 228-257. Ox-trails and stage coach roads from Yuma through Warner's Ranch and San Gorgonio Pass to San Bernardino. Not relevant to western Mojave road. UCLA.

Beattie, George William and Beattie, Helen Pruitt. Heritage of the Valley, San Bernardino's First Century. Forward by Henry R. Wagner. Pasadena: San Pascual Press, 1939. Although primarily an account of San Bernardino Valley, this work includes some accounts of the trail blazers who crossed the western Mojave. It also sheds light on the growth of population in the valley and its interaction with desert inhabitants. UCLA.

Belden, L. Burr. "Forgotten Army Forts of the Mojave." The California Deserts: The Westerners Brand Book, No. 11. Russ Leadabrand, ed. Los Angeles: Los Angeles Corral, 1964. This narrative supplies cause and effect data important to an understanding of government policy. UCR.

Belden, L. Burr. San Bernardino Sun-Telegram, 1951-1963. Excellent local history series:

"First of Mormon Settlers Reached Valley Century Ago" June 3, 1951
"State in 1840s Reflected Great U. S. Expansion" July 15, 1951
"Mormon Battalion Holds Unique Spot in U. S. History" July 29, 1951
"Stage By-Passes San Bernardino: Politics Blamed" November 25, 1951
"Church-Wall Used as Fort Against Cavalry Raiders" January 6, 1952
"Overland Trains Reach City After Pass Surmounted" May 25, 1952
"Fantastic Boom of 1880s Sees Many Swindles" June, 1952
"Waterman Mine Big Producer in Silver Bullion" June 29, 1952
"Schools Mirror County's Growth in Four Decades" October 12, 1952
"Mechams Tell of Calico Silver Camp Discovery" October 26, 1952
"Calico Booms as County's Biggest Mining Center" November 2, 1952
"Borax Discovery Unlocks Fabulous Mojave Wealth" December 7, 1952
"Borax Operation Moved to Calico: Giant Company Formed" January 4, 1953
"Little Railroad Supplants Mules in Calico Hills" January 11, 1953
"Barstow Develops When Railroad Needs More Land" April 26, 1953
"Salt Lake Route Starts Through Trains in 1905" August 2, 1953
"Lucerne Starts with Cattle, Soon Adds Alfalfa" June 16, 1957
"Victor Valley Scene of Early Cattle Ranges" June 30, 1963
"Desert Blooms with Homes in Apple Valley, Hesperia" July 21, 1963
"Oro Grande Has 'Golden Origin'" July 14, 1963
"Lucerne Valley: Prospector Lee Disappears, 'White Lead' Never Found" August, 1963
"Waterman Junction" September 13, 1963

Bernard, Doris. "The Dawn of Antelope Valley." Antelope Valley Spectator II(1), Jan.-Feb., 1963, pp. 16-18. Natural resources and Indian occupation are treated here with little attention to history. AVC.

Bernard, Doris. "Ghost Ships in the Sand." High Desert Spectator, July-August, 1964, pp. 4-17. A well-researched article on the camels used on the Mojave Road drawn from Harland D. Fowler's research with sketches and photos taken from the National Archives. AVC.

Bernard, Doris. "Saint Andrews Priory at Valyermo." High Desert Spectator, August-Sept., 1965, pp. 29-36. A history of the Benedictine Monks that presently occupy St. Andrews Priory in Valyermo which lies at the extreme southwestern edge of the western Mojave study zone. AVC.

Bieber, Ralph P., ed. Exploring Southwestern Trails, 1846-1854, by Philip St. George, William H. C. Whiting, and Francis Xavier Aubrey. Philadelphia: Porcupine Press, 1974. Aubrey returned to the east in 1853 crossing the western Mojave Tejon Pass to the Mojave River after a cattle-driving trip.

Bliss, Carey S. William Hayes Hilton Sketches in the Southwest and Mexico 1858-1877. Los Angeles: Dawson's Book Shop, 1963. See for sketch "Mojave Valley, 1852," and for interiors of typical miners' cabins. HUNT.

Boalich, E. S.; Castello, W. O.; Hughenin, Emile; Logan, C. A.; Tucker, W. Burling. The Clay Industry in California. Sacramento: California State Printing Office, 1920. Provides a list of clay industry sites in California, including the western Mojave.

Boalich, E. S. Magnanese and Chromium. Sacramento: California State Printing Office, 1918. Provides list of manganese sources on western Mojave. HUNT.

Bolton, Herbert Eugene, ed. Historical Memoirs of New California by Fray Francisco Palou, O.F.M., Vol. IV. Berkeley: University of California Press, 1926. Palou's account of Anza's crossings are embellished with notes by Bolton. Supplies map of Garcés desert crossing of 1776 taken from the Spanish Archives. HUNT.

Bonsal, Stephen. Edward Fitzerald Beale: A Pioneer in the Path of Empire 1822-1903. New York and London: G. P. Putnam and Sons, 1912. An important figure for western Mojave history both as road builder and rancher at nearby Tejon Pass area.

Bowen, O. E., Jr. "Geology and Mineral Deposits of Barstow Quadrangle, San Bernardino County, California," California Division of Mines Bulletin 165. Pl. 1, scale 1:125,000, 1954.

Bowen, O. E., Jr. and Ver Planck, W. E. "Stratigraphy, Structure, and Mineral Deposits in the Oro Grande Series near Victorville, California." California Division of Mines and Geology Special Report 84, Pl. 1, Scale 1:24,000, 1965.

Boyd, William Harland. 1912-Centennial Bibliography on the History of Kern County California. Bakersfield: Kern County Historical Society, 1966. Brief history and annotated bibliography.

Branstetter, Jack Edward, "Hid-Wa Mining Company, Inc." High Desert Spectator, April, May, June, 1965, pp. 34-35. Discussion of mine claim ownership using mixed breed mine as an example of a rediscovered mine. AVC.

Branstetter, Jack Edward, "Hid-Wa Corporation." High Desert Spectator. January-February, 1966. A progress report on what appears to be mercury ore ("red cinders") found in the Boron District. Fills us in on modern mining in the Antelope Valley. AVC.

Branstetter, Jack Edward. "Shea's Castle." High Desert Spectator. September, 1964, pp. 4-16. This conspicuous home is located fourteen miles west of Lancaster. This article follows its use and ownership to date of publication. AVC.

Branstetter, Jack Edward. "Tails and Trails of the Twenty-Mule Teams," Antelope Valley Spectator, II (6, 7 and 8). September, October, November, and December, 1963. Uses Calico Print and other primary sources to construct a history of borax mining from ancient times through to western Mojave enterprises of the present. AVC.

Brewerton, George Douglas. "A Ride with Kit Carson through the Great American Desert and the Rocky Mountains," Harper's New Monthly Magazine, August, 1853, pp. 306-334. Primary account of Carson's skill in desert crossings, in particular a passage describing travel eight days beyond Cajon Pass. Brewerton, age 20, accompanied Carson. UCLA.

Brewerton, George Douglas. Overland with Kit Carson. New York, 1930. Routes Carson's use of Spanish Trail in 1848, Amargosa railroad route and through western Mojave.

Brown, Nancy. "Burton's Tropico Mine," Antelope Valley Spectator, I(5) November, 1962, pp. 7-9. Superficial history, but includes several useful photos. AVC.

"Bruce Minard," Antelope Valley Spectator, III(4), April, 1964, pp. 5-13. Story of George Homes, Bruce Minard, and the Silver Queen Mine. AVC.

Boalich, E. S.; and Castello, W. O. Tungsten, Molybdenum and Vanadium. Sacramento: California State Printing Office, 1918. Lists tungsten deposits throughout California, including western Mojave.

Bradley, Raymond, "The Legend of Chimney Rock," Desert Magazine, November, 1969. Story of 1867 fight between posse and Indian raiders at Chimney Rock.

Broadhead, Michael J. A Soldier-Scientist in the American Southwest Being a Narrative of the Travels of Elliott Coues, Assistant Surgeon, U.S.A., with His Observations upon Natural History. Tucson: Arizona Historical Society, 1973. Coues translated the Garcés diary and traveled the Mojave Road in the 1860s. UCLA.

Burcham, L. T. California Range Land: An Historic-Ecological Study of the Range Resources of California. Sacramento: California State Printing Office 1918. A study of California range lands, basically weak in its attention to our study area as it significantly does not even discuss Antelope or Lucerne valleys where ranching has been active since the 1870s.

Burr, Bleden L. "Forgotten Army Forts of Mojave." In: The California Deserts: The Westerners Brand Book Number 11. (Los Angeles: Los Angeles Corral, 1964). Excellent history of Mojave army forts. SBCM.

Caballeria, Father Juan. History of San Bernardino Valley from the Padres to the Pioneers 1810-1851. San Bernardino, 1902. See p. 103 for his account of horse thieves who retreated to the Mojave Desert. HUNT.

California, Department of Public Works. Division of Water Resources, Bulletin No. 47. Mojave River Investigation. Sacramento: California State Printing Office, 1934. Useful data on underground reservoirs, water companies, and historic water use.

Cambridge, Carl, Sr. "Camels of Uncle Sam." Mohahve, III, (1966). Excellent history of Beale's camel expedition, especially as it pertains to the western Mojave. UCR.

Carleson, Edward, "Martial Experiences," Overland Monthly VII, 41 Second Series, May, 1886, pp. 480-495. First hand account of travel along Mojave Road by this volunteer made in 1863. HUNT.

Carmany, John H. Review of the Year 1866. San Francisco: H. H. Bancroft & Co., 1867. Carmany, a stock expert, sums up mining operations in the state and significantly ignores the western Mojave. His analysis of the borax industry supplies background for the mines which later developed. HUNT.

Casebier, Dennis G., Carleton's Pah-Ute Campaign. Norco, CA: Dennis G. Casebier, Publisher, June, 1972. Excellent history relying exclusively on primary sources. Carleton established Camp Cady during the campaign, an important historical site in the western Mojave. BLM-R.

Casebier, Dennis G. The Mojave Road. Norco, CA: Tales of Mojave Road Publishing Company, P. O. Box 307, 1975. No. 5 of series, dedicated to E. I. Edwards. Exhaustive history of the road. Centers interest on eastern Mojave, but is useful as well to western zone. HUNT.

Casebier, Dennis G. The Mojave Road in Newspapers. Norco, CA: Tales of the Mojave Road Publishing Company, 1976. This brief collection of primary sources is a refreshing addition to desert literature, but contributes more to the eastern than western zone. HUNT.

Caughey, John. Gold is the Cornerstone. Berkeley and Los Angeles: University of California Press, 1948. Although directed toward northern California, this work supplies us with the history of claims, districts, and other legal aspects of California mining. See also for explanation of mining terms and industrial machinery. HUNT.

Caughey, John Walter. "Southwest from Salt Lake in 1849," Pacific Historical Review, VI (1), June, 1937, pp. 143-181. Caughey sets the famous Hunt-Sand Walking Company journey in its proper historical setting. Some members of the party crossed the western Mojave, and this is an exhaustive and important piece of research of the sources and historical facts of that crossing. UCLA.

Chickering, Martha. "The Founding of a Mojave Desert Community," California Historical Society Quarterly XXVII(2), June, 1948, pp. 113-122. Lucerne Valley's first residents told in the first person.

Chopud, Donald. Francois X. Aubrey: Trader, Trailmaker and Voyageur in the Southwest 1846-1854. Glendale: Arthur H. Clark Company, 1975.

Cleland, Robert Glass. The Cattle on a Thousand Hills. San Marino: The Huntington Library, 1941. Includes some data on horse thieves and marauding desert Indians in southern California.

Cleland, Robert Glass. This Reckless Breed of Men: The Trappers and Fur Traders of the Southwest. New York: Alfred A. Knopf, 1950. A useful synthesis of mountain men histories which supplies background to the lives of Smith, Walker and Young, all of whom crossed the western Mojave. HUNT.

Cloudman, H. C., Huguenin, E., and Merill, F.S.H., "San Bernardino County Cool Gardre," California Mining Bureau Report 15, 1919.

Controtto, Eugene L., "Where Green Marble was mined...," Desert Magazine, August, 1958. Description of Verde Antique Quarry seventeen miles northeast of Victorville.

Cooke, Philip St. George, Whiting; William, H. C.; and Aubrey, F. Xavier. Exploring Southwestern Trails 1846-1854. Southwest Historical Series Vol. VII. Glendale: Arthur H. Clark Company, 1938. Aubrey's trips of 1853 and 1854 took him into the western Mojave. His journal included here supplies a brief primary account. UCLA.

Corle, Edwin. Desert County. New York: Duell, Sloan and Pearce, 1941. Section "Mojave is Mojave" with pages devoted to Calico are of interest to the subject study zone. Entertaining and useful but without documentation or scholarly approach. UCLA.

Coues, Elliot, ed. and trans. On the Trail of a Spanish Pioneer: Garcés Diary 1775-1776. 2 vols. New York: F. P. Harper, 1900. Translation of Garcés Diary. Coues supplies helpful annotations identifying the Garcés route with modern place names. Useful as a source for early Spanish contact in the western Mojave study zone. Also supplies an historical account of Indians living in the zone. UCLA.

Coy, Owen C. The Great Trek. Los Angeles: Powell Publishing Company, 1931. Chapter "Death Valley Trail" tells of Manly Party, but also of earlier Cleveland Party which traversed southern route of gold seekers to Mojave River and over Old Spanish Trail and Cajon Pass. UCLA.

Daggett, Stuart. Chapters on the History of the Southern Pacific. New York: Ronald Press, 1922. Significantly omits an account of the desert trackage.

Dale, Harrison Clifford. The Ashley-Smith Explorations and the Discovery of a Central Route of the Pacific 1822-1829. Cleveland: Arthur Clark Company, 1918. Scholarly overview of contributions to exploration and cartography made by Ashley and Smith. Places Smith, who traversed western Mojave in 1826 and 1827, in historical perspective and includes direct quotations from his Journal. HUNT.

Davis, John F. Historical Sketch of Mining Law in California. Los Angeles: Commercial Printing House, 1902. Useful account of confusion over ownership and development of law 1848 to 1900. HUNT.

DeGroot, Henry. "The Mining Resources of Southern California," Overland Monthly IX(53) Second Series, May, 1887, pp. 455-461. Superficial and with most attention given to Calico Mines. HUNT.

"De Tal Palo Tal Astilla," Publications, Historical Society of Southern California X, 1917, p. 158. Letter here written by a participant in the Battle of Chimney Rock describes massacres of whites and posse which killed off the Indians in 1867.

Dibblee, T. W. "Geology of Willow Springs and Rosamond Quadrangles: California," U. S. Geological Survey Bulletin 1089-C, 1963. 253 pp. Plate 11 shows broad geology of the Mojave Desert including the Calico region. UCLA, Geology Library.

Dolbear, S. H. "Mineral Productions in San Bernardino County, 1880-1943, in Economic Mineral Resources and production of California," California Division of Mines Bulletin 130, 1945.

Duke, Donald and Kistler, Stan. Santa Fe--Steel Rails through California. San Marino, CA: Golden West Books, 1963. A pictorial account with some relevant photographs. Supplies background to routing of desert lines. BANC.

Edwards, E. I. Desert Harvest. Los Angeles: Westernlore Press, 1962. Expanded annotations on his 25 desert books.

Edwards, E. I. Desert Voices: A Descriptive Bibliography. Los Angeles: Westernlore Press, 1958. Some 1500 entries. UCLA Sp. Col.

Edwards, E. I. The Enduring Desert. Los Angeles: The Ward Ritchie Press, 1969. Classic bibliography of the California deserts and an update of his earlier Desert Voices.

Engineering and Mining Journal. New York: Hill Publishing Company, 1881-1925. A weekly. See "California News" in index as well as stock reports. A valuable primary source for the thorough researcher. News of western Mojave mining is limited to the important districts and big producers. UCLA, Geology Library.

Foreman, Grant, ed. A Pathfinder in the Southwest. Norman: University of Oklahoma Press 1941. This follows the itinerary of Lt. A. W. Whipple during his railroad survey, 1853-1854. Chapter XV presents an edited and readable series of journal entries made March 9-13 and Chapter XVI follows to Cajon Pass with March 14-16, 1853. Emphasis is on Indian escorts and populations. HUNT.

Frickstad, Walter N. A Century of California Post Offices 1848 to 1954. Oakland: Philatetic Research Society Publication, 1955. UCLA, Sp. Col.

Gudde, Edwin W. California Place Names. Berkeley: University of California Press, 1975.

Hafen, LeRoy R. The Mountain Men and the Fur Trade of the Far West. 10 Vol. Glendale: Arthur H. Clark Company, 1965-1972. Mojave River and Desert are both indexed, leading to helpful syntheses of subjects such as horse thieves, mining, and historic crossings. HUNT.

Hafen, Leroy R. The Overland Mail 1849-1869. Cleveland: Arthur H. Clark Company, 1926. Overland mail routes began under impetus of the opening of the Oregon Territory and gold rush. Salt Lake route crossed western Mojave en route to Los Angeles and is treated here. UCLA.

Hafen, LeRoy and Ann W. Journals of Forty-Niners Salt Lake to Los Angeles. Glendale: Arthur H. Clark Company, 1954. The Hafens put together primary accounts of 49'ers to create this work. The Jefferson Hunt Wagon Train passed through the western Mojave planning unit, and this has four accounts of travelers in the party to tell the story: e.g. Sheldon Young, whose logs can be found in the Jayhawkers Collection, Huntington Library. HUNT.

Hafen, LeRoy R. and Ann W. Old Spanish Trail Santa Fe to Los Angeles: With Extracts from Contemporary Records and Including Diaries of Antonio Armijo and Orville Pratt. Glendale: Arthur H. Clark Company, Account, including lengthy quotation from primary sources, demonstrates routes of Spanish Trail across western Mojave and supplies background to lives of the trailblazers and commercial travelers. UCLA.

Hafen, LeRoy R. "Walkara's Half Century." Western Humanities Review. Summer, 1952. One of the earliest articles written about this famous Indian who raided San Bernardino ranchos in the 1830s.

Hill, James M. "The Mining Districts of the Western United States," United States Geological Survey Bulletin 507. Washington: Government Printing Office 1912. Following history of and definition of a district, this inventories and maps mining districts supplying pertinent data which includes a bibliography if available. UCLA, Geology Library.

Hine, Robert V., California's Utopian Colonies, New Haven: Yale University Press, 1966. Milestone study of utopian communities, including Llano del Rio.

Hogg, John Edwin, "My Forty Years of Pulling Freight." Touring Topics, August, 1930, pp. 24-29. In this article John A. Delameter, an old time freighter, tells the author how they built most of the big borax wagons at Mojave. Delameter probably designed the wagons. HUNT.

Holmes, Roger and Paul Bailey. Fabulous Farmer: The Story of Walter Knott and His Berry Farm. Los Angeles: Westernlore Press, 1956. This little book reads like promotional literature, still it tells the story of Knott's early years on the desert and also of his plans for the ghost town. HUNT.

Hopping, Paul and Sylvia, "Silver Mountain," Mohahve, III (1966). History of Victorville mining. UCR.

Hughes, Jerry and Dan L. Patridge. Selected Data on the Wells in the Barstow Area. United States Geological Survey Publication, 1973. Government Printing Office.

Hunt, Aurora. Major James Henry Carleton, 1814-1873, Western Frontier Dragoon. Glendale: The Arthur H. Clark Company, 1958. Scholarly account which places Camp Cady and Carleton's desert responsibilities in the larger historical framework. Little of a specific nature on the western Mojave. CSULB.

Huxley, Aldous, "Ozymandias, the Utopia that Failed." California Historical Quarterly, LI(2), Summer, 1972. Romantic narrative of the rise and demise of Llano Del Rio, Antelope Valley. Rich in detail of the laborious undertakings, publications, and vandalism which followed the colony's departure.

Hydle, O. L. Quartz Hill Yesterday and Today. Quartz Hill, CA: O. L. Hydle, 1971. Devoted to growth of organizations, local facilities, and brief biographies. Includes a short history and list of sources. AVPub.

Ingersoll, Luther A. Century Annals of San Bernardino County. Los Angeles: 1904.

Jaeger, Edmund C. "The Ghost that Refuses to Die." Desert Magazine. August, 1954. History of Hesperia centers on land ownership and water supply.

Jaeger, Edmund C., "Trails to More Outdoor Enjoyment." Desert Magazine. May, 1960. Story of a cattle raid by Indian Walkara and some unemployed mountain men in 1840.

Jennings, Bill. "Desert Wilderness, New Battleground for BLM," Desert Magazine of the Southwest, July, 1978, pp. 20-23. Discussion of issues surrounding definition of wilderness and the relevance of this term to desert land.

Kagan, Paul. "Portrait of a California Utopia," California Historical Quarterly, LI(2), Summer, 1972. Sound political history of the rise and demise of Llano del Rio.

Keagle, Cora L., "Mother of a Ghost Town." Desert Magazine, May, 1938. Stress factors which made it possible for men without capital to exploit mining in the Calico District.

Keeling, Patricia I., ed. Once Upon a Desert. Barstow: Mojave River Valley Museum Association, 1976. A rich contribution to local history. Contains photos, interviews, local vignettes and a general overview of the Mojave Valley area.

Kellogg, Stan, "Calico--Old and New." Desert Magazine. November, 1967. Town features and fires at Calico receive most space.

Laizure, C. McK. "San Bernardino County Cool Gardie." California Mining Bureau Report 30, 1934.

Langley, Harold D. To Utah with the Dragoons and Glimpses of Life in Arizona and California, 1858-1859. Salt Lake City: University of Utah, 1974. See for description of desert in letters included.

Lawrence, Eleanor. "Horse thieves on the Old Spanish Trail." Touring Topics, Januay, 1931. Follows title in reciting names of well-known, but also obsure, figures.

Lawton, Harry. Willie Boy: A Desert Manhunt. Balboa Island, CA: The Paisano Press, 1960. Dramatization of the Willie Boy manhunt based on interviews and primary sources. UCR.

Leadabrand, Russ. A guidebook to the Mojave Desert: Including Death Valley, Joshua Tree National Monument and the Antelope Valley. Los Angeles: The Ward Ritchie Press, 1966. A tourist's guide to historic desert sites. Concise narrative history is included. UCR.

Lee, W. Storrs. The Great California Deserts. New York: G. P. Putnam's Sons, 1963. This synthesis of desert-wide history adds some insight into homesteading, World War II activity, and film making in the western zone. UCR.

Lesley, Lewis Burt, ed. Uncle Sam's Camel, the Journal of May Humphreys Stacey. Cambridge: Harvard University Press, 1924. Includes report by Edward F. Beagle.

"The Littlerock Story." Antelope Valley Spectator, I(3) September, 1962, pp. 12-14. AVC.

Lowery, Vern. "Fremont and the Mohahve," Mohahve, II (1965) Recounts history of Fremont's trek through Antelope Valley and Victorville area.

McFarlane, Neville L., Ayers, R. S. and Winright, G. L. California Desert Agriculture, California Agricultural Experiment Station Extension Service Circular 464, November, 1957. 66 pp. Data for ranchers and farmers here is directed to those in Imperial Valley area. At this time it is claimed that approximately 350,000 head of cattle are brought into the entire California desert annually, but none of the figures are broken down into areas. Livestock is described as a growing feature of the desert agricultural picture.

Manderville, James H. Petition for a tax upon Crude Borax, Borocic acid, and Borate of Lime. Washington: Thomas McGill & Co, 1883(?) This petition for the borax mining companies of California and Nevada supplies a clear picture of foreign production, manufacture, and the international trade. It asserts that a British monopoly controlled the market. HUNT.

Manly, William Lewis. Death Valley in '49. Ann Arbor: University Microfilms, 1966. A primary account of the ill-fated Sand Walking Company of 1849. Written from memory forty years later, but stands up.

Mellen, Herman F. "Reminiscences of Old Calico," Southern California Quarterly XXXIV(1, 2, and 3), 1952. A three part article of scholarly quality which follows the title in bringing together a narrative history of the mines.

Mendenhall, Walter C. "Some Watering Places in Southeastern California and Southwestern Nevada," USGS Water Supply Paper No. 224. Washington, D.C.: Government Printing Office, 1909.

Miller, Ron and Peggy. Mines of the Mojave. LaSiesta Press, 1976. A synthesis of mining tales found elsewhere in magazine articles. UCR.

Mills, H. W. "De Tal Palo Tal Astilla." Publications, Historical Society of Southern California X, 1917. See letter written by George Miller, Jr., "First Fight at the Mill," an account of the Indian raid at Las Flores Ranch in 1866 and subsequent so-called last Indian battle at Chimney Rock.

Millspaugh, Albert U. "River of the Desert," Desert Magazine of the Southwest, September, 1977, pp. 16-19. One of many articles to be found on the above and below ground course of the Mojave River.

Mining and Scientific Press, an Illustrated Journal of Mining, Popular Science, and General News. San Francisco: Dewey and Company, 1885-1920. The "Mining Summary" section is organized by county. A valuable primary source for history of mining and mining technology. UCLA, Geology Library.

Mitchell, Barbara. "Antelope Valley History," Antelope Valley Spectator II(3 and 4), April, May-June, 1963, pp. 5-9 and 12-16. A superficial and somewhat interpretive history of Indian and Spanish periods. AVC.

Mitchell, Barbara. "The Pathfinders of Antelope Valley," Antelope Valley Spectator, III(2), February, 1964, pp. 4-18. Provides background of Fremont and Carson and a brief account of their entry into Antelope Valley. AVC.

Mohahve; Books II and II. Victorville: Victor Valley College, 1963-1965. The uneven character of this publication need not detract from the contribution it makes upon careful reading to Victor Valley's local history. AVPub.

Mojave River Commission. Report on the Utilization of Mojave River for Irrigation in Victor Valley, California. State of California Department of Engineering, Bulletin No. 5. Sacramento: State Printing Office, 1918. History of Irrigation districts and use of water rights. Useful. BANC.

Mojave River Valley Museum. Historic Series #1, Historic Vignettes, Personalities of the Desert. Martha Burnaw, ed. Barstow: Mojave River Valley Museum, 1971. Personal memoirs and good photographs.

"The Mojave Store," Antelope Valley Spectator I(4), October, 1962, pp. 15-17 AVC.

Mojave Valley Chamber of Commerce. Communities of Barstow, Daggett, Helendale, Hinkley, Lenwood, Newberry, and Yermo. Industrial Survey: The Mojave Valley Area, San Bernardino County, 1955. Useful for some statistical data for this period. BP.

Molhausen, Baldwin. Diary of a Journey from the Mississippi to the Coasts of the Pacific with a United States Government Expedition. 2 vol. London: Longman, Brown, et al., 1858. This wealthy German diplomat requested entry and was appointed to the Whipple railway survey party of the 35th parallel route in 1853. The preface by Alexander von Humboldt sets the historical stage for the comments this man of letters, appointed topographical draftsman, had to make. He contributed to the geological and ethnographic data of the western Mojave. HUNT.

Morgan, Dale Lowell. Jedediah Smith and the Opening of the West. Indianapolis-New York: Bobbs-Merrill, 1953. Supplies excerpts from Smith's journal which relate to the 1826 and 1827 westward crossing of the western Mojave zone. Republished by California Historical Society in 1954. UCLA.

Myrick, David F. Railroads of Nevada and Eastern California. Vol. II. Berkeley: Howell-North Books, 1963. Exhaustive research has made this a basic source of railroad history. The emphasis is on organization, financing, and type of equipment. CSULB.

Nadeau, Remi, California Ghost Towns and Mining Camps. Los Angeles: Ward Ritchie Press, 1965. Chapter 26 "Calico" gives superficial data on this important site. UCLA.

Norris, Frank and Carrico, Richard L. A History of Land Use in the California Desert Conservation Area, 1978. BLM-R.

Okeshott, Gordon B., ed. San Fernando, California, Earthquake of 9 February 1971. California Division of Mines and Geology Bulletin 196, 1975. History of earthquakes in the area reaches into western Mojave study zone. UCLA, Geology Library.

O'Conley, Mary Ann. Upper Mojave Desert. Detroit: Harlo Press, 1969. A highly personal account of the Death Valley, Calico, Baker area. Supplies brief but useful syntheses on topics such as the Calico Prints and completion of the Tonopah-Tidewater Railroad. HUNT.

O'Neal, Lulu Rasmussen. A Peculiar Piece of Desert. The Story of California's Morongo Basin. Los Angeles: Westernlore Press, 1957. Scope is high desert region close to Morongo Valley and includes topics such as historic accounts of Indians, mines, Morongo Pass, San Gorgonio Pass, Morongo Valley and Yucca Valley. An important source of local history to the Morongo-Johnson Study area. UCLA.

Pacific Road: The Plan for its Construction, now before Congress. Reports of Special Committee...with the Bill Annexed, 1853. Peripheral to study zone but supplies Congressional and contemporary feelings toward land grants and a railway to the Pacific. See U. S. War Department Report for Survey Report. UCLA Sp. Col.

Paher, Stanley W. Death Valley Ghost Towns. Las Vegas: Nevada Publications, 1973. Includes towns such as Coolgardie, Goldstone, Calico, and Borate, but offers little information on any but Calico. HUNT.

El Paisano. A personal newsletter from the President of the Desert Protective Council. Active pressure for wildlife protection, careful watch over armed services requests for desert land, billboards, and grazing. Lolomi Lodge. Box 33, Banning, California. UCLA

"The Palmdale Story." Antelope Valley Spectator I(2), July, 1962, pp. 7, 24-25. AVC.

Palmer, William J. Report of Surveys across the Continent in 1867-1868 on the 35th and 32nd Parallels, for a Route Extending the Kansas-Pacific Railway to the Pacific Ocean at San Francisco and San Diego. Philadelphia: W. B. Selheimer, 1869. Topical summary of report made for Union Pacific Railway Company, Eastern Division, for a route to the Pacific. West of the Rio Grande they followed two main routes 32nd and 35th Parallels. Water and mines of the western Mojave receive cursory treatment. UCLA.

Paul, Almarin B. "The Evolution of the Stamp Mill," Overland Monthly XXV (149), Second Series, May, 1895, pp. 522-530. Informative and useful to the history of mining machinery in Mojave zone. HUNT.

Paxton, June LeMert. My Life on the Mojave. New York: Vantage Press, 1957. Early Yucca Valley homesteaders are part of the subject matter, but this is folksy and not historically useful. Flowers, hikes, and social connections predominate. BANC.

Pearson, June, "This is a True Story about Mr. Van Tassel Who Lives in a Rock and Has a Time Machine," Desert Magazine, March, 1969, pp. 17-19. Provides data on Giant Rock north of Yucca Valley.

Pepper, Jack. "A Trip to Tropico." Desert Magazine, October, 1968. Description of Tropico mines which ties them to Willow Springs.

Pierson, Erma. Kern's Desert. Bakersfield: Kern County Historical Society, 1956. Chapters on Antelope Valley sites are well done and useful to our study in helping locate sites. HUNT.

Pierson, Erma. The Mojave River and its Valley. Glendale: Arthur H. Clark Company, 1970. An excellent general history of the Mojave River and its valley. For the study of the western Mojave, Pierson gives a sound, fundamental account of all white exploration and settlement, from Garcés to the present. Treats place names and development of towns. UCR.

Pinart, Alphonse. Journey to Arizona in 1876. Translated by George H. Whitney. Los Angeles: Zamorano Club, 1962. This French scholar held a strong interest in Alaska, Russian America, and finally in California. He crossed the western Mojave in 1875 showing on his map the river, Camp Cady, Fish Pond, Lane's and a railroad running from Wilmington to Indian Wells near Palm Springs. Brief primary account of hazards and of Camp Cady ruins. HUNT.

Rascoe, Jessie. Southern California Treasures. Fort Davis, Texas: Frontier Book Company, 1969. Largely of desert mines with attention to stage coach robbers and mines in other parts of California. Uses newspapers and mining publications and sources on lost and old mines. UCLA.

Reed, Lester. Old Timers of Southeastern California. Redlands, Ca: Citrograph Printing, 1967. Essays on ranch families, but none in western Mojave zone. UCLA.

Rhiner, Grant A., "The Mojave River," Mohahve, III, 1966. References to Fremont's and Smith's Treks across the western Mojave. Indian Wars included. UCR.

Robinson, W. W. The Story of San Bernardino County. San Bernardino: Pioneer Title Insurance Company, 1958. Brief, but useful, account by a worthy local historian. AVPub.

Rollins, Royce, "The Catacombs of Calico." Desert Magazine, November, 1964. Story of the Odessa Mine which made a millionaire of John Daggett, future Lieutenant Governor of California.

Rusling, James F. Across America: or the Great West and Pacific Coast. New York: Sheldon and Company, 1874. General Rustling's assignment from the Quartermaster's Department to make a tour of inspection took him from Prescott, Arizona over the western Mojave following the river up to Cajon Pass in April, 1867. He reflects advice that the Mojave River is a tributary of the Colorado River but adds little to what was already known of the subject area. HUNT

Saul, Richard B. "United States Mineral and Location Monuments," Mineral Information Service XV(1), October, 1962. List of mineral monuments by county includes an incomplete but useful list of surveys for which a mineral monument was established. Data includes date of instructions, district, name, and map coordinates.

Schaller, Waldemart. Borate Minerals from the Kramer District Mojave Desert, California. Washington, D.C.: Government Printing Office, 1930. Short history of development of mines. BANC.

Settle, Glen A., Bears-Borax and Gold. Kern-Antelope Historical Society, Inc., Bakersfield, 1965. Useful first-hand accounts of area near Mojave in the 1890s. HUNT.

Settle, Glen A. Here Roamed the Antelope. Kern-Antelope Historical Society, Inc., Bakersfield, 1963. A well-researched history of Antelope Valley which includes some primary documents. HUNT.

Settle, Glen A. Tropico: Red Hill with a Glamorous History of Gold. Rosamond, 1959. Excellent in-depth history of the Tropico Mine by the mine's assistant manager. Puts the history of the mine and of the Antelope Valley in a national perspective. HUNT.

Southwest Pacific Railroad Company, Atlantic and Pacific Railroad Company. Statutes, Conveyances and Documents. New York: Stockholder Job Printing Office, 1867. Supplies primary documents and background to construction as well as insights into the principals involved in the construction of this national road (the Atlantic and Pacific). HUNT.

Spears, John R. Illustrated Sketches of Death Valley and Other Borax Deserts of the Pacific Coast. Chicago and New York: Rand, McNally and Company, 1892. Spears was a roving reporter for the New York Sun and came to the Mojave in 1891. He did sketches on desert borax and recorded firsthand observations. Includes desert yarns and many excellent photographs taken by the author. Much is peripheral to this study, however, he stayed in the Daggett area and observed mines north of it. HUNT.

Stephens, L. Daw. Life Sketches of a Jayhawker of '49, 1916. Author set out with his family from New Jersey in March, 1849.

Sullivan, Maurice S. "When Indians Brought the First Fast Mail into California," Westways, April, 1934, pp. 25 and 38. Relates history of Coco-Maricopa mail route from Arizona to San Bernardino. Apparently they ran from the Salton Sea to Palm Springs and thence to San Gorgonio Pass. In so doing they probably did not cross the western Mojave unless it was for a short distance in the Yucca Valley area. HUNT.

Storms, W. H. "San Bernardino County" California Mining Bureau Report 11, 1893, pp. 337-369. Calico District described, pp. 337-345. Excellent discussion of ore deposits and active mines for that period. UCLA, Geology Library.

"A Story of Achievement and Transition," Antelope Valley Ledger-Gazette, November, 1930. A progress edition useful for poultry and ranching information. AVC.

Sylvester, Ellsworth A., "Interview with Hattie and Harry Garden and Their Son Glen," Mohahve, II, 1965. Interview provides history of location and name of Apple Valley. UCR.

Thompson, David G. "The Mojave Desert Region, California," USGS Water Supply Paper No. 578. Washington, D.C.: General Printing Office, 1929.

Thompson, David. Relief Map Showing Watering Places, Mohave Desert Region. NP U.S. Geological Survey, 1921, 5 sheets. Surveyed in 1917-1918 by David G. Thompson. Shows mines, some ranches (e.g.: Black's Ranch, Hinkley Valley). BANC.

Thompson, David G. "Routes to Desert Watering Places in the Mohave Desert Region, California," Water Supply Paper 490-B. Washington, D.C.: Government Printing Office, 1921. BANC.

Townley, S. D. and Allen, M. W., "Descriptive Catalog of Earthquakes of the Pacific Coast of the United States 1769-1928," Seismological Society of America, Bulletin XXIX, 1939, pp. 1-297. See p. 35 for January 9, 1857, earthquake and damage in western Mojave zone. UCLA, Geology Library.

Treolar, Richard. "Mohave's Desert Queen," Desert Magazine, December, 1975. Story of Soledad Mountain mines where gold was found in 1933.

Troxel, B. W., and Morton, Paul K. "Mines and Mineral Resources of Kern County, California," County Report 1. San Francisco: California Division of Mines and Geology, 1962. A brief area history is followed by tables and discussion of each mineral exploited in the county. Locations, deposits, history, and underground workings for the more important mines follow.

Tucker, W. B. and Sampson, R. J. "Mineral Resources of San Bernardino County," California Division of Mines Report 39.

U. S. War Department. Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean. Vol. III, IV, V and X. Route near the 35th Parallel under the Command of Lt. A. W. Whipple topographical engineers, in 1853 and 1854. Washington, D.C.: Government Printing Office, 1856. Daily log and topical report on all aspects of flora, fauna, and human habitation. Whipple gives only a superficial account of western Mojave zone. See Vol. X for Williamson Report.

Van Dyke, Dix. "A Modern Interpretation of the Garcés Route." Annual Publications Historical Society of Southern California, XIII(4), 1927, pp. 353-359. A refreshing and probably correct geographical update which challenges the earlier interpretation of Elliot Coues.

Veatch, Dr. John A. Report to the Borax Company of California. San Francisco: Whitton, Towne and Company, 1857. This scholarly report demonstrates the state of development of the borax industy in 1857. Antelope Valley is close to areas then thought to be exploitable. HUNT.

Waitman, Leonard. "The History of Camp Cady." Historical Society of Southern California Quarterly, XXXVI, March-December, 1954, pp. 49-91. Exhaustive research has produced a definitive article on the history of the camp. UCLA.

Waitman, Leonard, "Horse Soldier Forts of the Mojave Desert," Quarterly San Bernardino County Museum Association XV. Spring, 1968.

Warren, Elizabeth von Till and Ralph J. Roske. Cultural Resources of the California Desert, 1776-1880: Historic Trails and Wagon Roads. Prepared for the U. S. Department of Interior, Bureau of Land Management, Desert Planning Unit, Riverside, California, January 9, 1978. Write University of Nevada, Las Vegas. She has mission records.

Weber, Harold F., Jr. "Silver Deposits of the Calico District," Desert Magazine, January, 1967. A brief synthesis which centers on geologic data rather than social.

Weber, Harold F., Jr., "Silver Mining in Old Calico," Mineral Information Service, May, 1966. Excellent article on Calico's history which indicates useful data.

Weight, Harold O. "Hunting Rock in the Calicos," Desert Magazine, January, 1948, pp. 26-30. General history of Calico mines in layman's terms. Includes story of the remaining buildings.

Weight, Harold O. "Man Who Bought a Ghost Town," Desert Magazine, July, 1953. Story of Calico's successive mine discoveries.

Weight, Harold O., "On the Trail of Alvord's Lost Gold," Desert Magazine, June, 1950. Discusses those roads and those men who had passed by the Alvord Mountains and overlooked mining possibilities there.

Weight, Harold O. Twenty Mule Team Days in Death Valley. Twentynine Palms: Calico Press, 1956. "Wagon to Have Through Hill" explores design and construction of borax wagons. Other articles discuss the mules, mule drivers, and borax deposits in the Calicos. Drains heavily upon the L. Burr Belden research but also supplies observations by old timers. HUNT.

"Welcome to Rosamond," Antelope Valley Spectator, I(5), November, 1962, pp. 13-15. AVC.

Wheeler, George M. Annual Report upon the Geographical Surveys West of the One Hundredth Meridian in California, Nevada....Washington: Government Printing Office, 1876. See pp. 329-333 for account of Lt. Eric Bergland's party that crossed western Mojave in 1875 on an irrigation feasibility study of the Colorado River.

White, Douglas. Story of a Trail, The Salt Lake Route. Los Angeles: San Pedro, Los Angeles, and Salt Lake Railroad, 1905. 164 pp. of maps and text devote one page to desert; none to western Mojave. Demonstrates that in 1905 the desert was not included in railway promotional plans. UCLA. Listed at Bancroft under Sargent, G. M.

Wilkinson, Van P., "Victor Valley's Silvery Lining," Desert Magazine, February, 1972. History of mines, roads, and structures in Victor Valley.

Williamson, Lt. Robert Stockton. Report of Expeditions in California for Railroad Routes to connect with the routes over the 35th Parallels of North Latitude in House Document No. 129, 33rd Congress. Washington, D.C.: Government Printing Office, 1856.

Wolle, Muriel V. S., Bonanza Trail: Ghost towns and mining camps of the West. Bloomington: Indiana University Press, 1953. Exceptionally well-researched chapter on Calico. HUNT.

Wright, Lauren A., et al. "Mines and Mineral Deposits of San Bernardino County," California Journal of Mines and Geology, XLIX(1). January, 1953, pp. 49-192. Writers made a personal on-foot survey of nearly all of the mines reported on, visited desert towns, talked with old-timers in the bars. They present here an inventory of all mines they determined to be of high yield and of recent operation. Data is presented in sections for each mineral, and mine histories are brief but useful.

Wynn, Marcia Rittenhouse, "When Ezra Hamilton Found Gold at Willow Springs," Desert Magazine, November, 1951. History of Tropico Mines.

NEWSPAPERS

Barstow Printer Review 1944-1958 and Desert Dispatch, October, 1958-June, 1978. (Microfilm) San Bernardino County Library, Barstow and Barstow Museum. Both published in Barstow. Source of ranching and mining history.

Calico Print (on microfilm). Mojave River Valley Museum. Broken file, 20 issues, 1882-1885, 1 reel.

The Desert Grapevine. Lucerne Valley, California.

Desert Spotlight, Yucca Valley, 1946 (short-lived).

Ghost Town News, 1941 V. 1, no. 2 - July 1946, V. 6, no. 33. Published at Knott's Berry Farm, Buena Park, California. Carries fictional and personal accounts of the desert and ghost towns. Occasional entries on sites in the western Mojave zone. e.g. Bull Springs located on a homestead filed by Frank Bull in the Morongo Desert. See section "Drifts from the Desert."

Havila Miner.

Lancaster, Daily Ledger-Gazette.

Los Angeles Weekly Star. See October-December, 1854, and February 16, 1856, for Colonel Washington surveys.

Mojave Desert News, 1939.

Mojave River Valley Museum holdings on microfilm. Various San Bernardino (city) newspapers, broken file, 1867-1887, 3 reels.
Our Bozoo-Booth's Bozoo, 1/26/1889-9/27/1890; 1 reel (Needles).
The Needle Eye, broken file 6/4/1889-12/27/1894; 1 reel
Desert Post (Yermo) 4/1/1958-9/18/1959; water damaged, 1 reel.

Morongo Valley Chatterbox, 1950.

Overland Mail

Pioneer Cabin News.

Redlands Citrograph. See Sept. 10, 1887 - Dec. 7, 1907, articles pertaining to mines.

San Bernardino Herald. 1860-1860 (1 year).

San Bernardino Mountains Highlander.

San Bernardino Patriot. 1860-1861 (1 year).

San Bernardino Weekly Argus.

Southern Vineyard. (J. J. Warner's paper).

UNPUBLISHED MANUSCRIPTS

Burton, Alice E. and Settle, Dorene Burton. "H. Clifford Burton." Rosamond, California, 1978. In addition to Burton's life story, this provides an intimate history of early Antelope Valley.

Chaffee, Everett B. "Jedediah Smith in California." M.A. Thesis, University of California, Berkeley, 1929. Early pages cover Smith's first desert crossing. Data on party members follows. BANC.

"The Enterprises of Walter Knott." Completed for Oral History Program, UCLA, 1965, by Donald J. Schippers, January, 1963. Useful description of homesteading and of labor in the Calico mines by Knott as a young man. UCLA, Sp. Col.

Evens, Even Lewes. "A History of Antelope Valley." Courtesy Roger Robinson, AVC.

Kirk, George, "A History of the San Pedro, Los Angeles and Salt Lake Railroad." Ms., A. B. Pomona College, 1934. Use of railroad periodicals and newspapers makes this a useful source. BANC.

Manghan, Scott Jarivs. "Francisco Garcés and New Spain's Northwestern Frontier, 1768-1781." This doctoral dissertation emphasizes the importance of Garcés in making administrative decisions and thus lends new insight into the kind of white man who opened the Mojave route. HUNT.

Southern Pacific Company, Bureau of News. "Historical Outline of the Southern Pacific Company" Ms., 19-3. Brief mention of desert lines. BANC.

Tyler, Joseph B. "Diary" undated. 133 pp. San Bernardino County Library. Compiled by C. E. LaFrize. Wagon and railroads in western zone receive attention.

Suss, Terry. Activities Along the Mojave Indian Trail: Aboriginal Trade-Military Occupation (unpublished, M.A. Thesis). November 27, 1974. University of California, Riverside. Scholarly history of the Mojave Trail which takes into consideration the diverse interpretations of historians who have written on the subject before him.

Whitmore, W. K. "Mojave Gold Mining District." Ms. at Bancroft Library. Includes a brief history, discussion of claims in the district and good detail on the Whitmore Claims, Nos. 1-7.

Wiley, Francis A. "Jedediah Smith in the West." Ph.D. Thesis, University of California, Berkeley, 1941. 420 pp. Ms.

PHOTOGRAPHIC COLLECTIONS AND SOURCES

Mrs. W. A. Alf, 33652 1st Street, Daggett, California.

Bancroft Library: Francis P. Farquhar Collection and Photographic Views of the Mojave Route, El Dorado Canyon, and Fort Mojave. A collection gathered by R. D. Hereuse. Lanes, on first crossing Mojave (from San Bernardino) #7.

California Historical Society, 6300 Wilshire Boulevard, Los Angeles. Pierce collection (same catalog numbers and negatives as HUNT and Los Angeles County Museum). Title Insurance and Trust Company Collections.

County of San Bernardino: Regional Parks Department, 157 West 5th Street, San Bernardino, CA 92415. Photographs of Calico Ghost Town.

Edwards Air Force Base. "Reach Beyond the Horizon," 16 mm motion picture. Contact Ted Bear, Historian. A beautifully composed history commencing with the Muroc Railroad water stop and bringing aviation history up to the present. See other photos.

Ledger-Gazette Daily Newspaper. 4481 No. Fig Avenue, Lancaster, (948-4701). Collection of old photos--publishes "then and now" flashbacks. Old files were destroyed by fire in 1912, still some photos are from before that year.

Mojave River Valley Museum. Barstow Street and Freeway. Exit Barstow, California. 200+; approximately one-fourth are historical. See "The Picture Show of Barstow, 1800-1935," compiled by N. Woolford and E. Henderson.

Kern County Historical Society and Museum.

Mr. Russell, Calico Motel, Daggett. Charges $4.00 for each print.

Security First National Bank of Los Angeles.

Spears, John R. Illustrated Sketches of Death Valley. This reporter-photographer includes rare shots of miners and mining machinery.

Traili, Margaret. "Mojave Mines," Overland Monthly, LII (5), November, 1908, pp. 403-406. Useful photos of Queen Esther Mine showing mill machinery. HUNT.

UCLA, Special Collections. A few of mining period interest.

USGS Photographic Library, Room 2274, Bldg. 25, Denver Federal Center, Denver, Colorado. Photos taken during USGS expeditions.

PAMPHLETS

Southern Pacific Company. The Southern Pacific Company's First Century. San Francisco: Southern Pacific Company, 1955. An overview with little relevance to desert crossing.

Data Bearing Upon Construction of a Line of Railway from the City of Los Angeles, California, to Salt Lake City, Utah. 1908(circa). See sections on "Mining Districts and Minerals."

Board of Supervisors. The County of San Bernardino, California. Redlands: Citrograph Book Press, 1903. Desert railroad and mineral data are summarized and propagandized. HUNT.

Historic Portal: The story of Victor Valley, California. Upland Savings and Loan Association, 1973. A chronology of Indian raids and confrontations in the western Mojave 1828-1903. AVPub.

Lucerne Valley Chamber of Commerce. Lucerne Valley tells the World. Pasadena: Post Printing, 1929. Subtitled: "Plenty of Water," this promotes land sales, alfalfa culture and poultry industries. HUNT.

Pierce, Phillip. Ghost Town Directory of the West. Abilene, Texas: Pierce Publishing Company, n.d. California map shows Bellville (gold) and Clapboard Gulch (gold) in western Mojave District. No map coordinates but appear to be in Apple Valley.

California Interstate Telephone Company, Romantic Heritage of the Mojave Valley: A Saga of Transportation...and Desert Frontiers, 1961, unnumbered pages. A useful and carefully researched work helpful to understanding local history.

California Interstate Telephone Company, Romantic Heritage of Victor Valley: A Saga of Desert Exploration and Expansion, 1961. Clear map and useful photographs relating to local subjects. AVPub.

COLLECTIONS

Antelope Valley Old Timer's Association.

George W. Beattie Collection. The Huntington Library, San Marino, California.
John Brown Diaries 1863-1864.
Henry Washington's field notes.
Salt Lake City Records of Mormon Colony travelers.
Muscupiabit No. 75 (Land east of San Bernardino) Box 6 #79.

Hayes Scrapbooks.
39 Indians II.
Southern California Traits
A valuable collection of clippings on Indian-white relations. (See for example "Mohave hostilities, 1859" and "Tejon Reservation").
BANC.

Jayhawker Collection, The Huntington Library, San Marino, California. Manuscripts and newspaper clippings. e.g. Diary of Asa Hayes; Log of Sheldon Young.

Kevney Collection of manuscripts on San Pedro and Wilmington. Los Alamitos Rancho, Long Beach, Kevney was once owner of Drum Barracks.

"Mines and Mineral Resources" 200
Pamphlets and articles. "Southern California Mines, Sales Opportunities" published by Los Angeles County Board of Supervisors lists and describes mines in western Mojave study zone. UCLA Sp. Col.

Mohave Mining Company, In: A Collection of Account Books and Day Books of Various California Business Firms, 1863-1921. 14 v. 33-40 cm. Ms. See V. 7 for Mohave Mining Company. Stored off campus. BANC.

Mojave River Valley Museum, Barstow Road and Virgina Way, Barstow, California. Holdings not listed elsewhere in the bibliography.

Maps:

a) Mines - xerox copies of surveyors maps made prior to patent issue.
b) Trails - oldest maps are again Federal Railroad Surveys and later water papers (oldest being 1909).
c) Historic buildings: plans and blueprints of the Harvey House, some townsite plat maps and a listing of known townsite plats and where they are located.

Interviews:

They have many, but without specific subjects, there is no way to list what they have.

Clipping Files:

Same status as interviews.

Documents:

a) San Bernardino County records, microfilm copies.
   1) Mining - all the desert mining records available up to 1910 (5 reels).
   2) Land - possessory land claims up to 1890 - 1 reel; BLM tract book #12 - 1 reel.

b) Various mixed documents including mine, deeds, agreements, loans, business transactions. Agreement books up to 1910 - 5 reels and miscellaneous books - 5 reels (3 reels cover copies of original documents).

Politics, government, trails, appointments, railroads, schools, prohibition, etc. Documents are: Clerk to the Board San Bernardino County Supervisors minutes, 1858-1912, 5 reels. Federal archives-appointments of San Bernardino County Postmasters, 1838-9/30/1971, 1 reel. Census--San Bernardino 1860, 1870, 1880 and 1900-4 reels; Census --Kern County and Inyo County, 1880 - 1 reel; Census--all the state of Nevada, 1880 - 2 reels.

Xerox copies of old records from California Bureau of Mines and Geology reports, various water papers. San Bernardino County histories, San Bernardino City and County directories, San Bernardino County Great Registers, other Calico Prints, genealogical records, family histories, railroad surveys, reports and approximately 500 L. Burr Belden articles.

Phineas Banning Collection. The Huntington Library, San Marino, California.

Railway and Locomotive Historical Society, Pacific Coast Chapter, 610 Arlington Avenue, Berkeley, California 94707.

Tropico Gold Camp Museum, Rosamond. Antelope Valley Old Timers' Association.

INTERVIEWS

Mrs. Walter G. Alf

Ted Bear, Historian, Edwards Air Force Base, Rosamond.

Mr. Bobby L. Gaines, Soil Conservation Service, U. S. Department of Agriculture, Lancaster. District Conservationist.

Rosa de Haulleville, Sister of Maria Huxley and co-resident of Huxley's home in Llano del Rio.

William H. Heegle, Assistant Superintendent, Calico Park, San Bernardino Regional Parks. At Calico for 20 years as ranger and builder.

Mr. Senkins, Fish Culturist, Thirty-year employee at Mojave State Fish Hatchery.

Richard E. Lingenfelter, Institute of Geophysics, UCLA. Lecturer, History of the Southwest. Author on Hardrock Miners.

Charles "Pat" Mitchell, President High Desert Cattlemen's Association.

Glen Moor. Fish and Game Department, Barstow.

Richard B. Saul, Geologist, Division of Mines and Geology, Department of Conservation, Los Angeles, CA.

Dorene Settle, daughter of Clifford Burton and present owner of Burton's Tropico Gold Mine.

Don V. Tucker, Publicity Manager, Regional Parks Department, San Bernardino, California 92415.