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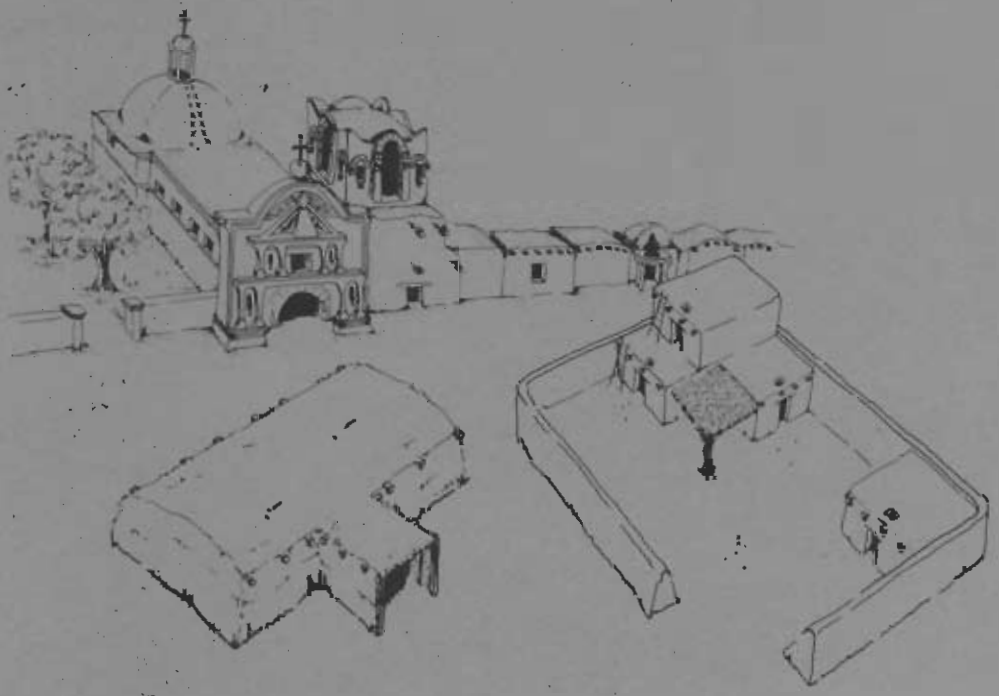

The Archaeology of Southeast Arizona: A Class I Cultural Resource Inventory

Gordon Bronitsky and James D. Merritt

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The Archaeology of Southeast Arizona: A Class I Cultural Resource Inventory

by

Gordon Bronitsky and
James D. Merritt

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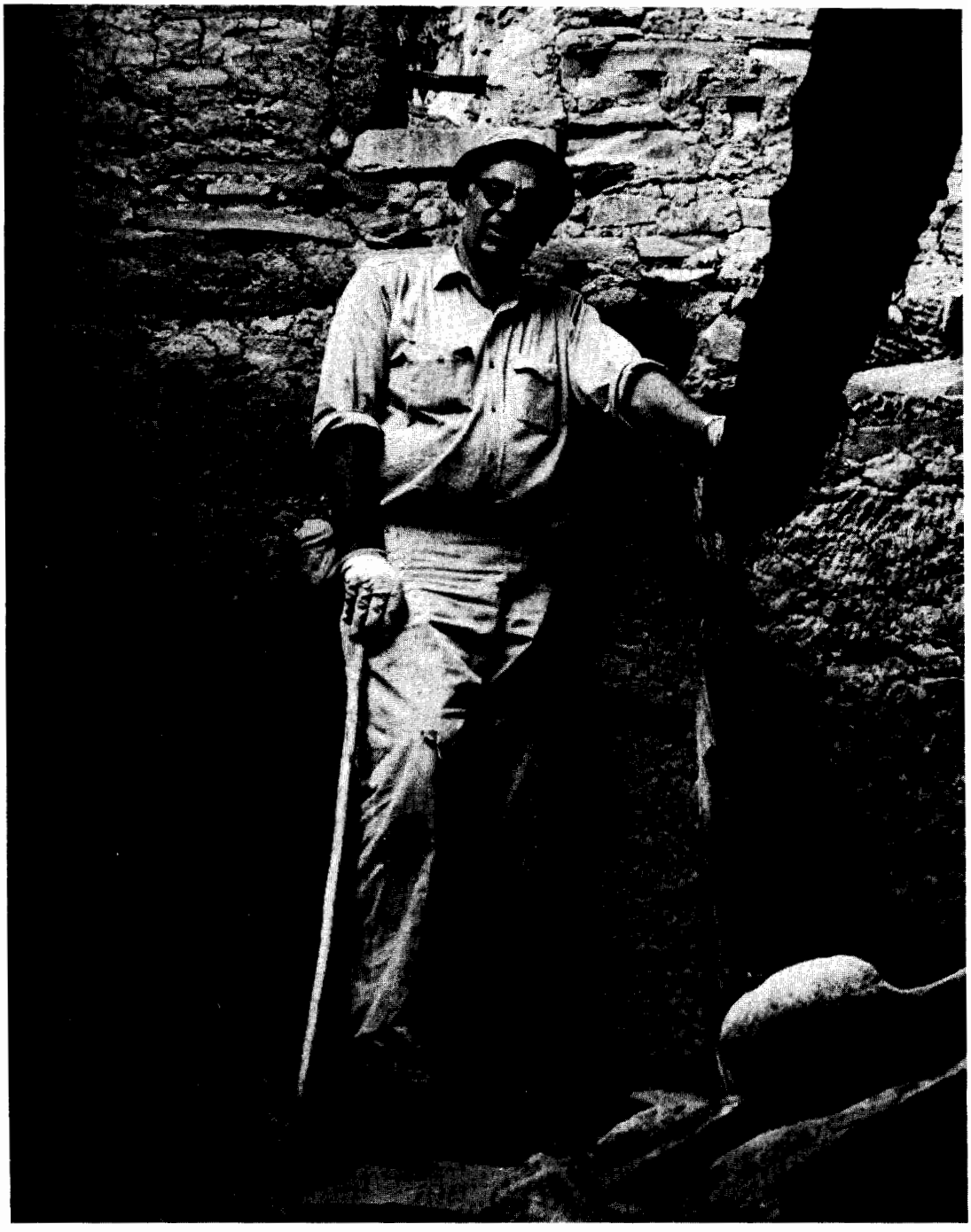
For Emil Haury



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Helga Tiewes, Photogrpaher

and Charles DiPeso

Courtesy of the Amerind Foundation, Inc.
Dragoon, Arizona

PREFACE

This overview study summarizes and assesses the cultural resources within the southeast region of Arizona. It provides a Class I type inventory of known cultural resources within the study area, covering the entire history of the region, including the prehistoric, protohistoric, and historic periods. We present a review of all cultures in the study area and their development within reference to research reports. The aboriginal cultures covered include Paleo-Indian, Archaic, Cochise, Hohokam, Mogollon and O'otam, Salado, Apache, and Sobaipuri. The historic cultures include Spanish, Mexican, and American.

The Class I inventory represents both an extensive literature and records search in conjunction with a compiliation of information about the known cultural resources in the study area. The overview was conducted by Professional Analysts, Inc. of Eugene, Oregon, for the Bureau of Land Management (BLM) and the U.S. Forest Service under contract with the BLM Safford District. The study covers both government and private lands and includes all land within the study area boundaries. Previous investigations and site summary tables are included. All existing site inventory records from government agencies and institutions were compiled and copied. Finally, all known sites and previous surveys were plotted on maps showing the distribution of cultural resources and the extent of survey coverage.

In addition to the background study, sections discuss the regional environment and cultural resource management. This report presents specific data about the known cultural resources, indicating the broad range of archaeological and historical sites. An extensive bibliography contains references to important archaeological reports and historical studies. We also include information about the condition of sites and whether or not they have been formally recognized or preserved. This report is a comprehensive statement of the status and needs for effective cultural resource management.

This study has taken many years to complete. The contract was awarded in 1980 to Professional Analysts, Inc.and research was conducted through January 1981. The contract was modified and expanded in 1981 to include the historic period. Research on the historic period was conducted through March 1982. The contract was terminated in 1985 by mutual agreement prior to completion of the final inventory report. This final report was prepared by the BLM Safford District Office in 1986.

Due to a five year gap between completion of data collection in 1981 and the preparation of the final report in 1986, this report is already out of date. While we regret this, we are at the same time elated to

have finally completed the report. We have met our goal of making this information available to cultural resource managers, archaeologists, historians, and the public.

One thing should be noted concerning the illustrations. They were selected to provide information on specific cultures, time periods, house styles, pottery types, events, etc. They were not used to illustrate individual sites, such as the Hodges Ruin. Many of the illustrations used were of the Hodges Ruin and its artifacts, but the intent was to illustrate broader subjects and show what was typical for a particular culture group or period or area. The selection of illustrations was constrainted by availability and time.

ACKNOWLEDGEMENTS

We would like to acknowledge everyone that contributed to the southeast Arizona Class I Inventory, but unfortunately, we have not been provided with the names of many of the contributors, specifically those who assisted in the research for the historic discussions. We thank all of you and apologize to everyone not acknowledged by name.

A special thanks goes to Charles Polzer, S.J., the historical consultant for this project, and his staff for making his office available to James Merritt and for providing Mr. Merritt with a great deal of guidance and assistance. Dr. Keith Basso reviewed the protohistoric sections and we thank him for this.

The senior author, Dr. Gordon Bronitsky, provided the following acknowledgements and dedication:

> An overview of this scope is a reflection of the efforts of many people. I want to express my appreciation to Morton and Francine Shafton and Irving Rosenberg for their hospitality and assistance. Jim Judge, Bruce Masse, Hayward Franklin, Mike Schiffer and Julian Hayden made available copies of unpublished papers. Don Wood, Dave Stephen, Betty Lee, Jack and Vera Mills, Richard Myers, Gay Kinkade, Frank Fryman, Julian Hayden, Mike Schiffer, Emil Haury, Charles DiPeso, Alice Carpenter, Tom Scott, Rich Lange, Keith Kintigh, Mark Henderson, Don Morris and Bruce Bartell all gave freely of their time to answer numerous questions about the study area. I owe them a debt of gratitude for their patience and their interest in the cultural resources of the study area. Bruce Masse, Mike Schiffer, Dave Doyel, and Hayward Franklin contributed valuable comments and criticism. Of course, any misinterpretations or errors are on my head alone. Sherri White was a valuable assistant and did the legwork involved in recording sites and acquiring references. Jack and Vera Mills graciously showed me through their invaluable private museum, and Charles DiPeso took time from his busy schedule to show me the Amerind Foundation collection.
>
> Finally, our knowledge of the cultural resources of the study area is largely a product of the effort and interest of two individuals, Emil Haury and Charles DiPeso. Their energy and enthusiasm have sparked innumerable researchers to build

further upon the foundations they have laid. This volume is dedicated to Emil Haury and Charles DiPeso with affection, respect and gratitude.

I would like to offer a personal thank you to a number of additional individuals whose contributions made this report possible. First, I thank Professional Analyst, Inc. for their initial dedication to the contract. Their final project manager Dan Brooks made a determined if unsuccessful effort to complete the contract requirements. A special thanks goes to the authors, Dr. Gordon Bronitsky and James (Don) Merritt. The quality of their research and writing is an example of real professionalism which is hard to match. Gordon's continued interest in the project and his strong desire to see the report published help keep this goal alive for me.

I am also indebted to the various institutions that provided information on their records and collections and to all those that granted permission to use copies of their illustrations in our report. In particular, Sharon Urban of the Arizona State Museum and other personnel of the museum deserve credit for providing great volumes of information in a very cooperative spirit. I would also like to thank Don Wood of the Coronado National Forest for serving as Project Inspector during the initial period of the contract.

I am indebted to Anne Woosley, Director of the Amerind Foundation for providing the photograph of Dr. DiPeso and to Kathy Hubenschmidt, Curator of Photographic Collections at the Arizona State Museum for pro- viding the photograph of Dr. Haury. I also thank Bereneice V. Humphrey for her fine sketch on the report cover.

The support and work of numerous BLM personnel deserve special credit. The Contracting Officers - James (Dick) Cazier, Barbara Atwood, and Don Sedlock - expended many hours in a dedicated effort to keep the contract progressing. They were very understanding of our needs which at times must have appeared to be rather bizarre. I am also most grateful to Carmen Sanchez, our Safford District Procurement Specialist, for her help throughout the project. The draft final report prepared by Professional Analysts was edited by Ken McGinty, BLM Writer/Editor of our Arizona State Office. Thanks Ken for your usual excellent work and for your interest. Thanks are also extended to Jane Closson, our present state office Writer/Editor for her assistance during preparation of the final report and help in arranging for printing. Gary Stumpf, BLM Arizona State Office Archaelogist, is responsible for starting the Cultural Resource Management Series of publications, and I want to thank him also for his encouragement and support.

The persons most responsible for the completion of this project are the Safford District Managers who have approved and supported the contract and the reports publication. Our present District Manager, Lester K. Rosenkrance, deserves special thanks for his patience and understanding. Lynn Saline, the present Assistant District Manager for Resource Management, has shown much patience and support throughout the

project and has my eternal gratitude. The final report was typed by Olga Diaz, Sandy Phillips, Louisa Othon, Elaine Rowley, Sharon Atkins and Debbie Miranda. I thank each of you for your hard work and long hours. Penny Rucks, our Gila Resource Area Archaeologist in the Safford District deserves my real appreciation for preparing the illustrations and for helping in other ways when help was urgently needed.

The assistance of two super volunteers, Ethel Plagenz and Rudi Benskin is really appreciated. I also thank my wife, Suzanne, and our kids for their understanding during the past few months when I became more of a memory at home than a real resident. And last, but foremost, I thank all those who have waited so long for this report to be published without giving up hope. In closing, I am most pleased that Gordon chose to dedicate this report to Emil Haury and the late Charles DiPeso. They are truly the two most outstanding archaeologists in the history of Southwestern archaeology.

Gay M. Kinkade
Safford District Archaeologist

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CHAPTER 1

CULTURAL RESOURCES MANAGEMENT SUMMARY

This overview provides background information regarding the cultural resources of southeast Arizona. Since the study area of the overview is vast, the area has many cultural resources and the information abut them is extensive. A Class I overview such as this summarizes all existing information about the inventoried cultural resources within the designated study area. Because of its comprehensive purpose as a cultural resources management tool, the Class I overview is more efficient with smaller study areas than with larger ones. As the study areas' size increases the data for the area becomes increasingly more unlimited. As such, resource managers should consider this overview as the first step in assessing the entire range of resources within the study area. This overview is introductory for several reasons.

A review of past research and present inventories of cultural resources in the region reveals several biases that limit our knowledge of the total range of existing resources. These biases result from the history and development of public interest in the heritage values associated with cultural resource sites. Archaeological studies are a relatively recent scientific field, which developed slowly in the United States in the 19th century. From their beginnings, archaeological studies in the United States have tended to concentrate on Indian sites. Moreover, the studies of aboriginal sites have primarily focused on only the most visible or largest sites. Therefore, we know more about the biggest sites, especially those with standing ruins. In the study area most surveys have concentrated on the river valleys, while other landforms have been neglected.

Historians generally have been more interested in political and military history and less interested in social history and in historical sites. The movement to preserve older historical buildings in recent years has developed more as a grass roots, general public concern. As such, the government has supported various programs that preserve and restore historic structures. Generally, these preservation projects result from the initiation and activities of certain individuals and groups who have particular interest in a given property.

In this study we have inventoried the already known sites and delineated several categories of cultural resources that now have received little or no attention in the past. This type of assessment is crucial for future planning. The processes of planning and cultural resources

management require, in the first place, a knowledge of all the possible types of resources in the region, what is called the universe of cultural resources. Within this universe are well known and poorly known sites as well as many sites that have yet to be discovered. This overview takes a first step in establishing the universe and assessing future information and management needs.

Archaeologists and historians will never know all about the past because new data and new ideas will continually be found. Planners and managers, however, can pragmatically work with the cultural resources under their control. The first goal is to establish a comprehensive inventory and to maintain and expand it as more information is acquired. In the past, no single complete inventory has been made for the State of Arizona because of the various interests and missions of the different organizations and agencies involved in cultural resource management. The Arizona State Museum and, more recently, the office of the State Historic Preservation Officer have tried to maintain comprehensive files, but have not attempted to incorporate all the information from the agencies and universities that have been active in site location and assessment.

Before presenting the results and recommendations of this study this summary outlines the culture history of the study area from the earliest to the most recent times. The earliest cultures of the region, the Paleo-Indian and Archaic societies, lived during a time of environmental change between 13,000- 3000 years ago. The Paleo-Indian cultures began with the first human occupants of North America, who hunted the large, now extinct mammoths and other animals. The Archaic cultures were the native peoples who continued to live in the region and adapted their lives to the increasingly arid environment as the modern deserts were formed. They gathered wild plant foods and hunted. Both hunting and gathering were important because they represent how people first adapted to desert life. The Paleo-Indian sites are especially important because they may contain information about the earliest human occupation of the New World. The area already has more Paleo-Indian sites than are known in other parts of the country; many more may need to be identified and studied.

These cultures were followed by the agricultural societies known as Mogollon, Hohokam, O'otam, and Salado. These societies occupied the region from about the time of Christ up until just before the Spaniards came north from Mexico. They lived along the river valleys, and some used irrigation techniques to farm the land. Most of our information about these societies comes from the river valley sites where most archaeological surveys have taken place. Though they primarily occupied the river valleys, these societies also had to get resources from elsewhere. Some surveys have found sites in the hills and mountains, but more needs to be known about how these societies used the total environment.

The Salado people disappeared from the region in the fifteenth century, and a cultural discontinuity exists between them and the Pima and Apache groups who were found by the Spaniards in the sixteenth and 17th centuries. In the protohistoric period (A.D. 1450-1700), only a few sites have been studied.

In the historic period, most research has focused on the Spanish missions and the American forts. Both missions and forts were special purpose sites, which give us little information about how most of these people lived most of the time. The Apache did not live in the study area until protohistoric times, and we know almost nothing about the sites they left. From this period we need future studies to focus on what sites are associated with Spanish and Mexican towns, mining camps, Apache camps, ranches, Mormon farms, and ghost towns of all kinds. Many of the sites from the historic period have been overlooked, and not recorded in the past.

Our evaluation of the present inventory of known cultural resources has shown several areas where the inventory is weak. Future studies should concentrate on these areas to realize the full range of resource types in the study area. The cultural resources record compilation produced an enormous volume of site forms and survey information. The records represent our knowledge of all the known cultural resources within the study area regardless of land ownership. These records and our site summary table reveals over 3,000 known sites.

Sites have been reported by several agencies and institutions over many years. Previous attempts to duplicate and compile records from the different sources have resulted in some overlapping of the records, an overlapping that was not consistently apparent in the records. Some records did not contain enough information to determine duplication. Moreover, agencies and institutions have tried to reconcile and recode their own records. These attempts have added more imprecision because they were usually not completed. Derived from the site summary table, Table 1, summarizes the number of resources recorded by each organization. These numbers are not exact because of the problems mentioned. They represent an approximate count, even though some sites may have duplicated records.

TABLE 1
Site Frequency by Organization

	All Sites	Hist./Prehist. and Historic	Prehistoric
Arizona State Museum	2,152	359	1,793
Bureau of Land Management	812	106	706
U.S. Forest Service	106	23	83
Museum of Northern Arizona	25	4	21
Amerind Foundation	222	28	194
Arch. Research Services	11	---	11
Total	3,328	520	2,808

From the site records we also tabulated the frequencies of site types. The most frequent site types are shown in Table 2. In counting

the site types, we used the Arizona State Museum's SELGEM AZSITE list of site types. Though the site types do show the general kinds of resources in the study area, the definitions are not internally consistent. Some resources contain more than one site type, and the site records were often not complete. Here again, the numbers are only estimates.

TABLE 2
Frequent Site Types *

Artifacts (isolated)	29
Artifact scatters	130
Bedrock mortars	21
Buildings (historic)	52
Burials	44
Campsites	76
Caves	86
Chipping stations	57
Compounds	51
Habitations	28
Hearths	139
Houses/cabins	83
Lithic scatters	1,153
Mines	20
Mounds	46
Petroglyphs	76
Pictographs	42
Pit houses	108
Pueblos (general)	40
Quarries	30
Ranches	62
Rockpiles	65
Rockshelters	128
Rooms	92
Sherd scatters	1,104
Stone alignments	56
Stone circles	48
Stone concentrations	21
Structures (unspecific)	46
Trash concentrations	85
Trash mounds	47
Villages	306
Workshops	29

* This Summary includes over 20 site types. A complete list is contained in Appendix 2.

Many of these sites are known to be highly significant. Their values are varied: some are unique; some have a high potential for yielding important cultural historical or scientific information; some are valued by specific groups in our society (including Native Americans); and some were places where important historical events took place. The diversity in site types, time periods represented, and values is itself a high value of the known resource base.

Our review of the site inventory records has revealed that an alarming percentage of the known sites are in poor condition. The two primary sources of deterioration are vandalism and erosion (and weathering of historic sites). Many archaeologists and managers believe that if these impacts are not controlled, the cultural resource base will deteriorate to a point where no resources will be available for future generations of Americans.

Beyond the summary and inventory functions of this overview, we have made several management and research recommendations on the gaps and weaknesses in the state of our knowledge about the resource base. These suggestions are designed both to correct deficiencies and to increase our understanding of the resources and their significance. We have stated these suggestions by current research priorities and trends. The three main trends reflect the need to know more about the character and condition of the sites and the subsistence and social systems they represent.

Cultural resource managers can direct future studies according to these priorities by following a systematic program of research designed to meet long-term goals. We have recommended several directions this program could pursue. Future inventory projects should concentrate efforts towards the inventory of the following:

1. Resource Discovery Methods - eliminate bias in resource recordation and attempt to find buried sites;

2. Resource Classification Systems - use appropriate and comprehensive research designs to collect and analyze data; and

3. Resource Condition Assessment - develop a better system of assessing site condition and continually update records of resource impacts and deterioration agents.

Each of these recommendations should be effected through an overall current research orientation that will increase our comprehension of the full extent of possible resources and how they reflect the study area's cultural history. The goals of this orientation are the general goals of all researchers who work in cultural historical studies. As such they will need continual data input and revision according to improved interpretation of past events. This orientation has three summary goals:

1. Environmental Reconstruction - to fill gaps in our knowledge of past environments, especially the conditions and changes that affected human populations;

2. Settlement Distributions - to define social units based on subsistence and economic systems and document the extent of their adaptation to specific ecological spheres; and

3. Social Historical Evolution - to define social boundaries, social and cultural interaction, and historical development sequences to better document cultural history.

If carried out systematically, these recommendations can assist in both understanding the total resource base and in advancing our knowledge of the cultural past. Pragmatically we can only take one step at a time. Each step should begin with a sound and clearly stated purpose to gather basic data. All later interpretations are only as strong as the evidence that supports them. Significant problems have occurred in the study area with both the basic data and poorly supported interpretations. Our recommendations will help in these areas and provide a context for further development. For this development to occur, however, common goals and cooperative scientific progress are needed.

We have reviewed the various resource protection measures available for preserving resource values so the resources can be used as allocated. Each measure should be considered for its feasibility, costs, and desired results.

Four management recommendations are provided: 1) continue the cultural resource public awareness campaign; 2) continue to evaluate resources for significance; 3) continue to base management on use allocation and needed protection; and 4) use the research recommendations in Chapter 10 to guide continued development of the cultural resource program.

CHAPTER 2

ORIENTATION

This Class I overview summarizes and evaluates the known cultural resource base within the Southeast Arizona Cooperative Class I Inventory Unit. The unit is bounded on the west by the Papago Indian Reservation, on the east by the New Mexico State boundary, on the north by the Apache Sitgreaves National Forest and the San Carlos Apache Reservation, on the northwest by Picacho Peak, and the south by the United States-Mexico international border (see Figure 1). The overview includes the prehistoric protohistoric, and historic periods.

The Bureau of Land Management (BLM) and the Forest Service operate under specific legislative mandate to identify, evaluate, and protect prehistoric and historic cultural properties and materials on public lands under their jurisdiction. They are required to insure that activities on lands under their jurisdictions do not inadvertently harm or destroy cultural resources. (See the following legislation: Antiquities Act of 1906; the Reservoir Salvage Act of 1960; as amended by P.L. 93-191; the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969 (NEPA); Executive Order 11593 of 1971; the Archaeological Resources Protection Act of 1979; and, the Federal Land Policy and Management Act of 1976).

BLM has devised a three-class system for cultural resource inventories. A Class I inventory such as this one, consists of a records search of existing archival data pertaining to known cultural resource properties on all lands within a specified area, regardless of land ownership. The results of a Class I inventory consist of a comprehensive narrative concerning the prehistoric and historic occupation of the study area, as well as a compilation of site records of all known cultural resource sites in the area, to be supplemented with locational information recorded on topographic maps.

The purpose of a Class I inventory is to assist BLM and the Forest Service in implementing various aspects of their cultural resource management programs. It provides a comprehensive current synthesis of cultural resource information for a particular area to guide in the interpretation of and to assess the significance of individual sites. It addresses management problems in the area, evaluating possible future management options. In addition, it serves as a useful reference document for background data pertinent to the area.

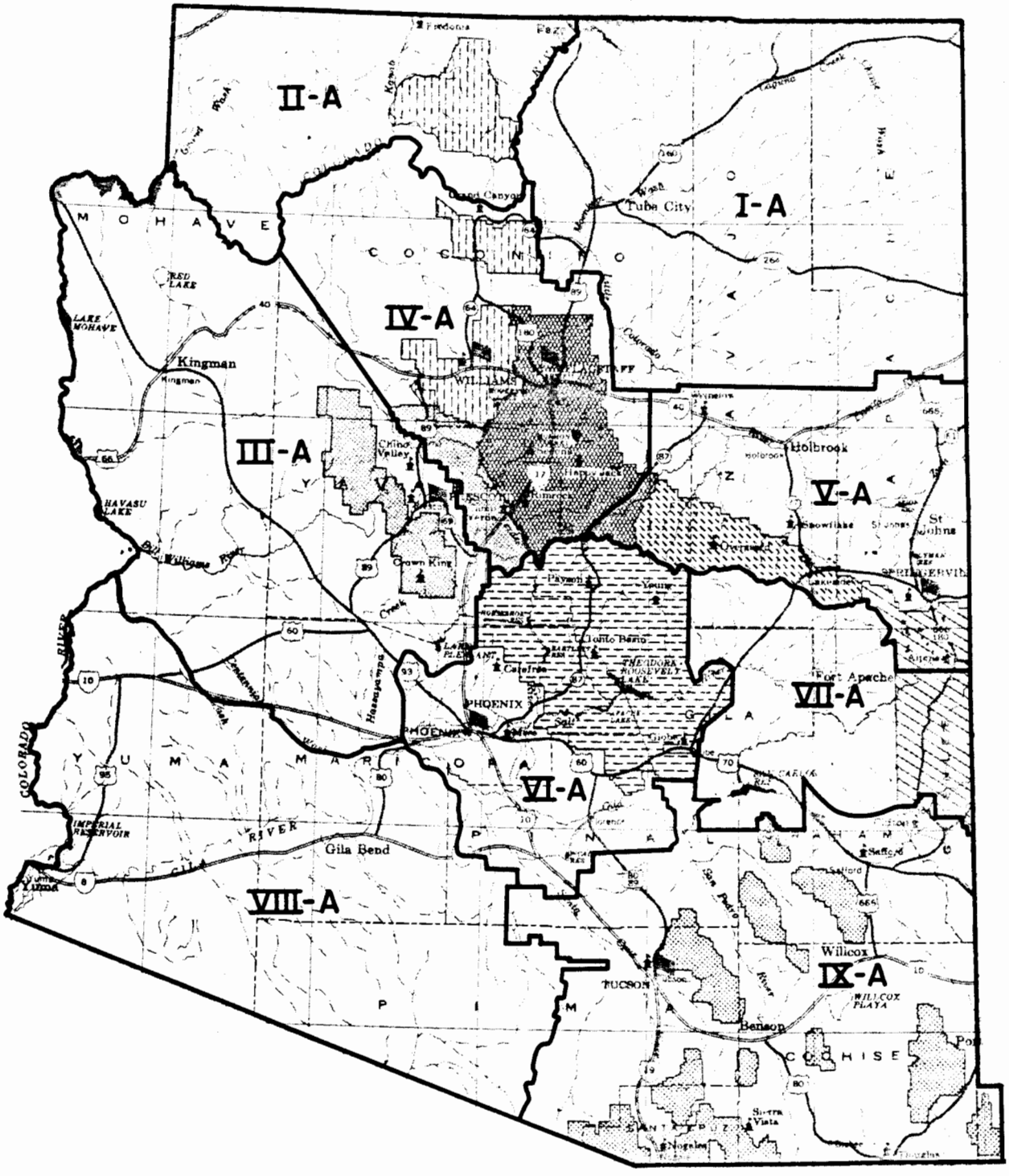

Figure 1. Southeast Arizona Cultural Resource Class I Inventory Unit (IX-A).

A Class I inventory is important in implementing cultural resource management programs in that it forms the basis and foundation for all future inventory and management actions in the area. It serves as one of the major sources of background data for cultural resource analysis in environmental assessments, land use plans, and other agency documents. This Class I inventory is intended to provide needed information for the State Historic Preservation Plan. It also will supplement the existing cultural resource site record system for BLM's Safford and Phoenix Districts and the Coronado National Forest. It should be a working document and be revised and updated continually as new information is acquired.

The Class I inventory, however, is not an end in itself. It is not a land use plan, a regional research design, or an inventory of all cultural resources in the study area. Rather, it is the base on which these plans, designs, and future inventories are completed.

In August 1978, BLM's Arizona State Office and the Forest Service's Region III signed an "Interagency Cultural Resource Inventory Agreement" (BLM No. AZ-950-IA8-001, USFS No. 16-R3-78-0018) for the coordination of Class I inventories undertaken by the two agencies in Arizona. Under this agreement, Arizona was divided into nine Class I inventory units, and a lead agency office was assigned responsibility for the planning and funding of the inventory of each unit. The remaining agency would be called upon for supplemental funding and technical aid as needed. For example, in Class I unit IXA, BLM's Safford District is the lead agency. The Forest Service's Coronado National Forest also has Jurisdiction over scattered parcels of land within the Class I unit IXA boundary, and was called on to provide technical information and review. The standards for all Class I documents completed under the terms of this agreement follow those presented for Class I inventories in the BLM 8111 Manual.

This inventory was conducted in 1981 and 1982 by Professional Analysts, Inc. of Eugene, Oregon. It was completed in two phases. The first phase compiled site records and information on the prehistoric and protohistoric periods. The second phase added information about the historic period and other information not covered in the first phase. Dr. Gordon Bronitsky conducted the research and prepared the initial drafts of all sections but the historic, and supervised the records compilation. Mr. James D. Merritt supervised and wrote the historic sections and transferred site inventory data to topographic quadrangle maps. Dr. Charles Polzer S.J., of the Documentary Relations of the Southwest, Arizona State Museum, served as historical consultant. As a result of changes in personnel, several persons served as program managers. In chronological order they were Margie Green, Dr. James E. Fitting, and Dan Brooks.

Shari White served as Dr. Bronitsky's Research Assistant and Gretchen Johnson was a Research Assistant in the Eugene office. Ms. White obtained copies of site inventory records, acquired research data, and transferred some site data to quad maps. Jon Hafmeister reviewed the site summary tables and prepared the map overlays and final copies of the quad maps. Ken McGinty of BLM edited the final draft and Jane Closson of

BLM served as editor during the 1986 publication phase of the project. Gay Kinkade served as the contracting officer's authorized representative and rewrote or rearranged much of the report for publication. Don Wood of the Forest Service served as project inspector during the initial period of the project. Contracting Officers for BLM were James R. Cazier, Barbara Atwood, and Dan Sedlock. The three report drafts were typed by Professional Analysts and the final was typed by BLM personnel: Sharon Atkins, Olga Diaz, Debbie Miranda, Louisa Othon, Sandy Phillips, and Elaine Rowley.

Ten work months (WMs), (1,717 hours) were consumed by the contractor in the research and preparation of the draft narratives. Six WMs, (1,035 hours) were spent compiling the site inventory records, preparing the maps and the site summary table, and preparing the site record compilation report. About 5.7 WMs (1,000 hours) were spent by the BLM Safford District Office in revising and typing the final report for publication.

A number of documents were prepared as part of the inventory which are not included in this publication. They include a lengthy site summary table, topographic quadrangle maps showing site and inventory locations, and a large base map of the study area with a mylar overlay showing site locations. This data is available for review at the Safford District Office for parties conducting professional archaeological research.

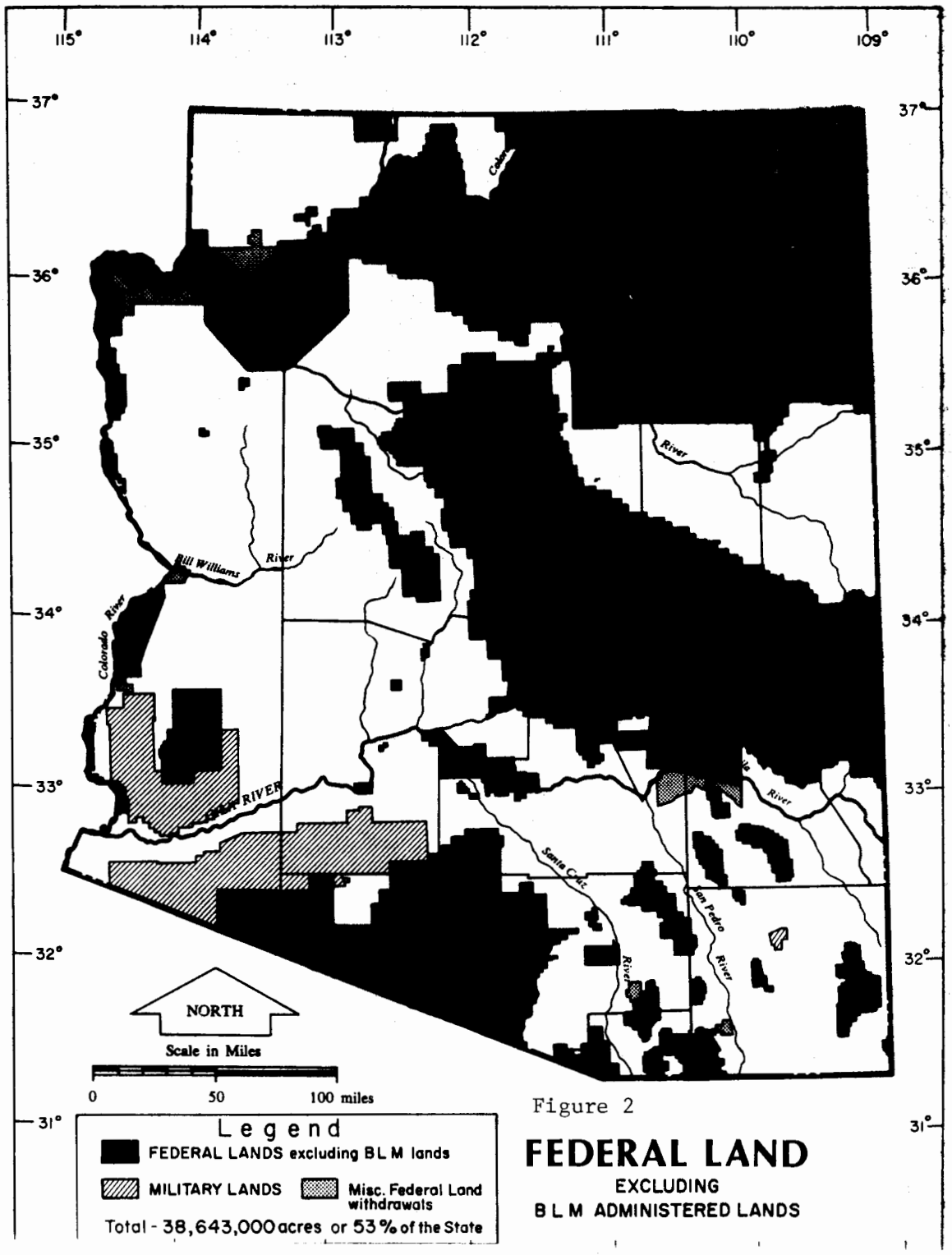

Figure 2

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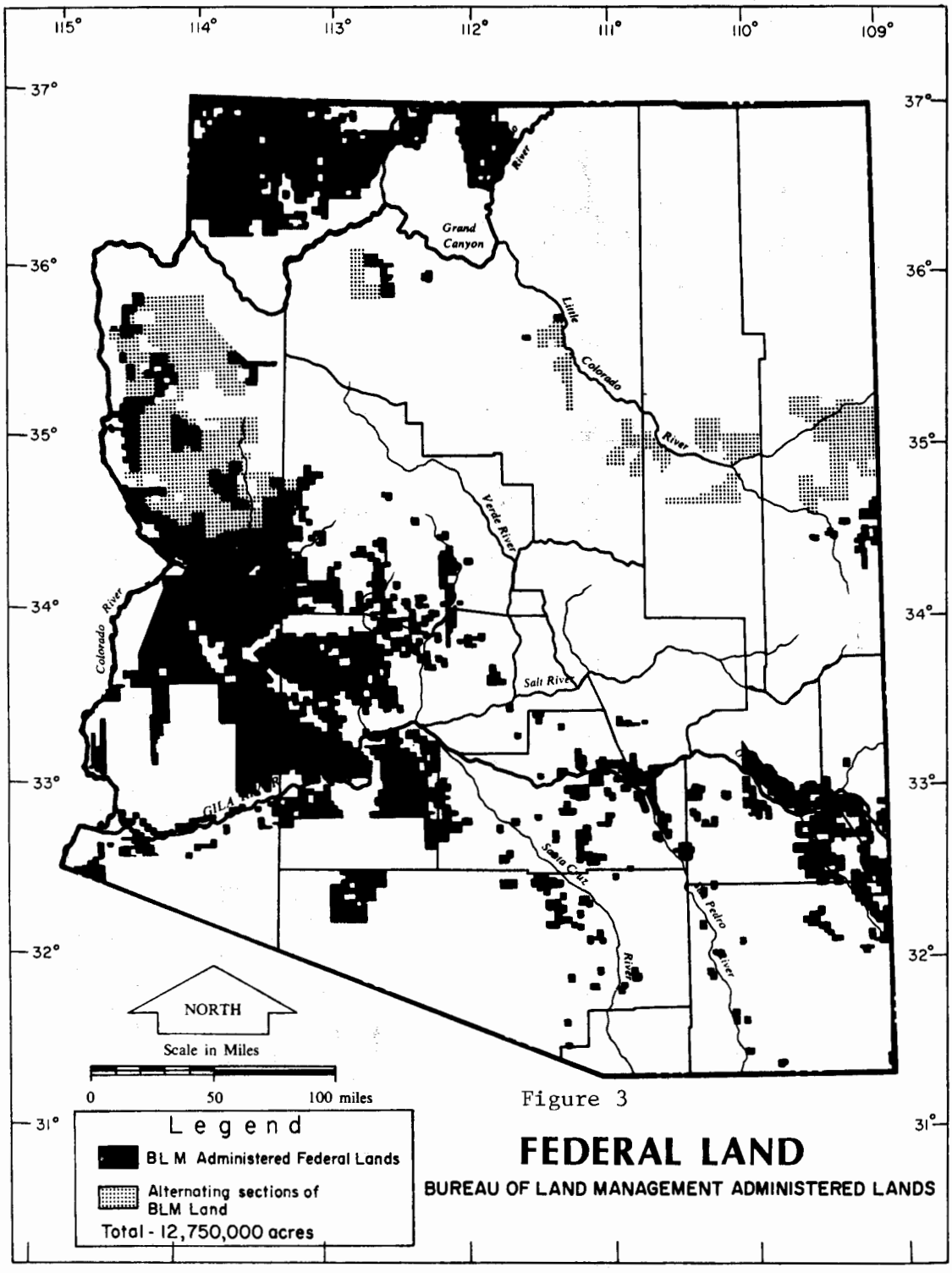

Figure 3

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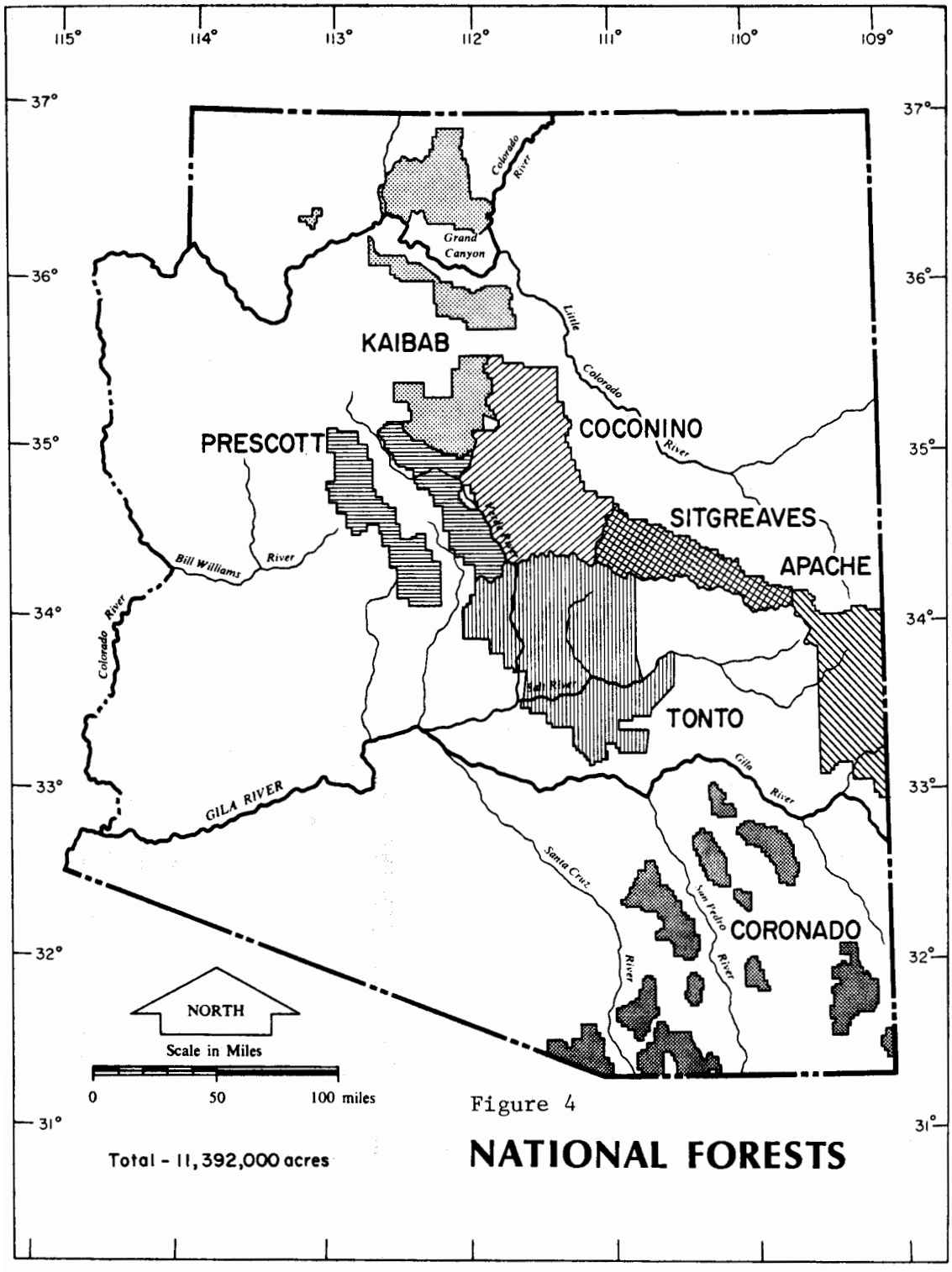

Figure 4

NATIONAL FORESTS

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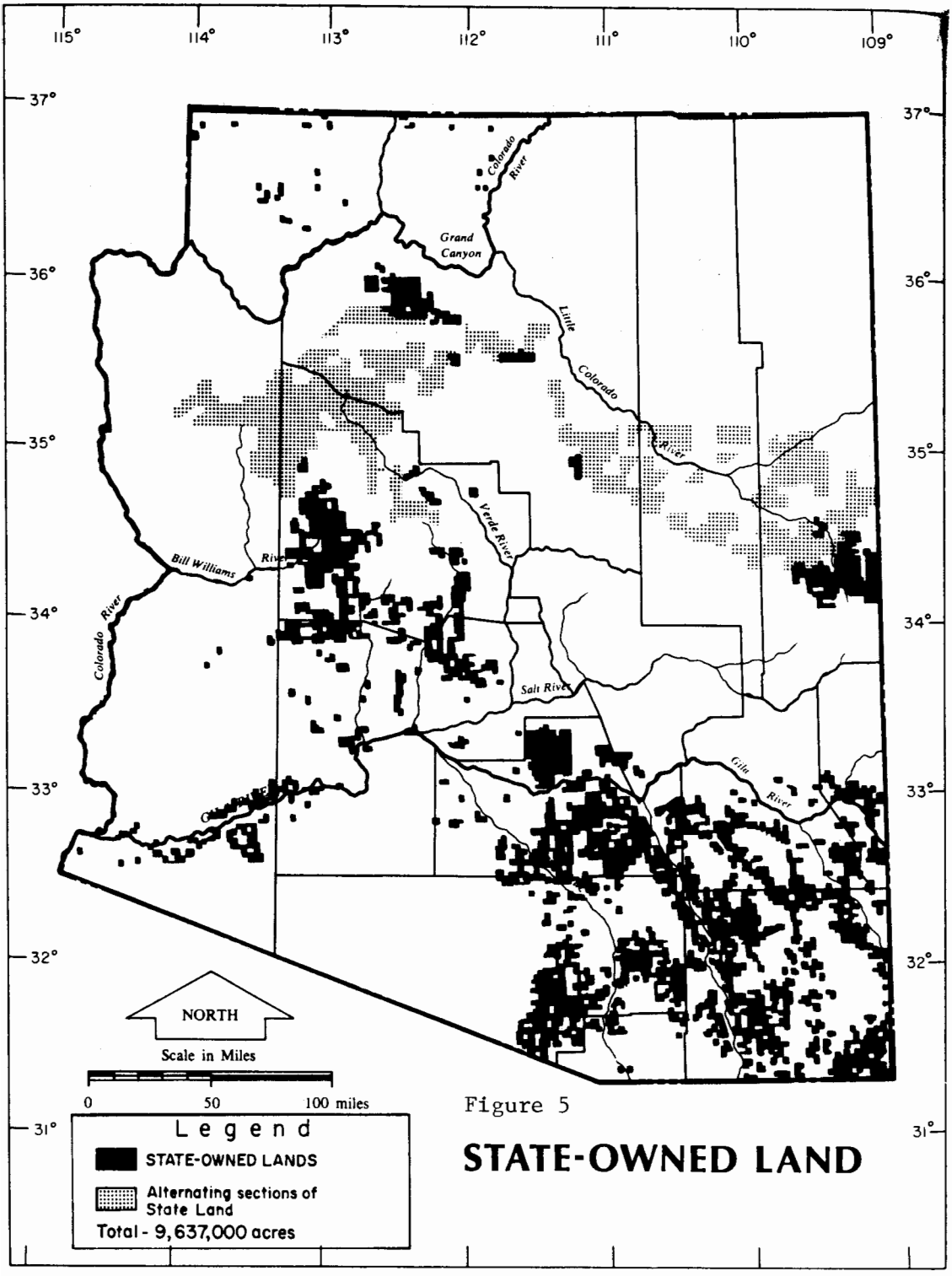

Figure 5

STATE-OWNED LAND

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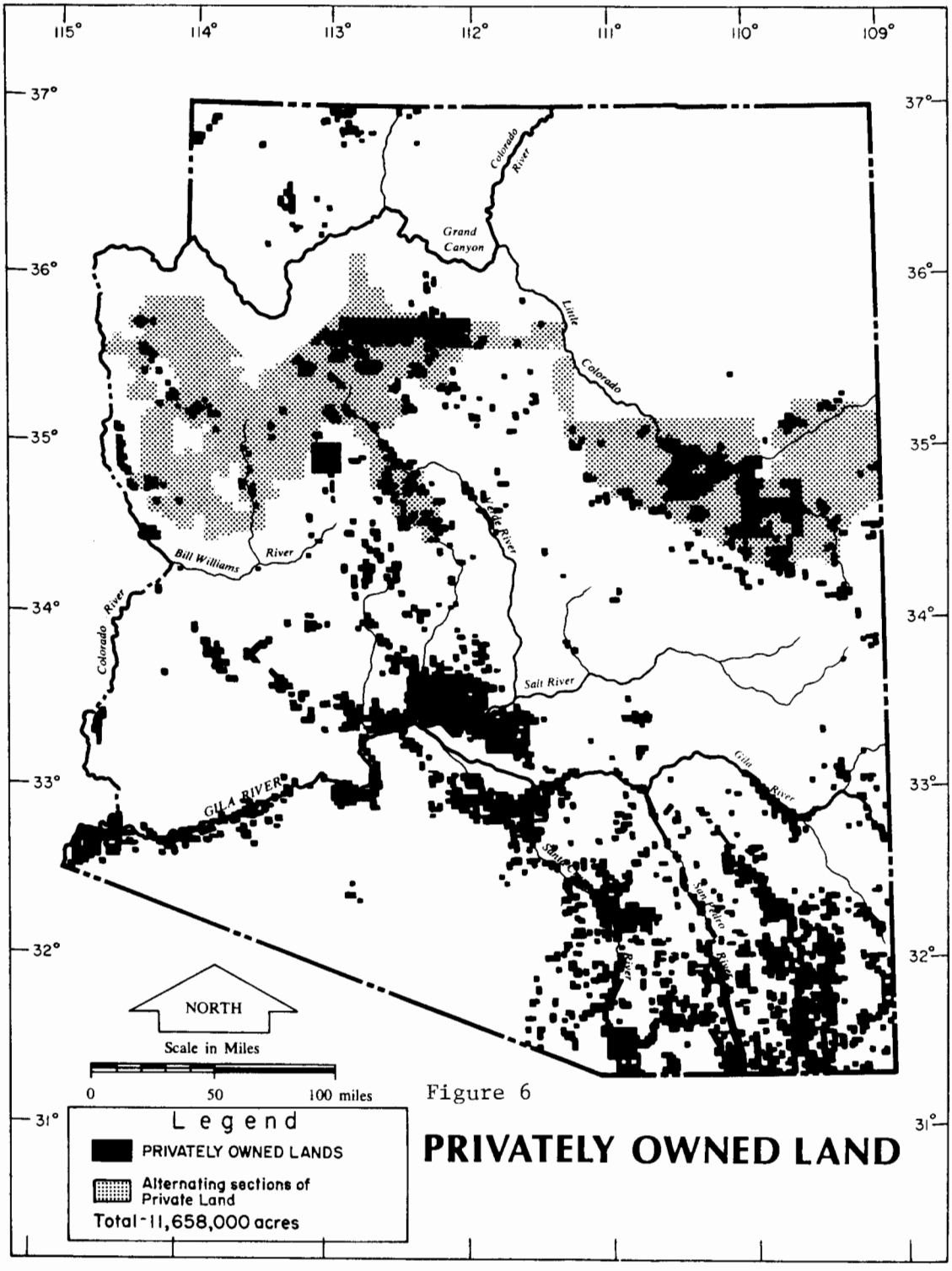

Figure 6

PRIVATELY OWNED LAND

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CHAPTER 3

ENVIRONMENTAL BACKGROUND

MODERN ENVIRONMENTS IN THE STUDY AREA

Southeast Arizona is part of the extensive physiographic Basin and Range Province of western North America. Numerous isolated mountain ranges trending north-northwest to south-southeast rise above broad, continuous alluvial basins. In the north of the study area, important ranges include (from west to east) the Silver Bells, the Roskruges, the Tucsons, the Tortolitas, the Tortillas, the Santa Catalinas, the Rincons, the Galiuros, the Santa Teresas, the Winchesters, the Pinalenos, the Gilas, and the Peloncillos. To the south (from west to east), the Baboquivari, Coyote, Sierrita, Patagonia, Santa Rita, Whetstone, Huachuca, Mule, Dragoon, Dos Cabezas, and Chiricahua Mountains tower above valley floors. Mountain formations began during the middle Miocene, 26 million years ago, when the Basin and Range Province was uplifted and faulted. The mountains are composed of Pre-Cambrian granite, gneiss, schists, Paleozoic and Mesozoic sedimentary rock, and Mesozoic intrusive volcanic rock (Barton 1925).

Elevations in the study unit range from 2000 feet on the flood plains to 10,717 feet on Mt. Graham in the Pinaleno Mountains. The terrain tends to rise, and mountain ranges grow more massive as one moves from the northwest to the southeast. Lowest elevations occur northwest of Tucson where basin floors of 2000-3000 feet and mountain summits of 3700-4500 feet are the norm. By contrast, southeastern basins such as the Sulphur Springs and San Bernardino Valleys average 4000-4200 feet, whereas peaks stand 6500-10,700 feet above sea level.

This wide range in elevation has a major effect on the area's climate. Following the elevational gradient, average annual precipitation ranges from 7-20 inches (18-50 centimeters), reaching 35 inches (89 centimeters) on the highest peaks. Precipitation thoughout the study area is biseasonal, consisting of westerly winter cyclonic storms and intense, often localized, convectional summer thundershowers associated with moist tropical air from the Gulf of Mexico.

The ratio of winter to summer rainfall varies across the study area. Along the western margins, winter rains account for 45-50 percent of the total annual precipitation; in the southeast corner, they provide only 30-35 percent (Hastings and Turner 1965).

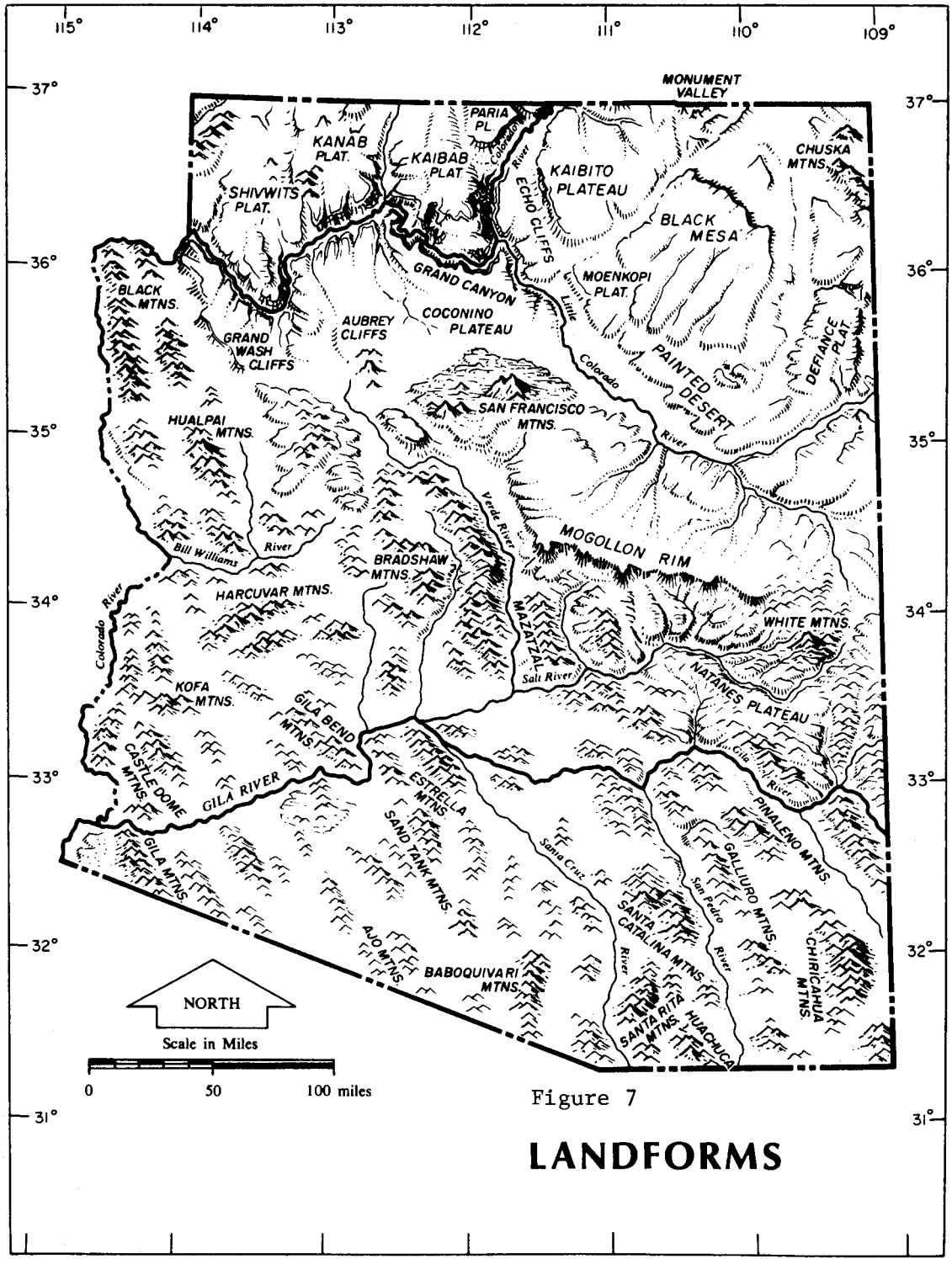

Figure 7

LANDFORMS

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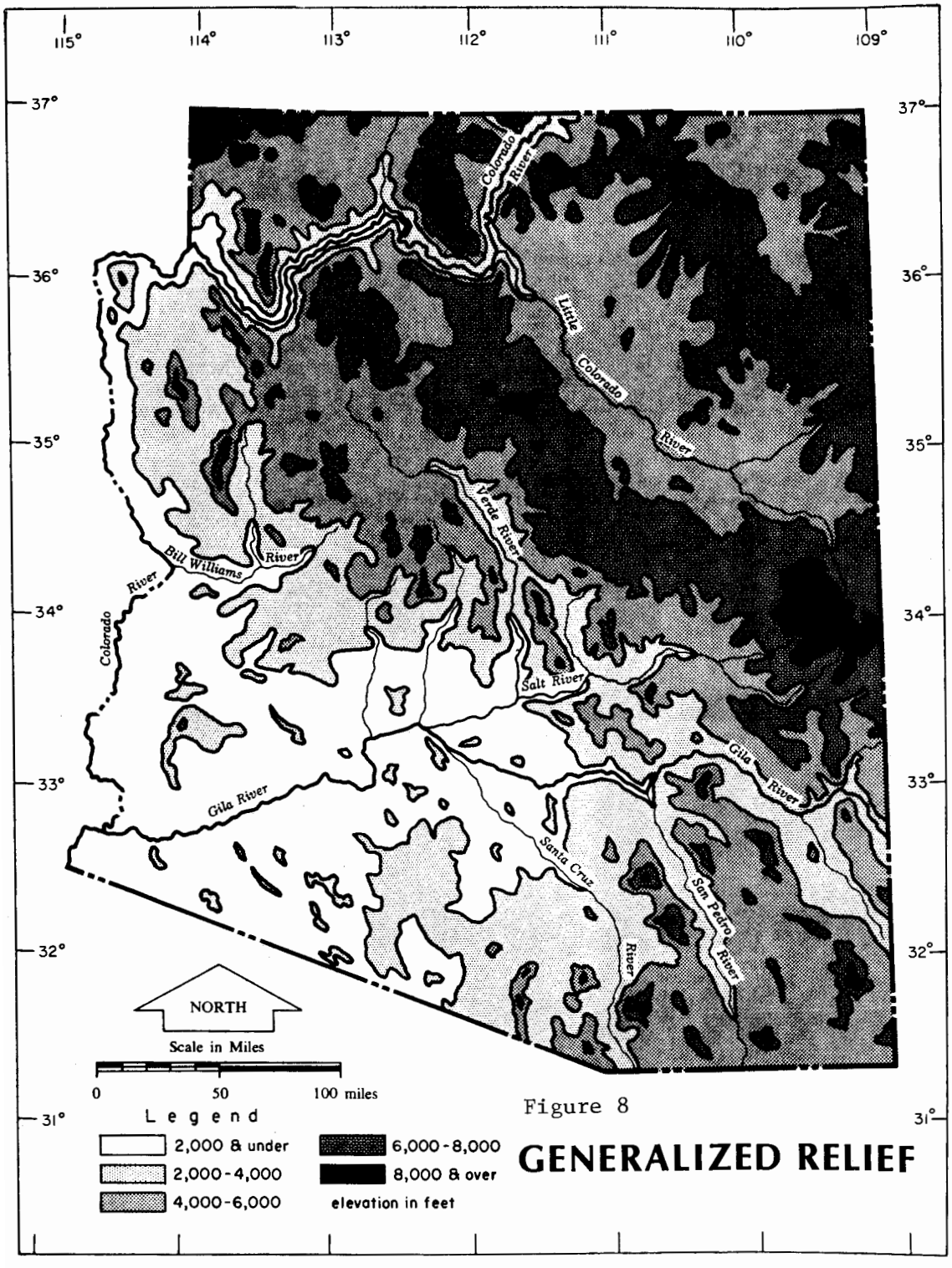

Figure 8

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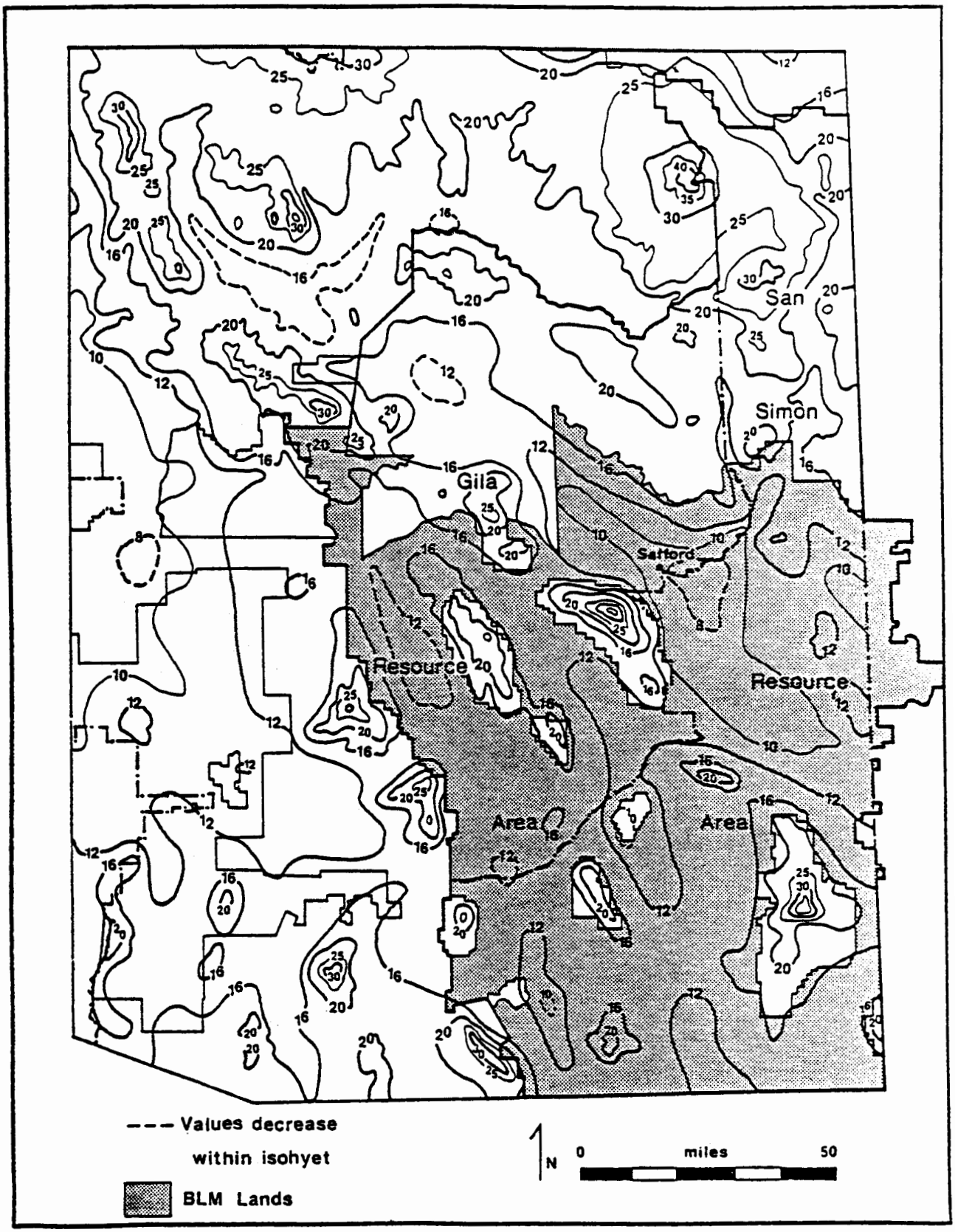

Figure 9

Mean Annual Precipitation

Furthermore, as in most areas of southwest North America, precipitation greatly varies seasonally and annually. For example, the coefficient of variation of yearly precipitation for Tucson is 30 percent. Coefficients of variation generally vary inversely with the mean amount of rainfall; areas receiving less rainfall also endure greater annual variability. Summer rains are more reliable than winter ones. In Tucson the coefficient of variation is 40 percent for summer precipitation and 54 percent for winter precipitation (Hastings and Turner 1965).

Like precipitation, temperature is greatly affected by altitude. Average annual temperatures range from 56 degrees F (13 degrees C) in higher elevations to 68 degrees F (20 degrees C) in lower areas. Summer temperatures are warm to hot throughout the study area, except in higher mountains. Winter temperatures are cool to mild. Throughout the year, daily temperature ranges are great, varying by as much as 30-50 degrees F.

Elevation significantly influences the annual number of frost-free days. A convenient rule-of-thumb is to subtract 30 days without frost for each 1000 feet increase in elevation. Tucson, for example, at 2500 feet, enjoys an average of 250 frost-free days. On the other hand, Willcox, at 4200 feet in the Sulphur Springs Valley has a frost-free growing season of 200 days.

Because of high temperatures, low humidity, and scarcity of precipitation, rates of evapotranspiration are high, and most of the study area is arid or semi-arid. True aridity prevails in the lower stretches of the region west of Tucson. As the elevation increases, the climate becomes semi-arid. Higher mountain ranges stand out as humid islands surrounded by a relatively dry terrestrial sea.

Vegetation is largely determined by climate, which in turn responds to elevation. The study area, like the rest of the Southwest, has marked altitudinal zones of plants and, to a lesser extent, of animals dependent upon certain plant associations. Five vegetation life zones occur in southeast Arizona: (1) the Lower Sonoran, consisting of desert-scrub; (2) the Upper Sonoran, composed of grassland, chaparral, and woodland; (3) the Transition, made up of a mixed pine forest: (4) the Canadian, or fir forest; and, (5) the Hudsonian Fir-spruce alpine forest (Lowe 1964:9). See Appendix 3 for dominant plant communities.

Two of the four major regional subdivisions of the Great American Desert-- the Sonoran and the Chihuahuan---are represented in the Lower Sonoran life zone in southeast Arizona. The Sonoran Desert, florally the most varied of the four, encompasses the western margins of the study area at elevations of 3000 feet or under. The Chihuahuan Desert, which occurs at higher elevations, occupies small, isolated portions of the San Pedro, Sulphur Springs, and San Simon Valleys. The Sonoran Desert provides a richer variety of plants and animals than the Chihuahuan, covers a larger area of the study unit, and was more important to prehistoric and historic human populations in southeast Arizona.

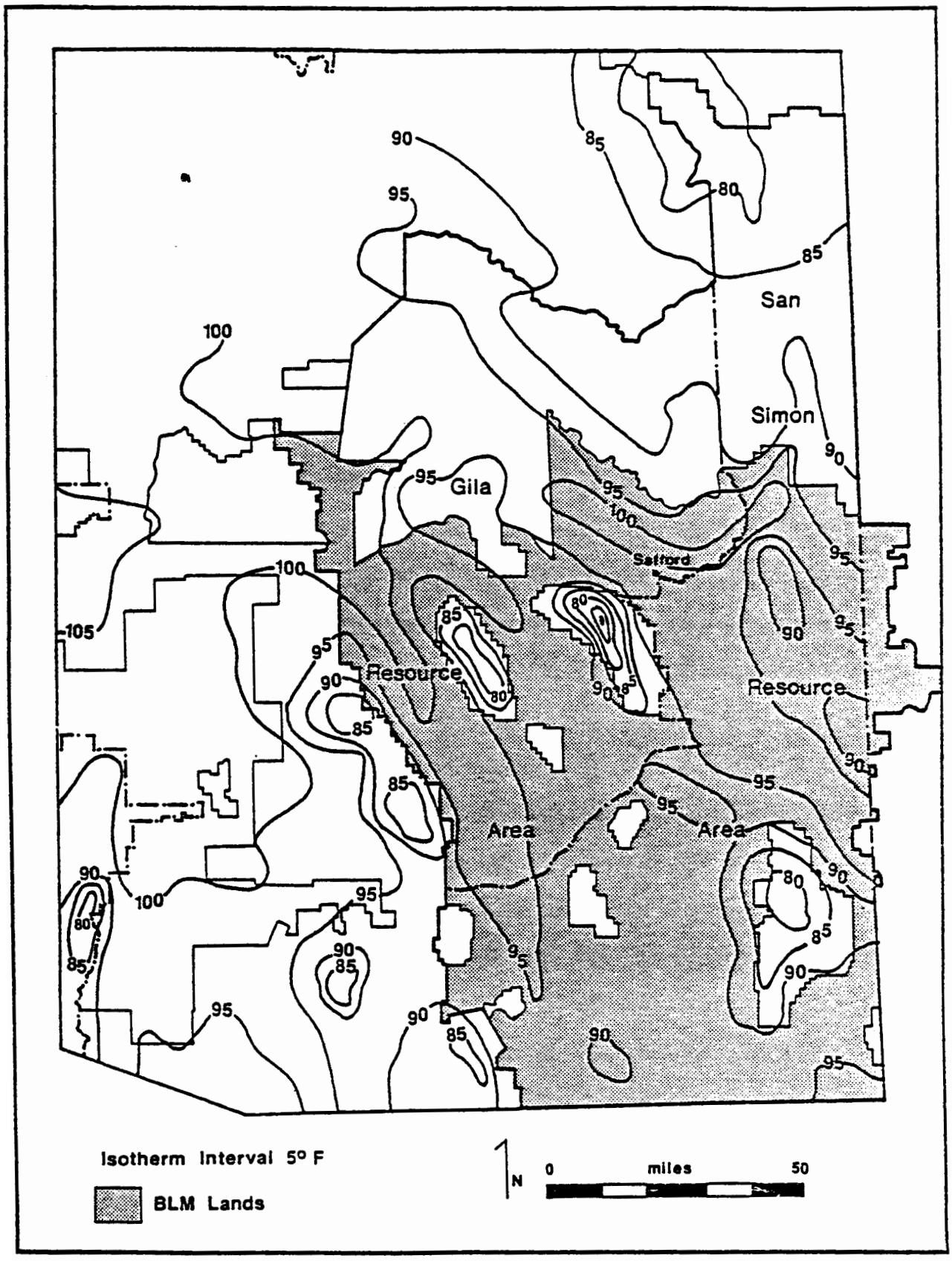

Figure 10
Mean Maximum July Temperatures

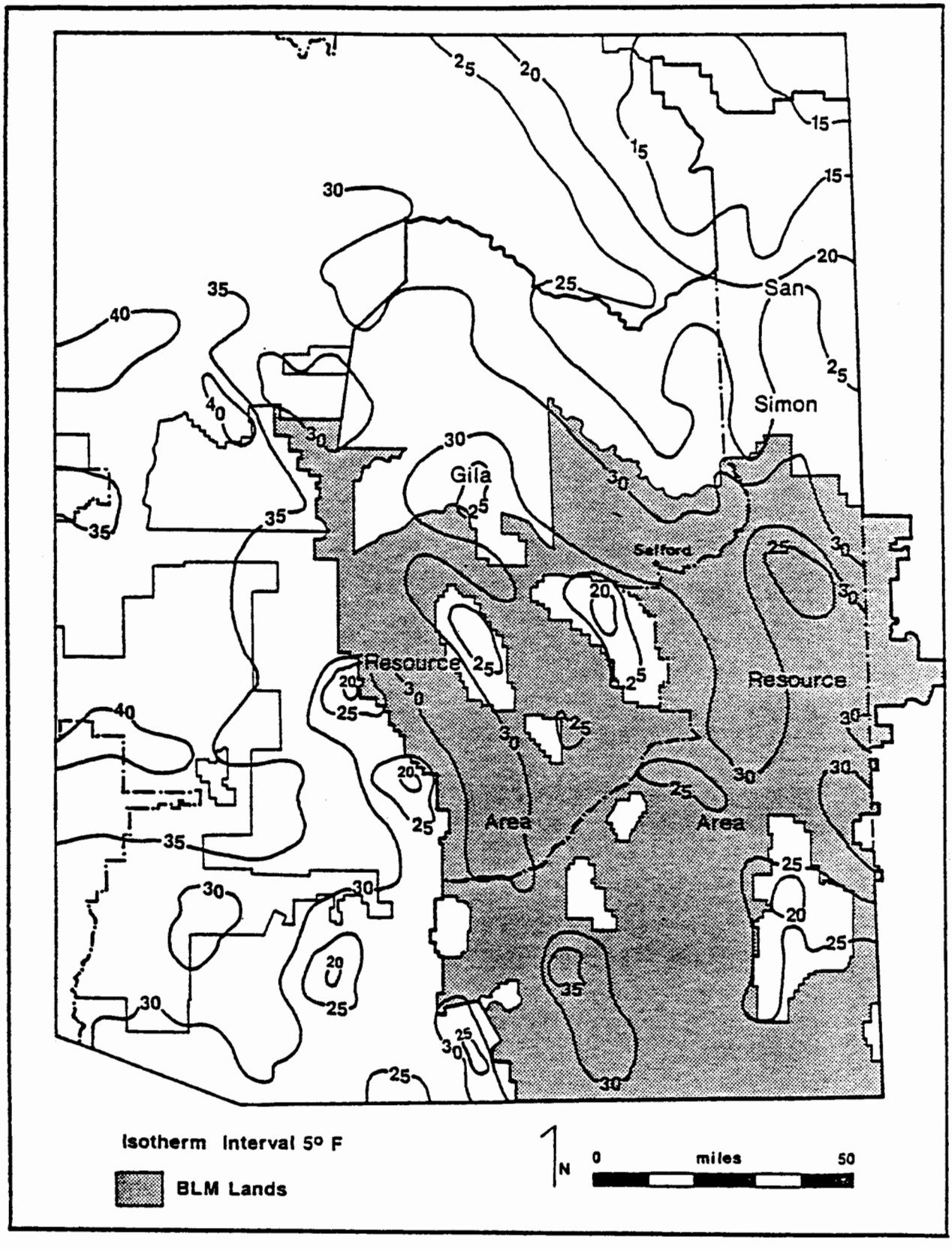

Figure 11

Mean Minimum January Temperatures

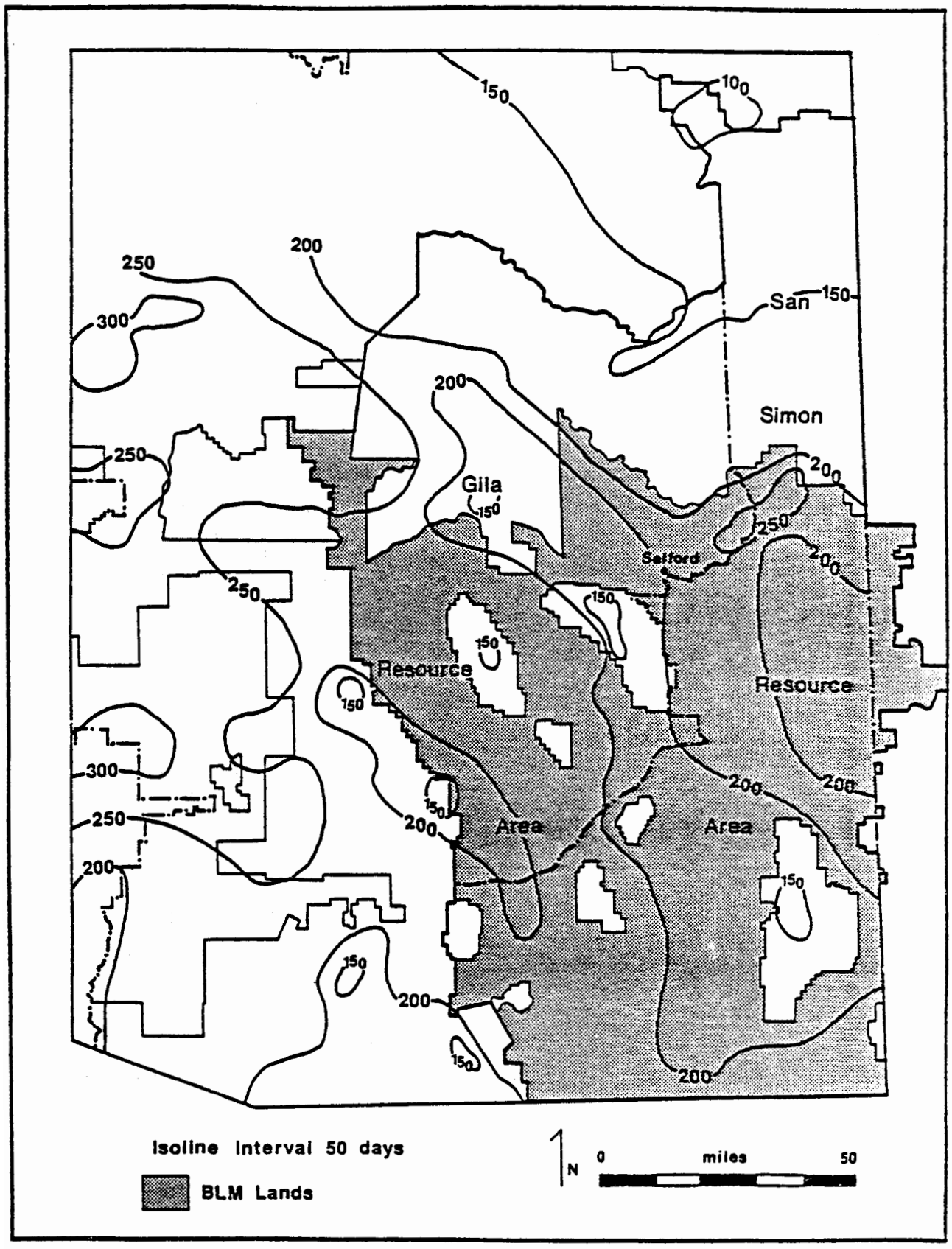

Figure 12

Mean Length of Growing Season (32°F base)

The Upper Sonoran life zone occurs from 3000 to 7000 feet and supports a rich variety of plants, many extremely important to prehistoric people. The Desert-grassland plant community of the Upper Sonoran life zone occurs above the desert and below either the evergreen woodland or the chapparal. Desert grasslands range from rare pure stands of perennial grasses to the more common mixed grass-shrub communities. Dense stands of tough evergreen shrubs such as manzanita and scrub oak, only occasionally broken by isolated trees characterize the chaparral plant community of the Upper Sonoran life zone and occurs most frequently in the northeast part of the study area, although small isolated stands occur throughout the study area. The evergreen woodland plant community is more open than the chaparral, encouraging a more mixed stand of vegetation including grasses, succulents, shrubs, and trees dominated by evergreen oaks.

The Transition life zone is a pine forest occurring from 7000-8000 feet in the study area. Dominated in this area by Ponderosa pine, this zone also includes several plant species important to prehistoric people exploiting this zone in late spring through the fall.

The Canadian life zone, or fir forest, lies above the Transition zone at altitudes of 8000-9000 feet in the Pinaleno, Santa Catalina, Santa Rita, Huachuca, and Chiricahua Mountains. Douglas fir and white fir are the most common trees. Above 9000 feet, on the summit of the highest peaks in the Chiricahua, Pinaleno, Huachuca, and Santa Catalina ranges is the Hudsonian life zone, or alpine spruce fir forest. The area covered by these two zones in the study unit is small, and neither zone was particularly important to human societies in either historic or prehistoric times except as areas for hunting.

Running throughout the five life zones is another extremely important type of biotic community--riparian woodland. Riparian woodland consists primarily of broadleaf, winter deciduous trees like cottonwood, willow, walnut, elder, ash, and sycamore. This habitat is restricted to the flood plains and channel margins of the study area's better watered drainages. Although species composition varies according to elevation and the corresponding differences in temperatures and precipitation riparian woodland is one of the most mesic of biotic formations in the southwest. The presence of surface or shallow subsurface water along the drainages insures an ample supply of moisture. In arid and semi-arid areas, riparian woodland supports the densest populations of plants and animals. Before the advent of windmills and pump-powered wells, these areas were also the scenes of the most intensive human settlement. Riparian woodlands of the Sonora Desert and its margins constitute true oasis. They are "the threads upon which centuries of human occupation have hung" (Sheridan and Nabhan 1978:3).

The major drainage network in the study unit is the lower half of the upper Gila River system. Although the Gila still flows along the northern margins of the study area, its two largest tributaries in southeast Arizona-- the San Pedro and the Santa Cruz--have undergone great hydrologic change during the last century.

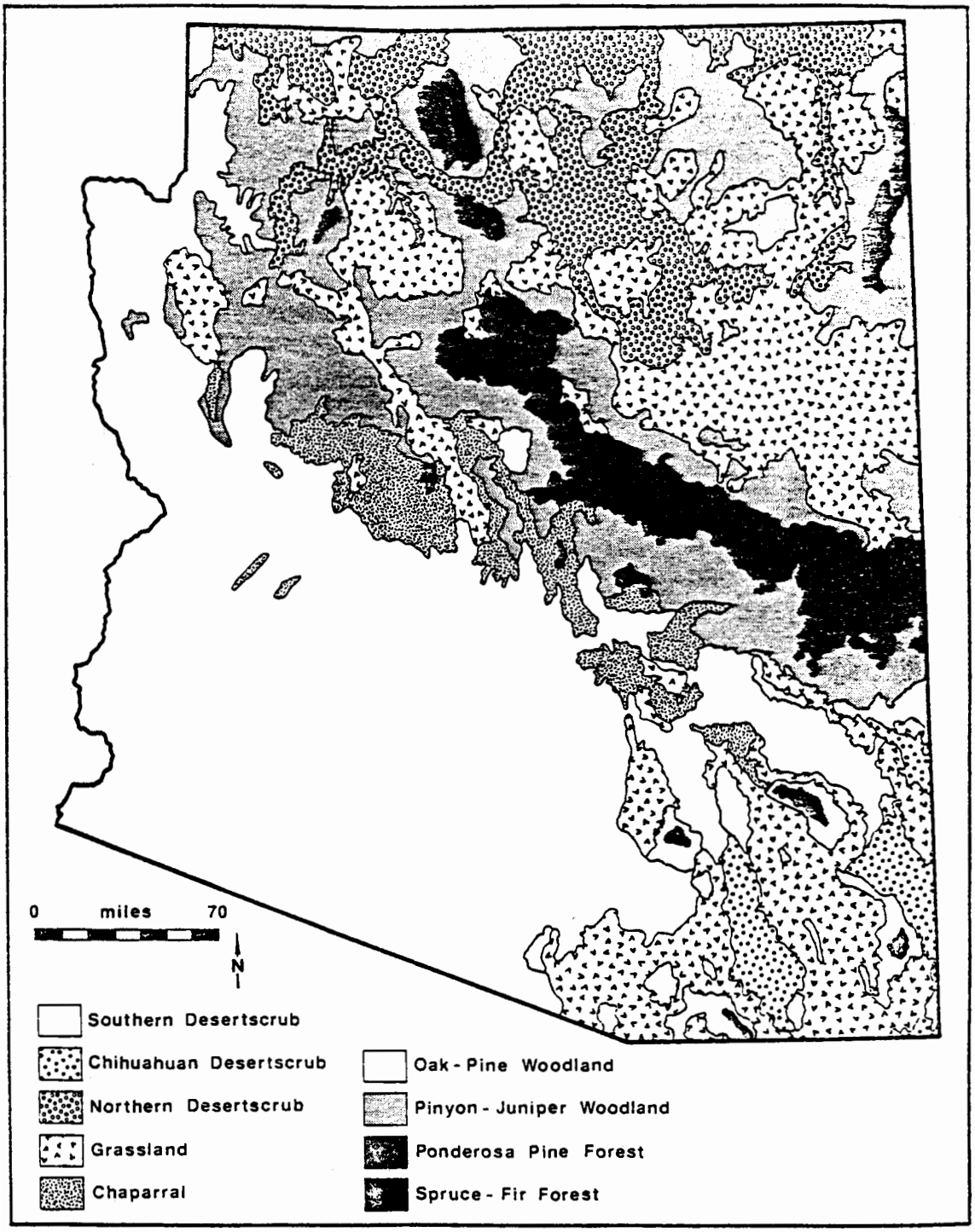

Figure 13 Vegetation of Arizona. (Modified from THE NATURAL VEGETATIVE COMMUNITIES OF ARIZONA, by D. E. Brown, 1973.)

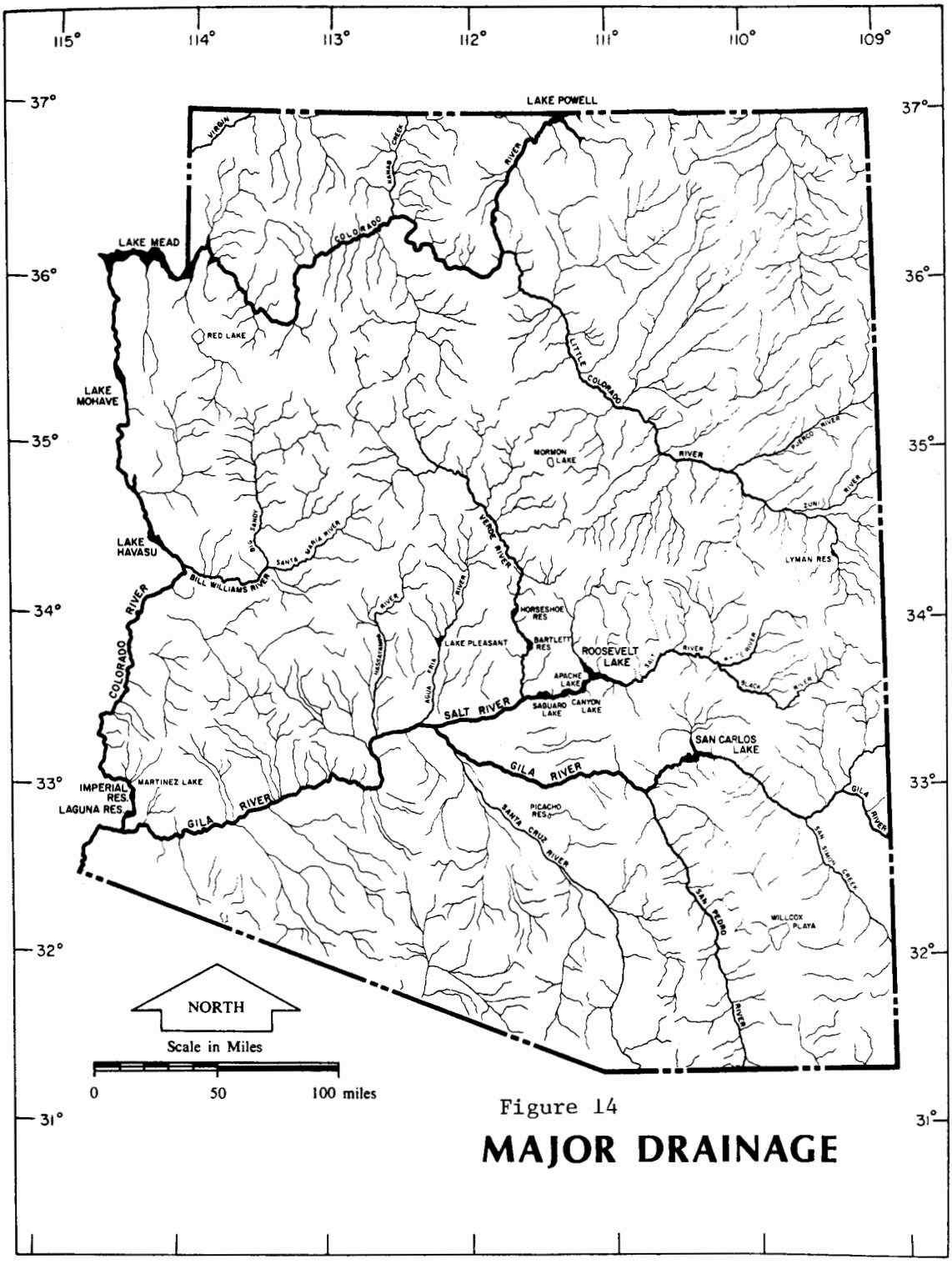

Figure 14

MAJOR DRAINAGE

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Until the second half of the 19th century, the San Pedro was a perennial stream and the Santa Cruz an intermittent one with long stretches of surface flow. Both rivers supported extensive riparian vegetation. Ground water pumping, entrenched channelization, destruction of riparian plant life, and overgrazing of the surrounding watersheds, however, transformed the Santa Cruz into a sandy waste and reduced the San Pedro to a trickle.

The only other stretches of permanently flowing water of any extent are Aravaipa Creek, a tributary of the San Pedro, and Sonoita Creek, a tributary of the Santa Cruz. Although numerous small creeks exist in upper canyons of mountain ranges such as the Santa Catalinas, the Pinalenos, the Chiricahuas, and the Huachucas, flow rarely extends for more than a few miles. Other important drainages in the study unit, such as Altar Wash, Whitewater Draw, Babocomari Wash, Rillito Creek, Pantano Wash, Canada del Oro, and San Simon Creek are dry except during the floods that follow heavy rains (Dunbier 1968; Cooke and Reeves 1976).

One notable example of internal drainage occurs in the study area--Willcox Playa, a shallow, salt-encrusted depression intermittently covered by a thin sheet of water, in the Sulphur Springs Valley. South of Willcox Playa, Whitewater Draw drains into the Rio Yaqui system of northwest Mexico. All the other major drainages of the study unit empty north into the Gila.

Many of these drainages, including the Santa Cruz, San Pedro, San Simon, and the streambeds emptying into Willcox Playa in the Sulphur Springs Valley have become deeply entrenched during the past century (Cooke and Reeves 1976). The arroyos formed by the downcutting of these drainages are among the study area's most distinctive landforms. Their formation, as well as the other environmental changes in southeast Arizona during prehistoric and historic times, are discussed in greater detail in the following sections.

PALEOENVIRONMENTS IN THE STUDY AREA

The end of the Wisconsin substage of the Pleistocene is a complex and poorly understood time. Pollen data from Willcox Playa, a remnant of Pleistocene Lake Cochise, suggest an environment around 22,000 years before the present (BP) with much greater effective moisture than at present (Hevly and Martin 1961). Increased effective moisture can be a function of many factors, including increased precipitation, lowered temperatures, reduced evaporation without precipitational changes, changes in seasonality or intensity of precipitation with no increase in total precipitation, a change in ground water discharge independent of climate, or a combination of two or more of these (Mehringer 1967a:96).

During the maximum extend of Wisconsin glaciation, evidence in the form of pollen from coprolites, playa lakes, alluvium, and spring mound

deposits shows that vegetation zones in the Southwest were displaced as much as 1000 meters below those of the present (Mehringer 1967b:249). During this period, modern desert areas had a heterogeneous mosaic of park and, woodland, and sagebrush or grassland flora (Mehringer 1967b:249). Unfortunately, there is no secure dated evidence in southern Arizona for vegetation changes between 20,000 BP and 12,000 BP, the period just before the marked climate shifts associated with the Two Creek interstadial. In particular, pollen records dating between 13,000-11,500 BP are lacking (Mehringer 1967a).

The Two Creeks interstadial, occurring around 12,000 BP, was associated with the onset of warmer and drier conditions in southeast Arizona. In the San Pedro Valley, this interstadial is evident in the change from fluvial deposition in the form of pond and marsh deposits to channel cutting and colluviation (Haynes 1971:8). Palynological studies revealed a large upward displacement of vegetation at this time (Martin 1970). The oldest pollen record from the Lehner site (11,300 BP), directly associated with the radiocarbon date, mammoth bones, and the same stratigraphic unit from which the Clovis material was recovered, indicates a desert grassland at this time (Mehringer and Haynes 1965). Mehringer (1967b:251) however, believes that this desert grassland was not a major feature of the San Pedro Valley until about 7500 BP.

The period between 11,500-7000 BP was labeled the Anathermal by Antevs (1948:1952). In his view the period began with climates as warm as those at present, with a trend toward still greater mean temperatures and a gradual shift from sub-humid to humid conditions. In contrast, Martin (1963a) thought that the Anathermal was warm throughout with an increasingly heavy summer rainfall pattern. As Haynes (1967:268) noted, the chronological and climatic reconstructions of geologists before the development of radiocarbon dating were based on the assumption that streams filled valleys with alluvial deposits during glacial stadials, with channel cutting occurring during interstadial episodes. Geologists also reasoned that fluvial periods, as marked by a rise in water levels in inland basins, generally corresponded with stadials. Most deposits associated with early human remains investigated by such geologists as Antevs and Bryan were thought to correspond to the last major moist interval of the Wisconsin glaciation, now known as Valders stadial and coterminous with Antevs' Anathermal (Haynes 1967:268).

More recent analyses reveal that this period was marked by a fluctuating trend toward decreased effective moisture in the study area and throughout the Southwest (Irwin-Williams and Haynes 1970; Irwin-Williams 1979). At the Lehner site, the "k" level deposit shows a minor trend toward more effective moisture around 10,400 BP (Haury, Sayles, and Wasley 1959; Mehringer 1967a). Later re-examination of the Lehner data suggests an earlier date for this moist episode between 11,500-11,000 BP (Irwin-Williams 1979:31) and that the development of the Clovis horizon is linked with the concomitant expansion of the grasslands.

Another minor trend towards greater effective moisture occurred between 8500-8000 BP (Mehringer 1967a), which possibly was related to the

expansion of the late Paleo-Indian Cody complex (Irwin-Williams and Haynes 1970). Evidence for this trend comes from pollen profiles recovered from the Double Adobe site in southeast Arizona and from the Tule Springs site in Nevada. The evidence from these sites however, indicates that climatic conditions essentially like those of the current period were present by 7000 BP (Mehringer 1967a:99).

The next major climatic interval was the Altithermal, which spanned the period between 8000-4500 BP. As originally defined by Antevs, the Altithermal was markedly more arid and warmer than the present (Antevs 1962). The concept of a hot, dry Altithermal later was challenged by Martin (1963a, 1963b). Martin saw the Altithermal as a period of greater effective moisture having heavy summer rains, in part due to his analysis of the palynological record from the Double Adobe site and Murray Springs (Mehringer, Martin, and Haynes 1967). In particular, the Murray Springs record shows slight increases in the frequencies of pollen of such mesic species as pine and cattail in beds deposited between 5000-4000 BP. By 4500 BP, vegetation zones were displaced downward ca. 300 meters (Mehringer, Martin, and Haynes 1967:796-797).

In part, these conflicting views result from the absence of well-dated exposures from the period between 7000-5000 BP (Mehringer, Martin and Haynes, 1976) due to removal of such sediments by erosion. Haynes (1966) has noted a marked change in Martin's pollen record at 7910 BP. Above this date is a zone of no pollen co-occurring with evidence of a well-developed erosional surface. Accordingly, it is impossible to determine how much time elapsed between the date and the erosional surface (Mehringer 1967a:99). As a result of erosion, the period is poorly known, and deposits are rare. The extinction of the last of the Pleistocene megafauna (e.g. Mammuthus, Bovis, Capromeryx) during this period, however, suggests a major climatic change. In general, the period is represented by an erosional break preceded by palynological indications of decreased effective moisture (Irwin-Williams 1979:32).

The differences in interpretation of the climate of the Altithermal may be more apparent than real. The pollen record used by Martin (1963a; 1963b) as evidence for a moist Altithermal dates to the latter part of the period (Mehringer, Martin, and Haynes 1967). This record suggests a fairly moist climate at the end of the Altithermal. As originally defined by Antevs (1962), the succeeding period, the Medithermal, is one of greater effective moisture, dating to between 5000-25000 BP. Accordingly, the late Altithermal at Murray Springs could be equivalent to Antevs' early Medithermal. So, both Antevs and Martin may be correct (Mehringer 1967a:100).

In addition, geographic factors may be partially responsible for the difference in interpretations. Antevs' concept of a dry Altithermal appears to have large support in much of the northern and central Rocky Mountains, the Great Basin, and the Mohave Desert (Mehringer, Martin, and Haynes 1967:795). The conflicting evidence from Murray Springs in the San Pedro Valley near the Mexican border may not represent the western United States but an extension of conditions from northern Mexico, where this period also is poorly known (Mehringer, Martin and Haynes, 1967:795).

The following Medithermal Period is one of a more favorable environment that may be related to the marked increase in Archaic sites during this period (Irwin-Williams and Haynes 1970). This period was ended by a dry interval around 2500 BP, perhaps equivalent to the Fairbanks drought of Antevs (1962). This dry interval began a period of decreased effective moisture, which lasted until 1000 BP. Around 1000 BP, a brief erosional cycle occurred, probably equivalent to Antevs' Whitewater drought (Irwin-Williams 1979:32).

Too few pollen records exist of the period after 1000 BP to permit extending these fluctuating climatic cycles to the present (Mehringer 1967a). Until recently, little attention has been paid to pollen records of this period. With the initiation of sustained investigations at the Hohokam site of Los Morteros (AA:12:57), however, this picture may soon change (cf. Downum, Fish, and Fish 1981).

The Tucson Basin receives more rainfall than much of southern Arizona, with a correspondingly high diversity of flora and fauna. The presence of two distinct wet seasons and a growing season of 250 days allowed the Hohokam to exploit a variety of agricultural microenvironments and wild plant and animal species habitats (cf. Yang and Lowe 1955). But increasing aridity and environmental changes continued. In addition, Doyel has suggested that the hydrology and topography of the Tucson Basin and Lower San Pedro Valley minimize the viability of irrigation (Doyel 1977a, 1977b:553).

In early Rincon times, the impact of deteriorating environmental conditions were related to changes in periodicity of rainfall and arroyo cutting (Martin 1963b; Weaver 1972).

Evidence shows an environmental change in the San Pedro River area from most moisture occurring in the warm season, to a more even distribution of precipitation similar to the region's present climate (Franklin 1978). The decline in summer moisture probably placed more stress on a subsistence system already pushed to its limit by the large population already exploiting the agricultural potential of the drainages and nearby areas. The scarcity of buffalo remains reveals that, although buffalo inhabited the San Pedro Valley (Agenbroad and Haynes 1975), they were never more than a minor component of subsistence.

Evidence for late prehistoric environmental changes in the entire study area is sparse, particularly in the absence of systematic pollen analyses, which could confirm climatic deterioration (Agenbroad and Haynes: 181). The evidence for climatic change has come from outside the area (e.g. Weaver 1972), so that at present, evidence for such change in the study area after AD 1000 is extremely weak (Masse 1979a:181).

Franklin (1978:378-379) has suggested that the drought of the late 1200s that affected the Anasazi area also struck southeast Arizona, resulting in depopulation, at least in the San Pedro Valley. These conditions may have improved by AD 1300, permitting resettlement. The environmental conditions may have worsened, ultimately resulting in final abandonment.

By the time of European contact, the three primary indigenous aboriginal societies occupied the zones with which they are historically associated. The Papago lived in the arid environments of southern Arizona in an area of no permanent streams, necessitating greater dependence on wild plant foods and a two-village annual pattern (cf. Underhill 1940). In contrast, the Pima and Sobaipuri lived along permanent rivers.

The nomadic Apache groups gradually moved into southeast Arizona during the protohistoric period. They occupied marginal lands, but extensively raided the produce of the San Pedro and Santa Cruz Valleys.

HISTORIC ENVIRONMENT

The environment of the study unit underwent several significant climatic changes during the Late Pleistocene and Holocene times. Fluctuations in temperature and the timing and amount of precipitation triggered fluctuations in the flora and fauna of the area as well. Changing precipitation regimes also affected the hydrological dynamics of the region's watersheds.

Environmental change also characterized the historic period. The most profound transformations of the environment, however, seem to be more closely associated with human impact than climatic change, even though some researchers claim relatively subtle secular changes in rainfall and temperature have occurred in the last 400 years. Man rather than nature appears to have caused many of the drastic plant, animal, water and landform changes in southeast Arizona.

Human populations have modified the natural environment of the New World since the late Pleistocene. One theory even contends that migratory Paleo big-game hunters caused the extinction of many larger mammals in North America in a relatively short time (Martin 1967). Nevertheless, as man's technological capacity expanded, his impact upon the natural environment grew increasingly more widespread and systematic. Succeeding Indian, Hispanic and Anglo-American occupation of the study unit influenced to an increasing degree the plants, animals, fauna, drainage patterns, and landforms of the area. The cumulative results of these changes are the increasing, perhaps irreversible, degradation of many aspects of southeastern Arizona's environment.

Several Indian groups occupied the region when Europeans or Euro-Americans first came to colonize. Piman-speaking people practiced irrigation agriculture along the Gila, San Pedro, and Santa Cruz Rivers. These Northern Pimans also gathered wild plant foods and hunted game in the surrounding deserts grasslands, and mountains. Small groups of Suma, Janos, and Jocome Indians-- Uto-Aztecan speakers whose languages apparently resembled Tarahumara or Opata (Naylor 1981)--probably followed a transhumant, hunting and gathering way of life in the southeast portion

of the study unit. Western Apache groups began moving into the upper Gila country during the seventeenth century, if not earlier. All of these groups affected to differing degrees the environments they exploited.

It seems certain that grasslands were more extensive, surface water more abundant, and riparian vegetation more lush before permanent Anglo-American settlement in southeast Arizona. Numerous reports of Spanish, Mexican, and Anglo-American visitors to the region describe a landscape much different from the one found in the area today (Hastings and Turner 1965; Dobyns,1981).

Historic environmental change in the study unit has received much attention from a variety of climatologists, geomorphologists, geographers, and historians. Emphasizing different types of data, these investigators have engaged in long-running, occasionally acrimonious debates concerning the causes of such change. Two major environmental perturbations in particular have captured their attention: the diminishing of the area's grasslands and the entrenchment of stretches of its watersheds. Both climatic change and human intervention are advanced as reasons for these phenomena.

Most investigators agree that up until the second half of the 19th century, grasslands were more open and extensive than they are today (Hastings and Turner 1965; Dobyns 1981). Since that time, the grasslands community experienced an increase in the number of woody and shrubby plants such as mesquite and various species of Acacia. Furthermore, the abundance and quality of the grasses themselves seem to have diminished. Many travelers reported lush stands of grasses in areas that are now barren or infested by thorny shrubs. Hastings (1959b), however, pointed out that such travelers' accounts need to be carefully interpreted because different travelers occasionally described highly different conditions for the same region. Both seasonal and annual variation in precipitation caused grasslands vegetation to highly fluctuate. During a wet year, grasses might grow "belly high to a horse". During a drought, the same grasses might be withered or spotty. As Hastings and Turner (1965:38) note:

> It would be an exaggeration to think of the desert grassland as being uniformly like the midwestern prairies--open rolling, and treeless. Parts were--and still are--but the chances are that most were not. Although the past century has seen a striking increase in the number of spiny shrubs and small trees, the invasion has been in the nature of an increase in the density of species that already were present, not (except for introduced exotics like Russian thistle) an extension of the range of new plants into areas that they formerly did not occupy.

One major hypothesis advanced to explain the deterioration of southeast Arizona grasslands is the suppression of fire--fire set by man as well as naturally ignited. Experimental and field studies by biologists

have shown that fires at regular intervals will reduce or prevent the spread of shrubs in grasslands areas. According to Humphrey (1958:243), "Invading shrubs...will normally not produce seed for several years. Fire occurring at intervals more frequent than this...would continue to keep them suppressed."

Furthermore, regular fires do not greatly damage production of grasses themselves. Grasses follow a fairly definite growth cycle. When temperatures and moisture are favorable, growth begins and seed stalks are produced. After the seed matures, it is disseminated and growth stops. The grass then enters a dormant stage. During dormancy, most of the food reserves needed for more growth are stored in the roots. Stems and leaves become dry--ideal tinder for range fires. These fires may burn off much of the dry biomass of the affected grassland, but roots and seeds buried in the soil may survive. When growth is resumed, new shoots do not have to compete with other species for sunlight and water. The ash from burns also may enhance soil fertility and stimulate even greater production and perennial grasses.

Indian groups throughout North America used fire as both a hunting strategy and a method of warfare. Dobyns (1981) points out that tribes in California, Arizona, and Sonora regularly set fire to desert, grassland, and riparian vegetation to drive out both small and big game and to delay or threaten their enemies. Following Stewart (1956), he argues that man-made fires were as important in maintaining the grasslands of southeast Arizona as they were in the prairies of the Midwest (Dobyns 1981).

Hastings and Turner (1965) dispute this claim. They argue that historical evidence is not extensive or detailed enough to support the contention that fire caused by man was the primary agent in shrub suppression. Fires would have to be frequent and extensive enough to retard the invasion of shrubs and small trees throughout southeast Arizona grasslands. They conclude that at least 5 percent of the entire grassland would have to be burned each year to maintain a relatively shrub-free grassland. According to them, a survey of some 22 travelers' reports from the 1840s and early 1850s fail to find mention of any evidence of large-scale burning, except for fires set by travelers themselves.

Translating the account of a Mexican military expedition led by Antonio Comaduran, Captain of Tucson Presidio, Dobyns (1981) challenges Hastings and Turner's interpretation. Comaduran and his experienced soldiers and Indian allies found Western Apaches actively engaged in fire drives and found the remains of previous fires in Aravaipa Canyon. From this account, and ethnographic evidence on the use of fire drives by other Indian groups, Dobyns claimed the Indians of southeast Arizona burned grasslands often enough to suppress shrub invasion. He also argued that travelers' accounts consulted by Hastings and Turner were a biased sample, written by Anglo-Americans with little experience on the southwest frontier.

Though Dobyns (1981) correctly points out that Comaduran may have been wiser to Indian ways than the travelers consulted by Hastings and Turner (1965), he fails to grapple with the fact that these accounts do not mention the existence of any large burned-over areas. The Anglo travelers may not have seen Apaches lurking in the mountains above them, but they surely would have noticed large-scale burning on grasslands they crossed. Dobyns' monograph therefore does not provide clearer and unequivocal evidence supporting the theory he advances. One must agree with Hastings and Turner's (1965:27) cautionary note:

> If burning is an adequate explanation for the existence of grasslands, then it not only must have occurred, it must have occurred at frequent intervals over the entire expance of the prairies. There is no evidence that it took place on the requisite scale with a requisite frequency. There is no evidence that it did not. One is justified only in stating that to the extent that fire did occur it may have helped locally to suppress woody plants. In short, it is by no means apparent that the desert grasslands of the Sonoran region owed their existence to "unrestricted burning" by aborigines, and one must agree with Sauer (1944:554) that one ought not to be "dogmatic about their origin."

Another major hypothesis concerning grasslands deterioration in southeast Arizona is the overgrazing by the hundreds of thousands of livestock, primarily cattle, introduced in the 1870s and 1880s. Cattle are know disseminators of seeds of shrub species such as mesquite. They not only spread these seeds in their feces, but also scarify them in their alimentary tracts, thereby facilitating seed germination. The denuded aspect of the range of the study unit recorded by photographs taken in the 1890s (Hastings and Turner 1965) testifies to the impact of livestock on grassland, woodland, and desert vegetation.

The introduction of large numbers of livestock by Anglo-American ranchers also coincides with the spread of shrubs and small trees on the study unit's grasslands. This association has led many investigators to conclude that overgrazing is responsible for grassland diminuition. But Hastings and Turner (1965) point out that large numbers of cattle owned by Spanish and Mexican ranchers roamed the same ranges from the 1790s-1830s without causing long-term damage.

Hastings and Turner (1965) therefore conclude that secular climatic changes rather than human intervention are the primary cause of the desertification or shrub invasion of southeast Arizona's grasslands. Examining climatic records from 1898 to the present, they argue that the region has experienced both a decrease in precipitation and an increase in temperature, both of which contribute to the progressive aridity of the study unit.

Cooke and Reeves (1976) challenge Hastings and Turner's interpretations, concluding that no statistically significant changes have occurred in annual rainfall or in winter or summer precipitation. Neither the historical nor the climatic record appear to contain unequivocal evidence concerning the role of human impact vs. climatic change as primary cause of grassland deterioration in the study unit.

The controversy over the causes of grasslands deterioration is mirrored by the debate concerning arroyo cutting. Cooke and Reeves (1976) state that the entrenchment on stretches of all major drainages in southeast Arizona took place between 1865-1915 and was particularly intense in the 1880s and early 1890s. Nearly the entire lengths of San Simon Wash and Whitewater Draw are entrenched today, as is the San Pedro River. Arroyos also have been incised along the southern stretches of the Santa Cruz River and are particularly pronounced between the San Xavier Mission and Tucson. Arroyos occur in the Altar and Aravaipa drainages as well. As Cooke and Reeves (1976) point out, however, the history of these incisions is complex. Not all arroyo cutting occurred at the same time, nor are all drainages uniformly entrenched. The extent and timing of incisions depended upon hydrological, geomorphological, and historical factors.

Two major schools of thought dominate the debate concerning arroyo cutting. One attributes entrenchment to human impact upon the environment, especially overgrazing (Thornthwaite, Sharpe, and Dosch 1942). The other school argues that, through overgrazing may have triggered entrenchment, regional climatic changes created conditions that allowed it to take place (Bryan 1940; Hastings and Turner 1965; Leopold 1951).

Despite their difference, both of these contending sides agree on the major mechanism leading to dissection: reduction of the vegetation cover of the surrounding watershed. Both sides agree that decreased vegetation cover, due either to overgrazing or climatic change, caused increased runoff. The shallow, meandering channels of the valley drainages were unable to accommodate the greater volume and velocity of the water they carried, and so they had to enlarge, either by downcutting, lateral cutting, or both. The relevant points of this debate therefore apply to the controversy concerning grasslands, since proponents of both sides argue that grassland deterioration significantly contributed to the entrenchment of the study unit's drainages.

Scholars advocating the overgrazing hypothesis point out that entrenchment of many southeast Arizona drainages began soon after the surrounding ranges were populated by vast numbers of livestock, especially cattle. Although the late 1700s and early 1800s witnessed the movement of Spanish and Mexican ranchers into southern Arizona, Apache attacks soon destroyed the developing industry. By the 1870s, however, the Apaches were largely contained, and Anglo-American stockmen moved into the territory. By 1885, the Governor of Arizona territory estimated 625,000 cattle in his jurisdiction, many of them on the prime grazing lands of southeast portions of the territory. This figure, probably conservative, increased to 1,095,000 5 years later. Despite the warnings of

some stockmen's associations about the dangers of overstocking Arizona's ranges, capital continued to pour into the cattle industry, and the number of animals kept growing (Hastings and Turner 1965).

In 1863, the overgrazed environment wreaked its revenge. Meager summer rains in 1891 and 1892 triggered a devastating drought, which killed from 50-75 percent of the herds. The photographs in Hastings and Turner (1965) graphically illustrate the desolation of denuded rangelands. University of Arizona botanist, James W. Toumey stated that grasses had been so reduced by cattle that it was difficult to find specimens to study (Bahre and Bradbury
1978).

In the 1880s and early 1890s, entrenchment occurred along stretches of many southeast Arizona drainages. Champions of the overgrazing hypothesis claimed that cattle caused dissection of the flood plains by (1) removing the vegetation cover of the watersheds, thereby reducing infiltration and increasing runoff; and (2) compacting and wearing trails into the soil, providing better surfaces for sheet runoff and incipient channels for gullying.

Another group of investigators, led by geologist Kirk Bryan, contested the primary agency of cattle in arroyo cutting. Impressed by his studies of flood plain cutting and filling, Bryan (1940, 1941) argued that entrenchment took place whenever significantly drier climatic conditions prevailed. As noted earlier, Hastings and Turner (1965) argued that declining precipitation and increasing temperature characterized southeast Arizona since at least 1898. Cooke and Reeves (1976) disagreed, stating no significant climatic change had taken place, but did agree with Leopold (1951) that the frequency of light rains had increased. They concluded:

> It could be that, as a result of this secular change, the water available for grasses may have been reduced in summer, the critical period of growth in this region, and thus protective vegetation may have been weakened at the time of arroyo initiation (Cooke and Reeves 1976:78).

In the most careful analysis of arroyo cutting in southeast Arizona to date, Cooke and Reeves (1976) also question the assumption underlying most previous studies of entrenchment: that reduction of vegetation cover led to increased runoff, which eroded and channelized valley floors. First they point out that arroyo cutting did not take place during Spanish and Mexican ranching periods in southern Arizona. Second, they note that, though droughts followed by years of heavy rainfall occurred in southern Arizona in 1884-1886 and 1899-1906 periods in which upland ground cover would be weakest, these cycles probably were not restricted to the last 100 years. Dissatisfied with hypotheses concentrating on changes in vegetation of surrounding uplands, Cook and Reeves (1976) focused on changes in the valley floors themselves. They argued that two major changes led to arroyo formation: (1) increased erodability of valley floor materials; and (2) increased erosiveness of flows

through valley bottoms. These changes were brought about by a number of land use patterns adopted widely in the study unit following Anglo-American settlement: the destruction of riparian vegetation by farmers, miners, and woodcutters; the building of railroad embankments; and, perhaps most important, the excavation of open trenches to intercept subsurface ground water along river channels. All of these factors tended to reduce the riparian vegetation and concentrate runoff in defined channels. Flood velocities and flood erosiveness therefore increased, and entrenchment followed.

Regardless of the causes, arroyo cutting in southeast Arizona and throughout arid North America became an ecological and economic disaster. Flood plain dissection drastically reduced the agricultural carrying capacities of the riverine oases so important to Indian, Spanish, and Mexican settlement. Carrying capacities of surrounding rangelands decreased as well. Arroyo cutting radically altered riparian vegetation communities. Before dissection, flood plain marshes and meadows provided hay or natural pastures for livestock during dry periods when forage in the uplands was poor. Destruction of these cienegas and meadows forced stockmen to rely on their ranges at a time when overgrazing and possibly climatic change were greatly reducing the natural vegetation cover of the uplands themselves (Hastings and Turner 1965; Bahre and Bradbury 1978).

Finally and most insidiously, channelization lowered valley water tables. Perennial streams like the Santa Cruz and San Pedro became ephemeral. Surface flow needed for flood plain irrigation declined or disappeared. Subsurface aquifers dropped due to lower infiltration rates and more rapid runoff, leading to increased reliance on ground water while it decreased ground water recharge.

In summary, southeast Arizona experienced a number of significant environmental changes during the historic period, many of them within the last 100 years. Perennial streams like the Santa Cruz and the San Pedro became transitory as the great mesquite bosques and cottonwood forests they supported were destroyed by falling water tables and the activities of farmers, woodcutters, and miners dependent upon firewood for fuel. Marshy cienegas along these rivers, and other drainages dried up as the beavers, who built water-retaining dams, were trapped out of existence. Grass cover became depleted, and grassland species composition transformed, due to cultural factors such as overgrazing and fire suppression, to secular climatic changes, or to both. In general, plant species in both the grasslands and woodlands communities have been upwardly displaced, in some locations as much as 1000 feet (Hastings and Turner 1965). Oaks have retreated higher into the mountains; desert vegetation has invaded grasslands at lower elevations. Finally, arroyos, often deep and long, have been incised into the alluvium of all the study unit's valley floors. Although the evidence is not entirely unambiguous, human, especially Anglo-American, impact upon the environment in southeast Arizona seems to be responsible for much of this environmental degradation.

CHAPTER 4

CULTURAL RESOURCE

INVESTIGATIONS AND RESEARCH BACKGROUND

SUMMARY OF PAST AND CURRENT WORK

Much research into the prehistoric and protohistoric periods has been conducted in the study area. The following discussion is segregated by time periods to facilitate the organization of past and current research. It is not a rigid classification but merely a heuristic tool. A tabular summary of past and current archeological investigations is presented in Appendix 1.

THE SPANISH PERIOD (1500-1848)

An awareness of the prehistoric resources of southeast Arizona has existed since the time of the earliest Spanish explorers. Prehistoric ruins served as a landmark for the first major entrada into the study area, that of Coronado. Although de Niza may have been the first to enter the region, the authenticity of the accounts of his visit has been questioned (cf. DiPeso 1958:164-165 for further discussion). Coronado is generally believed to have visited a ruin called Chichilticalli during his expedition of 1540. This visit occurred several days after the expedition left Corazones, which was probably a Lower Pima or Opata village in what is now the state of Chihuahua. Chichilticalli was evidently a major landmark, having given its name to a nearby mountain range (Hammond and Rey 1940:297-298).

The reports of Coronado and his soldiers show much disappointment upon reaching the site. Rather than the great structure they expected, they found a large red adobe house, abandoned and falling down, which may have been a fortress (Hammond and Rey 1940:191-283; Winship 1896:413-456). Castaneda, who had come up with the main body of the army after Coronado's vanguard, felt Chichilticalli had been built by an orderly, war-like people from a distant land, possibly Cibola (Hammond and Rey 1940:207).

Bolton (1949) felt the ruin was located in the Sulphur Springs Valley near Bonita; DiPeso (1958) further identified it with a late Salado compound in the Jesus drainage near Bonita partly excavated by Duffen (1937). In contrast, Sauer (1932) felt the site of Chichilticalli was the Haby ruin on the headwaters of the Aravaipa drainage (cf. Sauer and Brand 1930). This site is another Saladoan compound occupation. But as

DiPeso (1958:168-169) has pointed out, many similar ruins in the study area could be identified as Chichilticalli.

With the advent of Father Kino among the Upper Pimas, numerous accounts were made of the study area. Kino wrote his own accounts of his explorations and missionary activities (Bolton 1936), and Captain Manje wrote accounts of many of the same events (Karns 1954). The latter translation however, has been sharply criticized (e.g. Fritz 1977) and should be used cautiously in reconstructing the lives of the Pima and Papago people. There are later accounts as well, including Garces and Pfefferkorn (Treutlein 1949). Unfortunately few accounts exist of prehistoric ruins after the middle of the eighteenth century (largely due to an increase in Apache raids), aside from a brief mention of an abandoned village at the foot of Picacho Peak by a priest accompanying de Anza in 1775 (Father Pedro Font, in Hackenberg 1964:144).

EARLY ANGLO-AMERICAN EXPLORATION AND INVESTIGATION (1848-1910)

The next mention of ancient sites in the study area comes from Lieutenant W.H. Emory (1848). He noted ruins along the Gila River at Bonita Creek and Solomon. The report probably contains the first description of the well known site of Buena Vista near Safford. He also described a number of ruins near the junction of the Gila and San Pedro Rivers, although these are mentioned only briefly as consisting mainly of sherd scatters (Emory 1948:592-594).

As the United States Army subdued the Apaches, other notices of antiquities began to come to the attention of soldiers, ranchers and farmers. In 1854, J.R. Bartlett mentioned a small ruin near the western source of the San Pedro, which he had observed in 1852 (Bartlett 1854). In 1879 R.T. Burr reported a large amount of irrigable land near a cavalry post in Rucker Canyon in the Chiricahua Mountains. Near this land, fed by a year-round stream, were the remains of six houses, represented by square stone foundations. Burr particularly noted the lack of defensive character of these structures, as evident in their open location and the dispersed nature of the settlement, as representing a pre-Apache agricultural population that had made plainware ceramics (Smithsonian Institution Annual Report 1879:333-334, cited in Sauer and Brand 1930:416).

Interest in the anthropology and archaeology of pre-European America was growing in the eastern United States. In the 1870s several anthropological societies were founded, including the American Anthropological Association and the Archaeological Institute of America. The fledgling Bureau of American Ethnology began to send trained observers to the Southwest with the army and other projects to describe the inhabitants and their antiquities and to collect specimens and make sketches. These early investigations, full of description and speculation, gradually laid the foundation for later comparative studies (Schroeder 1979). The first of these early researchers to investigate the study area was

A.F. Bandelier, who was sent to the southwest in 1880 by the Archaeological Institute of America. He scouted through the San Pedro Valley enroute to Sonora, but felt the area to the east was not worth inspecting. As he wrote in 1884:

> The dismal barrenness of the country west of the Rio Grande, as far as the Paso del Dragon (Dragoon Pass) in Arizona, on a line running due west of Fort Selden and south to the Mexican Boundary, precludes the possibility of important traces of aboriginal population being found there (Bandelier 1892:479-480).

Even so, he did note that, of the three longitudinal valleys between New Mexico and Tucson south of the Gila (the San Pedro, Sulphur Springs, and San Simon), the only one with large evidence of prehistoric habitation was the westernmost, the San Pedro, as it was the only one with perennial water. Among the ruins he described were the sites of Tres Alamos (Bandelier 1892:477) and Babocomari (Bandelier 1892:480).

As settlements grew after the removal of the Apaches, more reports of antiquities came in. W.S. Devol, of Tucson, made a three-day excursion into the area of Bonita Creek and Midnight Canyon, just south of the San Carlos Apache Reservation and east of Safford with several other people and described what he called "cliff dwellings" (Devol 1897, cited in Wasley 1962:380).

Devol's account was known to J.W. Fewkes and W. Hough, the next professionals to visit the study area under the sponsorship of the Bureau of American Ethnology. Although they did not visit the area Devol explored, Fewkes and Hough conducted a brief reconnaissance of the Pueblo Viejo area (the Safford region) including visits to the sites of Buena Vista and Solomonville. Even at that date, Solomonville had been almost destroyed by agriculture. In his report, Hough (1907) briefly discussed fifteen sites in the area. Fewkes (1904) account is more thorough, describing artifacts, agricultural features, and site architecture.

The Bureau of American Ethnology also sponsored a brief collecting trip to southeast Arizona in 1900 by R. Russell who never published his results (Bureau of American Ethnology Twenty-Second Annual Report 1907:xiii, cited in Sauer and Brand 1930:417). Some of the ruins along the Gila and San Pedro rivers are briefly described in his account of the Pima (Russell 1908:25,88 fn.a,99). About the same time, D. Meinzer studied the water supply of the Sulphur Springs Valley and noted the presence of ruins around Sulphur Spring and on the margins of Willcox Playa (Meinzer and Kelton 1913).

One of the earliest accounts of sites in the Tucson Basin came from Ellsworth Huntington, a geographer who visited the region in the early 1900s. Under the auspices of the Carnegie Desert Laboratory, Huntington recorded and described several sites, including Los Morteros, the Black Mountain site later excavated by Fontana, Greenleaf, and Cassidy (1959:51; Huntington 1914). The Black Mountain site was also described

by Lumholtz (1912) as part of his account of his exploration of northern Mexico. Similarly, McGee (1898) briefly described the site en route to the Seri country. The Lumholtz and McGee descriptions of the site are among the earliest mentions of a Trincheras site.

THE ESTABLISHMENT OF ARCHAEOLOGY AS A DISCIPLINE (1910-1950)

A.E. Douglass, the pioneer of dendrochronological studies, moved to Tucson and became Acting President of the University of Arizona in 1911 (Longacre 1970). As a result of his interest in archaeology, a program in anthropology was established under the direction of Byron Cummings and his students. Cummings and his students, including Emil Haury, Lyndon Hargrave, and John McGregor, were to become the nucleus of southwestern archaeology for decades to come.

Research in the Tucson Basin

Douglass and H.B. Leonard mapped a number of ruins between Bear and Sabino Canyons (Douglass and Leonard 1920-1921). Among the earliest excavations conducted by Byron Cummings was intermittent work at the St. Mary's Hospital site (AA:16:26) between 1920-1930, although the site was not recorded until 1961 or formally reported upon until 1979 (Jacobs 1979). Several small collections of maize and beans were made at the site over the years. Analysis of these collections is reported by Miksicek (1979). Arizona BB:14:13 was also partially excavated during the 1920s under the direction of Byron Cummings. No report exists for the site, although a survey card is on file at the Arizona State Museum (Stacy and Hayden 1975:23).

Emphasis was placed on the largest, most accessible sites. The first complete report of an excavation in the study area dealt with work by Haury (1928a; 1923b) at the Tanque Verde ruin, which became the basis for his master's thesis, the first granted in anthropology by the University of Arizona. This site (BB:14:1) became the type site for the Tanque Verde phase, a Classic Hohokam manifestation in the Tucson Basin. Some of the conclusions in these works were later reconsidered after excavations at Roosevelt:9:6 (Haury 1932). A brief account of the excavation can be found in Fraps' 1935 article.

Excavations were conducted in the Tucson Basin in 1929 and 1930 at Martinez Hill (BB:13:3) under the general direction of Byron Cummings. The results of the excavation were presented in a masters thesis by Norman Gabel (1931). The site is near San Xavier del Bac Mission and was excavated to provide more information about a previously unknown region, particularly for its diagnostic ceramic and architectural features. Although seven adobe roomblocks were present, rooms were excavated in only three of these. The ceramics reported from this late site are Tucson Polychrome and Tucson Red-on-brown. Gabel also mentioned the Trincheras site on Martinez Hill, which he felt might have served as an occasional refuge from floods of the Santa Cruz River.

From 1930-1933, the first excavations at University Indian ruin were carried out under Byron Cummings' guidance by students and Civilian Conservation Corps laborers. Seventeen rooms southeast of the major mound were excavated (Kelly 1936). Some time before this excavation, Ben Wetherill excavated a structure just north of group 1. No information can be found on his work, but Hayden reported that Wetherill found fragments of a restorable majolica bowl on the floor of one of the rooms. The sherds were sent to the Arizona State Museum but have never been found. If the bowl was indeed found as reported, it would have been an extremely important find, since it would show that some Classic period occupation persisted in the Tucson Basin until Spanish contact (Hayden 1957:178). Further excavations were carried out in the late 1930s, which provided the type description for the Tucson phase, the last prehistoric period in the occupation of the Tucson Basin (Hayden 1957). The site lies northeast of Tucson above Pantano Wash.

Perhaps the most important site in the Tucson Basin is the Hodges site (AA:12:18). This was the type site for the early phases of the regional sequence, from the Pioneer Hohokam period through the Rincon phase, although the phases before the Sweetwater were not securely established at the site (Kelly 1978). The site was first described by Huntington, who thought it was an extension of the Jaynes ruin (AA:12:13), the earliest identified site in the area. Carl Miller began excavations in 1936 at what was then called the Gravel Pit ruin. He was assisted by Mr. and Mrs. Wetmore Hodges, who funded a great deal of the excavation and after whom the site was eventually named.

Work continued in 1937 and 1938 under the sponsorship of Gila Pueblo and the direction of Isabel Kelly. The report for the site has only recently been published (Kelly 1978), but the field notes have been on file in the Arizona State Museum and cited in most works on the Tucson Basin. James Officer compiled and revised the field notes (Kelly 1961). In the introduction to both the 1961 and 1978 versions, Officer noted that the excavation of the site yielded a good cross section of material from the Tanque Verde phase. Gila Basin ceramics from Vahki through Snaketown Phases were found in stratified context at the site, revealing the earliest presence of Hohokam materials in the Basin. The later Canada del Oro, Rillito, and Rincon phases were also defined at this excavation from architectural and ceramic changes.

The only other excavations in the Tucson Basin during this period were limited to trenching of the Freeman site (BB:14:3) by Emil Haury. No report was ever made on this work, but Zahniser (1966:113) stated that the trench was placed through a rubbish mound and yielded Colonial and Sedentary period Hohokam Ceramics.

Frank Mitalsky conducted a reconnaissance survey of the Tucson Basin, which was reported in a manuscript dated 1932 and which is on file at the Arizona State Museum. In the late 1930s an archaeological survey was also conducted in the Empire Valley, next to the Tucson Basin, under the direction of Emil Haury. The results were presented in a master's thesis written after World War II (Swanson 1951).

Major Research Outside the Tucson Basin

Several significant studies were conducted outside the Tucson Basin during the 1920s. E. Hands conducted a brief excavation of the Grantham Farm near Light in the Sulphur Springs Valley. One structure was excavated in a small cluster of house ruins, revealing a house pit with boulder foundation and jacal superstructure, associated with undecorated ceramics (Sauer and Brand 1930:446).

More important was the work of Byron Cummings and three of his students (Haury, Hargrave, and McGregor) near Sonoita. Here in 1926 they uncovered two human skeletons embedded in the side of Cienega Wash on the Empire Ranch. These Burials were covered by 12 feet of stratigraphic deposition. The next year, they uncovered the skull of a mammoth missing its lower jaw at the Double Adobe site in the Sulphur Springs Valley near Bisbee. Underlying the skull was a stratum in which they found groups of grinding stones. These artifacts lying below the mammoth in alluvial deposits, later defined by Sayles and Antevs (1941) as belonging to the Archaic Cochise culture, were one of the first definitive associations of human tools with extinct fauna. This find, along with that of Figgins at the Folsom site in northern New Mexico, answered many of the criticisms that Alex Hardlicka had raised about early human beings in the New World. These findings led to the acceptance of the existence of early man with mammoth, extinct bison, and other late Pleistocene fauna (Schroeder 1979a:9).

At the first Pecos conference held in 1927, the Double Adobe find led to the inclusion of Basket Maker I in the Pecos sequence of prehistoric Pueblo development. This hunting and gathering phase was seen as the hypothetical ancestor to later Basket Maker II developments (Kidder 1927). Since then, the term Basket Maker I has been dropped in favor of the use of a number of local Desert Archaic progenitors, such as the Cochise (McGregor 1965:126; Lipe 1978:336). Although the association of early man with extinct fauna at the Double Adobe site has been questioned (e.g. Kelley 1959; Willey and Phillips 1958), later examination has shown the association of ancient fauna with materials of this hunting and gathering stage, now called the Sulphur Springs stage of the Cochise Culture (Haury 1960).

Other important developments in the late 1920s included the establishment of the Gila Pueblo Archaeological Foundation at Globe by Harold and Winifred Gladwin. Heavily influenced by the "time-space revolution" of the early 20th century (Taylor 1954), which sought to establish the boundaries of prehistoric cultures in space and time, the Gladwins sponsored excavations that led to the definition of Cochise and Mogollon as prehistoric entities in the 1930s (e.g. Haury 1936b; Sayles and Antevs 1941). Beginning in 1928, they also sponsored one of the largest archaeological surveys ever attempted in the Southwest (Schroeder 1979a) to delimit the Hohokam realm. Much of the study area was included in their eastern surveys (e.g. Gladwin and Gladwin 1935).

In 1929, Carl Sauer and Donald Brand of the University of California conducted a survey of the area between the Santa Cruz River and the New Mexico-Arizona border, and from the Gila river to the international boundary. They focused on this area to learn more about the peripheries of better known cultures of the Southwest. They took as their goal locating and inspecting the greatest number of ruins in the time they had along with collecting representative artifacts at each site (Sauer and Brand 1930:417). The great amount of disturbance due to erosion and rodents made stratigraphic studies impossible without thorough excavation, but these same factors were believed to have made surface collection a satisfactory approach by bringing ceramics of different periods to the surface. Collection of ceramics was limited to decorated wares.

E.J. Hands played a major role in the Sauer and Brand survey. A pioneer settler in the Chiricahua Mountains and amateur archaeologist, Hands had also participated in work at Tanque Verde ruin and at Grantham Farm.

Sauer and Brand do not mention the actual area covered in this survey, nor do they identify areas actually surveyed. Most sites appear to be near or in valleys, suggesting no survey was done away from these areas. Emphasis on collection of decorated sherds meant that few plainware and no aceramic sites were reported.

Outside the Tucson Basin, the 1930s were most notable for three major events. During this decade, research defined the Cochise hunting and gathering culture as a major Archaic tradition. In addition the southwestern most branch of the Mogollon in Arizona, the San Simon, was established as a result of work carried out at this time. Finally, the 1930s saw the establishment of the Amerind Foundation, the last of the privately endowed southwestern institutions in the tradition of Gila Pueblo (Schroeder 1979a:10). With its primary focus on the archaeology of southeast Arizona, southwest New Mexico, and the Casas Grandes region of Chihuahua, the Amerind Foundation would be a major contributor to knowledge of the study area for decades to come.

Interest in the pre-ceramic horizon of southeast Arizona had begun with the discovery of the Double Adobe mammoth find in the Sulphur Springs Valley by Cummings and his students in 1926 and 1927. In 1935 Cummings reported the find to the meeting of the southwestern branch of the American Association for the Advancement of Science in Santa Fe (Sayles and Antevs 1941:1). The importance of this discovery led Emil Haury and E.B. Sayles, of Gila Pueblo, to conduct a reconnaissance survey of southeast Arizona in December 1935. This survey noted a number of sites similar to Double Adobe as well as later pre-ceramic sites.

In the spring of 1936, Ernst Antevs, a research associate in geology at the Carnegie Institute of Washington, joined the group. The group found ancient stone tools from the Santa Cruz Valley south of Tucson east to Playas Lake in southwest New Mexico, and from the Mexican border north to the Safford area during a survey sponsored by Gila Pueblo. The similarity of these artifacts found in an area some 150 miles from east to

west, and 95 miles north to south caused Sayles and Antevs (1941:2) to group them into the Cochise Culture. They defined stages on the basis of changes in the lithic assemblage.

Another regional study was Hawley's (1932) work at the Bead Mountain Pueblos in the Middle Gila coupled with her earlier study of late polychrome ceramics, the Gila Polychromes, in the area (Hawley 1930). Hawley noted the association of these wares with compound structures. Cultural differences within the Middle Gila led her to delimit north and south districts. The southern district included much of the study area (Hawley 1930:523). Hawley thought that these decorated wares may have originated in the Casas Grandes area and then spread from the Middle Gila into the Gila-Salt Basin during the Classics phase of the Hohokam.

Oscar Tatman conducted brief excavations in the Middle Gila in 1931 at the site of Buena Vista. The landowner, however, withdrew permission for excavation, and the work was never completed. The results of the excavation have been summarized by Brown (1973).

Carl Trischka conducted more extensive excavations on the eastern slope of the Mule Mountains at a number of red-on-brown campsites, which had been discovered by William Mardon of Bisbee in 1929. Excavations revealed abundant plain and red-on-buff ceramics, shell bracelets, cremations, and carved stone bowls as well as a number of pit houses with lateral entries. Some water control devices and agricultural terraces were associated with these sites. Although no defensive structures were noted at the site, Trischka (1933) discussed a series of circular stone walled enclosures on nearby Abbot's Peak, which may have been defensive.

Outside the Tucson Basin and its immediate vicinity, L.R. Caywood conducted limited survey and excavation in the Sulphur Springs Valley in the early 1900s. This work served as the basis for Caywood's master's thesis under the direction of Emil Haury (Caywood 1933).

Excavations were also carried out at the Webb ruin on the south side of the Pinaleno Mountains in 1939 (Duffen 1937). The 15-acre surface site consisted of three compounds and a ceremonial structure. Gila Polychrome was the dominant ceramic type.

The Amerind Foundation and Other Research

The final major event of the 1930s was the establishment of the Amerind Foundation in Dragoon, Arizona. The following account is based on work by Fenner (1977) and DiPeso (1981), unless otherwise noted. The Amerind Foundation was the creation of William S. Fulton. Born in Connecticut in 1880, Fulton visited the Southwest briefly several times between 1915-1920, retiring to Arizona after serving as president of the Waterbury Farrell Foundry. In 1931, he built his home on the Double F Ranch in Texas Canyon near Dragoon. Because of Fulton's interest in archaeology, George Heye invited him to become a trustee of the Museum of

the American Indian. Correspondence between the two men led to the publication of excavations Fulton had conducted at a pit house site on the ranch. The publication of "Archaeological Notes on Texas Canyon, Arizona" (Fulton 1934a:1934b;1938) was funded by Fulton, who personally distributed it to friends and interested professionals. This publication marked the start of the Amerind series of publications and served as a marker of the seriousness with which Fulton regarded publication as an obligation of an excavator.

A major controversy arose at the time over the cultural affiliations of the Dragoon Culture, which had been defined as a result of the work by Fulton and Trischka (Trischka 1933). The Gladwins felt this culture was of Mogollon origin, Fulton and Haury felt its roots lay in the Hohokam. Resolution of the debate was to be a major research focus of the foundation for many years.

The Tuthills built a three room museum in 1936 to house their collections, which became a nucleus for the present one. Three more rooms were added in 1937, and the Amerind Foundation was incorporated as a legal entity.

As the Amerind Foundation grew, Fulton hired Carl Tuthill, a student of Emil Haury at the University of Arizona, to supervise excavations at the Gleeson site south of the Dragoon Mountains. Work continued at the site through 1939, and the results were published in 1940 (Fulton and Tuthill 1940).

In 1941, E.B. Danson of the University of Arizona completed an extensive survey of the Santa Cruz River Valley from the origin of the river in southern Arizona into the state of Sonora, Mexico, and north to the town of Tubac, Arizona. This area of 30 square miles was surveyed mainly on both sides of the river but "in some places into the mountains and up some tributary streams" (Fulton and Tuthill 1940:3). No information can be found about the exact area covered, nor did Danson provide a map of the sites surveyed. He did state that two types of sites were omitted--Trincheras sites and early man sites. It is unclear, especially for early man sites, whether he did not find such sites or whether he did not record mesa sites with Polychrome ceramics or walled hilltop sites with undecorated wares. Sauer and Brand (1931) had used the term Trincheras to apply to both. Little attention was given to historic non-Indian sites.

Shortly after his work with the Cochise culture, E.B Sayles began a survey and excavation in the San Simon Valley, again sponsored by Gila Pueblo. From this work, he defined the San Simon Branch of the Mogollon (Sayles 1945). The earliest phase, the Penasco, was described from excavation at Cave Creek Village (Chiricahua:3:21, in Gila Pueblo survey) on the eastern slope of the Chiricahua Mountains and San Simon Village (CH:10:2) north of the Dos Cabezas Mountains near Bowie.

The Amerind Foundation continued to grow in the 1940s, conducting excavations in the study area at the site of Tres Alamos, north of Benson

in the San Pedro Valley. Again a major goal of the research was to learn more about the prehistoric Dragoon culture (Tuthill 1947). Meanwhile Fulton continued work at the Double F Pit House site and the Westfall site in the early and mid 1940s. The foundation also hired yet another University of Arizona student, Arnold Withers, to excavate a ceremonial cave in the nearby Winchester Mountains (Fulton 1941).

Tuthill left the Amerind Foundation in 1947 to become curator of exhibits at the San Diego Museum of Man. The next year, Charles C. DiPeso, another University of Arizona student, was hired by Fulton. DiPeso began work at the site of Babocomari Village north of the Huachuca Mountains. The goals were to establish the temporal boundaries of the site and a spatial delineation of the Babocomari culture, to establish a San Pedro Valley chronology, and to examine Salado-Babocomari relationships (DiPeso 1948). Completed in 1949 the work served as the basis for DiPeso's master's thesis, which was published by the Amerind Foundation in 1951 as another volume in the series on the prehistory of southeast Arizona.

World War II caused a hiatus in survey and excavations throughout southeast Arizona. A shell and bone necklace was recovered from a burial exposed in a bank of the San Pedro River 21 miles southeast of Oracle near a late ruin with Gila Polychrome (BB:7:5) but was not reported until 1977 (Carpenter 1977). In 1949, Ray Romo discovered a cache of copper bells, stone, and turquoise beads in the western Santa Catalina Mountains. This find was later reported by Haury and Gifford (1959).

The first work conducted after the war was the partial excavation of the Zanadelli site (BB:13:12) on the Santa Cruz River 14 miles south of Tucson. Students at the University of Arizona put in a stratigraphic test that revealed a pit house and ceramics from the Tanque Verde and Tucson phases (Wright and Gerald 1950).

THE MODERN ERA

Research During the 1950s

PALEO-INDIAN RESEARCH

A major focus of research in the early 1950s was the study of early man--the Paleo-Indian occupations of southeast Arizona. Before the development of radiocarbon dating in the late 1940s, early man sites in the New World, such as the Double Adobe site, were dated largely through the efforts of geologists like Kirk Bryan and Ernst Antevs (Haynes 1967:268). Radiocarbon dating methods, first at the Naco site and later at the Lehner site, would extend southwestern chronology far beyond the limits imposed by dendrochronology (Schroeder 1979a:12).

Figure 15. Excavation of Mammoth Bones at the Naco Site, Southern Arizona. Left, John Lance. Right, Emil Haury. (Wormington 1964). Courtsey Denver Museum of Natural History and Arizona State Museum, University of Arizona.

In the fall of 1951 a concentration of bones that had been known for at least 15 years, was freshly exposed by floods in an arroyo of Greenbush Creek, northwest of Naco. The bone bed was excavated in 1952 under the direction of Emil Haury (1953). The bones represented most of a mammoth, with the exception of the hind legs, pelvic girdle, and several lumbar vertebrae, which may have been removed in butchering. Eight Clovis projectile points were found in unmistakable association with the bones and another was found upstream in the arroyo. The absence of butchering tools and the apparent waste of leaving the points in the animal has led some to suggest that the bones represent an unsuccessful kill (e.g. Judge n.d.:13).

The Lehner site (EE:12:1) lies southwest of Hereford, Arizona. The bones were first exposed in 1952 and reported by the Lehners, upon whose property they were found. The find consisted of fragments of mammoth bones in a black deposit 8 feet below the surface in an arroyo tributary of the San Pedro River. More bones were exposed by the heavy rains of the summer of 1955 (Wormington 1964:55).

The remains of nine Columbian mammoths and several other extinct mammals were uncovered in an excavation conducted by Emil Haury, E.B. Sayles, and W.W. Wasley. Associated with these were thirteen Clovis points, two hearths, and eight cutting and scraping tools (Haury 1956b; Haury, Sayles, and Wasley 1959). A date of 15,000-10,000 years BP was suggested by Antevs on the basis of geological evidence (Wormington 1964:55; Haury, Sayles, and Wasley 1959:2). Statistical analysis of a series of dates from the Clovis level obtained by improved counting techniques yielded an average age of 11,260$\pm$ 360 BP and demonstrated considerable agreement between results for individual samples and among radiocarbon laboratories (Haynes 1964:1408; 1967:269). In part, these results demonstrated the error in the earlier dates obtained by the solid-carbon method (Haynes 1964). Fossil pollen directly associated with the radiocarbon dates, the mammoth bones, and the stratigraphic unit from which the bones had been recovered revealed an environment of desert grassland (Mehringer and Haynes 1965). Together, the Naco and Lehner sites comprise "one of the most significant Clovis sites" (Agogino 1968:2).

A number of other early finds were reported in the 1950s. On the margin of Willcox Playa, the inner remnant of the old floor of pluvial Lake Cochise, a crudely made projectile point was found in situ in Pleistocene lake gravels (CC:13:5). Although not considered a Clovis point, it was probably of the same age. Grinding stones were also found nearby at the same depth (Haury 1953:11; Wormington 1964:59). At another site on Willcox Playa (CC:13:3), a heavily mineralized head of a human femur was found (Haury 1953:11). In addition, a Clovis point was found on the surface in Texas Canyon, and another was found in a blow-out near Willcox (CC:13:1) (DiPeso 1953b).

OTHER RESEARCH

Additional researchers continued exploring the Archaic during the 1950s. In the Empire Valley, Frank Eddy excavated a San Pedro Cochise midden (EE:2:30) at the base of the west bank of Matty Canyon (Eddy 1958). His work uncovered a silty clay-stained black midden associated with 22 pits, two of which may have been houses, a variety of ground and chipped stone tools, eight human burials, and a canine interment. Two buried Hohokam pit houses (EE:2:10, EE:2:34) were also found, the older dating back to the Pioneer period. The results served as the basis of Eddy's master's thesis and report one of the few finds of Cochise materials with perishable bone and horn implements (Eddy 1958).

In the Tucson Basin, M.J. Rogers conducted the first survey to explore the preceramic period (Rogers 1958). In 1958 he surveyed San Dieguito remains along the Pantano and Rillito drainages, which geological evidence led him to believe were over 8000 years old. Rogers saw no gap in occupation during the Altithermal between the San Dieguito and Amargosan occupation, which in turn lasted into historic times as the Pima and Papago. Later evidence reveals a difference in the extent of oxidation between the tools of the two occupations, arguing for some hiatus (Stacy and Hayden 1975:10).

Partly due to the work at Naco and Lehner, relatively little work was undertaken in Hohokam materials during the 1950s. Under the direction of E. Danson, Paul Frick surveyed the Santa Cruz Valley from Tubac to Sahuarita to learn more about the archaeological remains in the area and their chronology (Frick 1954). The survey was conducted in 1952 and 1953 and was limited to areas accessible by vehicle roads. As a result, much of the mountain foothill area was not surveyed. Representative artifact collections were taken from the sites but no excavating was done.

A total of 216 sites were recorded, classified as sherd areas, compounds, and rock-walled mesa-top enclosures. Most sites dated to the Rillito phase and consisted of sherd areas on the lower terrace above the river. Sites of the Rincon, Tanque Verde, and Tucson phases were also found. McConville and Holzkamper (1955) of the Arizona State Museum recorded more sites in the Tucson Basin in a survey of a gas pipeline right-of-way for the Southern Pacific Railroad.

Limited Excavations were carried out at San Augustin Mission (BB:13:6). Testing at the Presidio revealed a prehistoric Hohokam pit house beneath the presidio walls (Smiley et al. 1953; Wasley 1956b; Haury and Fathauer 1974). Nearby, burials and a cluster of San Pedro Cochise artifacts were also reported (Smiley et al. 1953).

A partial excavation of the Joe Ben site (BB:13:11), a stratified site just south of Tucson, yielded Cochise and Hohokam material (Fontana 1956). Fontana and others also reported on their examination of the Black Mountain site, a fortified hilltop south of Tucson. A few decorated ceramics found were all Tanque Verde Red-on-brown, suggesting an occupation between AD 1100-1300. The report also contains a list of

other known Trincheras sites, a summary of historical references to these sites, and a consideration of the types and functions of Trincheras sites (Fontana et al. 1959).

Two prehistoric shell caches were found in the region. George Hopper discovered a cache of forty-one Glycymeris shells on Flowing Wells Road in Tucson. This cache probably represented a craftsman's store of materials for manufacture, as most appeared to have the lip chipped off to serve as blanks. At the Flieger ruin near Oracle, Mrs, Garner Trowbridge uncovered a cache of shells along with two three-quarter grooved axes in a large Tonto Polychrome jar. A total of 3153 shells were recovered from the cache (Stanislawski 1961).

Donald Tuohy conducted a survey of the Gila River channel between Safford and the Buttes Dam site for the Arizona State Museum. A manuscript is on file at the Arizona State Museum reporting this survey and associated excavation (Tuohy 1960). The Buttes Dam Site was excavated by W. Wasley and B. Benham (1968). A number of these sites were checked later on and reported on in the Arizona State Museum Archaeological Series No. 2 (Vivian 1970a).

In the Bonita Creek region, S.R. Claridge discovered a ceremonial cave (W:14:1) in 1957. A number of items were collected from it in 1957 and 1958, including wooden flowers and cones, strings of miniature baskets, terraced wooden objects, a wooden pendant, cotton cloth, and miniature bows and arrows. Most of these items had been deposited in a Maverick Mountain Polychrome jar covered with a smudged brownware bowl. These items probably belonged to a group of Kayenta migrants who settled to the north in the Point of Pines area around AD 1280 (Wasley 1962).

AMERIND FOUNDATION RESEARCH

The major project of the Amerind Foundation during the early 1950s was the excavation of the early historic site of Quiburi (EE:8:1) near Benson on the San Pedro River. Fulton had been urged by Erik Reed, Emil Haury, and others to excavate this site because of its connection with Father Kino and the possibility of its destruction due to the building of a nearby dam. The site was excavated in 1950 and 1951 by Charles DiPeso. His conclusion that the site is in fact a historic Sobaipuri Village has since been questioned on several grounds (e.g. Fritz 1977). The work was the basis of the doctoral dissertation of DiPeso, who became the first student to be awarded the Doctorate in Anthropology at the University of Arizona. Both the dissertation and its publication (DiPeso 1953a) showed the influence of Walter Taylor, which had also been evident in DiPeso's writing about Babocomari. This influence was particularly noticeable in his concept of archaeohistory, defined as study using the combined disciplines of history, ethnology, and archaeology (Fenner 1977:324). In the same year that the work at Quiburi was finished, DiPeso (1951b) also published the results of a brief excavation in 1948 at a Hohokam ball court on the San Pedro River.

As a result of the findings at Quiburi, later research at the Amerind Foundation began to focus heavily on this poorly known protohistoric period, especially in the Santa Cruz Valley. In 1953 Barton Wright was hired as a new staff member and put in charge of testing at Ramanote Cave and at the Paloparado site (DD:8:1) between Tumacacori and Calabazas. The major excavations were supervised by DiPeso and published in 1956 (DiPeso 1956).

The research uncovered an early Hohokam component and a late component with ceramics resembling those at Babocomari. The research also led to two major developments. First, the publication of the study marks the introduction of the term O'otam to cover the indigenous people of southeast Arizona who had made red-on-brown ceramics (in contrast to Hohokam red-on-buff products) and who served as recipients of the ideas and populations from Mesoamerica such as the Hohokam (DiPeso 1979:92).

DiPeso also created some controversy with his claim that the most recent component at Paloparado was in fact the late 17th century vista of San Cayetano del Tumacacori. Henceforth DiPeso referred to the site by this name. The results of a recent statistical analysis of the burials from these sites have been published (Grebinger and Adam 1978).

In 1955, Wright left the Amerind Foundation, and DiPeso was named Director, continuing in that post until his recent death. In 1956, DiPeso directed research near Reddington in the San Pedro Valley at the site of Reeve Ruin, to examine the possibility of a Salado migration into the region (DiPeso 1958). The nearby Bidegain Ruin, a small surface jacal village, was also tested (DiPeso 1958). Across the river, Rex Gerald excavated the Davis Ruin under the provisions of a predoctoral program set up by the Amerind Foundation (Gerald 1975). The Davis Ruin was similar to the Reeve Ruin and served as the basis for DiPeso's conclusion that both represented a Western Pueblo site intrusion.

DiPeso then conducted excavations at Casas Grandes in Chihuahua from 1958-1961. Both he and Fulton received a number of honorary awards as a result of their long interest in the prehistory of the region. The University of Arizona bestowed a honorary Doctor of Science degree on Fulton in 1959. The following year Fulton received a honorary Doctorate of Human Letters from his alma mater, Yale. In 1959, the American Anthropological Association awarded DiPeso the A.V. Kidder medal for his work.

Research in the 1960s

PALEO-INDIAN RESEARCH

During the 1960s, new directions were forced upon the archaeological community. The advent of many highway salvage projects greatly increased data accumulation but time and manpower constraints often limited the scope and direction of these projects. Although salvage work became an important element, more traditional research continued to expand the data base as well.

Geological reconnaissance in the upper San Pedro Valley near Sierra Vista resulted in the discovery of an outcrop of mammoth bones near Murray Springs (EE:8:25). The stratigraphic context was similar to Lehner, so excavations were begun in 1966 in hopes of exposing a Clovis kill site (Haynes and Hemmings 1968). Excavation in 1966 revealed the partial skeleton of a mammoth along with scattered remains of Pleistocene forms of bison, horse, camel, and wolf. In addition, several flakes were found near the mammoth bones. Excavations in 1967 uncovered an almost complete mammoth skeleton on a buried occupation surface on which over 3000 flakes were found. The materials came from two excavation localities. Parts of four mammoths and two bison were represented, and a radiocarbon date of 11,230 BP $\pm$ 340 years was obtained.

In a nearby area of the site a partial and disarranged carcass of a large mammoth was found with a fragment of a flake knife remaining in the rib area. A Clovis projectile point lacking basal grinding and some point tips were found a few meters away amidst the apparent, scattered remains of a single bison. Perhaps the most impressive aspect of this area was the occurrence of 1430 pieces of debitage resulting from a complex knapping operation in which edged tools were prepared and sharpened for mammoth processing.

The nearby Escapule Mammoth site (EE:8:28), southeast of Murray Springs, was discovered in 1966 by Louis W. Escapule of Sierra Vista (Hemmings and Haynes 1969:184). He partially excavated the mammoth bones, finding two Clovis projectile points in situ among the ribs. He reported the find to the Arizona State Museum.

Later, Murray Springs project personnel undertook excavations. The find represents a single Columbian mammoth wounded and possibly killed by Clovis hunters around 11,200 years BP. No material for radiocarbon dating was found, but the stratum was considered about the same as the stratum that had yielded dated Clovis sites elsewhere in the valley (Hemmings and Haynes 1969:186). The excavations at Murray Springs and the Escapule Mammoth site formed the basis for Hemmings' (1970) doctoral dissertation.

The early sites at Naco, Lehner, Liekum (Haynes and Johnson n.d., cited in Hemmings and Haynes 1969), Murray Springs and Escapule all cluster on tributary arroyos of the San Pedro River near the Mexican border. The concentration of so many sites in such a limited area makes it a very important region for the study of early man (Hemmings and Haynes 1969:185). Similar Clovis materials have been found in Mexico as far north as Pozo Valdez in Sonora (Ortiz and Taylor 1972). Clovis points have also been reported as surface finds in the Tucson Basin (Agenbroad 1967b).

Another mammoth find was reported during salvage excavation near Double Adobe (Windmiller 1970; 1973a). Here mammoth bone splinters and three stone flakes were found in a gravel lens in a rusty sand stratum. The Sulphur Springs stage material of the Cochise was originally identified in the same stratum. The splinter showed some stream rolling, and

there was no association of the mammoth bones with the cultural material. Windmiller, however thought that the stratum in which the mammoth material had been deposited could be much younger than the period currently thought to mark the extinction of late Pleistocene fauna and could date to the Sulphur Springs period (Windmiller 1970; 1971a).

OTHER RESEARCH

Agenbroad (1966; 1970; 1978) excavated a large Chiricahua stage site, the Lone Hill site (BB:10:17) in 1965. The site lies on the eastern flank of the Santa Catalina Mountains, west of the San Pedro River. For the first time, a sampling design was used. Ultimately, 35 metates, 68 manos, 165 projectile points, 52 miscellaneous tools, and over 1,300 pieces of debitage were recovered. These objects were derived primarily of local materials. Agenbroad concluded that the site was seasonally occupied by people exploiting both animals and plants. He also defined activity areas evidently based on sexual division of labor, with men involved in soft-hammer finishing of pretrimmed cores and women involved in plant processing.

The salvage of a deeply buried San Pedro stage Cochise site (EE:2:50, Pantano site) was reported in 1968 (Hemmings et al. 1968). Arizona State Museum personnel, however, had collected material from the site since 1964 as it eroded out of the banks of Pantano Wash, 28 miles southeast of Tucson. The site was estimated to cover 2-5 acres. Because of the site's size, its density of debris, and the heavy-duty nature of the milling stones excavators suggested that it represented a summer macroband camp similar to the San Pedro stage type site at Benson:5:10. Maize pollen was found at the site, as was Opuntia (Hemmings et al 1968:27).

The only features formally excavated at the site were burials. One was excavated in 1964 by A.E. Johnson and C. Greenleaf for the Arizona State Museum. A second was recovered in 1967 by E.T. Hemmings for the Arizona State Museum (Hemmings 1969a). Three radiocarbon dates were reported from the Coyote Draw site in the Lower San Pedro: 1360 ± 190 (A-861): 2270 + 150 (A-862); and, 3210 +240 (A-866) years BP (Haynes 1968).

Perhaps the most impressive Archaic study conducted in the 1960s was Norman Whalen's survey of Cochise site distributions in the San Pedro Valley, which served as the basis for his doctoral dissertation (Whalen 1971). The survey was prompted by Whalen's dissatisfaction with the relatively small number of such sites found since Sayles and Antevs (1941), many of which had been found by accident. Even that study had concentrated on sites along major streams, resulting in the neglect of sites on ascending terraces and in the mountains (Whalen 1975:203).

Between 1966 and 1970 Whalen surveyed a 100-square mile area on the west side of the San Pedro Valley south of Benson. He found 90 sites, 82 of which were non-ceramic. From these sites samples were selected for either complete recovery or partial random sampling in both the terrace

and piedmont zones. Analysis of the materials of both the Chiricahua and San Pedro stages at these sites led to the conclusion that the piedmont sites had been favored areas for stone tool production (1975:208). Most of the sites were located in the piedmont zone.

Excavations at Hohokam sites in the study area during the 1960s was largely overshadowed by Haury's re-excavation at Snaketown in 1964 and 1965 (Haury 1976). In 1962, Fontana and others published a study of Papago pottery, which reviewed the history of archaeology in the area as well as the history and ethnography of southeastern Arizona (Fontana et al. 1962). The study also discussed many sites in the area. One of the major goals of the work was to approach the question of a Hohokam-Pima continuum from a study of historic and modern Papago wares. Ultimately, the authors concluded that they could not make a clear connection between Hohokam and Papago on the basis of form; their general impression was one of sharp discontinuity in ceramics (Fontana et al. 1962).

Jack Zahniser (1966;1970) conducted a survey in the Tucson Basin in the Rincon Valley in conjunction with excavation of BB:14:24, next to the Tanque Verde ruin. The goals of the project were to provide a report for BB:14:24 before the land was sold for development, incorporate existing information about the Tanque Verde ruin, learn about the nature of the prehistoric occupation of the area around these two sites, and provide a general statement about the Tanque Verde phase (Zahniser 1965b:11).

Zahniser limited his survey to ridges like those on which his site and the Tanque Verde ruin are located. Although he felt the survey was complete for Sections 8 and 9 of Township 15 south, Range 16 east, he provided no map and his emphasis on ceramics apparently led to neglect of aceramic materials. Moreover, his interest in Tanque Verde phase occupations probably skewed results in their favor, although most sites are identified by phase.

In conjunction with the building of Interstate 19, four sites south of San Xavier Mission were excavated in 1965 and 1966 by J. Sciscenti and J.C. Greenleaf (Greenleaf 1975). These sites (BB:13:16, BB:13:41, BB:13:43, and BB:13:50) were considered to be part of a settlement that also included four unexcavated sites (BB:13:42, BB:13:44, BB:13:45, and BB:13:48) consisting of low trash mounds near pit houses. The main occupation at each site dated to the Rincon phase, although ceramics from Canada del Oro through Tanque Verde phases were found. Two transitional ceramic types were found, late Rincon Red-on-brown and Rincon Polychrome. A major cremation area was found at BB:13:16, as well as two inhumations.

Limitations imposed by the right-of-way precluded discovery of mortuary areas at the other sites (Greenleaf 1975:101). Carbonized plant remains were found, mainly in a storeroom at BB:13:50 (House 12). Six of the seven identified species were found in separate storage jars. In addition, two types of maize were present, as well as Jack bean and stick-leaf (Meotzelia sp.) (Bohrer et al. 1969). This find marks the first documentation of human use of stick-leaf in the Lower Sonoran life zone (Greenleaf 1975:106).

The Whiptain ruin (BB:10:3) was partially excavated by the Arizona Archaeological and Historical Society under the direction of Bruce Bradley in 1966 and 1967, Paul Grebinger from 1968-1970, and Sharon Urban in 1970 and 1971. The final excavation was conducted in 1971 by Pima Community College under the direction of Phil Lord. About fifty houses were excavated. Paul Grebinger has the field notes, and a site report is in preparation. Analysis of the pollen from the site has served as a master's thesis (Lytle 1971) and has been published as a comparison with other pollen evidence from the Basin (Lytle-Webb 1978). According to Stacy and Hayden (1975:19), the site is 20 miles from the Hodges site (AA:12:18) in the Agua Calienta Hills and covers 60 acres. It appears to be a single component Tanque Verde phase occupation. Materials from the site have been used in an analysis of design attributes of Tanque Verde Red-on-brown (Grebinger 1971a; Grebinger and Adam 1978), along with ceramics from the Hodges site, Rabid ruin, Martinez Hill, and University Indian ruin.

No report has been written on Rabid ruin (AA:12:46), south of the Hodges site on the Santa Cruz River. According to Stacy and Hayden (1975:19), the Rabid ruin was excavated as a highway salvage project directed by Laurens Hammack (n.d.a.) of the Arizona State Museum in 1968 and 1969. The site is Tanque Verde phase. One pit house was archaeomagnetic dated, although the date is not available. A later description by Betancourt (1978a:50) stated that forty-four mortuary pits were excavated. Nancy Hammack (1978) analyzed the ceramic vessels from the mortuary pits, and Lisa Huckell analyzed the carbonized plant remains (Huckell 1976).

In 1965 the Arizona Department of Transportation excavated a lower terrace compound at San Cayetano del Tumacacori in the Tucson Basin (Brown and Grebinger 1969). As a result of the excavations, Brown and Grebinger (1969:196) felt that some of the architectural differences that DiPeso had defined as temporal may have been due to differences among contemporaneous social groups. In addition, they felt the distinction DiPeso had made between Remanote Plain and Paloparado Plain was invalid. The distinction had been made between ceramics that were tool polished on the interior and exterior (Paloparado Plain) versus ceramics that were hand manipulated and smoothed (Ramanote Plain). Excavations produced sherds with both kinds of marks (Brown and Grebinger 1969).

Highway salvage excavations were carried out at BB:13:14, five miles south of Tucson on the west bank of the Santa Cruz River by E.T. Hemmings (1969) in the late 1960s. A number of burials were recovered eroding out of the bank in a horizon of silt refuse, and archaeological features were found 1 meter below the present surface. The burials and cremations spanned AD 900-1300 and included the burial of a dog with a painted bowl and a male burial with tool kit for delicate cutting and scraping as for processing small game.

Excavations at Potrero Creek near Nogales (EE:9:53) were conducted by Paul Grebinger (1971a) and served as the basis of his doctoral dissertation. The site was occupied from approximately AD 750-1250. Pollen

analysis, animal remains, and the patterned distribution of material culture revealed a prehistoric environment better suited to floodwater farming than the present. Perhaps as a result, the activity structure of the site reflected a total involvement in subsistence activities, in the form of raw material processing areas and food cooking areas (Grebinger 1971a:78). Thirty-seven burials and four cremations were also recovered, all with a near lack of grave goods (Grebinger 1971a:76). Most importantly, Grebinger felt that the material culture of the Potrero site, had much more in common with Papaguerian non-riverine sites to the west than with riverine sites such as the nearby Paloparado site (Grebinger 1971a:17).

Ten cremations were uncovered in 1969 by the Arizona State Museum Highway Salvage Section at the nearby site of EE:9:68. Analysis of the ceramic materials, which consisted of local brownwares, Rillito Red-on-brown, and Trincheras Purple-on-red and Polychrome led to definition of the area as a "Santa Cruz contact zone" (Reinhard 1978:247). The zone was the area with the greatest mixture of Trincheras and Hohokam artifacts, namely the Santa Cruz River and its tributaries between Tumacacori and Nogales. In addition to ceramics, the nature of the area as a transition zone is reflected in the secondary urn mode of cremation, the practice of occasionally "killing" funerary vessels and the use of multiple cremations. In these characteristics, the area differs from another transition area, the San Pedro Valley (Reinhard 1978:247).

Work at late sites in the San Pedro Valley, including the Garden Canyon site, was carried out in 1964 (Young 1972b).

In 1963, Johnson and Wasley (1966) reported the excavations at two sites (V:16:8 and V:16:10) near Bylas. These excavations were important because there has been little archaeological research conducted along the Middle Gila Valley. The sites represent a local variety of the general Western Pueblo culture. Comparative ceramic type dating dated the sites to the twelfth century. Because these sites contain elements of Mogollon, Anasazi, and Hohokam and because of their transitional location, they belong to the regional Bylas phase (Johnson and Wasley 1966:249). Some of the site traits are similar to sites found in the Point of Pines region.

In part as a follow-up to work at Reeve ruin (DiPeso 1958), the University of Arizona conducted a field school at the Ringo site (FF:3:8) in 1962. The Ringo site lies in the southern Sulphur Springs Valley in Turkey Creek Canyon on the western slopes of the Chiricahua Mountains (Johnson and Thompson 1963a; 1963b). Two room-plaza complexes were excavated, as well as a possible ceremonial structure between the compound walls of Unit 1 and those of Unit 2.

Two primary cremations and three primary inhumations from the Ringo site and cremations from the nearby Kuykendall site (FF:2:2, Mills and Mills 1969) markedly differed from the Hohokam mode of secondary cremation away from the actual site of cremation (Johnson and Thompson

1963b:477). Several lines of evidence, including the cremations, suggested that this late development originated in the Mogollon pattern of the area, rather than representiong a Salado or Western Pueblo migration.

The Kuykendall site is a large site featuring a number of compound and primary cremations, as at Ringo. At both, instrusive decorated wares outnumbered those made locally, a pattern also noted at Bobocamari, Paloparado, and Reeve ruin. Ramos and Tonto Polychromes were present at the Kuykendall site but not at Ringo, so a temporal overlap was possible (Johnson and Thompson 1963b:477).

A brief report was issued in 1966 on the Glass Ranch site, a plainware village of short occupation on the east side of the Chiricahua Mountains (Mills and Mills 1966). Twenty rooms were excavated, but only 13 decorated sherds were recovered (four Tucson Polychrome and nine Gila Polychrome).

Sites such as these led to more research on Western Pueblo and Salado manifestations in southeast Arizona. In 1963 Gwinn Vivian and W.W. Wasley revisited the Buena Vista site in the Safford Valley. They collected two boxes of sherds and added notes to Tuohy's earlier observations (Buttigieg-Berman 1977).

Research in the 1970s and 1980s

THE TUCSON BASIN

In the 1970s, urban expansion, federal and state legislation, and public interest combined to produce a vast upsurge in archaeological research and publication. For example, Lindsay and Metcalf (1973) evaluated possible impacts from building a proposed service facility on Tumamoc Hill. The Arizona Archaeological and Historical Society then intensively surveyed the hill. As a result, the site has produced one of the best documented series of reports on late prehistoric features, with information on ceramic distribution (McLean and Larson 1979), distribution of other material culture (Larson 1979), trails (Hartmann and Hartmann 1979), and petroglyphs (Ferg 1979). Along with White (1965), Ferg's (1979) study is one of the few studies of rock art in the basin. Perhaps the most important studies are Wilcox's (1979) analysis of the warfare implications of the dry-laid masonry walls at the site and Masse's (1979) study of nearby agricultural features, the first in the basin.

Excavations at the Hardy site (BB:9:14) showed public interest in archaeology, as well as the archaeological profession's response to this interest. Excavations at the site in Fort Lowell City Park were carried out for the Pima County Parks and Recreation Department and the Pima County Parks and Recreation Commission (Gregonis 1976b; 1977). Five pit houses were excavated, as well as an outdoor hearth, storage pits and caliche borrow pits. Materials were collected for faunal and archaeobotanical analysis. In addition archaeomagnetic dates were collected from the hearths of one house, although the dates are not available.

The ceramic and architectural evidence suggested a transition between the Rincon and Tanque Verde phases, with no occupational hiatus as suggested by Zahniser (1965b:45). The Hardy site was probably representative of most of the large villages in the Tucson area (Gregonis 1977:12) and was developed into a public exhibit in the park. In response to public interest, additional materials on the Hardy site and general prehistory of the Tucson area were presented in a well written handbook published by the University of Arizona (Gregonis and Reinhard 1979).

In response to national and state environmental directives, cultural resource management studies have constituted most of the archaeological research in the Tucson Basin in the 1970s. Some work, however, was still conducted in a salvage context where materials were eroding out of washes or uncovered during construction, as with a reported early historic burial from the San Xavier Reservation (AA:16:35) (Ayres 1970b). A similar burial, known as the Bechtel burial, was salvaged during monitoring operations conducted by the Cultural Resource Management Section of the Arizona State Museum for the Pima County Sewage Disposal Plant north of Tucson (Fritz 1977:27). The burial has not been formally reported but may be early historic Sobaipuri.

Additional burials were recovered eroding from the west bank of the Santa Cruz River near the San Xavier Reservation after severe floods in 1979 (BB:13:14) (Doyel 1979a). Two cremations, five inhumations, and a possible dog burial were recovered in an area first recorded by W. Wasley in 1955; additional burials have been recovered from the general area since then (e.g. Hemmings 1969a). No features have been excavated other than burials at the site, which may be a western extension or mortuary area of the Martinez Hill ruin (Doyel 1979a:4).

Most work, however, was carried out as part of programs to assess and mitigate the impact of proposed projects. Many of these projects were based on explicit research designs and attempts to explore specific research problems. Mark Grady (1973) surveyed the Salt-Gila Aqueduct right-of-way for the Central Arizona Project and located seven sites within the proposed Tucson Division project area. Most of these sites were late Hohokam temporary activity sites. The area north and west of the Santa Catalina Mountains were surveyed in 1973 for a proposed housing development (Roubicek, Cummings, and Hartmann 1973). Five previously recorded sites were visited, and six additional sites were recorded--two of which had associated ball courts.

A records inventory of the Tucson Basin was conducted as the first stage of work for the Tucson Sewage Project in 1973. This inventory covered 31 linear miles in Pima County and the City of Tucson. Fifteen sites were reported in the proposed sewer route (Fritz 1973). The route was surveyed the next year but only two of the 15 sites could be located. Fourteen more sites, however, were recorded: six multi-activity sites and eight limited activity sites. Prehistoric canals were recorded at three sites (AA:12:15, AA:12:90, AA:12:92), as well as a San Pedro Cochise projectile point (Fritz 1974a). Five additional miles were surveyed for the Tucson Sewage Project in 1974, and four more sites were

recorded (Fritz and Grady 1974). Two sites to be affected by the Tucson Sewage Project were selected for excavation as part of the mitigation program, the historic Fort Lowell Kitchen site (BB:9:72), and AA:12:90 near the sewage plant (Kinkade and Fritz 1975).

The work at the sewage site examined two prehistoric ditches through the use of backhoe trenches and excavated a historic homestead house. These are the first water control features of this kind investigated in the Tucson Basin (Kinkade and Fritz 1975). Finally, the Rillito section of the sewer project was surveyed; but no additional survey was determined to be needed (Gregonis 1976b).

Surveys were also conducted for the Tucson Gas and Electric El Sol-Vail Transmission Line to assess the impact of proposed transmission towers (McDonald et al. 1974). Only one site, a bedrock mortar concentration (AA:16:43), was located in the Tucson Basin in the Sierrita Mountains.

Several records inventories were performed during the mid-1970s. Stacy and Hayden (1975) assessed the cultural resources in the Saguaro National Monument east and west of Tucson. The overview included a thorough review of archaeological research outside the monument, particularly in the Tucson Basin, and a review of archaeological studies in the monument. The research potential of the monument was assessed, and several management recommendations were made. Ferguson and Beezley (1974) checked records for the San Manuel-Red Rock APS Transmission Line study area. Archaeologically sensitive areas were defined for the San Pedro Valley, Santa Catalina Mountains, Tucson Basin, Rincon Mountains, Falcon Valley, Tortolita Mountains, and a part of the Santa Cruz River Valley.

A records check was also done as the first part of a program for a proposed sewer route and treatment plant in the area south of the Canada del Oro drainage in Tucson (Brew 1975). Forty-four sites were inventoried, and the district was recommended for nomination to the National Register of Historic Places. Survey was conducted in the area the next year, four sites were examined and three artifact areas were discovered (Brew 1976). Vivian and Reinhard (1975) performed a records check for the Santa Cruz River Lineal Acquisition and Development Project summarizing 19 previously recorded sites.

Several small-scale surveys and limited excavations were conducted during the mid-1970s as well. McGuire (1975) surveyed the proposed Silverbell Park and Golf Course area and recorded three sites (AA:12:93, AA:12:95, AA:12:96). Limited excavation was carried out for the San Xavier Bicentennial Plaza (Ciolek-Turrello and Brew 1976). Test excavations uncovered a number of artifacts ranging in age from prehistoric to contemporary. Remains of a ramada were also found. Lensick (1976b) recorded one site and 52 isolated finds in survey of the Diablo Village Estates Housing Development in the Avra Valley west of Tucson. Testing was carried out at the site (AA:16:52) (Lensick 1976b). The proposed Salt-Gila Aqueduct of the Central Arizona Project was resurveyed in 1978, and nine sites were located (Stein 1979). Forty miles of powerline

right-of-way were surveyed in 1978 for the Tucson Gas and Electric Company in the northern Tucson and lower Santa Cruz River Valley area; four sites and four artifact scatters were recorded (Rozen 1979a).

A major focus of archaeological investigation during the midand late 1970s was the proposed Santa Cruz Riverpark. The initial management plan by Doelle (1976) summarized the sites recorded in the district and recommended nomination of the riverpark as a National Register District. As part of the program, the proposed River Road bikeway was surveyed (Scheick 1976), and the impact assessed to three sites along Rillito Creek (BB:9:27, BB:9:43, BB:9:54).

A more formal research proposal for the riverpark recommended an overview and intensive survey of the area (Czaplicki 1977). As a first step, Betancourt (1978a) wrote an archaeological synthesis of the Tucson Basin, focusing on the Santa Cruz and the riverpark area. The proposed riverpark Archaeological District was then surveyed the same year (Betancourt 1978b). Thirty-three sites were recorded, making a total of 63 known sites within the district. Eight of these were Cochise, 51 were Hohokam, and the remaining 24 were historic. The report summarized several Cochise sites in the Tucson Basin that had not been formally reported, such as the sites along the Brickyard Arroyo (Betancourt 1978b:37). The report also compared these sites to similar sites within the riverpark, such as BB:13:107 and BB:13:108. Both sites had heavily patinated hearthstones, suggesting great age and possible affiliation with the San Dieguito materials surveyed by Rogers (1958).

Between 1976-1978, Doyel (1977b) excavated three Hohokam sites and a historic Pima site in the middle Santa Cruz River Valley south of Tucson. At the England Ranch site (DD:8:129), the remains of six Piman structures were uncovered 1 mile south of Tumacacori National Monument. These materials were similar both in structure and in associated lithic materials to materials from Alder Wash (BB:6:9), yet different from the latest prehistoric occupations in the area (Fritz 1977). On this basis, Fritz criticized previous studies of protohistoric sites (e.g. DiPeso 1953a) and proposed that southern Arizona had been abandoned by the mid-1400s and had then been reoccupied by Piman groups from the south (Fritz 1977) in contrast to the notion of a Hohokam-Piman continuum in the area.

Excavations were carried out by the Arizona State Museum for Arizona State Parks at Tubac Presidio in 1974 (Shenk and Teague 1975).

Another limited overview was conducted for the Transportation Corridor Project. Five prehistoric sites were reported, including three that had been destroyed by the building of Interstate 10. Of the two remaining, BB:13:39 was a Hohokam village occupying 100 square meters, with 25 centimeters of cultural deposition. BB:13:64 is reported as a Hohokam habitation site of unknown size, represented by a sherd and lithic scatter (Czaplicki 1978). The area was then surveyed (Rozen 1979b).

Somewhat earlier, Ackerly and Rieger (1976) synthesized the known archaeological resources of southwest Pinal County to the northwest of the study area. An overview of Davis-Monthan Air Force Base revealed no recorded archaeological resources, primarily due to restricted access by the public to the facility. The base, however, was felt to have much archaeological potential (Bremer 1978).

Small-scale survey and excavation continued through the late 1970s. King (1968) surveyed proposed horse trails in Saguaro National Monument and as a partial follow-up, Pima Community College mapped Four Saguaros rockshelter (BB:14:9) for the National Park Service (Johnson and Hewitt 1977). Jim Hewitt of Pima Community College also conducted a brief survey of the Tucson Airport Authority Study Area (Hewitt 1979).

Lyle Stone of Archaeological Research Services performed a cultural resource survey and evaluation of a 14-acre site of a proposed aggregated materials source, 16 miles southeast of Tucson (Stone 1978). One component of a three-component site (BB:14:73) was located in the project area, namely six linear rock alignments on the floodplain above the west side of Pantano Wash. Data recovery and site avoidance were recommended.

Archaeological Research Services also surveyed Del Bac Heights, an 11-acre parcel, for Pulte Home Corporation. By the time of the survey, the property had been excavated and graded to a depth of between 1-10 feet below ground level. Evidence suggested that a prehistoric Hohokam site (AA:12:115) had existed on the parcel, but had been obliterated by construction (Stone 1980). A similar clearance was done for the Salida del Sol Development (Fortier and Stone 1980). One major site (AA:16:44) was recorded, a large lithic and ceramic scatter.

OUTSIDE THE TUCSON BASIN

As had been the case before initiation of legislation, finds were often brought to the attention of archaeologists as they were observed eroding out of washes and sand dunes. In 1970, Franklin and Clements reported on a possible Hohokam burial at BB;11:24, which was eroding out of a trash midden in the bank of Soza Wash in the San Pedro Valley (Franklin and Clements 1972). Similarly, excavations were carried out in 1972 near Bowie at the Gold Gulch site (CC;10:2), a site of possible San Pedro Cochise affiliation. The work revealed a seasonal occupation by a relatively small social unit, perhaps during the late fall (Huckell 1973).

Most archaeological information, however, came from archaeological surveys held as part of the mitigation and clearance process required by law. Relatively little excavation was conducted, and much of the work has not been completely reported, particularly at the large late sites. For example, the Arizona State Museum Highway Salvage Department conducted excavations at Alder Wash (BB:6:9) and two sites in Peppersauce Wash (Dos Bisnagas BB:6:6, Una Cholla BB:6:18). Aside from a brief unpublished report by Hammack (1971), description from a nearby survey conducted by Breternitz (1978), and partial analysis presented in Franklin and Masse (1976), no comprehensive report has been presented; although it is in preparation by Masse (1985).

In 1972 a clearance survey was conducted of the Clifton to Tucson section of the Tucson Gas and Electric San Juan to Vail Transmission Line under the direction of David Doyel (1972b) of the Arizona State Museum. This survey recorded three sites northwest of Willcox, one possibly of San Simon Mogollon affiliation. In 1972 the Museum of Northern Arizona completed the San Juan to Clifton segment of the survey (Kane and Fuller 1972a;b). Also in 1972 surveys were conducted for the Apache-Twin Buttes and Pantano-Whetstone Transmission Lines (Walker and Polk 1973).

As the need grew for better management of archaeological resources, a number of Class I overviews were completed, including the San Simon and Vulture Units of the Bureau of Land Management (BLM) (the San Simon Unit lies near the New Mexico border in the study areas) (Quinn and Roney 1973); BLM's Middle Gila Planning Unit, generally to the northwest of the study area (Debowski and Fritz 1974); BLM's Winkelman and Black Hills Planning Units in the north and east portion of the study area (Teague 1974); and BLM's Geronimo Planning Unit, covering most of the Safford Valley (Doelle 1975a). In addition, the San Manuel-Red Rock APS Transmission Line study area (Ferguson and Beezley 1974) and the Arizona Public Service Cholla-Saguaro Transmission Line study area (Goree, Larkin, and Mead 1972) were also completed.

BLM, the Forest Service and other organizations also conducted hundreds of short surveys directed at small-scale impact mitigation or limited area management objectives. In 1974, Gilman and Sherman (1975), working for the Arizona State Museum, conducted a survey next to the Gila River near Safford for the Graham-Curtis Canal Company. They located four new sites and redefined a previously recorded site (CC:1:17). A similar survey of a limited area on the south side of the Gila River at Foote Wash and No-Name Wash east of Safford recorded a number of Mogollon plant collecting sites (Kinkade 1975a). Mitigation data recovery was completed by Dr. James E. Fitting (1977). Also during this period, many sites were recorded by BLM and the Forest Service as part of on-going cultural resource management programs (eg. Department of the Interior, Bureau of Land Management 1979a-x).

Gilman and Richards (1975) surveyed Aravaipa Canyon for the BLM, providing a closer look at one of the few perennial streams left in the Lower Sonoran life zone due to changes brought about by irrigation and erosion. They resurveyed previously recorded sites, including BB:2:13 and BB;2:14 (Cochise sites) and BB:2:2, a Hohokam site with materials from the Sweetwater phase to the Sedentary period. They recorded new sites as well, including a possible Apache site (BB;3:7), a ceramic period shelter (BB:2:17), and BB:3:21, a cliff house in an overhang along Turkey Creek, which had been visited by Emil Haury and students in 1966. The absence of associated artifacts precluded further cultural identification (Gilman and Richards 1975:12).

Additional Apache material was discovered in 1974 by H. McCrorey on his ranch on the east side of the Chiricahua Mountains (Ferg 1977c). In a rockshelter (FF:4:8) in a tributary canyon of the San Simon Valley, McCrorey found a human skeleton, a rusted metal knife, a complete gourd

vessel, and some cordage and cloth fragments. The burial was identified primarily from the dating of the knife as Chiricahua Apache.

Archaeological field schools continued working in the study area. The Twin Hawks site near Oracle was excavated as a field school by Central Arizona College under the direction of Dudley Mead. No report has been released, partly because of shifts in personnel and the time required to analyze materials from large sites. A brief description, however, can be found in Franklin and Masse (1976:50).

Several field schools were carried out by the Arizona College of Technology in the 1970s. The Big Ditch Site on the San Pedro River near Aravaipa Creek was excavated under the direction of W. Bruce Masse (Masse n.d.b; Masse et al. in preparation). A field school was conducted on the nearby Ash Terrace under the direction of Michael B. Bartlett. No report is available on this project.

In 1975 and 1976, two Salado sites near Safford were excavated by students from Eastern Arizona College under the direction of Tom Scott of the Anthropology Department (Westfall et al. 1979:43). The field school moved in the late 1970's to Aravaipa Canyon and continued its research (no report).

Just as the Salado Redware Conference had provided a major opportunity in the 1960s for exchange of views and information among archaeologists working in a number of regions (Lindsay and Jennings 1968), a Salado Conference was held at the University of Arizona in 1976. The results of the conference were published as a special volume of The Kiva, edited by Doyel and Haury (1976).

In 1976 the Arizona State Museum inventoried nine proposed pumping stations in southern Arizona for the SOHIO West Coast-Mid-Continent Pipeline Project (Linskink 1976). Two sites were found. One of the sites, the Poor Canyon Scatter (BB:11:25) located near Redington, is a lithic scatter believed to be Cochise. Mitigative data recovery was completed by the Arizona State Museum (Ferg 1977b).

A survey of 180 square miles of the east side of the San Pedro Valley was carried out by N. Whalen from 1975-1977. A total of 293 sites in five environmental zones were recorded, most of them Chihuahua and San Pedro Cochise (Whalen 1981).

A major series of surveys were conducted for the Arizona Electric Power Cooperative (AEPCO) in 1977. The first phase surveyed 56 miles of right-of-way from the Greenlee Substation to Morenci and on to Safford. Seventy-six sites were recorded (Simpson and Westfall 1978). Phase two was an intensive survey of the right-of-way corridor between Safford and the AEPCO Cochise Power Plant, south of Willcox. Twenty-seven sites were located, six of which were recommended for nomination to the National Register of Historic Places. Data recovery through surface investigation and some test excavations was carried out at 11 sites (Westfall et al. 1979). Several sites revealed Amargosa or Cochise occupation; if the

identification of the Amargosa materials is valid, it would mark the eastern-most extension of this poorly understood Archaic culture. A number of sites around Willcox Playa such as CC:13:11 were recorded (Simpson et al. 1978) in the same area first examined by Meinzer in the early 20th century.

The New Mexico State University Cultural Resource Management Division of the Sociology and Anthropology Department conducted survey and excavation during this period for the Public Service Company of New Mexico in the Clifton and Duncan area (Bussey and Beckett 1975; Beckett 1978; Gomolak 1977; Berman 1978).

Two Mogollon sites were discovered: the Mesa Top site and the Cerro De Los Piedras site (BLM AR02-04-291). Excavation at the Mesa Top site revealed a Mogollon occupation lasting from about 50 BC-AD 925 (Berman 1978). This has been one of the few excavations conducted at a Mogollon site east of the San Pedro Valley since the Cave Creek-San Simon Village study. Remains shared both Mimbres and San Simon branch traits, and the analysis of the early ceramics showed that previous ceramic analyses in the Mimbres-San Simon area were inadequate and the classifications were possibly in error. The test excavation of the Cerro De Las Piedras site yielded little data on the site's occupation, but did provide some information on the impact of the construction of a temporary road on sites (Beckett 1978).

More limited survey was conducted by Buttigieg-Berman (1977) for a proposed powerline right-of-way east and north of Safford. The report contains the most recent description of the Buena Vista site and excavations by John and Vera Mills at the site, which were published the next year (Mills and Mills 1978).

Breternitz (1978) conducted a survey in the lower San Pedro Valley for a 69- and 115- kv transmission line for Continental Copper Company. The survey report describes several late sites thought to have resulted from coexistence of traits of an indigenous population with elements of the Hohokam and Mogollon cultures (Breternitz 1978:20). Salado sites are described as continuous along the river from its mouth to the town of Benson. These sites are accompanied by large cleared agricultural areas on ascending terraces and on floodplains of small tributary drainages (Breternitz 1978:18).

This report has one of the first descriptions of large-scale agricultural features since Agenbroad's research in the Redington-San Manuel region of the San Pedro valley (Hammack 1971; Agenbroad 1967a). Similar features are known for the Safford area (Gilman and Sherman 1975; Woosley 1980).

In addition, four surveys were conducted on the west side of the San Simon Valley for CXC, Inc. Four sites, five subsites, and several isolated artifacts were found, all of Mogollon or Salado affiliation. One site was recommended for nomination to the National Register of Historic Places (Gregonis 1979).

Archaeological survey for the Arizona Public Service (APS) Cholla-Saguaro Transmission Line corridor was conducted in the mid-1970s (Teague and Mayro 1979). The first phase surveyed the area from Antelope Peak near Winkelman to Red Rock recording five prehistoric sites (Kinkade and Gilman 1974). Analysis of these sites focused on defining subsistence-related activities in the southern desert and presented new information on the use of non-riverine areas by both the Hohokam and Salado (Ackerly 1979:405). The second phase of the survey of the southern portion of the APS line covered the area between Antelope Peak and Superior (Canouts and Phillips 1975). A total of 13 sites were recorded, including two sites originally recorded in the Buttes Reservoir survey (Debowski et al. 1976).

In 1973, Brown carried out a survey and limited excavation in the Pueblo Viejo area (Safford Valley) to examine the problems of the origins of the Salado in this area (Brown 1973). That Salado Polychrome in the area were strongly associated with sites of the Point of Pines Reserve Tradition confirmed to Brown that Johnson's hypothesis had been correct to the extent that the Western Pueblo problem cannot be separated from the Salado problem. Brown, however, found no evidence for the Salado originating in the Safford Valley (Brown 1973).

Second Canyon ruin (BB:11:20) was excavated in 1969 and 1970 as part of the Arizona State Museum Highway Salvage Program. The site lies on a gravel ridge overlooking the west bank of the San Pedro River north of Redington (Hammack 1970). Two components are present at the site. The earlier component is a Hohokam occupation represented by 16 excavated pit houses and ceramics of the Gila Butte, Santa Cruz, and early Sacaton Phases. After a brief hiatus, the site was occupied by a population affiliated with the Tucson Basin. Several pit houses were excavated with associated Tanque Verde Red-on-brown ceramics of the thirteenth century. The major occupation is Salado, manifested by 22 rooms in three main groupings partially enclosing four plazas. In addition, evidence exists of protohistoric occupation, possibly Sobaipuri or Apache, in the form of several surface firehearths (Franklin 1978).

Information on Second Canyon ruin was presented as a preliminary report by Hammack (1970). A complete report was later published by the Highway Salvage Division of the Arizona State Museum (Franklin 1980). The excavation also served as the basis for Franklin's doctoral dissertation (Franklin 1978). More information on this ruin can be found in Franklin and Masse's (1976) article on the San Pedro Salado, which also presents information on other late sites in the San Pedro Valley.

In 1980 and 1981, BLM's Safford District completed a clearance inventory and archaeological testing program at five proposed dam sites for the San Simon Restoration Project. The dams were proposed for the lower San Simon River between Safford and Bowie. Few cultural resource remains were discovered at the Slick Rock, South Well, and Creosote dam sites. The Tanque project area yielded 35 prehistoric sites, which are primarily Mogollon and represent limited activity localities involving food gathering and processing and lithic procurement (Kinkade 1981, personal communication). The Timber Draw project area contained 37 prehistoric and

two historic sites. Prehistoric sites consist of Chiricahua and San Pedro Cochise sites, early to late Mogollon sites, and sites containing both Cochise and Mogollon components. Testing has shown that the cultural deposits are up to 2 meters deep (Dooley et al. in prep.).

In 1979 the Cultural Resource Management Section of the Arizona State Museum conducted extensive research in the northern section of the Santa Rita Mountains. Earlier survey in 1975 and 1976 of this 25-square mile area had found hundreds of sites. The region is subject to a proposed exchange of land between the Forest Service and ANAMAX Mining Company. Testing operations have been undertaken at over 40 sites from artifact scatters to major villages under the direction of Bruce Huckell (1980) and Sharon Debowski (1980). The Final report is currently in preparation.

Excavations are also continuing at the Pima Community College field school site of Indiantown in the Tortolita Mountains (Stephen and Hewitt 1981).

In 1979 a Class I overview of the middle and lower Santa Cruz Basin was prepared by Westfall (1979) for the Tucson Division of the Central Arizona Project. The area includes Arizona archaeological grids AA:3, AA:7, AA:8, AA:12, AA:16, and BB:9, covering 1,550-square miles. Previous research was summarized, although little research had been done within the northern part of the project area. Westfall developed a predictive model of site distribution, which is being tested in a Class II sample survey for the project, headed by Carol McCarthy as Supervisory Archaeologist (McCarthy 1982).

Major excavations are being conducted at Los Morteros (AA:12:57) within the Tucson city limits. The site was visited by Huntington (1914) who called it Charco Yuman. The site is one of the largest and least disturbed in the Tucson Basin. Mapping, surface collection, and excavation are being undertaken by the Archaeology Section of the Arizona State Museum, with a major portion of the funding donated to the University of Arizona by the land developer. Surface indications are mainly Tanque Verde in age, with Rincon and some Snaketown-Gila Butte materials below the subsurface (Lange 1981, personal communication). Archaic materials have also been uncovered. The research is emphasizing the walls and agricultural terraces to determine if these Trincheras-like features may have had agricultural rather than defensive functions. In order to accomplish this goal, a variety of observations have been made, including terrace width, length, height, and depth of soil. A total of 12 terraces have been tested, and soil, pollen, and subsurface artifact samples have been taken (Downum et al. 1981:1-2). Perhaps the most noteworthy results thus far has been the discovery that terraces were used for both habitation and agriculture. Pollen analysis indicates cultivation of maize and, possibly, sotol (Downum et al. 1981:5).

Most of what remains of the Tanque Verde site is located on the property of the Fenster School. Dick Goddard has begun the task of locating materials and reports from the site and summarizing what is currently known about it. Limited excavations were begun in 1981 (D. Goddard 1981 personal communication).

Within the last year a coarsely coiled basket was removed from Chiricahua National Monument by Don Morris of the Western Archeological Center because it was damaged by a resident ring-tailed cat. Studies of associated materials are underway (Morris 1981, personal communication).

The Eastern Arizona College Field School plans on excavating near Safford during the 1982 field season.

PRESENT RESEARCH ORIENTATIONS

Research orientations in archaeological and historical studies are constantly changing. During the past 20 years the focus of research has changed twice, transforming orientations towards our understanding of cultural resources. The first change was the shift from an inductive to a deductive approach to the perception of archaeological materials. The second change was the growth of cultural resource studies required by government agencies. This development required agencies to conduct inventories and data recovery programs and forced archaeologists and historians to consider all evidences of past human activity rather than to focus narrowly on their specialized interests. Inventory and compliance research projects demand an accounting and comprehension of all cultural remains.

Researchers in southeast Arizona have effected these changes in orientation by following two general lines of research. Though other auxiliary lines have been followed, and lines of research have overlapped, these two lines represent the predominant modes of research. The first orientation is ecological, assuming that humans live in and react to their environment. Even though basic human responses to the environment are similar worldwide, responses to physical and social environments differ. Studies of societies' responses to the physical environment have focused on the subsistence base--its opportunities and limitations.

In the desert Southwest, recent studies have emphasized the adaptation to the arid physical environment. Concomitantly, researchers have needed to study the technological system developed to maintain survival in the desert. This need has lead to research analyzing "techno-fact" types of data.

The other ecological approach emphasizes the social environment. Cultural regions are often defined by recognition of social groups as represented by archaeological complexes, historical references, and modern observation. Researchers have attempted to define both realistic social groupings and interactions among groups. Earlier interests in social ecology led to numerous identifications of archaeological and historical cultures, as well as a profusion of proposed migrations, wars, dominations, and influences.

These explanations were often based on inappropriate correlations between artifact types and social groups. More recent studies have focused on cultural and social unit definition and boundaries using differently constructed data bases, which recognize that information about social relations is independent of the material on which it is found. For example, settlement pattern studies can be used to study either physical or social environmental relationships. The types of data collected about the settlement pattern depends on whether the investigator is studying subsistence or social units and boundaries.

The second orientation is epistemological. Government assisted cultural resource management studies and interest in human ecology have stimulated significant interest in identifying and understanding the total range of cultural resources. The requirements of compliance and inventory demand that all types of cultural resources be discovered and identified. This comprehensive procedure has resulted in the treatment of many cultural resources that were previously overlooked. As a consequence, many of the smaller and disturbed resources now are reported. Epistemologically, these resources are highly important for the information they contain about low-visibility cultural activities and the processes of site formation and erosion. Each of these three aspects is significant to our understanding of culture history and our ability to evaluate cultural remains. As a result of cultural resource projects, the number of resources added to site inventories has dramatically increased (as the voluminous records compilation for this project shows). Though some may feel that unnecessary sites have been recorded, this research orientation, for the first time, has forced the recognition of all types of cultural resources. Archaeological and historical sites that were never previously considered are being described and understood. Unknown archaeological cultures and little known historical phenomena are now being recognized. Although some researchers may be uncomfortable, this knowledge of the total range of the cultural resources has forced investigators to redefine many of their previous analytical conceptions and more precisely specify the relationship between human behavior and cultural remains. Both of these primary orientations are important in understanding the contexts of the research designs that have been used in the study area.

RESEARCH DESIGNS

The purpose of all research designs is to develop a problem statement and to develop appropriate strategies, methods, and tactics to solve the problem. Although this statement sounds simple enough, many unknowns and uncertainties are involved in the study of human history and prehistory that make it somewhat difficult to construct tight research designs. The difficulty lies in the complexity of human history. Three factors contribute to the complexity: 1) Human behavior (including past human behavior) is unpredictable; 2) cultural remains do not directly represent the past activities that caused them; and 3) the relationship between antecedent and consequent events, via cultural remains, frequently is uncertain.

Both of the research orientations described above plus the complexity of human history have contributed to the context of the research designs developed by investigators in the study area.

A comprehensive research design proposes and tests a well-defined model of human behavior and explains the relationship between the model and the material remains being studied. Though many types of human behavior could be studied using cultural remains, the research orientations discussed above have directed most investigations in the study area towards predictive models of human settlement. These studies have focused analytical attention on site location, site type (function), and changes in location and type through time. Several of the research designs discussed in Chapter 5 are summarized here.

Settlement pattern studies often address several research questions and attempt to illustrate correlations between site location, subsistence strategies, and social organization. These models are usually based on assumptions derived from known site distributions, ethnographic analogy, and decision theory. The pragmatic objective is to delineate critical features of the effective environment that were important in determining site location by type through time. Judge studied Paleo-Indian settlement patterns along the Rio Grande in New Mexico using both a predictive model and probability sample. The model predicted Paleo site location based on topographic features. The random sample survey confirmed the model in that all the Paleo sites discovered conformed to the model. The effective environmental variable used were distance from water, overview, and hunting areas. The site typology recognized base camps, processing, and armament sites. Though conducted outside the study area, this study shows the type of approach that could be used in southeast Arizona.

Archaic period sites have been studied more thoroughly because they are more common in the study area. Whalen (1971; 1973; 1981) surveyed Cochise sites in the San Pedro Valley and adjacent terraces and mountains, discovering both base and work (processing) camps in the valley and on ascending terraces. Windmiller (1972) recommended a concentrated, more intensive survey, extending Whalen's (1971, 1973) model to include all possible sites of the Archaic period through the agricultural transition. McCarthy and Sires (1981:12) point out the need to account for Archaic sites deeply buried by erosion. The Anamax-Rosemont project has discovered over 20 Archaic sites on the bajadas and foothills of the Santa Rita Mountains adding a significant corpus of new data (Debowski 1980; Huckell 1980).

Though archaeologists have only recently begun to focus on early prehistoric sites in southeast Arizona, the cultures of the later prehistoric periods continue to receive the most attention. Historically, this emphasis on later periods is due to the great amount of information already collected about the sedentary, agricultural societies. These societies have been the most intensely studied, and the differences in approach and interpretation are vast. Older orientations that emphasize cultural traits differ sharply from newer approaches that attempt to delineate cultural processes. The current mainstream researchers, as

illustrated by the syntheses in Ortiz (1979), tend to compromise both approaches within an ecological framework. The demands of epistemological clarity, however, continue to require a retreat for some older conceptual frameworks. This analytical crisis is exemplified by the new trends in research design.

Representative of the new trend is Grady's (1976) dissertation on agrarian adaptation and regional synthesis. Grady recognized the incompatibility of the older regimes and the new approaches and suggested a research design that could redirect research along more satisfactory lines. Although his thesis is preliminary and he didn't discuss all the implications, it serves as a significant first step in the right direction. Since all the issues cannot be fully treated in this discussion, we will summarize only the recent trends in research designs.

Grady's (1976) research design is not complete because it does not specify the bridging argument between theory and cultural remains. His regional approach consolidated the theoretical basis for a comprehensive ecological approach to the societies that inhabited the Sonoran Desert, which overlaps into the study area. Though the previous orientation divided Sonoran Desert societies into different archaeological cultures on the basis of differences in material assemblages, the present orientation recognizes the similarities in cultural process and adaptation. The differences are in design and not kind. The Hohokam heartland had streamwater for irrigation; the Papagueria lacked it, and some streamwater existed in between (the western part of the study area). This approach greatly clarifies the confusion between Hohokam, Pima, Papago, Sobaipuri, and O'otam. Martin (1979:61-62) elegantly pointed out the significance of this concept for the Southwest, in general, and for Mogollon, in particular. This regional approach, when all the appropriate implications are accurately deduced, can provide a new basis for attacking sticky problems like ethnographic continuity, social and political complexity, and interregional interaction.

Other current researchers have approached the problem of site variation and created research designs from the bottom up. The investigators are emphathetic with the regional approach, but they concentrate on the distribution and attributes of cultural remains. Their research has involved most notably, predictive model studies. Predictive model investigations do not have to bridge argument to theory, but these unexpressed assumptions do affect the construction of the models. These ideas can be illustrated by looking at the evolution of a current long-range project in the study area.

In preparing for the building of the Tucson Aqueduct of the Central Arizona Project, the Arizona State Museum has conducted surveys and developed a predictive model for cultural resources in the project area. Westfall (1979) developed the initial model, which was evaluated and refined after additional survey by McCarthy and Sires (1981) and McCarthy (1982). Westfall (1979) stratified the project area by modern vegetation zones and classified site types by function. McCarthy and Sires (1981)

found that this method did not predict the occurrence of cultural resources as well as a model should. Later, McCarthy (1982) restratified the project area by using a composite technique that correlated topographic, aqueous, and vegetation variables. The site classification system was also changed to one based on site size (quantity and extent of cultural remains) rather than inferred function. This third study produced a better predictive model, but the theoretical and bridging assumptions that could explain why the refinements worked better were not specified. This summary of current research designs shows both how far we have progressed and how far we have yet to go.

RESEARCH DIRECTIONS AND DATA GAPS

This section discusses current research directions and significant data gaps of the study area. This information is presented in order and arranged by cultural period and group for easy reference. An infinite number of data gaps exist. The ones covered here are important in relation to the current research directions and the cultural historical issues discussed above.

PALEO-INDIAN

The study area presents many opportunities for the study of Paleo-Indian culture history and lifeways. The abundance of Clovis sites suggests the potential to learn more about the possibility of pre-Clovis occupations in the Southwest, "one of the most pressing unsolved problems in American prehistory" (Irwin-Williams and Haynes 1970:61). Judge (n.d.:34) suggested that Clovis may represent a terminal middle Paleo-Indian period lifestyle with a generalized adaptation to the high-diversity environments south of the maximum extent of the Wisconsin glaciation, judging from the location of such sites, primarily in mountain settings. Accordingly, the closeness of mountains and broad river valleys of the study area provides a diverse environment that should have been optimum for pre-Clovis inhabitants. In part, the existence of pre-Clovis occupation has been difficult to verify for many of the same reasons that affect our knowledge of later Paleo-Indian occupation, including low site visibility caused by transient occupations by small groups and the actions of geologic processes after occupation. In addition, our understanding may have been hindered by an inability to recognize the antiquity of the hypothesized, generalized pre-Clovis tool kit (Judge n.d.).

Rock shelters and cave sites in the study area should be systematically investigated for evidence of pre-Clovis materials. Geomorphological studies can provide information about late Pleistocene landscapes. In conjunction with information about areas where suitably ancient soils have been exposed, this information can be used to build predictive models of site location. A similar approach can be applied to regional surveys to determine if the patterning observed in the Rio Grande for Paleo-Indian site location occurs elsewhere (Judge n.d.).

The assumed correlation of Clovis and mammoth remains should be considered in Clovis studies in the study area. Judge (n.d.) has noted a wide range of fauna in association with Clovis materials from ten sites in the Southwest and Plains. His site typology for the Paleo-Indian period, based on frequencies of projectile points and scraping tools, completeness of points recovered, presence of faunal remains, and mean number or artifacts per site (Judge n.d.:18-22), served as a basis for delineating campsites, kill sites, processing sites, and quarry sites. Clovis kill sites, however, failed to conform to the pattern of kill sites for later Paleo-Indian sites, supporting Judge's contention that Clovis hunters primarily were scavengers of mammoth and hunters of bison and other species (Judge n.d.:33). Given the visibility of mammoth bones in arroyo walls, the possibility of skewed data should be considered.

Experimental replication of Paleo-Indian artifacts and butchering practices can also provide information about tool wear patterns, relative efficiency of different tools and techniques, and energy expended in subsistence tasks. Huckell (1979) has reported on the butchering of a dead circus elephant using replicas of Clovis artifacts. As a result, he has noted that Gorman's hypothesis about the cultural meaning of the orientation of a freshly killed carcass would be "physically impossible" for real-life hunters to carry out (Huckell 1979:188).

Since later Paleo-Indian materials are known from adjacent portions of New Mexico (Fitting and Price 1968), efforts should be made to locate such sites. The transitional nature of the Rattlesnake Pass point (Agenbroad 1967b) suggests the presence of later materials in the study area. Few multi-component Paleo-Indian sites are known in the United States (cf. Blackwater Draw, Locality 1, Haynes and Agogino 1966). If any of these sites are located in the study area, they would provide much information about the transition from the relatively well-understood Clovis horizon to later manifestations. Such sites also could provide more information about the transition from the Paleo-Indian period to the Archaic.

More detailed information is needed for paleo-environmental reconstructions to permit a better understanding of human-land relationships in prehistory. Several time periods are especially under-represented. Aside from the data from Pleistocene Lake Cochise around 22,000 BP, relatively little is known from the Late Pleistocene in the study area. The gap from 13,000-11,500 BP is especially crucial, as it represents the period just before the advent of Clovis hunters. Environmental knowledge of this period is needed to evaluate the hypothesized environmental diversity exploited by middle Paleo-Indian people, of whom the Clovis horizon may have been a last manifestation (Judge n.d.). Faunal studies also can provide insight into the extent to which Clovis hunters actively pursued mammoths or acted as scavengers (Judge n.d.).

Although many more data gaps exist for the Paleo-Indian period in the study area, the following additional gaps have been identified during our literature search: date of entry into North America; nature of subsistence strategy - generalized or specialized (mega-fauna hunters); nature

of settlement pattern; determinants of settlement pattern; nature of their social, political, and religious organization; precise dating of their occupation; and physical characteristics of the people.

Two additional data gaps relating to the environment of this period will be listed but not discussed. These gaps are: end of Wisconsin substage poorly understood; and conflicting interpretation on climate between 11,000 B.P. and 4,500 B.P.

ARCHAIC

Much more research into the Archaic of the study area is needed. At the most general level, the basic Cochise pattern as defined by Sayles and Antevs 1941, needs to be re-examined. Sayles and Antevs have presented a list of artifact and site characteristics for the Cochise culture, yet more recent work has found that many Archaic sites do not conform to the pattern (e.g. Westfall et al. 1979:74).

More information is needed on the definition of Cochise phases in order to deal with the relationship of the Cochise to other early complexes and to deal with the problem of cultural continuity within the Cochise. The Sulphur Springs phase has been regarded as simply a different adaptation of San Dieguito, concentrating on seed exploitation (Hayden 1970:88). It has also been regarded as the remains of Clovis gathering camps based on the absence of projectile points in the Sulphur Springs phase (cf. the material from Ventana Cave and Double Adobe), although the Sulphur Springs materials lack the chipping techniques associated with Clovis (Haury 1981, personal communication). Sayles and Antevs (Sayles et al. 1958) found sites in the Double Adobe area similar to Sulphur Springs, but with projectile points, which they attributed to the Cazador phase. Whalen's (1971) re-study of the materials claimed that Cazador actually was contemporaneous with Sulphur Springs and represented its hunting facets. Another re-examination regards the Cazador materials as more similar to the later Chiricahua stage (Irwin-Williams 1968c), leaving the status of these materials unclear at this time.

The early San Dieguito complex has been largely defined from the amount of patination, materials (particularly refractory igneous rock), topographic association, and the absence of pressure flaking (Rogers 1958; Warren 1967; Hayden 1981, personal communication). Patination has been linked to different pluvial episodes, yet it is unclear what the episodes of patination represent. Some insights into the problem are beginning to come from investigations into the actual formation processes of patination and desert varnish (cf. Dorn 1980 for a review).

Research into the potential of andesite phenocryst oxidation as a relative dating technique similar to obsidian hydration may provide more definite information about the relative temporal placement of artifacts and assemblages than current reliance on visual inspection (Hayden 1981, personal communication). As Rogers' (1958) study has shown, attempts to

date these materials have depended on topographic assessment and correlation of artifacts with dated sites elsewhere. The temporal placement of these sites, in turn, is still poorly understand (e.g. Mohave Lake, Warren and Decosta 1964).

Another problem with the San Dieguito complex is the implicit assumption of the great age of the materials due to the crudeness of workmanship and absence of pressure flaking. Most San Dieguito artifacts were made of coarse volcanic materials, best worked by percussion techniques. More research is needed on the relationships among choice of materials with resultant limitations on technique, function of tools, quality of workmanship, and age. This need is particularly strong because all the San Dieguito materials from the study area have come from surface locations that do not yield samples for dating (cf. Haynes 1969 for a more complete discussion).

A gap in our knowledge of the Archaic environment occurs between 7500-4500 B.P. (Mehringer 1967a), the Altithermal, as originally defined by Antevs (1937; 1955). The increased aridity of the period may have been responsible for an apparent Archaic population decline (Irwin-Williams and Haynes 1970). Although Paul Schultz Martin (1963a; 1963b) has postulated a "wet" Altithermal, the idea of a hot, dry Altithermal appears to be supported from deposits in the Great Basin.

Efforts should be directed toward the recovery of deposits from this period, although they are rare. This knowledge would allow assessment of the extent to which the moist environments reported by Martin are a local situation along the Mexican border, perhaps as an extension of conditions to the south, or are part of a more general phenomenon. Given the erosional onset of the Altithermal (Irwin-Williams 1979), geomorphological information should be extensively used to predict the location of deposits to optimize data retrieval.

A related problem is the environment and occupation of the study area during the Sulphur Springs-Chiricahua stage transition, a lengthy period. Future investigation could clarify the extent to which this gap is simply a function of the paucity of research or is instead a manifestation of a sparse population during a dry Altithermal. Rogers (1958) saw the gap as reflecting an abandonment of southern Arizona. With a return to moister post-Altithermal conditions, the study area saw the migration from California of a new complex, the Amargosa (Rogers 1958). Here, cultural contact and diffusion with indigenous Chiricahua stage Cochise peoples led to the adoption of metates and certain projectile points by the Amargosa. In contrast, Hayden (1981, personal communication) has regarded the Cochise simply as a grasslands variant of the Amargosa. Similarly, Schiffer (1981, personal communication) has pointed out the favorable environment occupied by the Cochise and suggested that the absence of grinding tools characteristic of these early California-based complexes may simply reflect the fewer seed-bearing plants in the West.

Another major research area is the definition of San Pedro subsistence and the transition to agriculture (see the following section on the

transition period). To investigate this transition, Windmiller (1972) has presented a general research design that can serve as a guide to future investigations. Following Whalen's (1971) work, Windmiller called for the delineation of a section of southeast Arizona to encompass a broad range of environments, followed by intensive survey. Use of the patterns recognized by Whalen (1971, 1975) can serve as the basis for developing a pattern of site recognition similar to that used by Judge in his survey of PaleoIndian sites in New Mexico.

Requiring individuals trained to recognize pre-ceramic lithic assemblages, such a survey is instrumental for defining the range of variability which itself is needed for an understanding of unique or low frequency sites, in addition to the more common sites found in probability-based surveys (Schiffer 1981, personal communication). Purposive surveys of this type are important for both research and management. For research, these surveys can increase the discovery probability of the low frequency sites. For cultural resource managers, high-intensity survey often is uneconomical in low density areas and frequently fails to produce samples large enough for statistical reliability (Schiffer 1981, personal communication).

Once such sites are located, research should concentrate on temporal placement by using a wide range of techniques, including archaeomagnetic dating. Researchers should also consider using varnish studies and fission track studies in absolute dating. Similarly, palynological ethnobotanical studies are needed to identify particular resource strategies practiced at different sites. This information can then be linked to broad-scale studies of subsistence techniques through a functional analysis of lithic assemblages and cultural features (cf. Betancourt 1978b:38ff). Patterns identified for the Late Archaic can then be compared to information about Hohokam subsistence in order to examine the continuities between the San Pedro stage of the Cochise and the Hohokam, particularly in the Santa Cruz and San Pedro Valleys (see Research Recommendation 1-3 in Chapter 10).

Several other data gaps occur in the Archaic record, including the following: precise dating of the Cochise and other Archaic phases; identification of San Dieguito remains; occupation of southeast Arizona between the Sulphur Springs-San Dieguito occupation and Amargosa occupation; dating of the period between the San Dieguito and Amargosa occupations; and discovery of well dated geologic exposures for 7,000 B.P. to 5,000 B.P. period.

TRANSITION FROM ARCHAIC TO SOUTHWESTERN CULTURAL TRADITION

The introduction of ceramics is generally believed to mark the transition from the Cochise San Pedro hunter-gatherers to Mogollon horticulturalists (see Haury 1941; Sayles and Antevs 1941; Martin et al. 1949, 1952; DiPeso 1979). In the study area, this transition seems especially clear for the San Simon area (Sayles 1945). A major gap, however, exists in our understanding of the transition in the San Pedro and Santa Cruz Valleys.

Cattanach's excavations near Fairbank yielded a wide range of unifacially and bifacially worked artifacts which he estimated to date between 500 B.C. and the introduction of ceramics (Cattanach 1966:24). These included 35 unstemmed points - 18 leaf-shaped, 16 triangular, and 1 chip end; 9 stemmed points, 2 with a stem wider than the blade and straight bases and 7 with narrower stems and convex bases (Cattanach 1966:5).

Some transition sites have been reported in the Dos Cabezas Mountains (Simpson et al. 1978:84-85) and the lower San Simon Valley (Dooley et al. in preparation) but, in general, neither the Santa Cruz nor the San Pedro Valley appear to have evidence of a transition (Cf. Ferg 1977b:8).

This lack of evidence has led to the development of a so-called "empty niche" hypothesis (Haury 1976; Doyel 1977a), in which the absence of conflict and defensive structures in early Hohokam settlements is seen as indicating either the absence of an indigenous population or the presence of a very small one. Although tentatively supported by present data, the hypothesis may more reflect our lack of knowledge of late Archaic settlement and subsistence patterns (e.g. Whalen 1971, 1975) then actual trends. The Pantano Wash site, with its AD 150-300 date, suggests a successful late Archaic exploitation of the Santa Cruz Valley just before Hohokam entry and, thereby, weakens the "empty niche" hypothesis (Masse 1980:11).

Additional data gaps and research questions include: why agriculture was adopted (not needed); why agriculture remained a relatively minor subsistence strategy for so long; and the origin of maize in northeast Arizona.

HOHOKAM

One of the greatest problems in the study area is the "insecure footing" (Schiffer 1982:27) of the chronology. Although several processual models have been proposed to account for developments in the region, basic sequences are still not clear enough to permit testing. Too little is known about the beginning and end of the sequence, and phase boundaries are poorly defined (absolute dates are lacking) (Schiffer 1981, personal communication). Given the dendochronological problems inherent in use of desert wood, researchers would do well to follow Haury's (1976) lead and use a variety of dating techniques such as archeomagnetism and alpha-recoil track dating to provide a system of cross checks against the original chronology.

The origins of the Hohokam are largely known from one site, Snaketown. No systematic search has yet been undertaken for Pioneer period remains. Such early sites are likely to be buried by later deposits. An understanding of geomorphological processes could be used to reconstruct the topography of the study area in the first millenium AD and to develop methods of site pattern recognition based on existing information. Such surveys can help define the range of variability of

this early date, information essential in assessing the role of external versus internal factors in Hohokam origins and change (cf. Lipe 1978:353ff). Survey data can also provide information to resolve the question of Hohokam relationships if any, with late Archaic indigenous peoples in the area (the "empty niche" hypothesis).

Further research into the archaeology of northern Mexico may provide information about Hohokam origins. Although the northern and western Mexican sequences are becoming better known (cf. Kelley 1966, 1971; see Meighan 1971 for basic instroductions), our knowledge still is spotty, particularly for southern Sonora and Chihuahua. Wasley's (1967) survey of southern Sonora has never been published; his work should be made more accessible.

The relationship between irrigation farming and social process has been at the heart of much of the debate about changes in the Hohokam world. The remains of prehistoric canals in the study area reveal the use of water control technology. Topographic and hydrological studies are needed to asses the potential use of the Santa Cruz and San Pedro Rivers to Hohokam farmers. More information is also needed about Hohokam economic adaptations to specific local environmental conditions. We need to understand shifts in scheduling strategies and crop diversification through time and their relationship to irrigation practices and social organization. We need to go beyond generalized models based on broad scale adaptations (cf. Woosley 1980) and look at specific questions of canal capacity and flow or productivity potentials and differentials of differing agricultural strategies (e.g. Downum et al. 1981) to understand how subsistence practices relate to population growth, technological change, and territorial expansion.

The role of trade in Hohokam subsistence also needs more research. Some have considered the Hohokam to be a Mesoamerican mercantilist expansion (e.g. DiPeso 1956). But Hohokam interactions with neighboring Mogollon, Mesoamerican, and Sonoran Brownware/O'otam groups is poorly understood. The presence of Mesoamerican goods in Hohokam sites has long been known, but the Hohokam contribution to the exchange remains largely unknown, as do the specific mechanisms for the spread of Mesoamerican goods and ideas. Such items appear to have been differentially received by villages along the San Pedro and Santa Cruz Rivers. Some villages have many such goods, others little. As Masse (1980) has asked, does a relationship exist between the occurrence of Gila-Salt buffwares and exotic goods? To better understand this interaction, more replicable ceramic types are needed. Little is known of the range of variability in the continuum of red-on-brown wares that occur over most of the study region (cf. Schiffer 1982:78).

Though much Hohokam rock art is known to exist in the study area, studies so far have been limited to subjective interpretations (e.g. White 1965) or descriptions (e.g. Ferg 1979). Rock art can have potential value in the study of social and ideological changes; an inventory of existing rock art sites can be a first step towards using this potential.

Explanations of the transition to the Classic period often have relied on climatic changes (e.g. Grabinger and Adam 1974; Doyel 1977a, 1977b, 1979a; Weaver 1972). Yet, no systematic palynological or geological studies have yet been undertaken in the study area. Such studies can provide information about lowering water tables and upward stream cutting, which can be used in testing explanatory models and formulating new ones (Grabinger and Adam 1974:237). Most statements about climatic change are based on information from outside the study area extrapolated for this region (e.g. Doyel 1979a).

Environmental speculations have played a major role in explanations for such phenomena as the establishment of the Hohokam in the Tucson Basin, Classic Hohokam developments, the Salado intrusion, and the Hohokam collapse. Since knowledge of palynological techniques has been widely disseminated (cf. Bryant 1978), and a directory of ethnobotanists exists (Minnis 1976), future researchers on public lands should be required to demonstrate knowledge of these techniques or to use specialists in their research. This data can then provide a basis for hypotheses already advanced as well as for future theory construction.

Further research in the Tonto Basin will prove helpful in evaluating the role of the Salado in effecting Classic period changes. All too often, Salado has been used to cover a variety of manifestations to the point where the term has come to mean almost all things to all people (see Doyel and Haury 1976 for a range of opinions about the Salado).

These studies can provide a better understanding of the range of Hohokam manifestations in the study area. The knowledge thus gained can then be compared with historic Piman data to arrive at a better understanding of historic changes among these peoples. The problems of cultural continuity can then be addressed with more substantive data than is now possible.

Additional data gaps identified in the literature are: defining Hohokam boundaries; nature of the process of Hohokam expansion into the Santa Cruz Valley from the Gila-Salt Valley (being addressed at present by various studies on the Central Arizona Project); social organization during the Sedentary Period; reason for abandonment of the lower San Pedro by the Hohokam by the end of the Sedentary (1200 A.D.); date for the abandonment of the San Pedro Valley uplands by the Hohokam; function of Trincheras; period from A.D. 1450 to 1700 A.D.; nature and extent of redistribution systems; reasons for and nature of population aggregation during the Classic Period; verification of population aggregation during the Classic Period; social, political and economic organization and change; definition and temporal placement of some of the major pottery types, e.g. Canada del Oro Red-on-brown, Rincon Red-on-brown, and Rillito Red-on-brown; and questionable reliability of the distinction between Rincon Red-on-brown and Rillito Red-on-brown. Many of these data gaps are discussed in Chapter 5.

MOGOLLON AND O'OTAM

The chronology of the O'otam area is marked by a number of temporal and cultural schemes derived from the excavation of a few sites in restricted areas. The diversity of chronologies has often masked basic similarities. Further, several of these schemes are based on inadequate stratigraphic sequences and regional settlement patterns which are at best poorly known, as Masse (1980:2) has pointed out. Many of the phases are defined on the basis of ceramic types which have not been well-defined and are difficult for other researchers to identify in the field (cf. Schiffer 1982, Fritz 1977). In some areas such as the San Simon Valley, subsequent ceramic types exhibit considerable temporal overlap, particularly in the early end of the sequence (eg Dos Cabezas Red-on-brown, Pinaleno Red-on-brown and Galiuro Red-on-brown). Finally, the absence of reliable material for dendochronological dating and the excavation of critical sites before the advent of radiocarbon dating has meant that many types and phases have been cross-dated by intrusive ceramics from the Tucson or Gila-Salt Basins. As Schiffer (1982) has cogently pointed out, Gila-Salt Basin ceramics were initially dated by cross-dated ceramics from the Anasazi area; the Tucson Basin sequence was then based on intrusives from the Gila-Salt Basin, making for an insecure chronology at best. When these types were then used to delineate temporal placement in the O'otam area, sequences are shaky indeed.

In large part it is the absence of firmly dated types which has been at the base of the revisions of the Mogollon and areal chronologies (eg Bullard 1962, Wheat 1955, Lipe 1978, Franklin 1978, Masse 1980). Generally these revisions have concentrated on the early end of the sequence, emphasizing compression of phases and upward revision of dates. It should be emphasized, however, that these problems also affect the more recent end of the temporal sequence in the area. Here the problem is complicated by a confusing and poorly understood array of plainware types. Attempts to bridge the gap between prehistoric complexes and early historic groups have often relied on plainware sequences (eg DiPeso's work at San Salvador de Baicatcan, 1953a). Until archaeologists begin to utilize the wide range of dating techniques now at their disposal, such as archaeomagnetic dating and alpha-recoil track dating, our understanding of the chronological sequences of the area will continue to be uncertain (cf Beckett 1978 for an "anomalous" archaeomagnetic date associated with a poorly dated ceramic type from a site near Clifton).

The Mogollon and O'otam region of the study area presents a valuable archaeological laboratory for the study of cultural interaction, including the apparent adoption of Hohokam and Mimbres branch ideas by an indigenous population. To understand this interaction, a primary need is better control of the cultural sequence.

In an area marked by the absence of datable wood and well-defined ceramic styles that can delineate temporal and spatial relationships, archaeologists need to turn to other methods. Certainly they need go no further than Haury's (1976) re-excavation at Snaketown for an example of the coordination of a wide range of chronometric techniques in an area with many of the same problems as the study area.

Ceramic distributions in the study area point to a number of unresolved problems regarding cultural interaction. In the upper San Pedro Valley, the sites of Gleeson, Texas Canyon and Tres Alamos are characterized by identical assemblages of Gila-Salt Basin Hohokam intrusive ceramics, yet Tuthill has indicated considerable differences among the indigenous wares of these sites, with Dragoon Red-on-brown dominant at the first two sites and Tres Alamos Red-on-brown, a relative of Three Circle Red-on-white, predominating at Tres Alamos (Tuthill 1950:57-59). Tuthill suggested that the Dragoon Red-on-brown sites were a development of the southern part of the area, with Texas Canyon a northern outpost (Tuthill 1950:59). Much of the material culture assemblages at the Gleeson and Texas Canyon sites, however, is quite similar to materials from Tres Alamos; resolution of the problem will require restudy of areal ceramics as suggested by Franklin (1978) and Masse (1980) and a better understanding of the temporal sequence. Certainly the continuing similarities in ceramic design between the Gila-Salt Basin Hohokam and San Simon Branch of the Mogollon are indicative of strong and sustained interactions, as is the apparent simultaneous end of indigenous ceramic traditions and Gila-Salt Basin influences around AD 1200 (cf Wheat 1955:200). In this connection, it is interesting to note that no San Simon ceramics have been reported as intrusives at any other Mogollon site, although Mogollon ceramics, particularly from the Mimbres area, were reported at Cave Creek and San Simon Villages (Sayles 1945:47). This lack of direct ties with other Mogollon branches may be a function of expansion into the more arid environments of the San Simon Valley, an expansion which created selective pressure for adoption of Hohokam subsistence techniques, which may have been linked to such customs as cremation and ball courts (cf Westfall et al. 1979).

Systematic studies of prehistoric settlement and subsistence systems are essential for an understanding of the range of variability in the area. Such information can help archaeologists begin to answer long-standing questions on cultural affiliations, relationships, and contacts. It also can lead to an understanding of shifts in subsistence strategies through time which, in turn, may be linked to the drastic changes evident at the onset of Period 4, and the questions of cultural continuity within the region.

Other data gaps include the following; validity of the O'otam concept; people included in the O'otam culture (boundaries of occupation); well defined ceramic types; absolute dating of pottery types; boundaries of the Mogollon and the boundaries and influence of each Mogollon branch; identification of the "complex" or "tradition" comprising the various "Mogollon" branches; temporal sequence of Mesoamerican contacts, influences, migrations, and intrusions; origin; origin and date of earliest Mogollon ceramics; origin and contemporaneity of Cerros Red-on-white, Three Circle Red-on-white, Encinas Red-on-brown, Dragoon Red-on-brown, Tres Alamos Red-on-brown, and Tres Alamos Red-on-white; nature of the interaction of Mimbres and San Simon Branches in the San Simon Valley and Safford areas; nature of Mogollon occupation between A.D. 1225 and 1300; cultural affiliation of late prehistoric sites (e.g. Babocomari Village); social and political organization; and archaeological evidence for Mogollon agriculture.

SALADO

More can be written (and probably has been written) about what is not known about the Salado than about what is known. The following discussion will cover only some of the data gaps which are in real need of further study. The list following this discussion will shown the remaining data gaps identified during the course of our research. Many of the gaps are discussed in Chapter 5.

The controversy over the origins of the Salado has continued. Conferences held (e.g. Lindsay and Jennings 1968; Doyel and Haury 1976) have been informative but have not resolved the controversy. In part, the problem lies in the history of research (cf. Franklin 1978:374ff). The Salado were first identified in the Tonto-Globe area, but until recently little work has been done in this area. Instead, the Salado have been studied in the Gila-Salt Basin where the presence of the Hohokam culture and possible Mesoamerican influences has made an understanding of the Salado phenomenon per se quite difficult. As Franklin (1978:375) has pointed out, the sites with the highest frequency of Gila Polychrome ceramics lie not in the Gila-Salt Basin, but in the San Pedro, Sulphur Springs, and Middle Gila Valleys of the study area. Future investigations in this core area will be crucial in understanding the Salado.

To assess the role of environmental factors in the fluorescence and decline of the Salado, efforts should be directed toward reconstructing the late prehistoric environment. Environmental changes have been proposed to account for the rise and fall of Salado, yet no systematic palynological studies have been undertaken. Such information also can be of use in examining ideas about resource stress and competition during this period.

Although the large Salado sites have been emphasized, surveys have recorded numerous small sites of Salado affiliation. It is unclear how these small sites articulated with the larger ones. Analysis of palynological and archaeological materials can provide insights to the hypothesized role of such sites as farm houses, thereby contributing toward a better understanding of Salado subsistence.

Studies of prehistoric Salado economics have focused on ceramic analysis, revealing local manufacture of a widespread design style. Further attention should be directed toward detailed petrographic studies to assess the possibility of specialized production of these wares on an areal basis. The poorly understood Salado plainwares would be an ideal field for further petrographic and technological evaluation in regard to exchange and specialized production. (See Davidson 1979 for an application of several such methods in a study of plainware from the study area). Distributional studies of lithic tools at the intra- and intersite levels may also prove helpful in the study of specialized production and exchange as part of the Salado phenomenon. Given the increased emphasis on storage facilities (Gerald 1975) and caches of foodstuff (Mills and Mills 1969), the possibility exists that intensive agricultural production was accompanied by an integrally related intensification of production and exchange.

Numerous other data gaps have been identified for Salado studies: definition of "Salado"; how the Salado or Salado influence entered each region of the study area (migration, trade, etc.); existence of Salado peoples in the middle Santa Cruz Valley (no evidence); date of Roosevelt Phase (proposed dates are unsure and confused); dates for Pinto Polychrome and Roosevelt Black-on-white; ending date for Gila Polychrome; designation of phases (disagreement at present); more information on Salado corrugated; better definition of Gila Black-on-red and Pinto Black-on-red; agreement on dates for Salado pottery types; origin of Gila Polychrome; mechanisms accounting for wide distribution of Salado pottery (e.g. trade networks); interaction among cultures during Salado occupation; presence of ceremonial structures at Salado sites; Salado lithics typology; Salado mortuary practices - the significance of the differences in use of inhumation and cremation; relationship between the Salado and protohistoric groups (Salado continuity); Salado social and political organization; settlement pattern; economic role of Casas Grandes during Salado times (goods supplied and received, the cultural context of the interaction, and the mechanisms of economic exchange); cultural affiliation of San Pedro and Safford area dryland agricultural fields (Salado or Hohokam); and the relationship among population growth, subsistence, environmental diversity, technology, and exchange.

PROTOHISTORIC PIMA

Better chronological control is essential to answering the question of Upper Piman occupation of the study area during the protohistoric period. Fritz (1977:16) has postulated a general abandonment of southern Arizona between the mid 1400s and 1540 AD with resettlement of the area by Upper Piman groups from northern Mexico between AD 1540-1680. More effective use of dating techniques already at the archaeologist's disposal, such as archaeomagnetic dating, can reveal such a hiatus, if it existed (cf. Doyel 1977b:7-8). Greater use of palynological and ethnobotanical methods of analysis can provide an insight to the degree of continuity of subsistence practices between late Hohokam, O'otam and Mogollon occupations and early historic aboriginal occupations. Such information can, in turn, be used in an assessment of cultural factors versus adaptational requirements in observed culture patterns. Certainly, better reporting of Upper Piman sites in mountain and pediment zones will enable a more thorough understanding of the role of wild plants and animals in relation to agriculture in the subsistence economy of these groups.

Many of these questions also can be approached through the study of existing historical documents. Research in the study area has generally relied on relatively few accounts by firsthand observers. Libraries in the United States, Spain, and Mexico contain a wealth of additional information in the form of censuses, administrative records, tax records, and mission archives, as well as other materials. These documents can provide detailed accounts of cultural groups, subsistence practices, demographic changes, and more to the researcher willing to engage in the admittedly enormous task of examining them. For those who would like to

take this path, Evans (1970) has provided a relatively brief, but thorough, introduction to manuscript collection in the United States.

There are many more data gaps on the Upper Pima, for very few of their cultural remains have been studied. The following gaps are discussed in Chapter 6: origin of the Sobaipuri (Salado, Pima, O'otam, or Sonoran); validity of distinguishing between the Sobaipuri of the San Pedro and the Upper Pima of the Santa Cruz; use of irrigation by the Gila River Pima; continuation of Gila Polychrome into the protohistoric period; location of Quiburi (at the site excavated or elsewhere); cultural affiliation of the "Upper Pima" component at Paloparado; validity of the idea of continuity from the Hohokam to the protohistoric Pima and Papago; settlement pattern; origin of the Upper Pima (excluding the Sobaipuri); and the Gila River Pima.

PROTOHISTORIC APACHE

The Apache during their initial years in southeast Arizona are the least known of any group in the history of the region. Only a handful of sites are known and few of these have been studied. Research in general has been minimal. As a result, any research topic on the protohistoric Apache would be a nearly complete unknown. In addition, information is difficult to get, as Apache sites are hard to identify and they contain very few features or artifacts.

As Gunnerson (1979:163) has noted, the period for which the most data exist on Apache archaeology is the late 1600s and early 1700s. These materials lie east of the Sangre de Cristo Mountains in New Mexico and have been studied both archaeologically (J. Gunnerson 1968; 1969; Gunnerson and Gunnerson 1971) and historically (D. Gunnerson 1974; Thomas 1935). Accordingly, the historic Jicarilla materials are the best known non-Navajo archaeological complexes.

The following list of data gaps provides an idea of some of the information that is needed on the early Apache: date of arrival of the Apache in southeastern Arizona; the identity and fate of the Jano, Jocome, Suma, and Nixoras and their relationship to the Apache; cultural affiliation of the surface hearths of Second Canyon Ruin (Apache or Sobaipuri?) and the earth oven at the Ringo Site (Apache?); the nature of protohistoric Chiricahua Apache subsistence; the types of early Apache pottery; the nature of protohistoric Apache material culture; the areas occupied at different times by the Apache; the size of the Apache population through time; and the settlement pattern of the protohistoric Apache.

HISTORIC

This period, along with the overlapping Protohistoric period, is the least well-known in southeast Arizona. In many cases archaeological and historical data complement each other so that a historical continuum can be constructed. A vast gap, however, exists in our knowledge of both Indians and explorers during the three pivital centuries from 1400-1700.

The lack of data for this period is more the result of little existing information, especially historical information, than of an absence of interest or research. Though archaeological studies (exception for DiPeso's work) have been somewhat limited, historians have vigilantly searched the archives for all documents relating to exploratory journeys into and through southeast Arizona. What historians need are new or undiscovered documents. Since the discovery of previously unknown documents is usually accidental and sporadic, our knowledge of the period without discovery of new information will grow only through application of an interdisciplinary approach that uses all applicable data to interpret historical clues and postulate probable events. This procedure is the approach used by DiPeso (1951a, 1953a, 1956) and others (Willcox and Masse 1981).

Following are the three broad areas where basic information is needed and little data exists.

Spanish-Mexican

Though several studies have been conducted at Spanish mission and presidio sites, little information exists about Spanish-Mexican domestic sites, including farms and ranches. From the earlier Spanish period to the later Mexican and Mexican-American times, we know little about the common residents of southeast Arizona. Barnes (1980) has significantly contributed to our basic understanding of the Spanish-Mexican ceramic types common to the area. This basis should provide researchers with a better tool with which to examine sites. McGuire's (1979) study of the Rancho Punta de Agua also is a good initial study of domestic sites. This area probably will become more important as Mexican-American studies become more popular.

Apache

Apache sites and material culture are the least well known of any of the aboriginal groups. Apache sites are difficult to locate because of the Apache nomadic lifestyle and their recent entrance into the study area. Moreover, Apache often occupied mountainous sites where survey and detection is difficult. Because of the information about the Apache in the historic ethnographic literature, a historical approach could be used to help predict site locations and interpret archaeological remains.

We do not know what the effect of Spanish and Anglo-American explorers was on the native Americans. For example, we have no data on whether epidemics were wide-spread after the early expeditions.

Anglo-American

Like the Spanish-Mexican cultural resources, Anglo-American sites have been only lightly studied. In southeast Arizona, most professional

attention has focused on military forts. This focus is extremely biased providing only a partial view of early American life in the area. Fontana and Greenleaf's (1962) study of Johnnie Ward's ranch stands out as the exception to this overwhelming concentration on military history.

Future research should focus on several areas in the Anglo-American period. The most important reason for Anglo settlement in southeast Arizona was mining. As in the early Spanish Colonial period, settlers moved into the are in search of the money that precious metals would buy. Neither the mining camps nor settlements have been studied for the cultural resources they left behind.

Another area involves the sites that resulted from the agricultural frontier. In addition to the needed studies focused on ranching and domestic life, we know little about the resources associated with agricultural settlement. Though the Pima and Papago Indians have farmed from early times to the present, the Mormon farming settlements are primarily known through the historical record. In the study area, Mormons occupied a small area around St. David, but the area of greatest impact was the Safford Valley along the Gila River. Leone (1973) has published an initial study of the site structure of Mormon towns based on Mormon occupation of the Little Colorado River north of the study area. As we begin to understand and assess the entire range of cultural resources in southern Arizona, these important farming settlements will have to be considered more closely.

The history of the social development of the historic occupants and the social relationships among the various cultures remains to be written.

Several environmental data gaps of importance to the study of the areas history exist. There is a long running debate on the causes of historic environmental changes, the causes of arroyo cutting, and whether precipitation has decreased or increased since about 1898.

CHAPTER 5

PREHISTORIC CULTURE HISTORY AND LIFEWAYS

Chapters 5, 6 and 7 summarize the culture history of the study area. Southeast Arizona is especially rich in cultural resources, and the prehistoric data base is large. In addition, the study area lies outside the various prehistoric culture core areas, resulting in its being largely neglected in general summaries of southwest archaeology. These factors have resulted in the relatively lengthy cultural resource narrative on the prehistoric period (chapter 5). The protohistoric discussion in chapter 6 is relatively short due to the lack of research on this period. The historic period narrative (chapter 7) is lengthy, primarily due to the need for a complete summary of the area's history and historical resources as a result of the lack of publications dealing with the area.

To facilitate the discussion of this data, archaeologically defined groups have been used to divide the prehistoric period information. The protohistoric narrative is divided into two sections, one discussing the Upper Pima and Sobaipuri, the other discussing the protohistoric Apache. Information about historic period cultural resources is presented in a chronological narrative and a section on historic lifeways based on a limited number of themes.

PALEO-INDIAN

ORIGINS AND RELATIONSHIPS

The precise date of human entry into North America is still unknown. Well-documented evidence of human beings in North America generally dates no more than 12,000 BP (Haynes 1969), but there is a growing amount of evidence of earlier entry during the Two Creekan, Woodfordian, and Farmdalian substages of the Wisconsin glaciation, Haynes' (1969) "Middle Paleo-Indian Period." Sites of this period, all outside the study area, include Meadowcroft rockshelter (Adovasio et al. 1979) and Fort Rock Cave

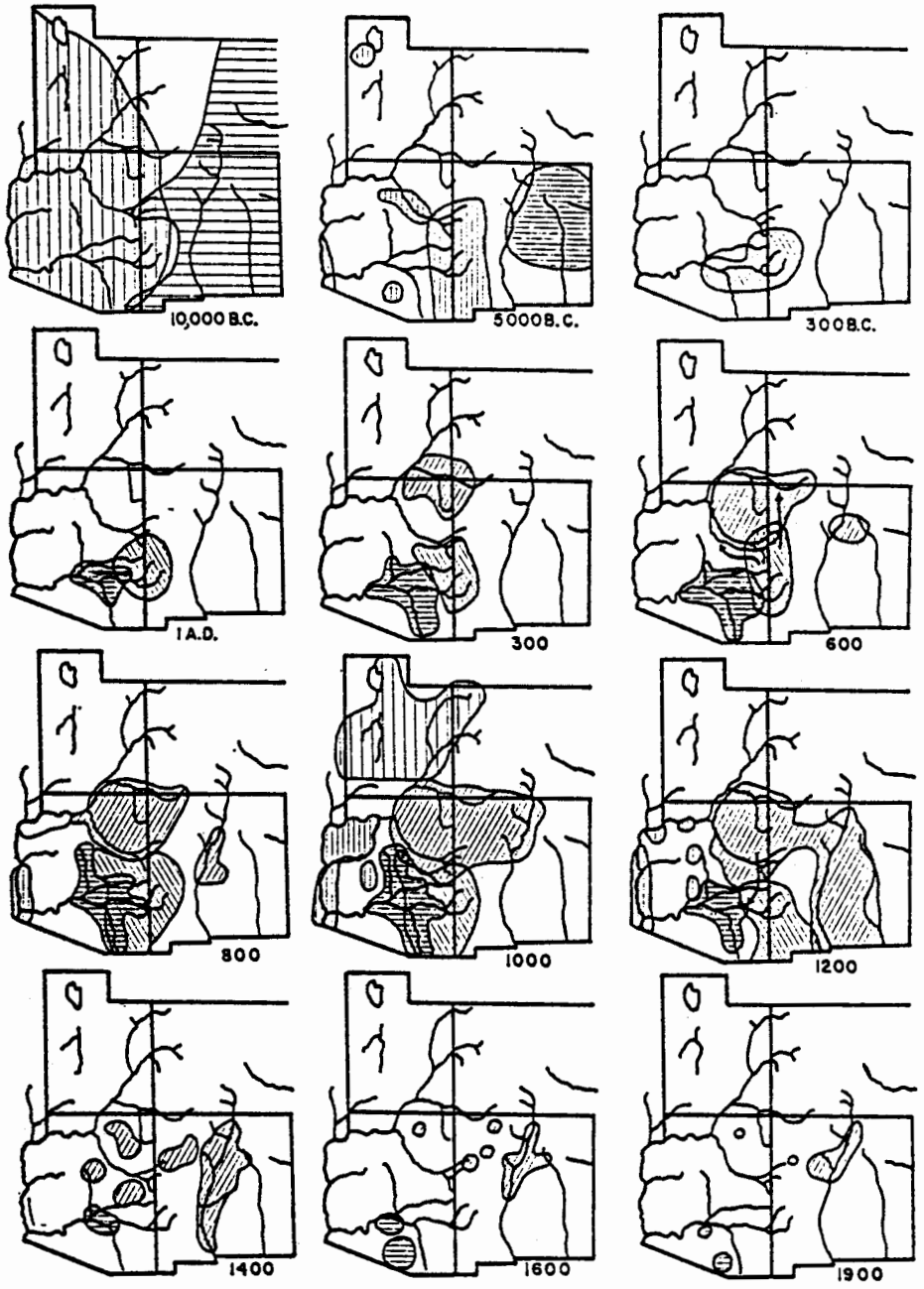

Figure 16. Development of Southwestern Cultures.

The development of the various cultural streams in the Southwest through time. The wide-spaced vertical lines are of the Desert culture at 10,000 B.C., the horizontal lines are of the Hunter culture. The diagonal lines from upper left to lower right are Mogollon culture, those from upper right to lower left Anasazi culture, horizontal lines are Hohokam, while vertical fine lines are Patayan. The overlapping of cultures is shown by overlapping lines, and heavy lines with arrows show directions of influence. The growth of these various cultural streams and their movements within the Southwest may be seen in this series of maps.

(McGregor 1965). © 1965 by the Board of Trustees of the University of Illinois.

in the United States (Haynes 1969), Valsequillo (Irwin-Williams 1967) and Tlapacoy (Mirabell 1967) in Mexico and Ayacucho (MacNeish 1971), and Guitarerro (Lynch and Kennedy 1970) in Peru. As Judge (n.d.:9) has noted, with the exception of Meadowcroft, all these sites are in the mountainous zones of western North and South America, suggesting adaptations different from those of the later Plains and Southwest Paleo-Indian manifestations.

SUBDIVISIONS OF THE PALEO-INDIAN PERIOD

The Early Paleo-Indian Period

The earliest undisputed evidence for human beings in the New World takes the form of Clovis projectile points and other associated artifacts. Clovis materials have been consistently dated to the period between 11,500-11,000 BP (Haynes 1967:278). The diagnostic Clovis point is a relatively large bifacially flaked lancelote point with concave base. The point is usually fluted on both sides, although unifacial flutes are known, as are multiple flutes. This fluting usually extends less than halfway up the length of the point, and hinge-fractured flutes are common. Clovis points manifest heavy basal and lateral grinding (Judge n.d.:12).

A second variety of Clovis point has also been described. Sometimes referred to as Type 2, it is similar to the Type 1 point just described but is smaller with a triangular blade, which is widest at the base (Wormington 1964:57-58).

Other artifacts associated with Clovis occupation include transverse end scrapers from flakes, converging-edge side scrapers, "ear form" side scrapers, bifacially worked knives, and gravers. Bone artifacts have also been reported, including a shaft wrench (Haynes and Hemmings 1968). Excavated Clovis sites have generally yielded remains of the Columbian mammoth, but other animals have been reported, including bison, horse, tapir, camel, cervids, canids, antelope, and jackrabbit (Haury, Sayles, and Wasley 1959; Haynes and Hemmings 1968; Judge n.d.).

Excavations at Naco yielded most of the bones of a mammoth except hind legs, pelvic girdle, and lumbar vertebrae, which may have been removed in the butchering process. Eight projectile points were found in definite association with the bones, and another Clovis point was found upstream in the arroyo (Wormington 1964:53). The exact position of some points could not be determined, but other points were found at the base of the skull, near the left scapula, between the ribs, and at the surface of the atlas vertebra. This last point may have caused death by severing the spinal column (Wormington 1964:53), although Judge (n.d.:13) believes that the remains represent an unsuccessful kill site because the points were left in the animal and no butchering tools were found. Since the initial excavations, another point, Naco II, was recovered in the materials removed by heavy equipment (Agenbroad 1967b:114).

The bones and points were situated on the surface of a rust-colored pebbly sand matrix resulting from stream deposition. The materials were buried by laminated beds of pond deposition. Overlying beds of channel and floodplain deposits revealed increasing aridity (Wormington 1964; Antevs 1953). Contending that the stream and pond deposits were formed during the last pluvial, Antevs (1953) dated the Clovis materials to between 11,000-10,000 BP. Disseminated flecks of charcoal from the alluvium containing the mammoth and associated Clovis points yielded a date of 9250 ± 300 BP (A-9, A-10). But the questionable association of the charcoal with the Clovis materials and the solid-carbon method of dating have rendered this dating questionable. On the other hand, geological evidence reveals the contemporaneity of the Naco materials with the Clovis materials from the Lehner site (Haynes 1964:1408-1410).

The Lehner site (EE:12:1) lies on the Lehner Ranch southwest of Hereford. Mammoth bones were first exposed in an arroyo tributary of the San Pedro River in 1952. More materials were exposed in 1955. Excavations were conducted at the site in 1955 and 1956 (Haury 1956b; Haury, Sayles, and Wasley 1959), revealing the remains of nine Columbian mammoths and at least one horse, bison, and tapir in a single bone bed in and on the gravels of a fossiliferous perennial stream. Thirteen Clovis projectile points were found in association with the faunal remains. In contrast to the Naco site, eight cutting and scraping tools were also found, revealing a function as a mammoth processing site (Judge n.d.:13). Further excavations in 1974 uncovered a large roasting pit and the remains of three more mammoths, as well as camel, rabbit, and a possible bear (Haynes, cited in Judge n.d.:13).

From geological evidence, Antevs (1959) dated the site to a Pre-Altithermal period, around 13,000 BP. Radiocarbon dates from two hearths associated with the bone bed revealed a date of around 8500 BP (Wormington 1964:55). Improved cutting techniques, however, have shown that these dates, obtained by the solid-carbon method, are in error (Haynes 1964:1408).

Statistical treatment of six dates from the Clovis level have instead shown an average age of 11,260 ± 360 BP for the Lehner site (Haynes 1964:1408; 1967). The overlying sediment in turn dates to 10,410 ± 190 (A-33bis), and the underlying sediments to 11,600 ± 400 (A-478b; Haynes 1964:1408). These dates provide the youngest securely dated records of a Pleistocene mammoth (Martin 1967:97).

Geological reconnaissance in the San Pedro Valley led to the 1965 discovery of an outcrop of mammoth bones at nearby Murray Springs. The similarity of the stratigraphic context to the Lehner site prompted excavations at Murray Springs, which were carried out from 1966 to 1971 (Haynes and Hemmings 1968; Hemmings 1968; 1970). The materials, however, are still being analyzed.

The site is a mammoth processing and bison kill site north of Hereford. Some twenty-five stone tools and two bone implements were recovered in association with the remains of four mammoths, ten bison, four horses, and other megafauna, in addition to over 3000 flint flakes.

Figure 17. Clovis Points Found with Mammoth Remains at the Lehner Site, Arizona. (Wormington 1964). Courtesy Arizona State Museum and Denver Museum of Natural History.

Locality 1 lies on a tributary arroyo of the Murray Springs Arroyo. The east section was a segment of a buried stream channel, with dense concentrations of mammoth and bison bones, abundant charcoal, and five large chert flakes (Hemmings 1968:2). The fuanal material showed no signs of rolling or abrasion; excavation of the adjacent terrain showed a Clovis kill and butchering site.

The northwest section of Locality 1 featured the partial, disarticulated carcass of a large mammoth with a flake knife fragment still in the rib area. A Clovis point and two point tips were found nearby, among the scattered remains of a single bison; the absence of basal grinding on the point as well as flaking oddities suggested the point was never finished (Hemmings 1968:2). Reanalysis of the materials, particularly the six points associated with bison in Area 4, revealed that the site might have served as a bison kill and mammoth butchering site rather than a mammoth kill site (Judge n.d.:15). The presence of bison at the site points to the development of the bison drive by Clovis hunters, a technique widely used by later Paleo-Indian groups (Irwin 1971:46).

The most remarkable aspect of the site is that it had the least disturbed "living floor" of any known Clovis site (Haynes, 1969:710). Great amounts of lithic debitage were present, representing the remains of the preparation and sharpening of tools for processing mammoths. Lithic analysis revealed a complex knapping operation employing a range of materials in which soft hammer retouch was a major component. The site was so well preserved that flake concentrations were still present, representing single knapping operations (Hemmings 1968:3). More flake clusters were found to the east of the mammoth. The lithic evidence suggests that bifacial preforms of extinct chert were brought to the kill site and sharpened for use as knives (Hemmings 1968:4). Analysis of materials and the absence of implements for processing vegetal foodstuffs shows a brief occupation, perhaps by as few as two or three individuals, allowing for possible destruction of part of the site by arroyo cutting (Hemmings 1968:7).

The most unusual discovery was the excavation of a mammoth-bone shaft wrench between the mammoth and the stream (Haynes and Hemmings 1968). It measured 260 millimeters in length and was found in two joined but broken parts lying horizontally on the buried surface of an ancient streambed 2 meters from the edge of the channel deposit. Even given the rarity of bone tools from early deposits, the implement is "unique in New World archaeology" (Haynes and Hemmings 1968:187).

A date of 11,230 + 340 BP was obtained from the shaft wrench. In addition, two other radiocarbon dates were obtained from a small hearth, whose small size (30 centimeters in diameter) has rendered its function problematic. The samples dated to 11,150 $\pm$ 450 BP and 11,300 $\pm$ 500 BP (Judge n.d.:14).

A final Clovis site in the area is the Escapule mammoth site (EE:8:28) southeast of Murray Springs. The remains of a single mammoth were found in 1966 by L. Escapule, who partially excavated them and found

two Clovis projectile points in situ. The find was reported to the Arizona State Museum and excavated that year by personnel of the Murray Springs project (Hemmings and Haynes 1969). The find represents an unsuccessful kill of a Columbian mammoth because no evidence was found of butchering or other use of the animal. The mammoth is larger and more mature than some of the mammoths associated with Clovis materials, so it may be the remains of an animal that escaped and died of its wounds (Hemmings and Haynes 1969:188). Although no material was recovered for radiocarbon dating, the find was stratigraphically the same age as other dated Clovis sites in the valley, around 11,200 BP (Hemmings and Haynes 1969:186).

Several isolated finds of Clovis projectile points have been reported in southeast Arizona. A point was found in position in lake gravels at Willcox Playa, the remnants of Pleistocene Lake Cochise (Haury 1953). The point is crudely flaked and triangular with some basal thinning but no true fluting. It is not evidently a Clovis point, but may well be the same age as the specimens from the Naco site (Wormington 1964:59). Another point, definitely Clovis, was found on the surface of Willcox Playa (CC:13:1) (DiPeso 1953b), and DiPeso (1953b) also reported the surface find of a Clovis point from Texas Canyon. Another point was found on the surface near Sierra Vista by Louis Escapule at EE:8:30 (Ayres 1970a). Similarly, surface finds of Clovis points are also reported from Sonora (Oritz and Taylor 1972) and northwest Chihuahua (DiPeso 1965).

Although a few surface finds of Clovis points are known from the Tucson Basin (e.g. the Herring point, AA:16:34 in Ayres 1970a, and a point from the San Xavier Reservation (Betancourt 1978b:35), Clovis materials are rare in that area. In the Santa Cruz Valley, late Pleistocene deposits are deeply buried by recent alluvium and are seldom exposed except by deeply-entrenched tributary channels and gravel pits (Betancourt 1978b:35), accounting for the general scarcity of these materials in the area (cf. Czaplicki 1978:5).

In summary, Clovis materials in the study area are associated with streams of marshy pond deposits. Analysis of the materials by Judge (n.d.:16) suggests that Clovis materials were most closely linked to these deposits of all the late Paleo-Indian sites in his study area, some sixteen in all. These Clovis sites feature the highest frequency of bone implements of all the sites, as well as the greatest variety of fauna, with the possible exception of the late Cody complex. Given this diversity, Judge (n.d.:16) called attention to mammoth remains as a probable source of bias in the discovery of Clovis sites and their interpretation.

Late Paleo-Indian Evidence

The first report of a post-Clovis Paleo-Indian point was made by Sayles and Antevs (1941:20) from a site near Portal. Re-examination, however, found the point actually to be a Clovis point (Agenbroad 1967b:114). Similarly, the crude, concave base point found in the Basal Volcanic debris stratum at Ventana Cave was originally defined as Folsom

(Haury 1950) and associated with a charcoal radiocarbon date of 11,300 ± 1200 BP (Haury 1975). Judge (n.d.:14) found the point to be similar in morphology to an unfluted Folsom point but the date to suggest a Clovis age. Another recent examination found the point to be neither Folsom nor Clovis but a part of a Ventana tool complex (Irwin-Williams 1979:34). Other Folsom-like points are reported from the Rising site (Myers 1967) and Rattlesnake Pass in the Tucson Mountains (Agenbroad 1967b:118). Agenbroad's examination of the point from the Rising site found it to be a reworking of the distal end of a broken basal fragment of a longer Clovis point (Agenbroad 1967b:118). The latter point, a surface find by J. Whitfield, does have characteristics of both Folsom and Clovis and may represent a transitional development (Agenbroad 1967b:118).

Although no indisputable Folsom materials have been recovered from the study area, later Paleo-Indian material is known from adjacent southwest New Mexico. Two Midland complex sites were reported from Hidalgo County, New Mexico in 1968 (Fitting and Price 1968). The first of these, Cloverdale Creek, is a workshop site with six parallel-flaked points similar to those from the Midland type site, plus point fragments, and a variety of unifacial tools, including spokeshaves and side scrapers. Most of the material consisted of unmodified debitage (Fitting and Price 1968). No radiocarbon dates were reported.

The second site, Burro Cienega Number 9, may be a Plainview complex occupation (Judge n.d.:19). An unfinished Midland point was recovered that was never finished as a point but used as a knife. The site had more side scrapers than the Cloverdale Creek site, as well as end scrapers, which were absent at Cloverdale. The Burro Cienega Number 9 site may represent a kill or short-term campsite. From the presence of these two sites in two distinct environmental zones, Fitting and Price (1968:7) concluded that they may represent separate stages of a yearly economic cycle. The sites, however, may also represent the regional diversification that developed as later Paleo-Indian populations began to adapt to more restricted environmental zones (cf. Haynes 1967), in contrast to the wide-ranging Clovis bands (Jelinek 1971).

CONTINUITY, SUBSISTENCE, AND SOCIAL ORGANIZATION

A major focus of much Paleo-Indian research has been the temporal placement of materials, aimed either at demonstrating the antiquity of human occupation in the New World or at determining the chronological position of various Paleo-Indian manifestations. Perhaps as a result, many reports of such sites have emphasized artifact description, particularly those artifacts considered temporally and culturally diagnostic. Those interpretive reports have had two different perspectives (Gorman 1972:206). In one, specific subsistence strategies are linked to artifact types and environments considered indicative of hunting or gathering emphases. In the other, the relationship between specific artifacts and environments is considered indicative of a specialized hunting strategy (Gorman 1972:206).

To learn more about social organization, Gorman (1972) analyzed projectile points from five different mammoths from three sites including Naco and Lehner. His study of twenty-four points revealed that the points had been deliberately left in mammoths, perhaps to substantiate claims to the kill by different hunters. This contention was based on a perceived correlation among colors, lithic materials, and proportional differences in the size of projectile points, as exemplified by an intact pair of reddish-brown chert points found close to each other in the same carcass. Similarly, another pair of clear quartz points were found close together. By focusing on the individual animal killed rather than the site, Gorman (1972:207) hoped to link variation in the artifact assemblage to variation in the organization of task-specific groups. His work, however, has been faulted for a lack of familiarity with the data. His results should thus not be considered conclusive (Cordell 1978:22; also see Huckell 1979).

Other studies designed to learn more about Paleo-Indian social organization have been conducted outside the study area. These studies include Wilmsen's (1974) re-examination of the Lindemeier Folsom site and his attempt to examine specific activities at several Paleo-Indian sites, including the Vernon site to the north of the study area (Wilmsen 1970), and Frison's (1974) study of the Casper site. In these studies, ethnological and ethnohistoric data are combined with ethnoarchaeological studies to provide models of social groups and tasks. Accordingly, they can provide valuable insights for future studies of the Paleo-Indian resources of the study area.

A crucial study of Paleo-Indian settlement pattern was conducted by Judge in the central Rio Grande Valley (Judge 1973; Judge and Dawson 1972). Although this study occurred outside the study area, it is an important example of the kinds of information that can be gathered through regional survey. The survey relied on a pattern of site recognition that incorporated topographic features of importance to ancient hunters. Such features included distance from water, distance from overviews, and distance from hunting areas. These factors were used to predict site location to maximize survey time and procedures.

To examine the possibility that sites were also located in areas not revealed by the site pattern recognition systems, probability sampling was employed to provide randomly selected grids for survey in areas outside the system. All sites identified as Paleo-Indian occupations conformed to the pattern (Judge 1973:51).

Analysis of the frequency of different stone tool types revealed the presence of task-specific intracultural variation. Base camps were defined where food was prepared, as was the case with processing sites. In contrast, armament sites were primarily areas of stone tool manufacture. Finally, by examining temporal variation in site location, Judge and Dawson also demonstrated change through time in Paleo-Indian cultural systems, with increased site distance from the hunting area through time, a general increase in distance from water through time, with less dependence on playa lakes for water, and increasing emphasis on closeness to

overview (Judge and Dawson 1972: 1214). These shifts represented an adaptation to increasing aridity, with resultant desiccation of the playa lakes through time and corresponding changes in location of megafauna.

Paleo-Indian subsistence has often been viewed as heavily dependent on the exploitation of the late Pleistocene megafauna. Indeed, some would regard Paleo-Indian subsistence as almost entirely based on meat (Hemmings 1970: 177). In this view, the extinction of these megafauna at the end of the Pleistocene is almost certainly due to overexploitation by human populations (cf. Martin 1967; 1973; Martin and Mosimann 1975).

This view, however, has been criticized on many grounds, including the lack of direct evidence of human association with many of the extinct genera (Jelinek 1967). Given the great variety of fauna found in association with Clovis occupations, Judge (n.d. 133-134) has argued that specialization based on the megafauna may be a late Paleo-Indian development linked to expansion of the grasslands around 10,300 BP. The resultant aggregation of megafauna prompted the adoption of mass kill techniques (Judge n.d.:36). In this view, the Clovis materials represent a generalized adaptation of middle Paleo-Indian period populations. According to evidence discussed earlier, if human populations entered the New World during this period between 28,000-11,800 BP, the Wisconsin glaciation would have been at its maximum expanse, and habitat diversity would have been high (Judge n.d.:44).

Our lack of knowledge of this period may in part be due to our inability to recognize these generalized tools and assemblages as early, especially considering the emphasis placed on the highly visible, specialized projectile points of late Paleo-Indian adaptations. Judge (n.d.:33) would alter the traditional picture of Clovis mammoth hunters to one of Clovis as hunters of bison who were also scavengers of mammoth as part of a diversified subsistence strategy, which also included a variety of smaller animals and plants.

ARCHAIC

ORIGINS AND RELATIONSHIPS

As originally defined by Willey and Phillips (1958:107), the term Archaic refers to a lifestyle of hunting and gathering that began after the Paleo-Indian period and continued into environments similar to those of the present. Several prehistoric cultures occupied the Southwest after the disappearance of the Paleo-Indian groups all of which exploited a broad range of resources, especially wild plant foods. They are sometimes grouped together as the Desert Culture. The Desert Culture was a

post-Pleistocene manifestation in the western United States, defined by a diversified economic base and distinctive material culture, particularly milling stones and basketry (Jennings 1956). The concept has some validity at the level of a broadscale adaptation to generally arid environments. Because of the existence of distinctive local adaptations to particular environments, however, some have suggested that the term be limited to the Great Basin (Warren 1967; IrwinWilliam 1979) and that the term Picosa be used for the broad continuum of related cultures in the Southwest after 5000 BP (Irwin-Williams 1967). Although presented as a conceptual model, Irwin-Williams' proposal has been criticized for its primarily descriptive content as well as for inaccuracies in the descriptions (Martin and Plog 1973:80).

The relationship of these cultures to the antecedent Paleo-Indian complexes is not clear. Haury (1953) at first supported the contention that the Paleo-Indian hunters had evolved into the later hunter-gatherers as increasing aridity led to the disappearance of the megafauna and a shift in subsistence techniques. This view was also held by Martin and Plog (1973:69-70). More recently, Haury has suggested that the Sulphur Springs stage of the Cochise Archaic may be an alternate facies of the Clovis complex, a gathering pose of the Paleo-Indian hunters. Although this view is still questionable (Haury 1981, personal communication), Haury's (1975:V) statement that the basalt flake point recovered from the volcanic debris layer at Ventana Cave dated to 11,300 BP $\pm$ 1200, is within the Llano Paleo-Indian tradition by material and technique, seems to support a relationship between Paleo-Indian and early Archaic groups.

In contrast, Irwin-Williams (1979:33) sees no direct evidence for any relationship between early Archaic and Paleo-Indian groups or for the origin of the Archaic in the late Paleo-Indian period. Instead, the origins of the Cochise Archaic may lie to the south in Mexico as a result of incursions of people into areas vacated by Paleo-Indian hunters retreating onto the plains with the megafauna (Irwin-Williams 1968b).

Perhaps the earliest evidence for hunters and gatherers in the Southwest was uncovered at Ventana Cave, a stratified site on the Papago Reservation in southwest Arizona (Haury 1950). Here the lowest occupational level yielded a radiocarbon date from charcoal of 11,300 BP $\pm$ 1200 BP (Haury 1975). Associated with this level were the remains of a variety of now-extinct fauna, including horse, tapir, ground sloth, and Caeromeryx, as well as modern forms. Excavations also revealed a crudely made lanceolate projectile point with a concave base, first described as Folsomoid (Haury 1950) but later described as Clovis (Haynes 1964). Irwin-Williams (1968a; 1979) has claimed the point is neither Folsom nor Clovis, but instead represents a poorly understood, widespread early gathering tradition, perhaps of ultimate Mexican derivation and ancestral to the Cochise Archaic. And Haury (1975:V) now states that the point, made from a basalt flake, is a local imitation of a Clovis point.

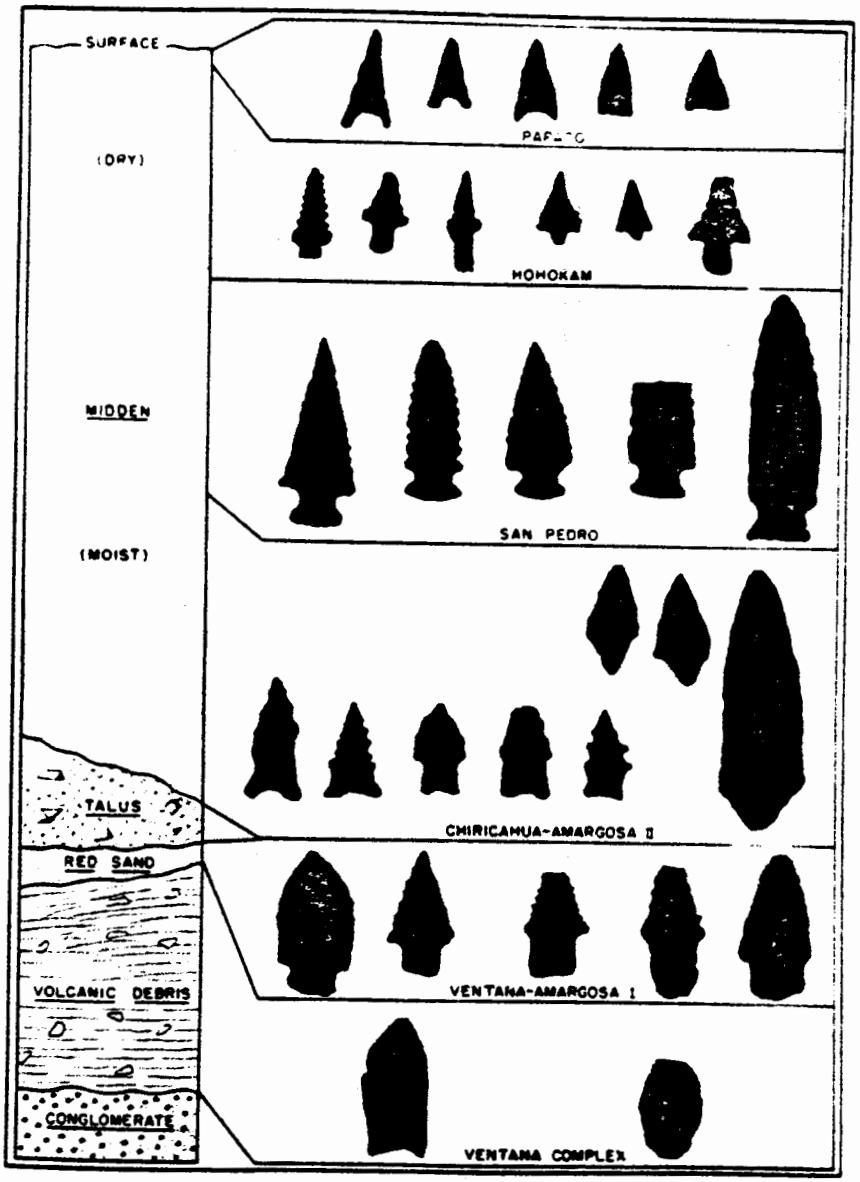

Figure 18. Ventana Cave Projectile Point Types by Level. By permission from The Statignaphy and Archaeology of Ventana Cave, Arizona, by E.W. Haury, Tucson: The University of Arizona Press, copyright 1950.

A variety of other tools were found in the basal volcanic debris layer. These tools have been grouped together as the Ventana complex and include scraper-planes, choppers, scrapers, and cutting tools made by percussion techniques on side-struck flakes, and a single discoidal mano. The importance of these materials, which were probably contemporaneous with Clovis or Folsom, is that they imply a more generalized hunting pattern and the possible early emergence of a generalized Archaic pattern similar to the poorly known San Dieguito complex (Lipe 1978:336).

The next culture-bearing layer at Ventana Cave, the red sand layer, is dated on geological grounds to 7000 BP. It is separated by an erosional hiatus of unknown duration from the volcanic debris layer (Haury 1950). Grinding tools are absent. The chipped stone tools are similar to late San Dieguito-Amargosa materials from eastern California, particularly the doublepointed leaf blades and the projectile points, which are similar to California Pinto points but lack basal notching (Haury 1950:203,266). Later levels yielded manos and metates similar to Cochise materials but also similar to Pinto Basin-Amargosa materials. These materials suggest a gradual decline in contacts with groups to the west and increased contacts with San Pedro Cochise groups to the east (Haury 1950:532).

Early Archaic developments in the study area occurred in the context of a general fluctuating trend toward decreased effective moisture between 11,000- 8000 BP, which is linked to the eastward movement of Paleo-Indian hunters from the Southwest onto the Great Plains (Irwin-Williams and Haynes 1970).

SUBDIVISIONS OF THE ARCHAIC

Cochise

The major Archaic manifestation in southeast Arizona is the Cochise Culture, originally defined as the pre-pottery and essentially prehouse culture in southeast Arizona and adjacent New Mexico (Sayles and Antevs 1941:8). Later research, however, has revealed remains of late Cochise houses. The origins of the Cochise are obscure, although it may be a northern extremity of a generalized northern Mexican foraging tradition (Irwin-Williams 1979:37).

The Cochise Archaic chronology has been subject to three major revisions. As initially presented by Antevs (1941), geological data indicated an age for the Sulphur Springs stage of greater than 10,000 BP. The Chiricahua stage occurred around 6000 BP, and the final San Pedro stage took place between 5000 BP and 3000 BP (Antevs 1941:55). The boundaries of the stages were tentatively set with the Sulphur Springs stage of unknown initiation and terminating around 10,000 BP, the Chiricahua stage then lasting until 5000 BP and the San Pedro stage terminating about 2500 BP (Antevs 1941:55). In an unpublished study in the 1950s, Wasley (in Sayles et al 1958) established more recent boundaries

for the Cochise phases, with Sulphur Springs at 10,000 BP to 7000 BP, the Chiricahua stage at 6000 BP to 2400 BP, overlapping with the San Pedro stage which lasted from 3000 BP to 2000 BP. In addition, he defined the Cazador stage as transitional between Sulphur Springs and Chiricahua at 7000 BP to 6000 BP but, as discussed earlier, this stage has not been generally accepted. Finally, Whalen took a position setting the phase boundaries between those of Antevs and Wasley, with the Sulphur Springs stage at 9500-5500 BP, Chiricahua at 5500-3500 BP and the San Pedro stage at 3500-2200 BP, based on a series of radiocarbon dates (Whalen 1971:67).

However, the association of the Sulphur Springs dates has been criticized, since some come from pollen zones, while others are from areas of human occupation (Jelinek 1967). Chiricahua stage material excavated at Bat Cave dated to between 6000 BP and 2500 BP or 3000 BP (the upper buff sand and midden levels VI-V), with the San Pedro zone (midden levels IV-III) falling between 3000 BP or 2500 BP and 2000 BP (Dick 1965:100). Dates from three San Pedro Cochise sites in the lower San Pedro valley yielded a mean age of 2280 ± 193 BP (Haynes 1968). Dates from the San Pedro stage Pantano site are even later, between 1850 BP and 1700 BP, or AD 150-300 (Betancourt 1978b:38). These dates favor a more recent occupation of the Cochise Archaic in the study area than originally stated by Antevs (1941), at least for the Chiricahua and San Pedro stages.

TABLE 3
Proposed Sequences for the Cochise Culture

Stage	Antevs (1941)	Wasley (1958)	Whalen (1971)
San Pedro	5000-2500 BP	3000-2000 BP	3500-2200 BP
Chiricahua	10,000-5000 BP	6000-2400 BP	5500-3500 BP
Cazador		7000-6000 BP	
Sulphur Springs	?-10,000 BP	10,000-7000 BP	9500-5500 BP

Sulphur Springs Stage (10,500-9000 BC)

The earliest manifestation of the Cochise tradition is the Sulphur Springs stage, known from six sites in the Sulphur Springs Valley and Whitewater Draw (Sayles and Antevs 1941). The stone tool assemblage has thin flat milling stones and small handstones. Some percussion-flaked, planoconvex scraping tools and knives were also defined as part of the Sulphur Springs lithic assemblage (Sayles and Antevs 1941:8). Retouch is present only along the edge of knives and scrapers, possibly due to use wear (Sayles and Antevs 1941:13).

The type site at Double Adobe (Sonora F:10:1(GP)) on Whitewater Draw near Douglas was first investigated by Cummings and his students, who

noted the presence of mammoth bones with these materials. This association of humans with now extinct fauna was described as one of the important features of this stage (Sayles and Antevs 1941:14). The association of such fauna as mammoth and horse with the Sulphur Springs stage has been questioned (Kelley 1959; Willey and Phillips 1958:91).

Haury, however, defended the association on materials and stratigraphic grounds, noting first that some of the bones showed signs of having been charred and split for food. Further, some of the bones were found in articulation, minimizing the possibility of capricious secondary deposition with the tools (Haury 1960:609). In addition, Haury (1960:609) pointed out that the mammoth skull was above the tool-producing layer at the Double Adobe site so that the mammoth had died after the artifact layer had been covered by alluviation. This argument reinforced earlier claims that the important association of extinct fauna with human artifacts had been unquestionably established by stratigraphic analysis (e.g. Gladwin 1937a:135).

Sayles and Antevs (1941:14) also felt the Sulphur Springs stage was important in establishing the existence of a food gathering economy in which grinding tools were a major artifact component. Antevs' analysis suggested a moister climate than at present with cooler temperatures, the Datil interval (Sayles and Antevs 1941; Antevs 1962), preceding the drier Altithermal period. On the basis of geological data, the Sulphur Springs stage was considered to predate 10,000 BP (Sayles and Antevs 1941:55). The first radiocarbon dates for the stage were 7805 $\pm$ 370 BP (C-216) and 6259 $\pm$ 450 BP (C-511) (Arnold and Libby 1951). Libby has reported a radiocarbon date from the site of 7756 $\pm$ 370 BP (Libby 1952). More recent work by Haynes (1967:271) has provided a date of 9350 $\pm$ 160 BP for the Sulphur Springs stage.

To date, no projectile points have been found in association with materials of the Sulphur Springs stage. Sayles and Antevs (1955) reported several sites in the area of the Double Adobe site with materials similar to Sulphur Springs but with projectile points from what they termed the Cazador stage. Associated sediments were radiocarbon dated between 6000-5000 BP. Whalen (1971) claimed that these materials were contemporaneous with the Sulphur Springs stage and were its hunting pose. Re-examination of the stratigraphy revealed problems in the relationship of Cazador materials to the radiocarbon dates. Furthermore, the lithics were not similar to Sulphur Springs artifacts but instead resembled later Chiricahua stage artifacts (Irwin-Williams 1968c).

Chiricahua Stage (9000-1500 BC)

The transition between the Sulphur Springs stage and the later Chiricahua stage is unclear. The apparent gap may be due to the paucity of research or reduced population levels during the Altithermal (Irwin-Williams 1979:38). According to the original definition, the Chiricahua stage was marked by an evolution to larger, shallow-basin milling stones

and the presence of bifacially worked percussion-flaked lithic artifacts. Some new types of grinding stones occurred as well as a few pressure flaked projectile points, originally thought to be intrusive (Sayles and Antevs 1941:8). Materials of this stage are more widely distributed in the study area. In the original survey, they were found associated with middens and hearths on the eastern slope of the Chiricahua Mountains and in erosion channels above Sulphur Springs deposits (Sayles and Antevs 1941:15).

The type site is a midden near the mouth of Cave Creek on the eastern slope of the Chiricahua Mountains (Chir:3:16(GP)). A variety of handstones were recovered, including small, one-hand ones, wedge-shaped, concave, and multi-faceted types, the latter suggesting mortar use. Similarly, a variety of milling stones were found, including hand-size, pebble, and basin types.

The remainder of the lithic assemblage consisted of percussion flaked tools, including plano-convex and biface blades, knives, scrapers, hammerstones, and spokeshaves. All blades were thick with sinuous edges and no retough (Sayles and Antevs 1941:15). Knives were made from primary flakes, with both unifacial and bifacial edge retouch occurring. Sayles and Antevs (1941:15) described as distinctive a knife type made from primary flakes with edges worn smooth. Scrapers were made from primary flakes with edge retouch. Side, end, and ovoid scrapers were present, but the most common type was plano-convex in cross section that lack retouch (Sayles and Antevs 1941:18).

Four projectile points were found at the type site but were considered intrusive on the basis of their low frequency, manufacture from a fine-grained quartzite not used for other artifacts, and the use of pressure flaking techniques (Sayles and Antevs 1941:18). According to Ferg (1977b:7), more recent work has shown that both the Sulphur Springs and Chiricahua stages had their own indigenous projectile point styles. Although Ferg did not cite examples, he may have been referring to the Cazador material discussed earlier for the Sulphur Springs stage.

Chiricahua stage projectile points have since been found at Bat Cave (Dick 1965) in New Mexico and elsewhere and include a large side-notched concave-based point considered diagnostic of this stage (Dick 1965), as well as a diamond-shaped Pelona style and a contracting-stemmed Augustin type (IrwinWilliams 1979:40). Haury (1950:280) considered the Chiricahua point to fall within the range of variation for Amargosa II points, as exemplified in the Chiricahua-Amargosa II level at Ventana Cave.

Some bone tools were also found with the Chiricahua stage materials, including a bone awl at Sonora F:10:31(GP) in the Sulphur Springs Valley, made from a split deer metatarsal (Sayles and Antevs 1941:19). In contrast to the Sulphur Springs stage, only the remains of extant fauna were uncovered, including coyote, jackrabbit, pronghorn antelope, deer, and turtle (Sayles and Antevs 1941:20). Turtle remains perhaps reveal a scarcity of meat. Although Sayles and Antevs (1941:19) mention the presence of bison remains with Chiricahua materials, recent work has found

that bison were not present in the San Pedro drainage until after AD 1200 (Agenbroad and Haynes 1975), suggesting some mixing of deposits.

Although the Chiricahua Cochise stage was first defined in the Fairbank, Double Adobe, and Portal areas of the study area, the earliest materials have been found at Bat Cave. There Chiricahua materials in the buff sand zone were dated between 6000-3000 BP or 2500 BP (Dick 1965:100). Some Chiricahua stage materials were also found in the moist midden layers at Ventana Cave in the context of a predominantly Pinto Basin complex (Haury 1950).

Closer to the study area, Haury excavated the Cienega Creek site (W:10:112) on the San Carlos Indian Reservation, a Cochise site with Chiricahua (Bed D-1) and San Pedro Cochise components. Forty-seven secondary cremations were uncovered, forty from a single area. The mean age of these cremations was 3135 ± 75 BP, making them among the earliest in the Southwest. Hearths and lithic tools were also found. Several shallow wells were excavated, although these probably supplied drinking water from the high water table (Haury 1957). Palynological analysis at the site revealed the presence of Zea mays pollen, dated to approximately 4200 BP, suggesting some reliance on cultigens and making the site "Arizona's oldest cornfield" (Martin and Schoenwetter 1960).

A Chiricahua Cochise site (BB:2:13) was also recorded in the northern end of the Galiuro Mountains on the San Pedro River near Aravaipa Creek (Gilman and Richards 1975:5; Whalen 1971:67).

Agenbroad's analysis of surface materials from the Lone Hill site (BB:10:7) (Agenbroad 1966, 1970, 1978) has provided major insights into Chiricahua stage economics. Lone Hill is a large surface site on the western edge of the San Pedro Valley, having abundant lithic debris, including flaked stone tools and milling stones. Using a 10 percent random sample, researchers analyzed 35 metates, 68 manos, 165 projectile points, 52 miscellaneous tools, and over 13,000 pieces of debitage. Statistical analysis revealed a nonrandom distribution of items associated with male production, such as projectile points, in contrast to items associated with female production, such as ground stone tools. This distribution suggested a sexual division of labor as well as a sexual division of site occupancy (Agenbroad 1978:56). From his analysis, Agenbroad (1970) concluded that the site had been seasonally occupied by people with a mixed hunting and gathering economy and that the site had definite activity areas, including an area for soft-hammer finishing of pretrimmed cores by males.

Several Chiricahua stage sites are known in the Tucson Basin, although they are poorly known. Perhaps the best known is the Joe Ben site (BB:13:11). Here an entrenched channel revealed Chiricahua materials below a Hohokam layer. Although charcoal samples were collected for radiocarbon dating, no dates were obtained. Rather the site was dated on the similarity of its ground stone assemblage of known Chiricahua stage materials (Fontana 1956). Other sites have been uncovered in channel banks in the Tucson area at the Brickyard Arroyo

Site (unpublished but summarized in Betancourt 1978b:37) and at BB:13:107 and BB:13:108, in the proposed Santa Cruz Riverpark. The riverpark sites featured heavily patinated tools, indicating great age (Betancourt 1978b:37).

Masse reported the discovery of nine Chiricahua Cochise artifacts in his survey of the area near Tumamoc Hill (1979). These included a triangular side notched basalt point with concave base and two basal tangs nearly identical to the basalt point from Ventana Cave (Haury 1950) and the Fairchild site (Masse 1979:150).

Chiricahua stage remains have been found at the junction of Timber Draw and the San Simon River north of Bowie. Surface materials were generally mixed with San Pedro stage remains (Dooley et al, in prep.).

The relationship of the Chiricahua stage to the later San Pedro stage is unclear. Acknowledging the continuity of the sequence, Sayles and Antevs (1941:55) stated that the Chiricahua stage lasted from 10,000-5000 BP, and the San Pedro stage lasted from 5000-2500 BP. Later revision of the sequence by Whalen (1971:67), put the Chiricahua stage at 5500-3500 BP and the San Pedro stage from 3500-2200 BP. Windmiller (1973), however, uncovered Chiricahua and San Pedro components at the Fairchild site and suggested the site was either transitional or that both components had been present at about the same time. And Wasley has stated that the Chiricahua stage, as an adaptation to local environments, may have persisted in local areas through the timespan occupied elsewhere by the San Pedro stage peoples (Sayles et al, 1958:68; cited in Ferg 1977b:8).

Future excavation of the Timber Draw sites may yield valuable information on the Chiricahua-San Pedro transition as well as on the San Pedro-Mogollon transition.

San Pedro Stage

The San Pedro stage of Cochise Archaic was first defined as having an abundance of chipped stone tools in the lithic asemblage, with pressure flaking common. Chipped stone tools are generally plano-convex in cross section and bifacially retouched. Such tools include knives and scrapers. Also present are large, deep basin metates with large handstones (Sayles and Antevs 1941:8).

The type site, Benson:5:10 (GP), was exposed in an arroyo tributary of the San Pedro River near Fairbank; its main feature consisted of three large pits, probably for cooking or storage. Associated with these pits were several hearths and shallower pits resembling those from other regions in southeast Arizona (e.g. Dragoon:Fulton 1934a,b; 1938; Gleeson:Fulton, and Tuthill 1940; Bisbee:Trischka 1933). Several shallow silt-filled depressions, larger than any of the pits, were also found, but were not investigated (Sayles and Antevs 1941:23). Although the Cochise culture was first defined as lacking domestic architecture, later work revealed shallow house floors at a number of San Pedro Cochise

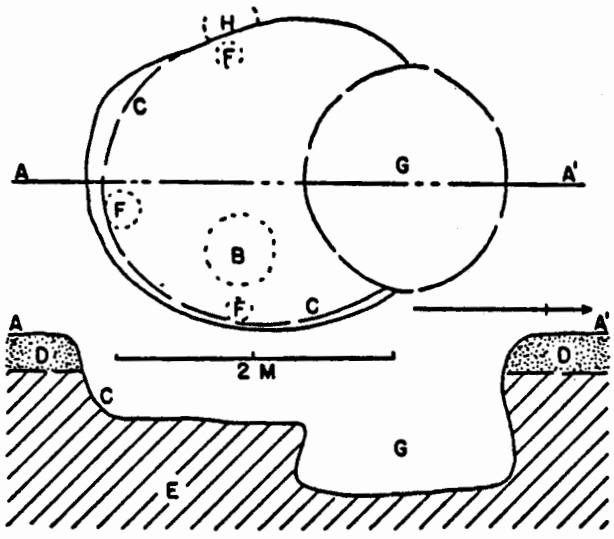

Figure 19. San Pedro Stage, Cochise Culture Plan and Section of House, Pearce: 8: 4. B, irregular depression .35 m. deep (fire area); C, slope at edge of floor; D, sand containing artifacts, burnt stone, charcoal to floor level; no pottery beneath the surface; E, native soil; F, poorly defined, shallow holes (roof supports?); G, storage pit; H, wall step entry. (Sayles 1945). Courtesy Arizona State Museum.

sites. As an example, at Benson:8:3(GP) near Charleston, excavation uncovered a shallow oval house floor with a probable storage pit and probable ash pit as well (Sayles 1945:1; cf also Pearce:8:4(GP), Pearce:8:11(GP) in Sayles 1945).

At Benson:5:10(GP) grinding tools were present, though outnumbered in frequency and variety by chipped stone implements. Sayles and Antevs used these findings to describe a tentative transition from plant gathering, as indicated by grinding and chopping tools, to subsistence based on hunting, as exemplified by abundant projectile points. The San Pedro projectile points are typified by broad lateral notching. As Debowski and Fritz (1974:15) have noted, later research on archaic manifestations has found an eclectic subsistence base. This base has involved a seasonal economic cycle based on shortterm occupations of specialized sites focusing on the exploitation of specific resources. Accordingly, the trend noted by Sayles and Antevs (1941:20; cf. Dick 1965:109) probably reflects a skewed site sample (Quinn and Roney 1973:17). Other artifacts recovered from the type site included a variety of hammerstones used for percussion flaking and as abraders, and small disks of unknown function (Sayles and Antevs 1941:24).

In addition to artifacts recovered in situ at San Pedro sites, Sayles and Antevs (1941:24) also discussed over 800 artifacts of this stage from 47 sites in southeast Arizona, indicating a marked expansion of the Cochise range at this time.

San Pedro stage sites are known from a number of other regions in the study area as well. In the Empire Valley, Eddy (1958) excavated a San Pedro midden in Matty Canyon (EE:2:30), uncovering several storage pits and a variety of stone tools, mostly of basalt. Of the 141 stone tools, 52 were ground. From these tools Eddy developed a formal descriptive typology based on the presence or absence of modification, nature of tool perimeter, and number of grinding surfaces present.

This typology served as the basis of characterization for eleven different ground stone categories, including pendants, curciforms, perforated and unperforated disks, hammerstones, and types of grinding stones (Eddy 1958:39-40). The chipped stone tools included uniface pulping planes, plano-convex scrapers, side and end scrapers, discoidal scrapers, and flake knives. The projectile points were triangular and notched to form a parallel-sided stem. They differed from those described by Sayles and Antevs in being smaller, thinner, and lacking a pronounced expanding base (Eddy 1958:47).

Several bone and horn tools were also recovered, including awls, bone hammers, tubes, cylinders, and antler tine flakers (Eddy 1958:49-51). The presence of such tubes has led Woodbury and Zubrow (1979:51) to speculate that they may have been used with tobacco after the fashion of modern Pueblo cloudblowers. The tobacco, however, was probably not domesticated.

Perhaps most importantly, Eddy excavated eight human and one canine burial in pits associated with the midden. Although Sayles and Antevs (1941:50) had reported a fragmentary human skull and long bone from the Sulphur Springs stage site of Sonora:F:10:17(GP), these are among the earliest formal burials reported in the study area. Seven were from a series of four pits next to each other. Three burials actually overlapped, indicating successive burials and thus some measure of sedentism or at least regular re-occupation of the site (Eddy 1958:52). None of the burials were accompanied by grave goods.

Several San Pedro stage surface scatters have been reported in the Tucson Basin along the Santa Cruz River, particularly on alluvial fans and terraces. Though some of these scatters are simply isolated finds of projectile points (e.g. AA:12:90, in Fritz 1974b), some of these are dense lithic scatters, suggesting a function as base camps in a seasonal round (Batancourt 1978b:38).

During excavations at San Jose de Tucson, Smiley recovered a number of artifacts tentatively dated to the San Pedro stage. In addition, several chunks of burned adobe with reed and grass imprints were also excavated, possibly the remains of wattle and daub walls (Smiley et al. 1953), again suggesting some measure of sedentism.

The most extensive excavations of a San Pedro stage site in the Tucson Basin were conducted at the Pantano Wash site (EE:2:50) (Hemmings et al. 1968) to salvage materials exposed by the wash. The site is some 2-5 acres in extent. The size, the density of debris, and the heavy-duty

nature of the ground stone tool assemblage implied a greater degree of sedentism than usually associated with Cochise occupations (Hemmings et al. 1968:27). The site may be a summer macroband camp similar to the San Pedro stage type site, the Joe Ben site, and the Matty Canyon site, already discussed. Two burials were the only features excavated at the site due to the amount of overburden. Artifacts included palette-like objects and perforated disks similar to those reported by Eddy (1958). The presence of Zea mays pollen and Opuntia pollen suggested a summer occupation, and some dependence on agriculture (Eddy 1958:23). Two radiocarbon dates are associated with the site, AD 168 ± 105 and AD 272 ± 73 (Betancourt 1978b:38).

The Gold Gulch site (CC:10:2) is an example of a specialized San Pedro Cochise site (Huckell 1973). Although no datable materials or diagnostic projectile points were found, the site was assigned to the San Pedro stage on the basis of the great amount of bifacial flaking and the shapes of preforms (Huckell 1973:128). The site is a small campsite on the bajada of the Dos Cabezas Mountains. Architecture consisted of four rock clusters and a cooking pit. Most artifacts recovered consisted of bifacial preforms. Analysis revealed that the site served as a locus for the reduction of trimmed cores into bifacial preforms. The small size of the site suggested a brief occupation by a small group. A late fall or early winter occupation was revealed by the location of the site in the lowlands and the limited number of grinding tools (Huckell 1973:127).

The Fairchild site is another specialized site, featuring a variety of caches and lithic implements, including scrapers, knives, gravers, drills, bone awls, manos, metates, pestles, and abraders. Lithic debris from all manufacturing stages was recovered; the absence of hammerstones suggested a quarry for the exploitation of nearby rock outcrops (Windmiller 1970, 1973). Similar evidence for exploitation of local lithic resources was found at the Poor Canyon (BB:11:25) lithic scatter site near Redington (Ferg 1977b, Lensick 1976a).

San Pedro stage projectile points, ground stone tools, and chipped stone tools have been found associated with hearths at Timber Draw at its confluence with the San Simon River north of Bowie. Several sites are represented, including some containing Chiricahua material and some containing Mogollon components (Dooley et al, in prep.).

San Dieguito Complex

Another early hunting and gathering complex, the San Dieguito, has been claimed for the study area (Rogers 1958). The San Dieguito complex is an early cultural manifestation in the western United States and is distinct in origin and material culture from the Desert Culture (Warren 1967: 168). The sequence of early cultures in the southern California-Great Basin heartland of the San Dieguito complex has undergone several major changes. The sequence was originally defined by M. J. Rogers (1929; 1939), but Rogers (1958) and others (Warren 1967) have since revised it.

With the exception of the Harris site in the Tucson Basin (Warren 1967), almost no materials of this complex have been found in situ; rather, they have been distinguished in surface collection by heavy weathering and patination and the absence of pressure flaking (Rogers 1958:3). Accordingly, San Dieguito I is defined by an artifact assemblage with little internal stylistic patterning and widespread areal and temporal distributions (Warren 1967:170).

As defined from excavations at the Harris site (Warren and True 1961; Warren 1967), the assemblage includes a variety of scrapers, with flake and ovoid side scrapers the most common, leaf-shaped knives, a crescent amulet, choppers, core and pebble hammers, and two types of projectile points. One type point is leaf-shaped and lenticular in cross section; the other is short bladed with a slight shoulder and a long, tapering stem (Warren 1967:174).

Two radiocarbon dates were obtained from the Harris site. One date of 4770 BP $\pm$ 160 (LJ-136) is of questionable association with the San Dieguito materials; further, it was run on shell that may have been later contaminated during storage (Warren 1967:179). The second date, of charcoal from a feature in the later La Jolla component of the site, was 6350 BP $\pm$ 240 (LJ-202). Since the La Jolla complex began around 8000 BP, the underlying San Dieguito complex is estimated to date before that time (Warren 1967:179).

Three radiocarbon samples were taken of charcoal and carbonaceous earth from the most recent (1965) excavations of the San Dieguito component at the Harris site. These samples yielded a mean date of 8720 BP $\pm$ 383 (Warren 1967:179). Dating of San Dieguito remains in the desert, however, has been more ambiguous because of the problem of dating the different lake stands at Lake Mohave and the problem of demonstrating comtemporaneity of artifacts with the lake stands (Warren and DeCosta 1964, cited in Warren 1967).

In the Tucson Basin, Rogers (1958) correlated patination on surface artifacts with topographic features, primarily terraces along Pantano Wash, to produce a chronological sequence of early occupations in the area, beginning with the San Dieguito I. Rogers (1958:4) identified San Dieguito I occupation as extending as far east as the San Pedro Valley, and the later San Dieguito II materials as being limited to western Arizona. From geological evidence, Rogers estimated that the San Dieguito I occupation along the inner terraces of the Pantano Wash dated to 4500 BP.

Rogers saw the San Dieguito I occupation of southern Arizona, his eastern aspect, as identical to the Sulphur Springs Cochise, except for the presence of grinding slabs in the Cochise. Since San Dieguito I lacked such slabs, Rogers (1958:10) felt their purpose was actually for grinding pigment among the Sulphur Springs and questioned the derivation of the Chiricahua stage from the Sulphur Springs. Hayden (1970:88) later suggested that the differences between San Dieguito I and Sulphur Springs could be ascribed to adaptations to different environments. Additional

San Dieguito material has been found in the Tucson and Rincon Mountains (Stacy and Hayden 1975:26).

Amargosa Complex

Rogers (1958) felt that southern Arizona was abandoned after the Sulphur Springs/San Dieguito occupation, possibly due to the increasing aridity of the Altithermal. Haury (1950) stated this abandonment may have lasted as much as 5000 years.

With the advent of moister post-Altithermal conditions, southern Arizona was occupied by a new gathering culture, the Amargosa. The Amargosa moved into the area from California. Increased interaction with Chiricahua Cochise peoples led the Amargosa to adopt metates and certain projectile point types (Rogers 1958:8). This development is expressed in the chronology of three periods of Amargosa. Amargosa I (8000-7000 BC) components contain few seed grinding implements. By Amargosa III (4000-1400 BP) times, metates prevailed in the assemblages and projectile points had decreased in size. The changes reflect increasing plant exploitation (Haury 1950; Jennings and Reed 1956; Rogers 1945).

Several Amargosa sites have also been found in the lower bajadas of the Dos Cabezas Mountains and in the upper bajadas of the Pinaleno Mountains (Westfall et al. 1979:325-326). As an example, Arizona CC:10:6 east of the Pinaleno Mountains showed some late Chiricahua-San Pedro manifestations. Evidence for an Amargosan occupation was also present, including certain ground stone tools and projectile points (Westfall et al. 1979:326).

A similar site, Arizona CC:9:2, lies in the Dos Cabezas Mountains. Its size and diversity of artifacts suggest its possible use as a base camp. Its tool types and frequencies were similar to those at CC:10:6, but projectile point attributes suggested an earlier occupation (Westfall et al. 1979:326). Few of the projectile points were similar to Cochise types. Most resembled points from the Pinto Basin and Gypsum Cave, both of which are included in the Amargosa II period, 5000-4500 BP (Rogers 1966).

Both the Pinto Basin and Gypsum Cave sites included Cochise material as well as Amargosan. The relationship between the two is still unclear. At Bat Cave, Pinto Basin, and Gypsum Cave points were found with Chiricahua stage materials (Dick 1965). The continuity of exploitation of resource locales has let Stacy and Hayden (1975:26) to suggest that the modern Papago are descended from the Amargosa.

CONTINUITY, SUBSISTENCE, AND SOCIAL ORGANIZATION

Since the initial work of Sayles and Antevs (1941) in defining the Cochise culture, relatively few Cochise sites have been investigated, and

these often were salvage efforts. These sites have revealed a range of functions, including quarrying (Ferg 1977b; Huckell 1973; Westfall et al. 1979:325), plant and game processing (Westfall et al. 1979:326; Simpson et al. 1978:87-88; Cattanach 1966), and multipurpose base camps (e.g. Pantano Wash, Hemmings et al. 1968; Matty Canyon, Eddy 1958).

A comprehensive study of the Cochise was undertaken in the late 1960s. At that time, Whalen (1971; 1975) undertook a detailed survey of 100 square miles between the Whetstone Mountains and the San Pedro River on the west side of the San Pedro Valley south of Benson. In contrast to the survey of Sayles and Antevs, which had concentrated on erosional exposures in major stream channels, Whalen's survey included a cross section of environments perpendicular to the valley, including mountains and ascending terraces or pediments. Eighty-two Cochise sites were discovered, twelve of which were selected for further analysis. Lithic material was categorized as finished tools or manufacturing material and investigated for topographic associations and density. Whalen's (1975:208) evidence suggested a preference for higher elevations, probably due to ease of access to resources in both canyons and mountains, as well as closeness to overviews of the valley.

Pediment sites featured a higher ratio of finished tools to manufacturing materials, revealing that these areas were favored for tool production. Pediment sites, however, had fewer finished tools in relation to total artifact count. Evidently greater parsimony in finished tools was exercised at the terrace sites. The frequency of lithics was apparently not a function of access to resources, as appropriate materials occur in both pediment and terrace zones (Whalen 1975:208).

Analysis of other materials from these sites revealed the existence of an economic cycle based on the exploitation of biotic resources of both areas without the development of markedly seasonal procurement strategies. Base camps and specialized activity sites ("work camps") were defined on the basis of the presence or absence of ground stone and hearths. Using modern hunter-gatherer populations as ethnographic analogies, Whalen (1971) estimated the basic population unit to be the small band, numbering twenty-five individuals. This estimate was supported by data from the small campsite of Gold Gulch, which probably represents a seasonal adaptation to scarce resources (Huckell 1973).

From 1975 to 1977 Whalen surveyed 180 square miles on the east side of the San Pedro River (1981). A total of 293 sites in five environmental zones (mountain, hillside, bajada, first terrace and floodplain) were recorded (Whalen 1981:1). Most of the sites were lithic sites. Materials from 225 sites were subjected to discriminant analysis in order to examine site activities. The functions showed close association between projectile points and manos in hide processing; projectile points and choppers at kill and butchering sites; planes and notches in woodwork; and buring and gravers in bone work. Associations were also found between hammerstones and cores in stone tool production; picks in mescal and agave procurement; and choppers and side scrapers in plant gathering (Whalen 1981:11).

Existing evidence indicates a stable, long-lasting hunting and gathering adaptation in the study area, based on seasonal exploitation of specific resources. Accordingly, a major question is why agriculture was adopted at all, and why it remained a relatively minor subsistence strategy for so long (Whalen 1973:90; Woodbury and Zubrow 1979:44).

The earliest occurrences of maize in the Southwest are found within a small area of west central New Mexico and east central Arizona, most notably Tularosa Cave (Martin et al. 1952), Bat Cave (Dick 1965), and Cienega Creek (Haury 1957; Martin and Schoenwetter 1960). The earliest maize and squash (Cucurbita pepo) at Bat Cave is associated with Chiricahua stage Cochise artifacts.

A review of the Bat Cave material reveals differing views of the dating of the site due to varying interpretations of the stratigraphy and radiocarbon dates (Woodbury and Zubrow 1979:47). The geological evidence suggests a date of approximately 5500 BP but the use of a pooled radiocarbon sample and the unreliable solid carbon method have led to the suggestion that the Chiricahua stage material may be as recent as 3500 BP (Woodbury and Zubrow 1979:47). Mangelsdorf, however, has favored the earlier date based on the primitive nature of the corn itself (Mangelsdorf and Lister 1956). The date of 4200 BP for maize pollen at the Cienega Creek site, again with Chiricahua stage materials, (Martin and Schoenwetter 1960) further supports that earlier date at Bat Cave.

The early date and the similarity of the Bat Cave maize to the pre-Chapalote race of the Tehuacan Valley point to diffusion of maize up the Sierra Madre Occidental from a Mexican center of development, since this mountain chain offers a string of cool, moist environments all the way to the Southwest. Such environments are ideally suited to this primitive strain of maize.

Beans (Phaseolus vulgaris) occur in San Pedro Cochise levels at Bat Cave, indicating an introduction possibly as early as 3000 BP (Dick 1965:100, 107). Thus, by this date, a trio of domesticates was present that could support later Sedentary ceramic cultures. This San Pedro stage maize at Bat Cave, however, is a tripsacoid form resulting from interbreeding of pre-Chapalote maize and teosinte, the "teosinte introgression" of Dick (1965:100, 107). Not only did this new variety produce larger cobs, it was also more resistant to arid environments, a factor that probably helped the spread of maize in the Southwest (cf. Cutler 1952). By the late San Pedro levels at Tularosa Cave, large numbers of full size cobs occurred (Cutler 1952).

In all likelihood, teosinte and its introgression diffused from Mexico, where similar developments had occurred as early as 4000 BP (Whalen 1973:91). Before this teosinte introgression, maize was evidently only a minor component of an economy heavily dependent on wild plants, perhaps cultivated in a pattern of "benign neglect," much like the historic Papago practice (Whalen 1973:90). The introgression of teosinte was a key factor in prolonging seasonal population aggregation and ultimate sedentism.

This gradual shift to sedentism is manifested in several concurrent developments. Among these developments is the appearance of Cochise domestic structures at such sites as Pearce:8:4(GP), Pearce:8:11(GP), Benson:5:10 (GP), Benson:8:3(GP), (Sayles 1945) and the Matty Canyon site (Eddy 1958) in association with storage pits and cooking hearths, suggesting the development of good surpluses. At Pearce:8:4, one San Pedro stage domestic structure featured a deep circular pit covering a third of the floor (Sayles 1945). Similarly, the burials at Matty Canyon and Cienega Creek (Haury 1957) also indicate a trend toward sedentism, at least initially in the form of increasingly frequent returns to favored sites. In this context, the later introduction of ceramics, considered to mark the transition to the Mogollon (e.g. Martin et al. 1952), should be regarded as another technological development designed to improve the use of food through better storage and cooking techniques (cf. Woodbury and Zubrow 1979:52).

The location of the late Archaic Pantano site (EE:2:50) near the floodplain of Pantano Wash, as well as the great extent of the site and the presence of associated corn pollen, all suggest the use of the riverine environment by populations employing a horticultural strategy (Hemmings et al. 1968; Masse 1980; cf. Kinkade and Fritz 1975:25 for other examples). Unfortunately, the paucity of research on late Archaic villages has made it difficult to comprehend the total nature of subsistence systems and settlement patterns during this crucial period. Masse (1980:7) has noted that early villages in the San Pedro Valley tended to lie near the mouths of tributary streams, facilitating the exploitation of the upper piedmont as well as the floodplain. Such site location was probably a factor in settlement size and stability.

Both Whalen (1973:94) and Woodbury and Zubrow (1979:44-45) have developed models of the Sedentary transition based ultimately on the work of Flannery (1968). In both models, introducing new varieties of maize led to a shift from the limited use of the Chiricahua stage of the Cochise to increased productivity and demand, linked to increased population density in a positive feedback loop. As populations grew and dependence on cultigens increased, semi-permanent structures and storage facilities allowed larger population aggregations to exist for longer periods of time, ultimately resulting in changes in social organization as well.

Although all admit the lack of evidence for these interactions, the existence of settled villages by 1500 BP is seen as a culmination of such trends (e.g. Woodbury and Zubrow 1979:45). As more research is done in other riverine environments in the study area, more late Archaic settlements will probably be found. Since many floodplain sites have been buried by alluviation (cf. Whalen 1975), and many are being destroyed by erosion (Kinkade 1981, personal communication), analysis of these sites will be crucial for an understanding of this transition. Proposed mitigative excavations at the Timber Draw sites on the lower San Simon River should contribute much significant data to help fill this data gap (Kinkade 1981, personal communication).

ORIGINS AND RELATIONSHIPS

The Hohokam, Piman for "those who have gone before," have been defined as a prehistoric cultural complex on the basis of a cluster of traits first delineated in southern Arizona (e.g. Gladwin and Gladwin 1933). Initial studies pointed out differences between prehistoric remains in the southern Arizona desert and the prehistoric Pueblo cultures to the north, and the Hohokam occupation was divided into five periods--Colonial, Sedentary, Classic, Recent, and Modern (Pima and Papago) (Gladwin and Gladwin 1933:5). Subsequent investigations at the major site of Snaketown near Phoenix, occupied about 300 BP until about AD 1100, yielded knowledge of yet an earlier period, the Pioneer.

Snaketown remains the most thoroughly investigated Hohokam site, from which comes a great deal of our understanding of southern Arizona prehistory (Gladwin et al. 1938; Haury 1976). The constellation of Hohokam traits defined at Snaketown includes dispersed villages (rancherias) of brush dwellings built in shallow elongated pits (in contrast with Mogollon and Anasazi pit houses). Subsistence was based on maize agriculture, often in association with canal irrigation. Larger settlements also featured ball courts and mounds. Cremation was the primary means of interment, again in contrast to the Mogollon and Anasazi practice of interment. Ceramics were characteristically brown, buff, or red-on-buff and made by the paddle and anvil technique. In addition, Hohokam material culture featured a diverse array of shell items, clay human and animal figurines, sculptured stone bowls, and palettes. Many of these traits were considered Mesoamerican in inspiration if not derivation (cf. Gumerman and Haury 1979:75).

To determine the extent of the Hohokam, Gila Pueblo undertook a massive survey using the Classic period site of Casa Grande as a starting point. The survey discovered that the eastern range of the Hohokam extended to Safford on the Gila River, the San Pedro Valley as far south as Benson, and the upper Santa Cruz Valley (Gladwin and Gladwin 1935:211). Later research has found that the Hohokam lifestyle was largely based on an adaptation to the Sonoran biotic province. The area around Benson marks a transition to the Chihuahuan biotic province, and, as a result, upper San Pedro cultural manifestations are not generally classed as Hohokam (cf. Gladwin and Gladwin 1935:225; Franklin 1978:367). On the Santa Cruz River, the number of "pure" Hohokam sites gradually decline south of Tumacacori. The region between Tumacacori and Nogales has been considered a contact zone between the Hohokam and the poorly known Trincheras culture to the south (Reinhard 1978:247).

REGIONAL VARIANTS

As more information became known, greater differences became apparent between the Hohokam as defined in the Gila-Salt Basin and in other areas. To the west of the study area, in the arid environment of Papagueria, the desert branch of the Hohokam appeared initially as a simpler version of the River Hohokam of the Gila-Salt--lacking figurines and with palettes, carved stone items, and shell jewelry rarely found. The Desert Hohokam lithic assemblage featured an abundance of roughly chipped choppers, and cutting and scraping tools. In part, these differences were hypothesized as due to dependence on a primarily foraging subsistence base. An area with no perennial streams or rivers and few perennial springs required a pattern of seasonally occupied villages (Haury 1950). Other traits, however, seemed to suggest cultural differences, such as the practice of inhumation and some ceramic variations, including a preference for redwares with red interiors, versus the black interiors of Gila-Salt redwares (after Haury 1950:547).

Although no single site in the region has produced the kind of detailed cultural sequence of Snaketown, excavations at Ventana Cave (Haury 1950) have revealed the presence of an earlier pre-ceramic occupation, discussed in an earlier section, which was followed by later ceramic phases. Additional prehistoric ceramic phases were defined as a result of investigations at Valshni Village (Withers 1944) and Jackrabbit ruin (Scantling 1939, 1941). Later investigations have added much to our knowledge of the Hohokam in the Papagueria (e.g. Rosenthal et al. 1978; Stacy 1974; Steward and Teague 1974; Raab 1974; Goodyear 1975).

Differences between the Hohokam of the Tucson and the Gila-Salt Basins are primarily architectural and ceramic. As Haury has noted, the major differences between Snaketown and the Hodges ruin, which served as the basis for the definition of the Tucson sequence, was the lack of prominent refuse mounds and platform mounds at the Hodges ruin (Haury 1978:126). Although Haury also noted the lack of clear evidence of canal irrigation in the area, other work has uncovered evidence of prehistoric canals (Kinkade and Fritz 1975). The paucity of evidence for such waterworks, however, may reflect differing agricultural practices required by differences in riverine topography.

The ceramic differences have led Kelly to categorize Tucson ceramics as intermediate between Hohokam Red-on-buff and Mogollon Red-on-brown wares. In particular, the paste of Tucson ceramics has been considered Mogollon in affinity, with its close-grained textures, as well as its polish and the relative absence of slipping. In shape and ornamentation, however, Tucson wares are similar to those of the Gila-Salt Basin (Kelly 1978:3).

The extent of the differences have led some archaeologists to propose limiting the term Hohokam to the prehistoric manifestations of the Gila-Salt Basin (e.g. Hayden 1957, 1970; Wilcox 1979). The problem of

defining Hohokam boundaries is complicated by the fact that human populations form open systems constantly exchanging matter, energy, and information with their social and natural environments (cf. Evans 1956). The rarity of such items as platform mounds, ball courts, and the ornate material culture outside the Gila-Salt has prompted the suggestion that these peripheral populations were not Hohokam but native groups differentially affected by involvement with the Hohokam (DiPeso 1953a, 1979). Still others view the differences as resulting from adaptations to different drainage systems (e.g. Masse 1980; Gumerman and Haury 1979; Doyel 1979b:553).

For the purposes of this overview, the ceramic culture of the Tucson Basin will be considered as Hohokam as well as those cultures extending south to Tumacacori on the Santa Cruz River. In addition, the lower San Pedro Valley as far south as Benson and along the Gila River as far east as Safford will also be considered part of the Hohokam domain. One should recognize, however, that the interactions among the ceramic-using populations of the study area are complex and poorly known.

HOHOKAM ORIGINS WITHIN THE STUDY AREA

To understand Hohokam developments in the study area, one must briefly review Hohokam origins in the Gila Basin. A number of theories have been proposed to account for the origins of the Hohokam. At a general level, these can be classed as theories that focus on indigenous developments (Gladwin et al. 1938) and theories that focus on external developments as a major factor (cf. Doyel 1979a, Haury 1976).

Most external theories have seen Hohokam developments as a function of events in Mesoamerica. Information from Snaketown, particularly that collected during the 1964-65 excavation, led Haury (1976) to conclude that the Hohokam represented a Mesoamerican migration into the Gila Basin during the Vahki phase, 300 BP-1 AD, of the Pioneer period. Haury's conclusion was derived from the relatively sudden appearance of a whole cluster of traits with no apparent local antecedents. These traits included a well-developed ceramic complex, figurines, cremations, canal irrigation, trough metates, stone sculpture, and a well-developed shell industry (Gumerman and Haury 1979:80).

Presumably the roots of the Hohokam lay in an as yet unknown agricultural population in northern Mexico, which moved up one of the south-north trending tributaries of the region (e.g. Gladwin et al. 1938; Haury 1945b, 1965, 1967, 1976). These immigrants, the Hohokam, moved into a riverine eco-niche in the Gila Basin suited for canal irrigation. This eco-niche was either unexploited (the "empty eco-niche" of Doyel 1979b) or only partially exploited by the indigenous inhabitants, presumably of Cochise derivation, since the archaeological records show no evidence of conflict. Conflict may have been absent because the indigenous hunter-gatherers exploited a range of eco-niches such that loss of the riparian zone was met by increased exploitation of other niches (cf. Haury 1976; Gumerman and Haury 1979). A survey of northern Sonora by W.W. Wasley

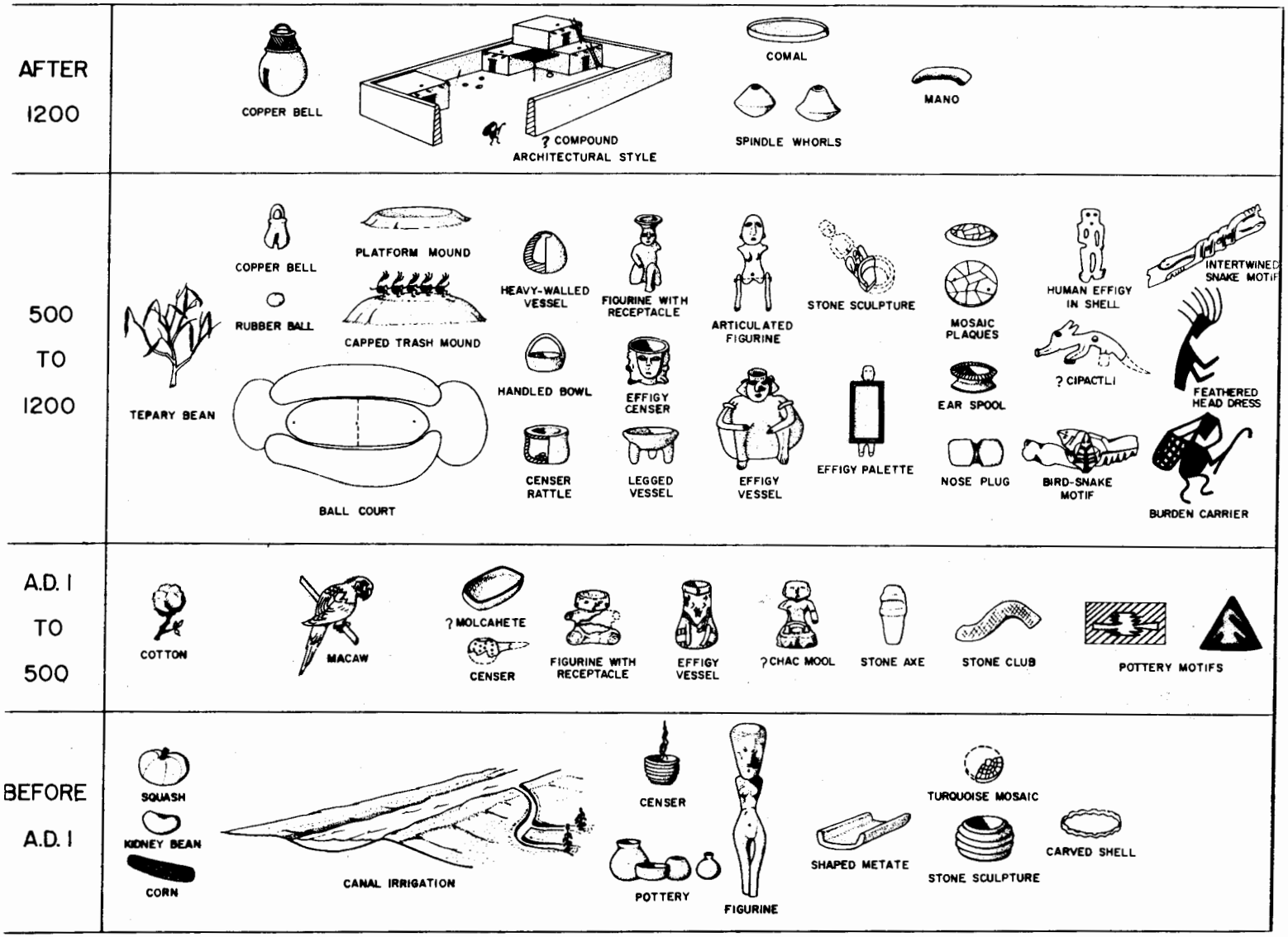

Figure 20. The Mesoamerican Impact on the Hohokam seen Through the Arrival of Culture Elements During Four Time Periods. By permission from The Hohokam Desert Farmers and Craftsmen, by E.W. Haury, Tucson. The University of Arizona Press, Copyright 1976.

revealed no Hohokam sites, suggesting that the migration was fairly rapid (Wasley 1967, cited in Gumerman and Haury 1979:80).

In contrast, DiPeso has regarded the earliest agriculturalists in the region as an indigenous development from Cochise antecedents resulting from the diffusion of agriculture and undecorated ceramics from the south. These indigenous agriculturalists he has labelled O'otam (DiPeso 1956, 1979). In this view, the Pioneer period of the Hohokam should be ascribed to the O'otam, as well as including the San Simon Branch of the Mogollon, the Dragoon Complex, and the Desert Hohokam (DiPeso 1979:92).

DiPeso reserves the term Hohokam for an intrusion by Mexican immigrants at AD 800 $\pm$ 100 (DiPeso 1979:93) bearing a religious complex associated with the Mesoamerican diety Tezcatlipoca. This period is equivalent to the Colonial period of the Snaketown chronology. After a period of Hohokam domination with the O'otam occupying adjacent borderlands, an O'otam reassertation occurred around AD 1250 (DiPeso 1956). By this time, however, the O'otam had adopted a great many Hohokam traits.

Schroeder (1953a, 1957, 1960, 1975) has labelled the native agriculturalists of the region as the Hakataya, linking them to prehistoric complexes of the lower Colorado River, some of which gave rise to historic Hokan speaking peoples. In his view, the indigenous Hakataya of the Gila-Salt Basin were conquered by organized groups of merchants who probably originated in the Tarascan region of western Mexico around AD 600 (Schroeder 1966:687). These merchants were the Hohokam.

Before this time, some influences from Mesoamerica had entered the Hakataya tradition through unregulated diffusion (Schroeder 1965). After this time, mercantile families served as the primary agents for the dissemination of Mesoamerican ideas and traits (cf. Schroeder 1963). Here again, Pioneer period developments are viewed as a non-Hohokam, Hakataya manifestation, and the Classic period is a time of dominance of both Hohokam and Hakataya by the Sinagua from north central Arizona (cf. Schroeder 1979b).

The diversity of exotic goods among and within villages in the Santa Cruz and San Pedro Valleys tends to invalidate the possibility of control by a centralized mercantile elite (Masse 1980). The concept of Hakataya as responsible for the Pioneer period has received little support from more recent work in the Gila-Salt Basin and the Colorado River, and Schroeder's most recent writings on the subject indicate no Hakataya presence east of Gila Bend (Schroeder 1979b:100, Figure 1).

Both DiPeso and Schroeder have been criticized for the use of traits rather than behavior, as units for comparison e.g. Grebinger 1971a:165-170). Both imply that the primary factor in the presence of a trait or trait cluster is the corresponding presence or absence of a norm for their creation in the population under study. Such an approach tends to minimize the role of differing adaptations or social structures in societal differences (Grady 1976). Other criticisms have concentrated on the inability of such theories to deal with the role of the indigenous

populations in a Mesoamerican network other than an suppliers of goods (e.g. Doelle n.d.; Doyel 1979b).

The other major theoretical approach to the explanation of the origins of the Hohokam has relied primarily on indigenous developments (e.g. Wasley 1966; Morris 1969; Doyel 1979b; Grady 1976; Plog n.d.; Gladwin et al. 1938). These proponents generally reject Mesoamerican origins for the Hohokam on the grounds that no clearly definable Mesoamerican antecedents have yet been located. Instead, they see late Cochise population growth as a key factor, leading to the adoption of farming. In any case, the data is ambiguous (Doyel 1981, Personal Communication).

The Pioneer period then was a period of feedback between population growth and increased agricultural dependence, which in turn led to the development of canal irrigation in the Gila-Salt Basin. The resulting increase in social, organizational, and ceremonial complexity was furthered by contacts with Mesoamerica, which would have augmented the prestige of leading lineages (Doyel 1979b:553; cf. Flannery 1968).

Both approaches have been criticized for their lack of theoretical adequacy and methodological utility; neither presents propositions that can be meaningfully tested in the archaeological record. Both represent competing belief systems (Doyel 1979b:554) more than attempts at explanation.

HOHOKAM CHRONOLOGY

The Hohokam chronology is largely based on the initial excavations at Snaketown. Stratigraphic deposits, mortuary areas, house floor superimpositions and stratified ceramic deposits were employed to create a relative sequence. Intrusive Anasazi ceramics that had been dated by dendrochronology were then used to cross-date the sequence and link it to the modern calendar (Gladwin et al. 1938). A major chronological problem was the dating of the earliest period, the Pioneer, which occurred before the production of Anasazi wares so that no independent means of dating could be used to verify the initiation or duration of the period. Since then, at least seven major revisions of the Snaketown Hohokam sequence have been presented. These have concentrated on the dating of the Pioneer period, particularly the first phase (Vahki) and the 200-year length of subsequent periods (Gladwin 1942, 1948, Wheat 1955, DiPeso 1956, Bullard 1962, Schroeder 1952a, Plog n.d., Schiffer 1982). In general, the revisions have presented markedly shorter versions of the chronology, usually by beginning the Vahki phase much after 1 AD, by assigning the Pioneer period to non-Hohokam cultures, or both. In large part, the problem lay in the ceramic types which were used to distinguish the phases; many had considerable temporal overlap, which was further complicated by the complex depositional history of the site and the general absence of wood suitable for dendrochronological dating (Doyel 1979a).

In order to resolve the chronological problems, Haury conducted further excavations at Snaketown in 1964 and 1965 (Haury 1967, 1976). A broad range of new dating methods were utilized, including radiocarbon dating, archeomagnetic dating, and alpha-track recoil dating. The radiocarbon-based chronology has since been criticized since the dates were based on hearth charcoal and the wood originated from dead branches from living trees, driftwood, or scavenged architectural elements. These provided dates which were earlier, often by a considerable number of years, than the associated human behavior (Schiffer 1982:45-52). However, the different dating methods have all produced dates consonant with the original sequence, and the original chronology has largely been reconfirmed. "Even by today's standards, the case Haury made in defense of the Pioneer Period sequence ... seems impressive" (Schiffer 1982:16).

The Tucson Basin chronology is largely based on excavations at the Hodges site and University Indian Ruin (Kelly 1978, Hayden 1957). Work at the Hodges site indicated that the Pioneer period sequence is virtually indistinguishable from that in the Gila-Salt Basin, as indicated by the fact that the ceramics are identical. Subsequent Colonial and Sedentary period wares continue to be similar in design to Gila-Salt Basin products, although differing in paste and surface treatment (Kelly 1978). The excavations produced a relative sequence of periods and phases, which were then linked to the Gila-Salt Basin sequence by the presence of intrusive red-on-buff wares, which in turn were cross-dated by intrusive Anasazi ceramics from northern Arizona. The sequence is further complicated by the general absence of trash mounds in the Tucson Basin (Haury 1978) so that stratigraphic sequences are rare and chronologies must be built from the seriation of shallow surface deposits. To date, only a few absolute dates have been obtained, and these are all from the Sedentary-Classic transition (Greenleaf 1975, Grebinger 1976); almost all the Tucson Basin sequence remains unsupported by absolute dates.

A similar problem exists in the San Pedro valley. Here too sequences were established on the basis of limited excavation and then tied into absolute sequences on the basis of intrusive Gila-Salt Basin, Tucson Basin, or Mogollon ceramics (eg. Sayles 1945; Tuthill 1947). Attempts to use dendrochronology has been hampered by the same problems of erratic desert tree ring growth which have plagued researchers throughout southern Arizona. At this point, no reliable absolute dates exist for this area (Masse 1980:5).

Chronologies in both the Tucson Basin and San Pedro Valley are in part based on changes in red-on-brown wares and, to a lesser extent, changes in plainwares. A major chronological problem has been the definition and temporal placement of such types as Cañada del Oro Red-on-brown, Rincon Red-on-brown, and Rillito Red-on-brown, particularly in view of the questionable reality of the distinction between the latter two (eg Kelly 1978, Schiffer 1982:24). Given the micaceous nature of many Hohokam wares in the region, techniques like alpha-recoil track dating would prove helpful in firming up the sequence (Schiffer 1982:85).

TABLE 4

POTTERY TYPES FROM THE HODGES SITE

Period	Phase	Pottery Type
Classic	Tanque Verde	Tanque Verde Red-on-brown
		Casa Grande Red-on-buff
		San Carlos Red
		Gila (?) Red
		Plainware
		Corrugated
Sedentary	Rincon	Rincon Red-on-brown
		Sacaton Red-on-buff
		Rincon Red
		Plainware
Colonial	Rillito	Rillito Red-on-brown
		Picacho Red-on-brown
		Santa Cruz Red-on-buff
		Plainware
	Cañada del Oro	Cañada del Oro Red-on-brown
		Gila Butte Red-on-buff
		Plainware
Pioneer	Snaketown	Snaketown Red-on-buff
		Miscellaneous redwares
		Plainware
	Sweetwater	Sweetwater Red-on-gray
		Plainware (presumptive)

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TABLE 5

DATES FOR DECORATED POTTERY FOUND AT SECOND CANYON RUIN

Salado series	
Tonto Polychrome	1300-1400*
Gila Polychrome	1250-1400*
Pinto Polychrome	1200-1300*
Roosevelt Black-on-white	1200-1300*
Tucson series	
Tucson Polychrome	1300-1400
Tucson Black-on-red	1300-1400
Pantano Red-on-brown	1300-1400
Tanque Verde Red-on-brown	1200-1400
Rincon Red-on-brown	900-1200
Rillito Red-on-brown	700-900
Middle Gila series	
San Carlos Red-on-brown	1275-1400 (1250-1400)
Hohokam series	
Sacaton Red-on-buff	900-1200
Santa Cruz Red-on-buff	700-900
Gila Butte Red-on-buff	500-700
San Pedro series	
Tres Alamos Red-on-white	900-1200
Cascabel Red-on-brown	700-900 (500-900)
San Simon series	
Encinas Red-on-brown	900-1200
Cerros Red-on-white	700-900 (800-1000)
Galluro Red-on-brown	500-700 (500-900)
Mogollon series	
Tularosa Black-on-white	1100-1250*
Mimbres Black-on-white	1100-1250*

* = dated by dendrochronology (Breternitz 1966)

() = suggested revision

TABLE 6

CERAMIC ASSOCIATIONS AT SECOND CANYON RUIN

Tucson Phase (Salado Occupation)	
Gila Polychrome	Gila Red
Tonto Polychrome	Belford Red
Pinto Polychrome(?)	Belford Plain smudged
Gila Black-on-red(?)	Belford Plain unsmudged(?)
Tucson Polychrome	Corrugated types
Tucson Black-on-red	
Roosevelt Black-on-white(?)	
Tanque Verde Phase	
Tanque Verde Red-on-brown	San Carlos Red
San Carlos Red-on-brown	Peppersauce Red(?)
Tucson Polychrome(?)	Gila Red(?)
Tucson Black-on-red(?)	Belford Plain unsmudged(?)
Rincon Red-on-brown(?)	Corrugated types
Tularosa Black-on-white(?)	
Mimbres Black-on-white(?)	
Colonial, Early Sedentary periods	
Santa Cruz Red-on-buff	Gila Plain varieties
Gila Butte Red-on-buff	Undecorated buffware
Sacaton Red-on-buff	
Cascabel Red-on-brown	
Cerros Red-on-white	
Encinas Red-on-brown	
Rillito Red-on-brown(?)	

Note: Some types may be associated with more than one phase.
(?) = association with phase not good, but probable

(Franklin 1980) Courtesy Arizona State Museum.

TABLE 7

CERAMIC CHRONOLOGY IN SOUTHEASTERN ARIZONA

Dates A.D.	Gila Basin	San Pedro	San Simon	Mimbres
1400				
	Gila Polychrome	Gila Polychrome		
1300	Casa Grande Red-on-buff			
		Tanque Verde Red-on-brown		
1200				
				Mimbres Black-on-white
1100				
	Sacaton Red-on-buff	Dragoon Red-on-brown	Encinas Red-on-brown	Mangus Black-on-white
1000		Tres Alamos Red-on-white		
				Three Circle Red-on-white
900				
800	Santa Cruz Red-on-buff	Cascabel Red-on-brown	Cerros Red-on-white	
700				Mogollon Red-on-brown
600	Gila Butte Red-on-buff		Galiuro Red-on-brown	
500				
				San Lorenzo Red-on-brown
400	Snaketown Red-on-buff		Pinaleño Red-on-brown	
300				
200	Sweetwater Red-on-gray		Dos Cabezas Red-on-brown	
100				
	Estrella Red-on-gray			

(Franklin 1980) Courtesy Arizona State Museum.

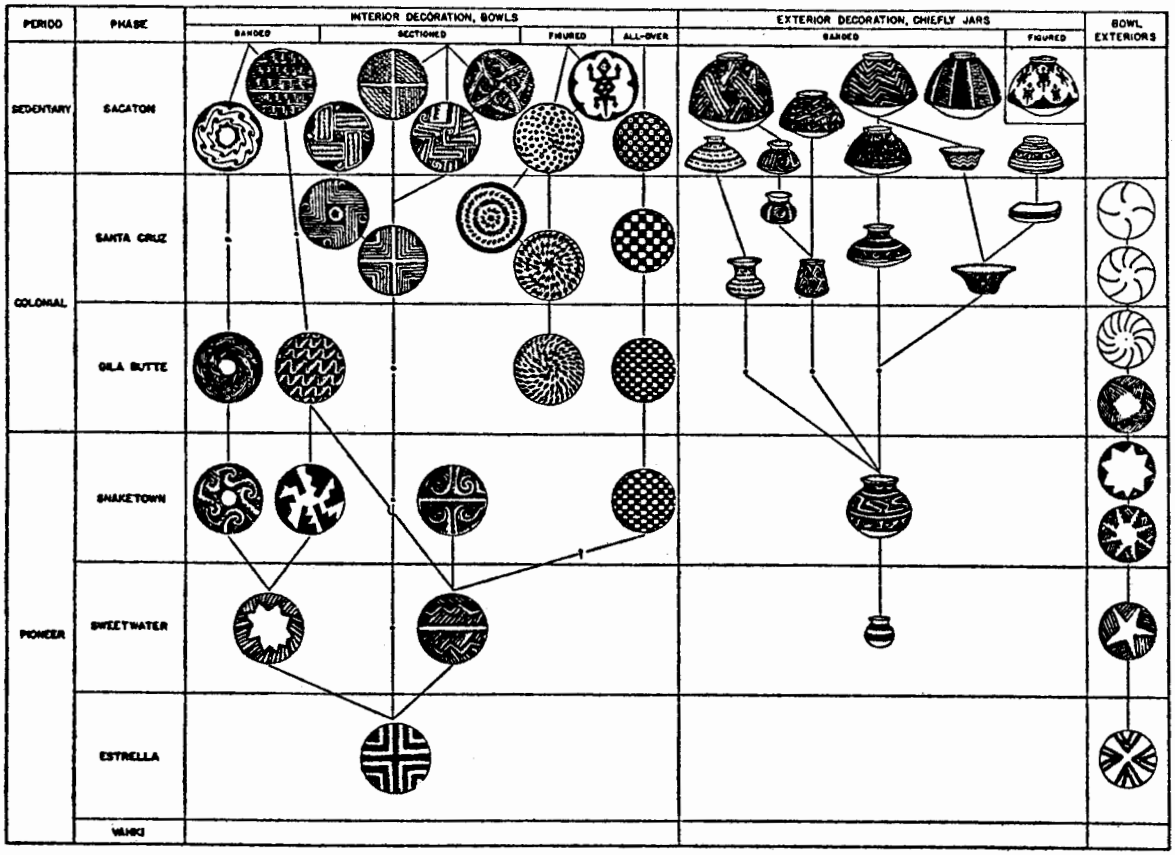


Figure 21. Main Trends in the Evolution of Design Layout.
The early phases are not as complete as they might be because of the derth of whole pottery, but the examination of the large sherds shows that the differences were only a minor character. (Gladwin and Haury 1938). Courtesy of Arizona State Museum.

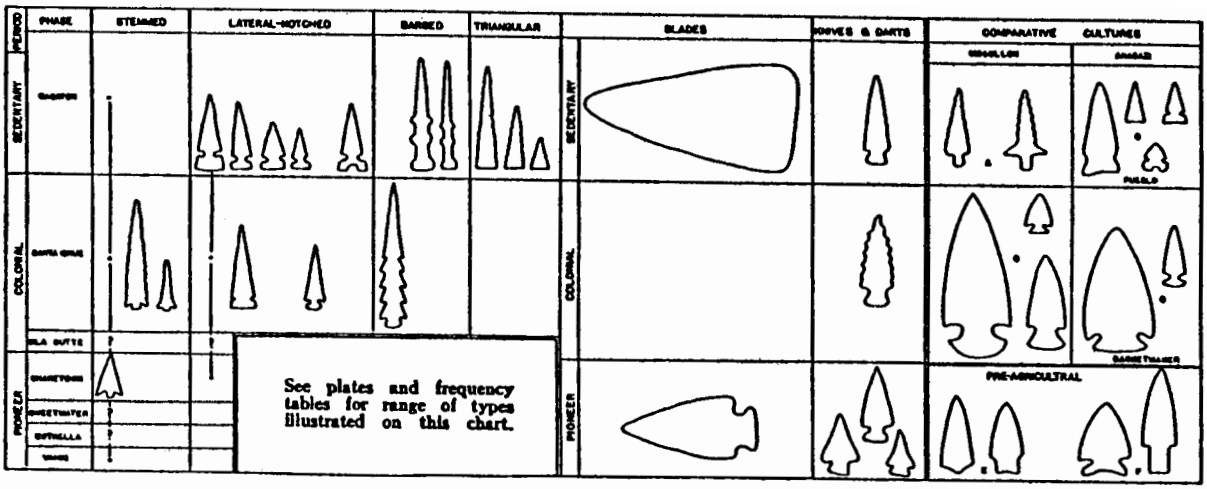


Figure 22. Developmental Chart of Projectile Points, Blades and Knives; and Comparison with other Cultures.

The greatest frequency of each Hohokam type is found in that phase in which the drawing appears on the chart. Contemporaneity with the Mogollon and Anasazi Cultures has been established as shown by this chart.

Comparative Cultures:

A, B, (Mogollon), after Haury, E. W., 1936*b*.
C, D, (Anasazi), Gila Pueblo collection.

Pre-agricultural.

E, Southern California, after Campbell, E. W. C., 1936.
F, Texas, after Sayles, E. B., 1935.

(Gladwin and Haury 1938). Courtesy of Arizona State Museum

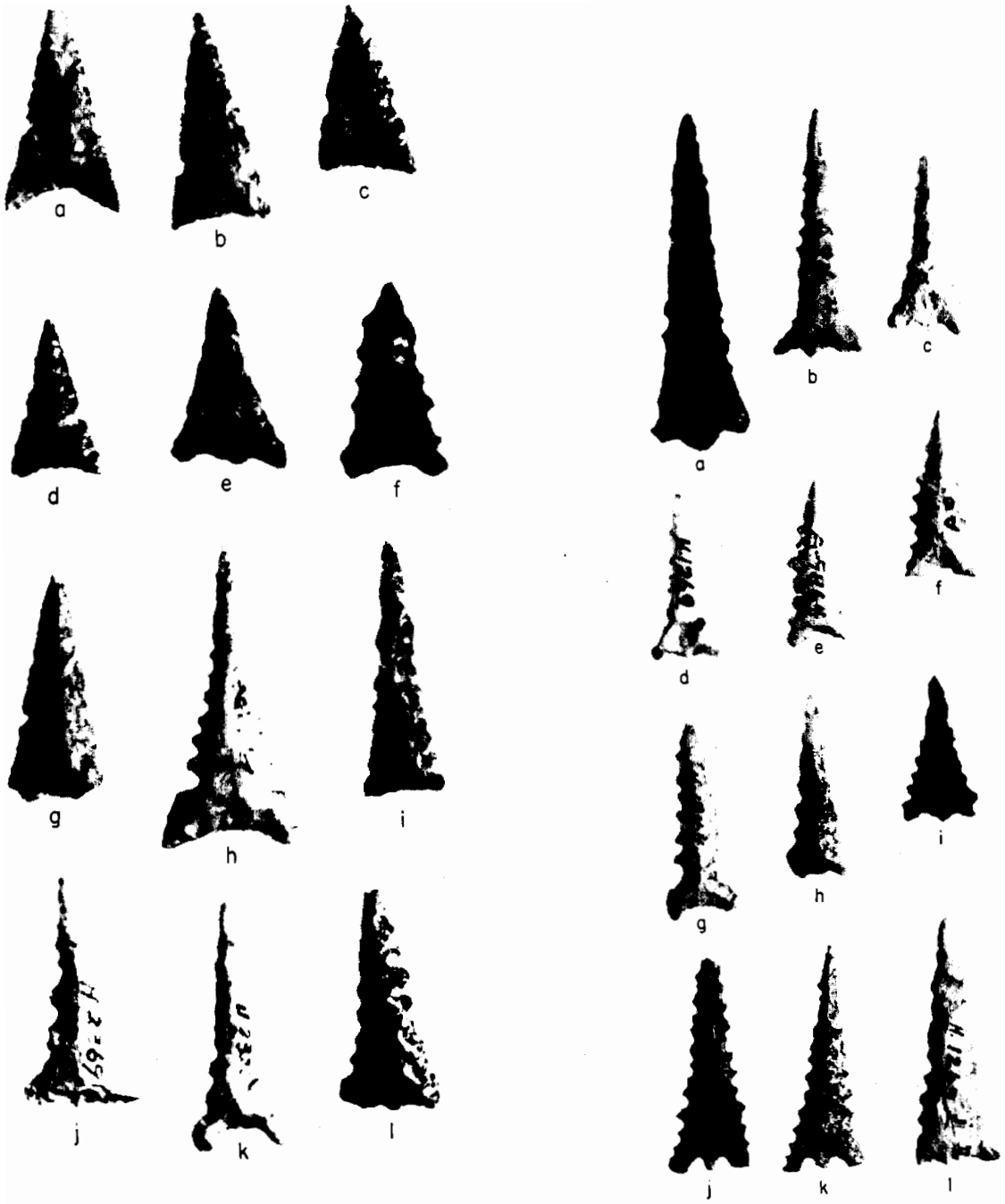


Figure 23. Projectile Points from the Hodges Ruin.

Miscellaneous projectiles. Phase: a-d, Tanque Verde; e-h, Rincon; i-l, Cañada del Oro (?). Material: a-c,g,i: chalcedony; d-f,l: chert; h,j,k: flint. Length of 1 2.8 cm.

Barbed and serrated projectiles: Rillito phase, Length of l:3.4 cm. By permission from The Hodges Ruin; A Hohokam Cummunity in the Tucson Basin, by I. T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

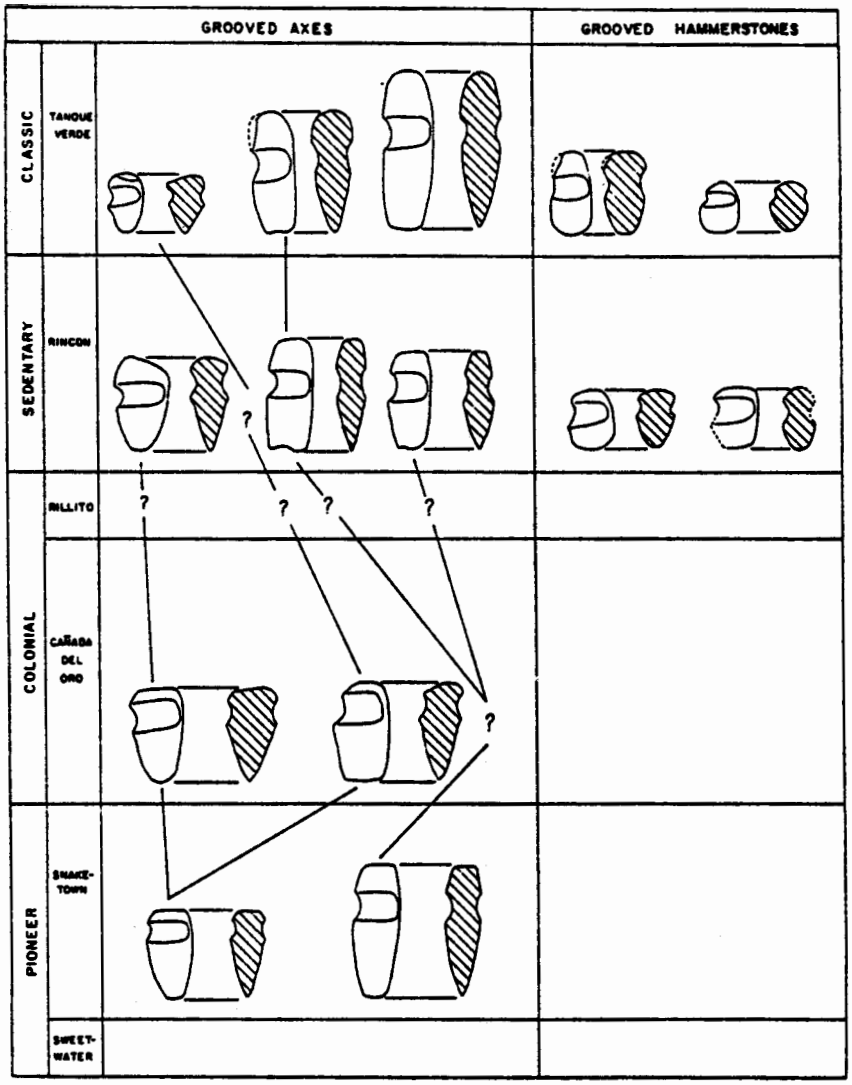


Figure 24. Development of Axes and Hammerstones. By permission from The Hodges Ruin; A Hohokam Community in the Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

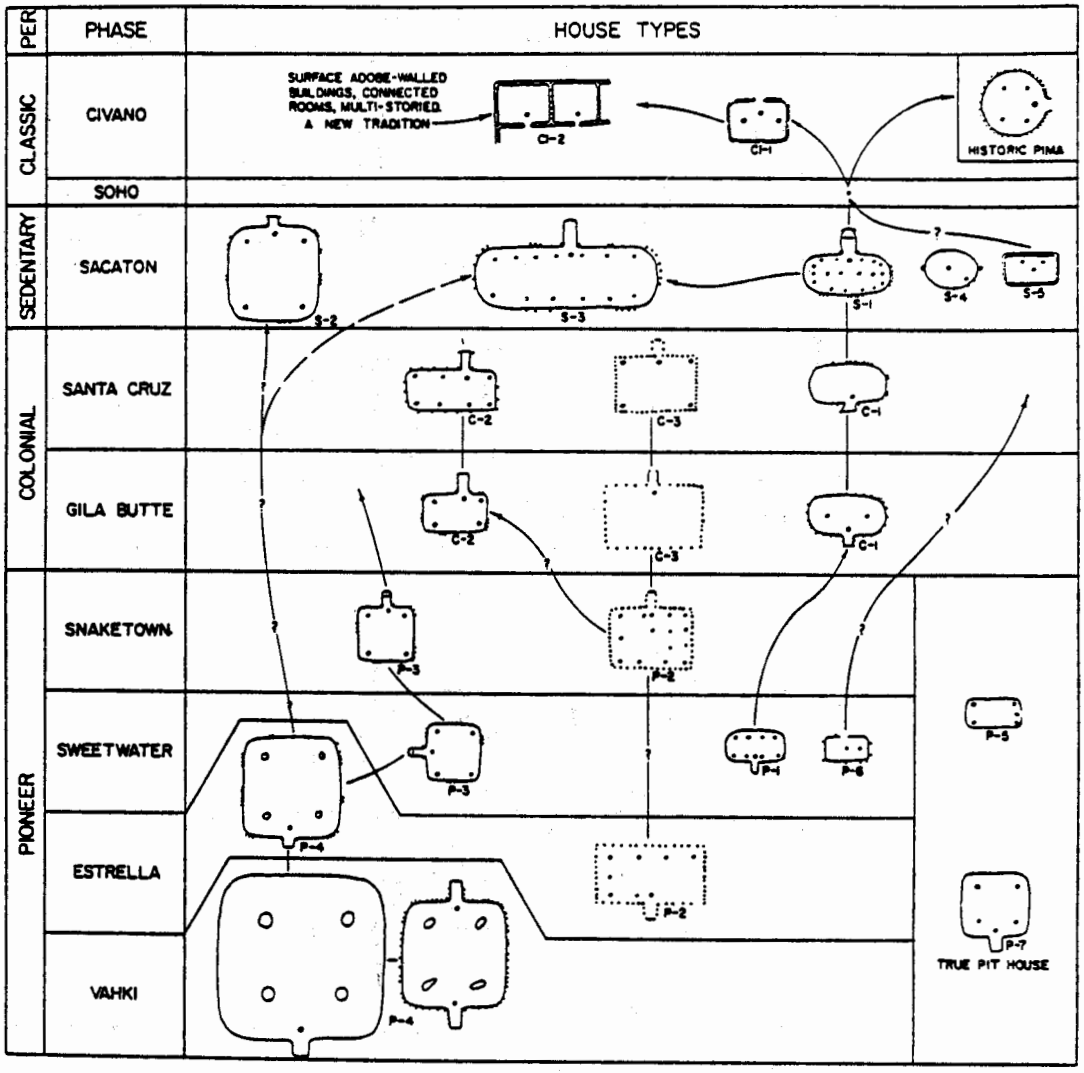


Figure 25. Synoptic Chart of Hohokam House Types by Phase and Period with Suggested Lines of Descent or Influence. House sizes are relative. By permission from the Hohokam: Desert Farmers and Craftsmen, by E.W. Haury, Tucson: The University of Arizona Press, copyright 1976.

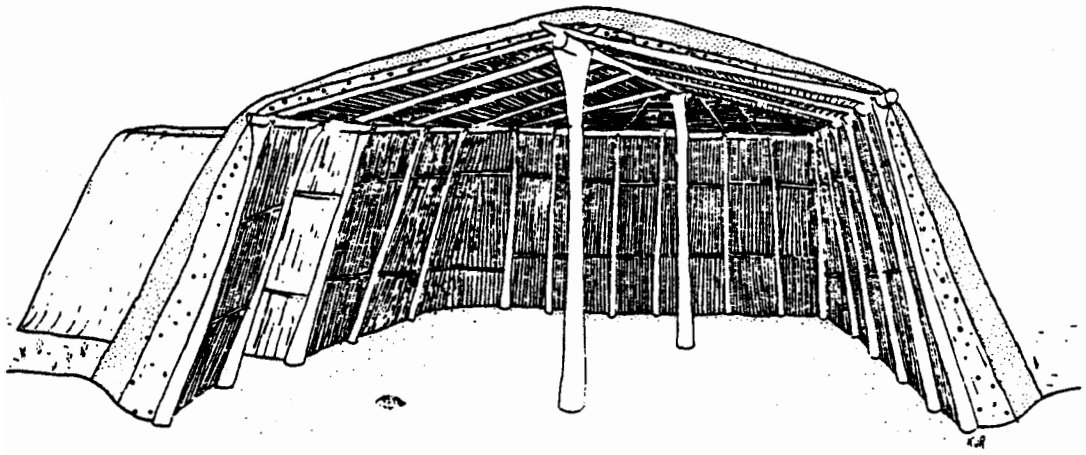


Figure 26. Cutaway Drawing of a Hohokam Pithouse.

This cutaway drawing of a Hohokam pit house shows the different materials used in its construction. The inner support posts are covered with brush, and the brush is plastered over with mud and dirt. The small feature near the entryway is the clay-lined hearth.

By permission from The Hohokam Indians of The Tucson Basin, by L.M. Gregonis and K.J. Reinhard, Tucson: The University of Arizona Press, copyright 1979.

Type	Section	Incidence	Phase Identification
Standing wall: floor bounded by substantial walls		18	16 Tanque Verde
Slant wall: wall a thin plaster coating on fill; slopes back from floor		12	5 Tanque Verde 1 Rincon (?)
Curb wall: floor bounded by low wall or half-rounded rim		8	[Unplaced; some, at least, probably Rillito]
Wall-less: without bounding walls		27	1 Tanque Verde 3 Rincon 1 Rillito-Rincon 3 Rillito 1 Cañada del Oro–Rillito 4 Cañada del Oro 1 Snaketown
Pit wall: excavated into hardpan, walls of excavation serving as lower house walls		3	1 Rillito [1 Cañada del Oro, or earlier; 1 Snaketown, or earlier]
Fragmentary, no data		16	1 Tanque Verde
Total		84	38[a]

[a]Houses mentioned within brackets are not included in this total.

Figure 27. House Types at the Hodges Ruin. By permission from The Hodges Ruin; A Hohokam Community in The Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

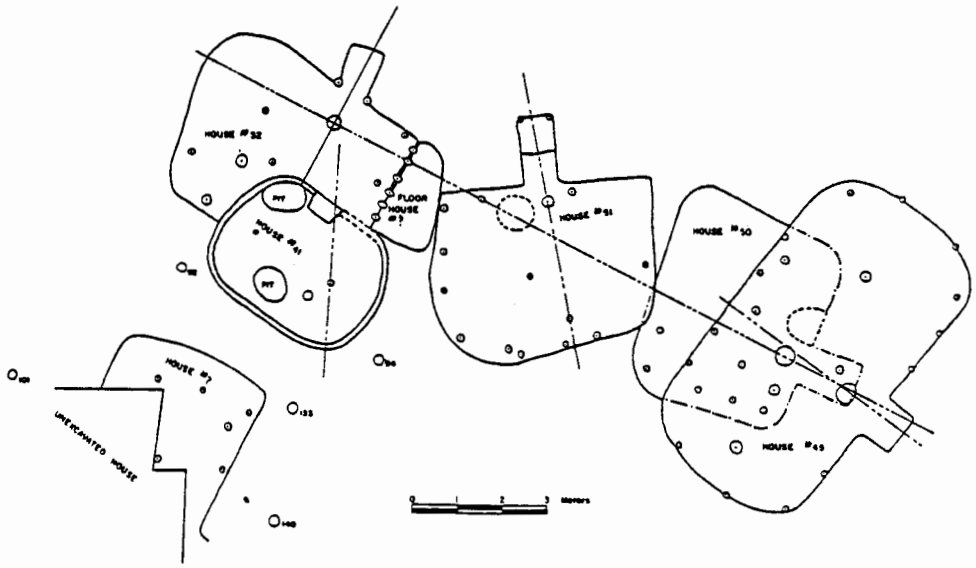


Figure 28. House Superposition at the Hodges Ruin. By permission from The Hodges Ruin; A Hohokam Community in the Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

SUBDIVISIONS OF HOHOKAM

Pioneer Period

In the study area, the apparent gap between late Cochise remains and the earliest Hohokam materials, has led to general acceptance of the idea that the Hohokam in this area originated in the Gila-Salt Basin (e.g. Haury 1950; Franklin 1978; Masse 1980; Kelly 1978; Westfall 1979; see Eddy 1958 and Wilcox 1979 for an opposing view). In large measure this idea is also supported by the virtual identity between Pioneer period ceramics in the Santa Cruz and San Pedro Valleys, and those of the Gila-Salt Basin. Not until the Cañada del Oro phase at approximately 500 AD does divergence occur (Kelly 1978). Only with the appearance of Cañada del Oro Red-on-brown does the red-on-brown tradition become apparent (Kelly 1978).

The Tucson and Gila Basins continued to maintain close ties as evidenced by the high frequency of intrusive Gila Basin red-on-buff wares from all but the Tucson phase at the Hodges site (Kelly 1978). Unlike Gila Basin wares, Tucson Basin ceramics were unslipped, having a characteristic brown background.

The earliest Hohokam evidence in the study area was uncovered at EE:2:10 in Matty Canyon in the Empire Valley (Eddy 1958). Here some 32 Vahki micaceous plain and red sherds were found, along with one Estrella grooved sherd (Eddy 1958:65). A nearby trashmound, EE:2:40, was identified as belonging to the later Snaketwon phase of the Pioneer period from the undecorated ceramics with similar wares from Snaketown phase contexts in the Gila-Salt Basin. The discovery of one Snaketown grooved sherd was considered to lend additional support to the placement (Eddy 1958:67). One Gila Polychrome sherd, however, was also found at the site, revealing some mixing of deposits (Eddy 1958).

Remains from elsewhere in the study area have generally marked an arrival of the Hohokam during the Sweetwater phase of the Pioneer period. At the Paloparado site (DD:8:1) on the Santa Cruz River near Tumacacori, DiPeso (1956:259-264) recovered some Snaketown and Sweetwater ceramics, although not in association with architecture of a comparable phase. Similarly, a scattering of Sweetwater and Snaketown sherds was found at the Potrero Creek site (EE:9:53) near Nogales (Grebinger 1971b:28-71). Some early material was also uncovered at the Hardy site in the Tucson Basin (Gregonis 1977).

The only early structure that has been investigated, however, has been a Snaketown phase pit house at the Hodges site (AA:12:18) on Rillito Creek (Kelly 1978). It, in turn, was similar to a Snaketown pit house at the Big Ditch site (near Aravaipa Creek), which is the earliest structure excavated so far in the San Pedro Valley (Masse 1980:5). Both structures were of the typical house-in-a-pit construction (Gladwin et al. 1938:84). Encircling floor grooves occur at the Big Ditch pit house, and both resembled house type P*2 at Snaketown (Haury 1976:65).

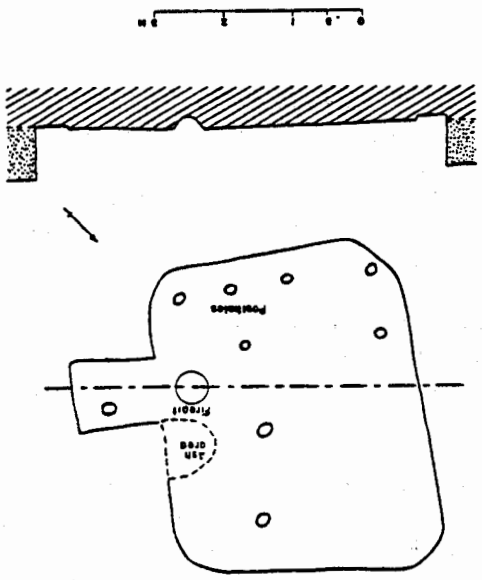


Figure 29. Snaketown Phase House at the Hodges Ruin. By permission from the Hodges Ruin; A Hohokam Community in the Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

At the Big Ditch site, the pit house was associated with large amounts of heavily micaceous Gila Plain sherds and some late Snaketwon Red-on-buff sherds, all on the floor. These sherds were capped by an undisturbed layer of pure Gila Butte phase refuse (Masse 1980:5). An archeomagnetic sample from the hearth, however, yielded dates of AD 935 $\pm$ 40. Another date from a Santa Cruz (Cascabel) phase structure provided a date of AD 1390 $\pm$ 20 (Masse 1980:5). Although these are the only two absolute dates from Hohokam sites in the San Pedro Valley, they must be regarded as anomalous.

In any event, the ceramic and architectural evidence suggests that, if any indigenous inhabitants were present in the study area to greet the Hohokam immigrants, they were quickly overwhelmed and assimilated by the newcomers (DiPeso 1956; Zahniser 1966; Greenleaf 1975; see Wilcox and Shenk 1977 for a view of the Hohokam as providers of ideas to the indigenes who never actually entered the study area).

Six late Pioneer period cremations were found at the Hodges ruin. One was an urn burial (bone in an upright jar with cover bowl), and one was a primary cremation. The remainder were mixed burials of bones and sherds (Kelly 1978).

If the Santa Cruz and San Pedro Valley were not being farmed, the opportunity for agriculture would have encouraged populations to expand from the Gila-Salt Basin. This expansion possibly occurred through range budding--the movement of groups to non-continguous, unoccupied territory, range expansion, and population expansion into similar, continguous environments (Grebinger 1971a:182-183). In such a case, pioneer lineages would have had claim to the most fertile valley lands, ultimately developing ranked lineages as land was rapidly claimed and as ball courts became a means of integrating contiguous villages (Grebinger 1971:182-183).

These major loci were the grandparent villages. These villages developed in the San Pedro Valley and reached their population in the late Rillito-early Rincon period, as exemplified by the Big Ditch site (Masse 1980:18). Many smaller villages developed between grandparent founder villages, resulting in the greatest exploitation of agricultural resources through such dry farming techniques as rockpiles, check dams, contour terraces, and gridded gardens (Masse 1980, 1979). The competition for resources among these populations may eventually have led to the development of chiefdoms in some parts of the study area (Doyel 1979b). Many of these smaller villages, however, may have been seasonal, agriculturally specialized sites, making the population increase more apparent than real (Doelle n.d.).

The Colonial Period

The Colonial period began around AD 500. At the Hodges site, the first phase of this period, the Canada del Oro, is represented primarily by sherds, as at Punta de Agua at the San Xavier mission (Kelly 1978; Greenleaf 1975). Canada del Oro Red-on-brown is similar in ornamentation to Gila Butte Red-on-buff, with the serrated scroll a diagnostic motif. The color ranges from brown to cream to gray to black, and firing clouds are prominent, although deliberate smudging is absent. Shapes are also similar to Gila Basin forms, with flare-rimmed bowls prominent. Compared to Pioneer wares, the paste of Colonial wares contains relatively little mica. Vessel exterior decoration generally featured closely spaced trailing lines (cf. Kelly 1978).

In Betancourt's (1978a:41) study of the proposed Santa Cruz River park, all three sites with Canada del Oro components also had Snaketown materials from the preceding Pioneer period. These similarities revealed some stability and continuity of occupation and suggested that these sites may have been analogous to the grandparent villages outlined for the San Pedro Valley (Masse 1980). The Hohokam inhabitants were evidently selecting locales with the best opportunities for floodwater farming. Such locales are marked by the junction of braided channels, high water tables, and the confluence of major streams. At the Santa Cruz River Park, the Rillito Wash and the Santa Cruz River join (Masse

Figure 30. Snaketown Red-on-buff and Cañada del Oro Red-on-brown from the Hodges Ruin.

Snaketown Red-on-buff and Cañada del Oro Red-on-brown: Vessels. *a–c*, Snaketown; all others, Cañada del Oro. *a*, *c*, dippers; *b*, flare-rim bowl; *d*, small hemispherical bowl; *e*, bottlenecked jar; *f*, plate; *g*, flare-rim jar. Rim width of *f*, 32.5 cm.

By permission from The Hodges Ruin: A Hohokam Community in the Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

1980:44). Similar selection criteria were evidently used in the Rincon Valley (Zahniser 1965b:119) and should be considered in the formulation of strategies to locate early agricultural sites in the region.

By the late Colonial Rillito phase (AD 700-900), Sedentary settlements were widespread in the upper and middle Santa Cruz Valley (Danson 1946; Frick 1954), as well as in the lower San Pedro Valley (DiPeso 1953a). Villages continued the dispersed rancheria pattern of the Hohokam until the Classic period. The basic structure was built in a shallow pit, squared in outline with rounded corners. A four-post roof support system was used, and two types of entries are know, long and with parallel sides, or shorter and rounded (Greenleaf 1975; Kelly 1978). The structure resembles contemporary structures in the Gila Basin (Gladwin et al. 1938:71-78). Its plan is also similar to the deeper pit structures at San Simon Village (Sayles 1945:23-26; Greenleaf 1975).

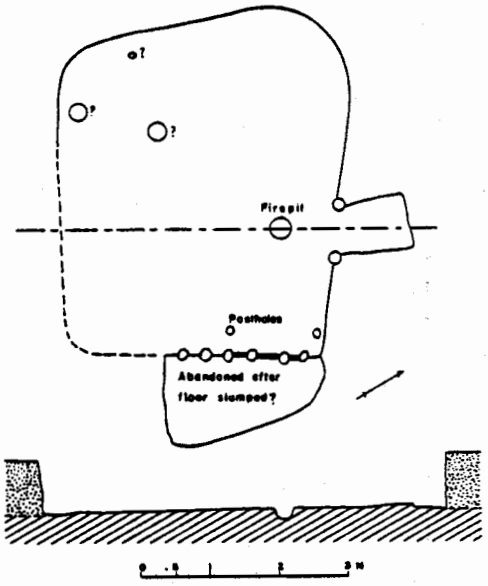
Rillito Red-on-brown vessels continued to be unslipped, although some were polished. By this time, the micaceous content of the paste was markedly reduced. Shapes parallel the Santa Cruz phase inventory from the Gila Basin, although there was less diversity in shapes, most notably eccentrics and life forms. Major design elements include fringing and cross-hatching on bowls (cf. Kelly 1978; Greenleaf 1975).

Plainwares continued the early emphasis on micaceous paste, and vertical wiping was introduced as a finishing technique. Some vessles appear to have been expressly made for cremations, usually small bowls and jars. Locally made redwares first appeared at this time (Greenleaf, 1975).

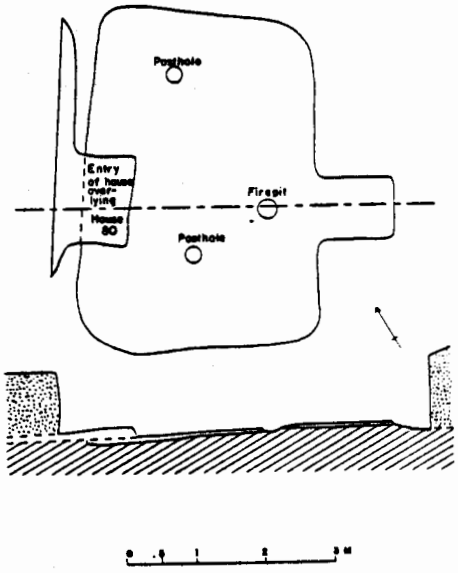
In the San Pedro Valley, relatively few settlements appear to have been settled at this time, which marks a time of "settling in" after the initial colonization period, around AD 500 (Masse 1980). Occupation was gradually intensified at favored grandparent villages, as evidenced by increasing village size, and the building of Snaketown-style ball courts at the Big Ditch site, Redington Village, and Sosa Wash ruin (Masse 1930:12).

Structures of house-in-a-pit construction showed much diversity at Second Canyon ruin. Most featured rectangular entries, although bulbous entries also occurred. Similarly, a variety of post support arrangements were found, with two postholes in walls or entries being most common (Hammack 1970:10; Franklin 1978:43-45). Hearths lay between the entry and the center, and unlined and clay-lined hearths occurred in equal frequencies (Franklin 1978:43-45).

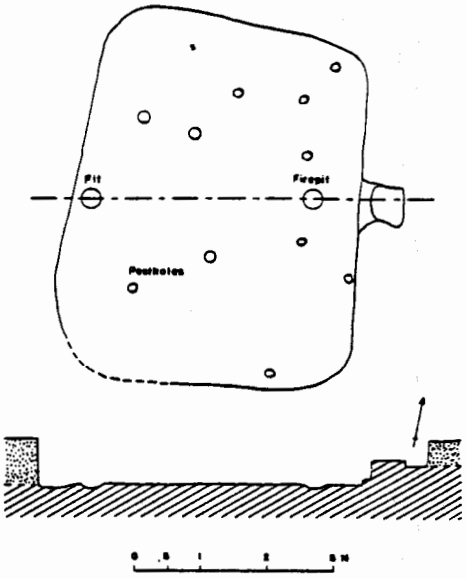
Cremations were both primary and secondary, with few associated goods. Cremations, however, were placed differently among roomblocks, suggesting some local microtraditions (Franklin 1978:344ff). The material culture so strongly resembles that of the Gila Basin that "in many respects, the San Pedro villages are little more than small scale versions of Snaketown" (Franklin 1978:300ff; 344ff).



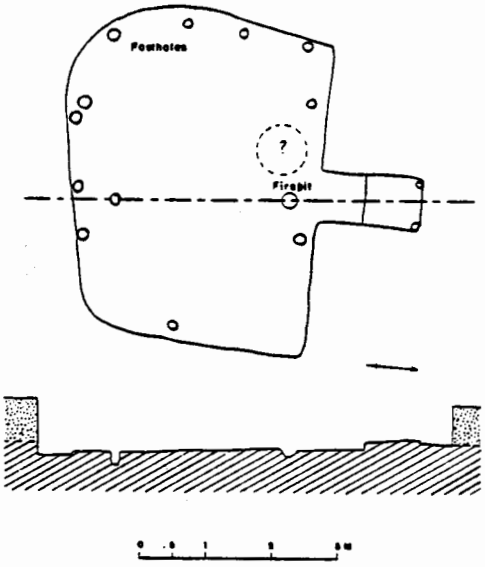
House 52: Cañada del Oro phase



House 80: Cañada del Oro phase



House 40: Cañada del Oro phase



House 51: Cañada del Oro phase

Figure 31. Cañada del Oro Phase Houses at the Hodges Ruin. By permission from The Hodges Ruin; A Hohokam Community in the Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

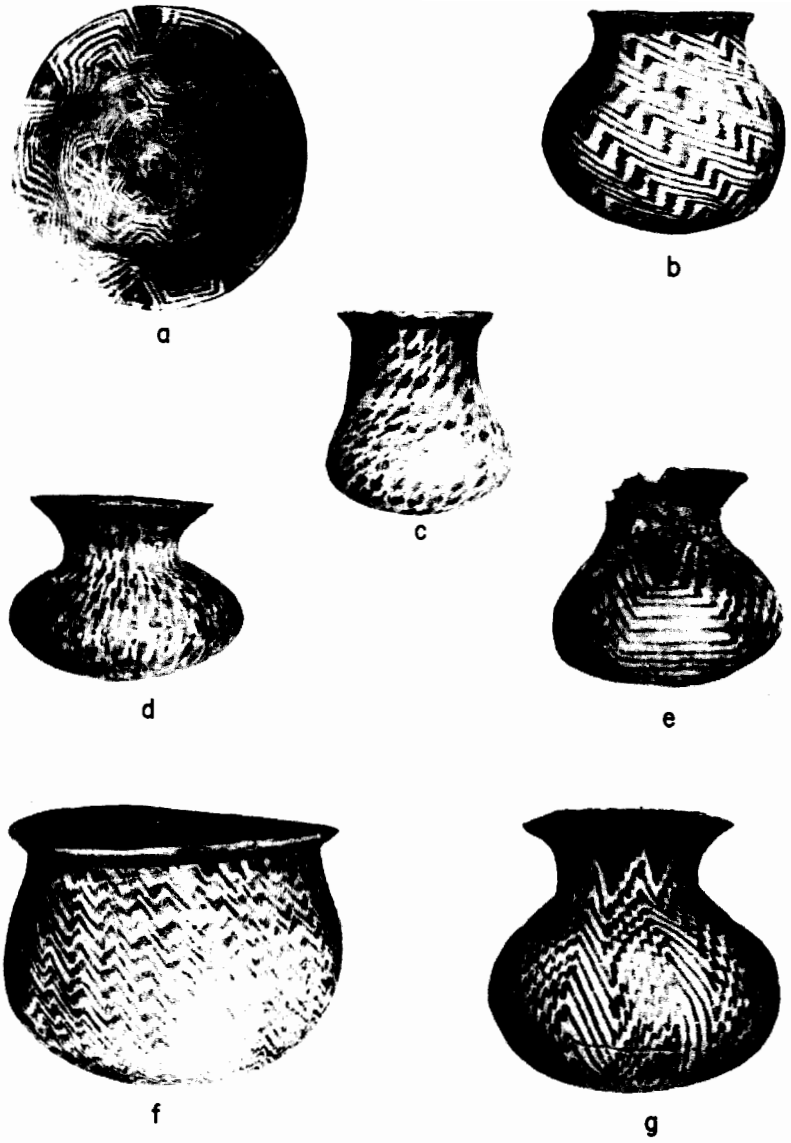


Figure 32. Rillito Red-on-brown from the Hodges Ruin.

Rillito Red-on-brown; Bowls and jars. *a*, outcurved bowl; *b–e*, *g*, flare-rim jars; *f*, recurved flare-rim bowl. Greatest diameter (non-rim) of *a*, 20 cm.

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The Sedentary Period

The following Sedentary period, represented by the Rincon phase in the Tucson Basin (AD 900-1250), was crucial in the prehistory of the Hohokam. At this time, the Hohokam area was at its greatest and populations at their highest. Throughout the Hohokam area, the number of settlements increased markedly, whether in the Gila River (Debowski et al. 1976:104), the Tucson Basin (Frick 1954; Doyel 1977a); the Papagueria (Raab 1976); Gila Bend (Wasley and Johnson 1965); or the San Pedro Valley (Masse 1980).

Throughout the study region, diversification intensified as Hohokam- or Mogollon-based ceramic and architectural traditions developed into more regional styles in the Dragoon area (Tuthill 1947, 1950), the San Simon region (Sayles 1945), the Safford Valley (Johnson and Wasley 1966), the Tucson Basin (Kelly 1978; Greenleaf 1975), and the San Pedro Valley (Masse 1980).

In both the Tucson and San Pedro regions, the natural environment had been greatly changed by human activity. Large villages lay in areas of greatest potential for irrigation (Wilcox et al. 1979; Masse 1979, 1980, as exemplified by such sites at the St. Mary's Hospital site (Jacobs 1979), Martinez Hill (Gabel 1931), the Hodges ruin (Kelly 1978), and Los Morteros (Downum et al. 1981). These large sites seem to have acted as primary places for the smaller sites around them, as revealed in greater frequencies of exotic goods and the association of ball courts with larger sites (cf. Kelly 1963). Many of the courts appear to be of the Casa Grande style (Gladwin et al. 1938), according to descriptions of courts near Benson (BB:13:5) (DiPeso 1951b), San Simon Village (Sayles 1945:31-32), and Tres Alamos (Tuthill 1947:38-43).

These round ball courts may have served as a means of integrating several villages, perhaps acting mainly as a dance court (Ferdon 1967; Haury 1956; cf. Kelly 1963; Grebinger 1971, 1976). Among contemporary Pimans, ritual dances serve to promote exchange of gifts and food between challenger and host villages, often leading to regular patterns of exchange between families. Such patterns may last for generations (Haefer 1980). In this connection, the two ball courts near Martinez Hill lie in an area where irrigation was practiced in historic times (Kelly 1963:100-101).

Excavations at several sites in the Punta de Agua area south of Tucson have defined a series of Rincon phase house plans with temporal significance for defining subphases (Greenleaf 1975:36-40). In early Rincon structures, the floor plan was oval, often with subfloor, bell-shaped storage pits. Similar oval structures were reported at the Bidegain site in the San Pedro Valley (DiPeso 1958a:146), also dated to the Rincon phase. At Blackstone ruin (AA:15:1), Tanner (1936) reported over 100 circular and oval rock alignments, which may also represent Rincon phase structures, from the occurrence of Rincon ceramics at nearby sites. It is unclear, however, whether these may not be sleeping circles such as those described for Tumamoc Hill (Larson 1972, 1979). As with

other Hohokam dwellings, the oval Rincon house type was largely a surface structure in a shallow pit, with a short entry and a wall groove around the floor and entry. Larger structures usually featured two centerline support posts, and all structures had shallow basin hearths (Greenleaf 1975:36).

A second Rincon phase house type was rectangular with rounded corners (sometimes called subrectangular) and had two centerline posts. Two subtypes were defined by the type of entry. Mid Rincon structures had a short parallel sided entry; late Rincon dwellings featured a bulbous entry, either level or stepped. Hearths were clay-lined hemispherical basins, usually with a caliche apron around them forming a raised collar. Both large and small dwellings occurred. Rarely, a long straight-sided entry is reported for late Rincon structures (Greenleaf 1975:36-37). Archeomagnetic dates from five late Rincon structures at BB:13:50 at Punta de Agua yielded a mean date of AD 1189 $\pm$ 21. By this time, villages were located along all the primary and secondary drainages of the Santa Cruz River (Betancourt 1978a:18-20; cf. Danson 1946; Frick 1954). In the Empire Valley, Rincon phase sites have been found equally along ridges and on alluvial flats (temporary camps) (Eddy 1958:78).

At Punta de Agua, clusters of two or more houses appear to have been related functionally and socially, as evident in the recurrence of features within units at individual sites. Greenleaf (1975:109) speculated that the clusters may have represented patrilocal extended families, probably relying on historic Papago social organization for analogy, with nuclear families living in the single or isolated houses. These patrilocal clusters may have then served to promote integration within the village.

Rincon Red-on-brown is the diagnostic ceramic type for this period, marked by a trend toward smudging and polishing over decoration (Greenleaf 1975:48-49; Kelly 1978). Exterior trailing lines declined markedly as a decorative technique, and designs tended to feature arrangements of plaited bands and greater use of fringed lines and panels, hatched bands, and single scrolls. Although hemispherical bowls remained unchanged in frequency, flared rim bowls were replaced by larger, outcurved bowls (Kelly 1978).

At Punta de Agua, several trends were apparent, including a shift toward larger and thicker vessels. A number of early and mid Rincon vessels were distinguished by whitish slip designs of Sacaton Red-on-buff from the Gila-Salt Basin. Plainwares increasingly varied, with vessel walls becoming thicker and temper much less micaceous. The hemispherical bowl was introduced in plainwares and became the dominant form by the end of the phase. Fewer sherds were recovered from mortuary vessels at the Hodges site, suggesting a shift in mortuary practices (Kelly 1978).

The lithic assemblage appears to be a reduced version of that found in the Gila-Salt Basin, with fewer items occurring as one goes east. The slate and schist pendant series in the Tucson Basin parallels that of Snaketown (Gladwin et al. 1938:126).

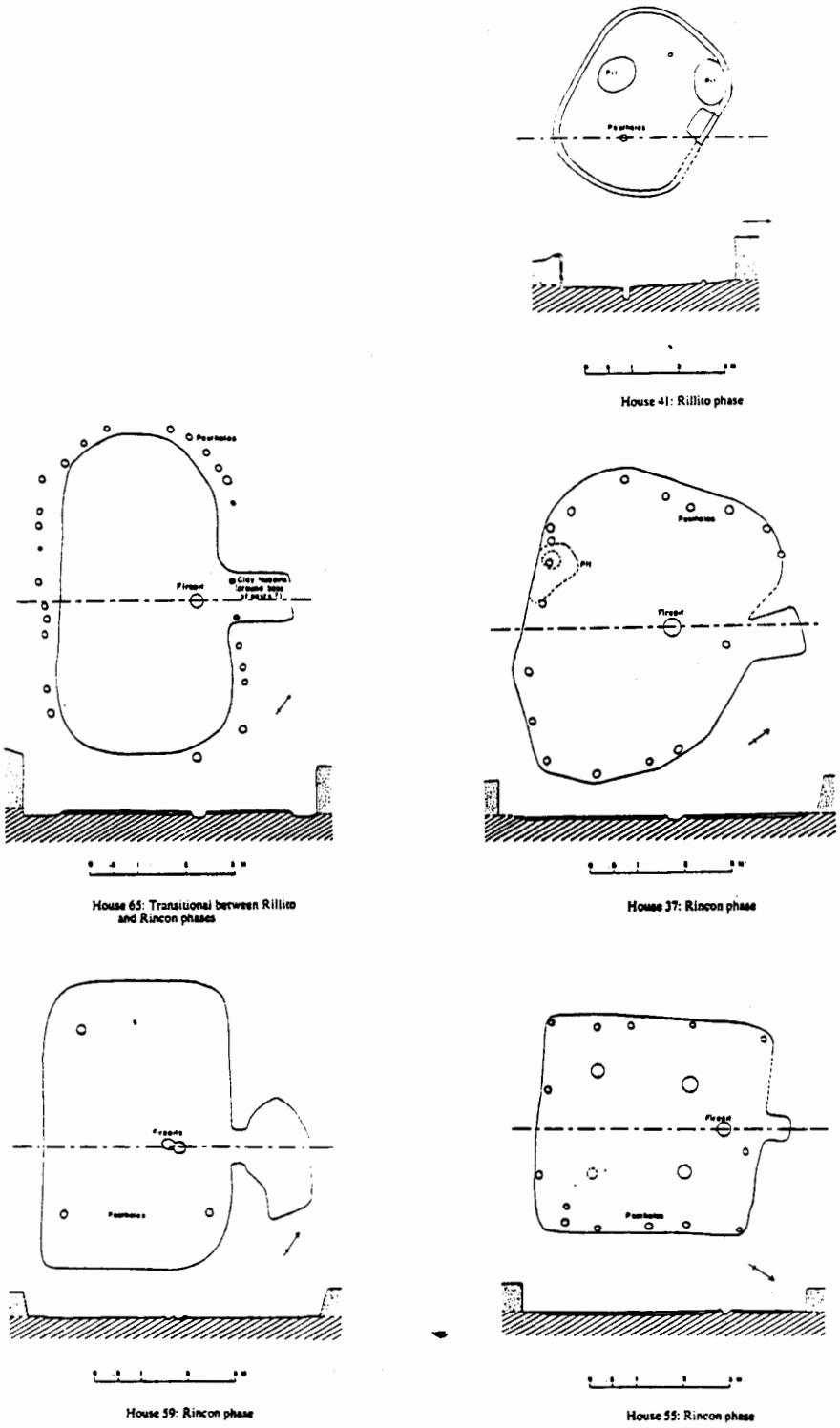
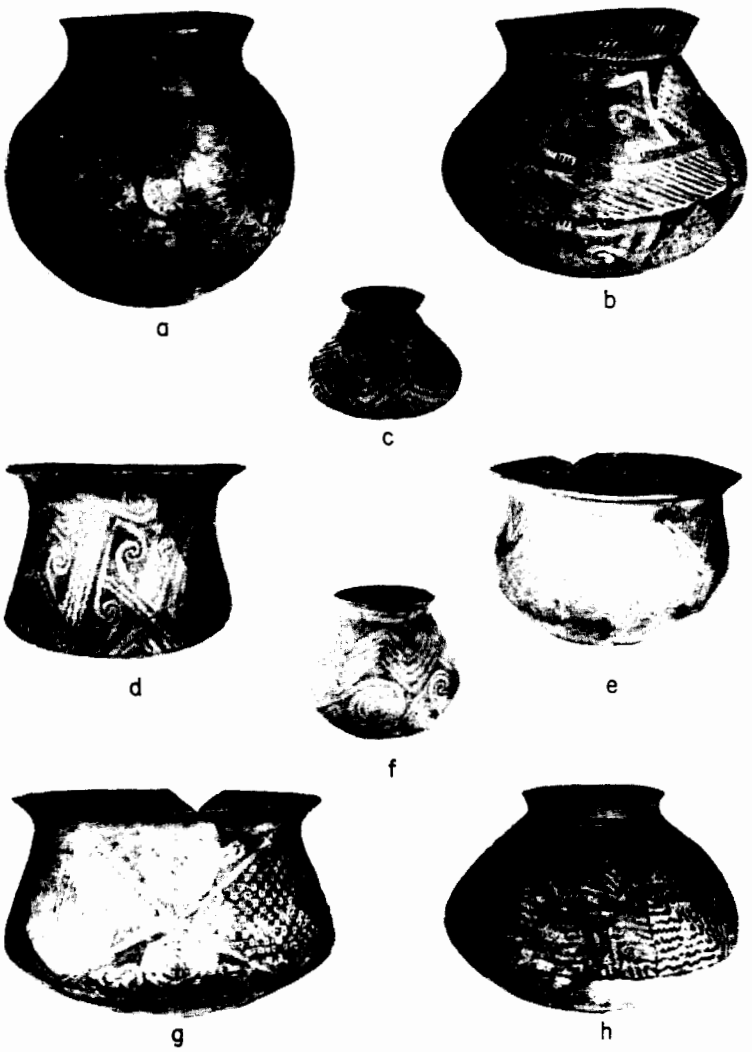
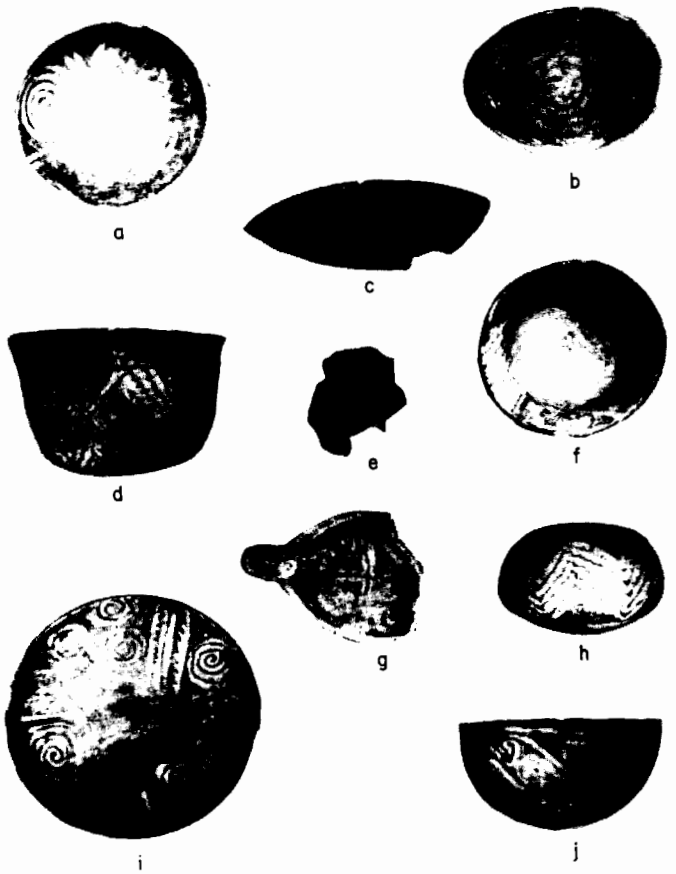


Figure 33. Rillito and Rincon Houses at the Hodges Ruin. By permission from The Hodges Ruin; A Hohokam Community in the Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.



Rincon Red-on-brown: Bowls and jars. *Jars: a, b, h,* flare-rim, globular bodied; *c,* flare-rim, low bellied; *f,* low returned rim, low bellied. *Bowls: d, e, g,* recurved. Maximum diameter (non-rim) of *g,* 39 cm.



Rincon Red-on-brown: Bowls, scoops, and effigy. *a,* hemispherical bowl; *b,* scoop; *c,* plate-like bowl; *d,* round-bottomed bowl; *e,* effigy; *f,* shallow, flare-rim bowl; *g,* effigy-handled scoop; *h,* incurved bowl; *i,* plate-like bowl; *j,* hemispherical bowl. Maximum diameter of *a,* 14.5 cm.

Figure 34. Rincon Red-on-brown from the Hodges Ruin. By permission from The Hodges Ruin; A Hohokam Community in the Tucson Basin by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

The full palette complex, however, is absent in the Tucson Basin (Kelly 1978:106) and the San Pedro Valley (Masse 1980). Similarly, elaborate stone carving is generally not found in the study area.

In contrast, shell mainly from the Gulf of California has been recovered from Hohokam sites in the Tucson Basin (Kelly 1978:110; Greenleaf 1975:98). The abundance of shell debitage at Punta de Agua and the Hodges ruin shows considerable on-site manufacture and supports the contention that the Hohokam controlled much of the shell trade in the Southwest (cf. Colton 1941; Towner 1945; Jernigan 1978). Etched shell, a major Hohokam achievement, has been found only in quantity at Snaketown and the Tucson Basin. In fact, one of the most important pieces ever found was found along Rillito Wash at the foot of the Tucson Mountains (Jernigan 1978:87; Pomeroy 1959). Much less shell and fewer types are found in the San Pedro Valley (Kelly 1978:110; Masse 1980).

Although cremation was the standard Hohokam means of disposing of the dead, some inhumations have been reported from Hohokam sites. At the Hodges ruin, portions of six unburned skeletons were recovered with associated ceramics (Kelly 1978). Two inhumations are reported from Punta de Agua at BB:13:41 and BB:13:43, although the limits imposed by the highway right-of-way restricted the discovery of the burial zone (Greenleaf 1975:101). Other Rincon phase burials have been reported from the San Xavier Reservation (Hemmings 1969a; Doyel 1979a) and the San Pedro Valley (Franklin and Clements 1972). In general, Rincon phase inhumations are either flexed or extended, and grave goods tend to be uncommon except for ceramics. Occasional dog burials have also been found (e.g. Hemmings 1969a).

The preferred means of burial, however, was cremation. In contrast to Classic Hohokam practices in the Tucson Basin, Rincon cremations were fairly uniform in mode. Secondary cremation with urn interment under an inverted bowl or large sherd was the dominant practice at the Hodges ruin (Kelly 1978:122-125) and at Punta de Agua (Greenleaf 1975). A few primary cremations (interment at the cremation site) are also reported. In general, the cremations at the Hodges ruin were more elaborate, suggesting links with the Gila-Salt Basin, as do the large number of mixed burials (bone and sherds intermingled) (Greenleaf 1975:104). In the San Pedro Valley, the differential occurrence of grave goods at this time may reveal some status differences (Masse 1980:21).

The late Sedentary period is one of great change leading to the Classic period, especially in the Gila-Salt Basin. At Punta de Agua, several late Rincon phase structures were made of post-reinforced adobe walled houses, two with survivals of the earlier bulbous entry (Greenleaf 1975:108). These late structures are generally associated with a new ceramic type, Rincon Polychrome, the first Polychrome indigenous to the study area. Rincon Polychrome is marked by strictly angular black and white designs on Rincon Red in a style reminiscent of Escondida Polychrome and St. Johns Polychrome decoration (cf. Carlson 1970 after Greenleaf 1975:108ff). Rincon Polychrome is concentrated in the Tucson Basin, although examples have been found as far north as the Gila-Santa Cruz Junction and as far south as the Paloparado site (Greenleaf 1975).

The appearance of this new type was crucial to Kelly's definition of the Cortaro phase. In part this phase was seen as a Tucson Basin version of the contemporaneous Santan phase in the Gila-Salt Basin (Gladwin et al. 1938; Kelly 1978). Later investigations into sites of this period found insufficient evidence for the definition of a separate phase, and both the Santan and Cortaro phases were later dropped (Kelly 1978; Greenleaf 1975). At present, the late Rincon phase is regarded as a brief-lived period of experimentation in ceramics and post-reinforced adobe walled structures, perhaps linked to changes in social organization as well (Greenleaf 1975:108). Evidently the transition was much less abrupt than in the Gila-Salt Basin (Gregonis 1977; Haury 1978). For reasons that are not understood, however, the Hohokam abandoned the San Pedro Valley by the end of the Sedentary period (Masse 1980; Franklin 1978; Franklin and Masse 1976).

The Classic Period

The architectural changes in the late Rincon phase were rapidly incorporated into the Tucson Basin architectural tradition in the later Tanque Verde phase. At Whiptail, semi-subterranean slant-walled houses with bulbous entries occurred early in the phase, logical successors to the late Rincon structures at Punta de Agua (Grebinger 1976a:43). Still early in this phase at Whiptail, one house was remodelled into an adobe standing wall unit, and several houses were built with stone-reinforced adobe walls. One house provided an archeomagnetic date of AD 1225 + 18 (Grebinger 1976a:43), a date that reinforces the date from a similar structure at Punta de Agua, discussed earlier. Above-ground architecture is a hallmark of the Tanque Verde phase (AD 1225-1300).

The type site for the phase is the Tanque Verde ruin (Haury 1927b, 1928a, 1928b; Fraps 1935), but the phase is best known from excavations at the Hodges ruin (Kelly 1978). Tanque Verde materials were also recovered at University Indian ruin (Kelly 1936, Hayden 1957) and BB:14:24 (Zahniser 1965b).

Two other important Tanque Verde phase sites have been excavated but never reported. On the upper terrace above the Santa Cruz River, Rabid ruin (AA:12:46) was excavated as salvage by Laurens Hammack for the Arizona State Museum. The second site, Whiptail ruin, has been excavated since the late 1960s by the the Arizona Archaeological and Historic Society. It consists of 50 acres of dispersed pit house clusters in the upper bajadas of the Agua Caliente Hills. Although the palynological analysis from this site has been published (Lytle-Webb 1978), the only known descriptions are in Grebinger's (1971a and 1976a; Grebinger and Adam 1974, 1978) work. Publication of the Whiptail material would be especially important to the understanding of Tucson Basin prehistory, as it appears to be a single component site and might, thus, provide a clearer understanding of processes in operation during this time period.

Tanque Verde phase sites are concentrated along the central Santa Cruz, Rillito, lower Pantano, and Rincon drainages. Sites, however, have

been reported north to the Tortolita Mountains (Stephen and Hewitt 1981), east to the Rincon Mountains, west to the Tucson Mountains, and as far south as Tubac (Zahniser 1965b; Danson 1946). Settlement criteria included closeness to water and arable land flooded by seasonal runoff, access to wild plant resources, and closeness to mountain resources, such as wood, larger game animals, and lithic materials (Zahniser 1965b:23).

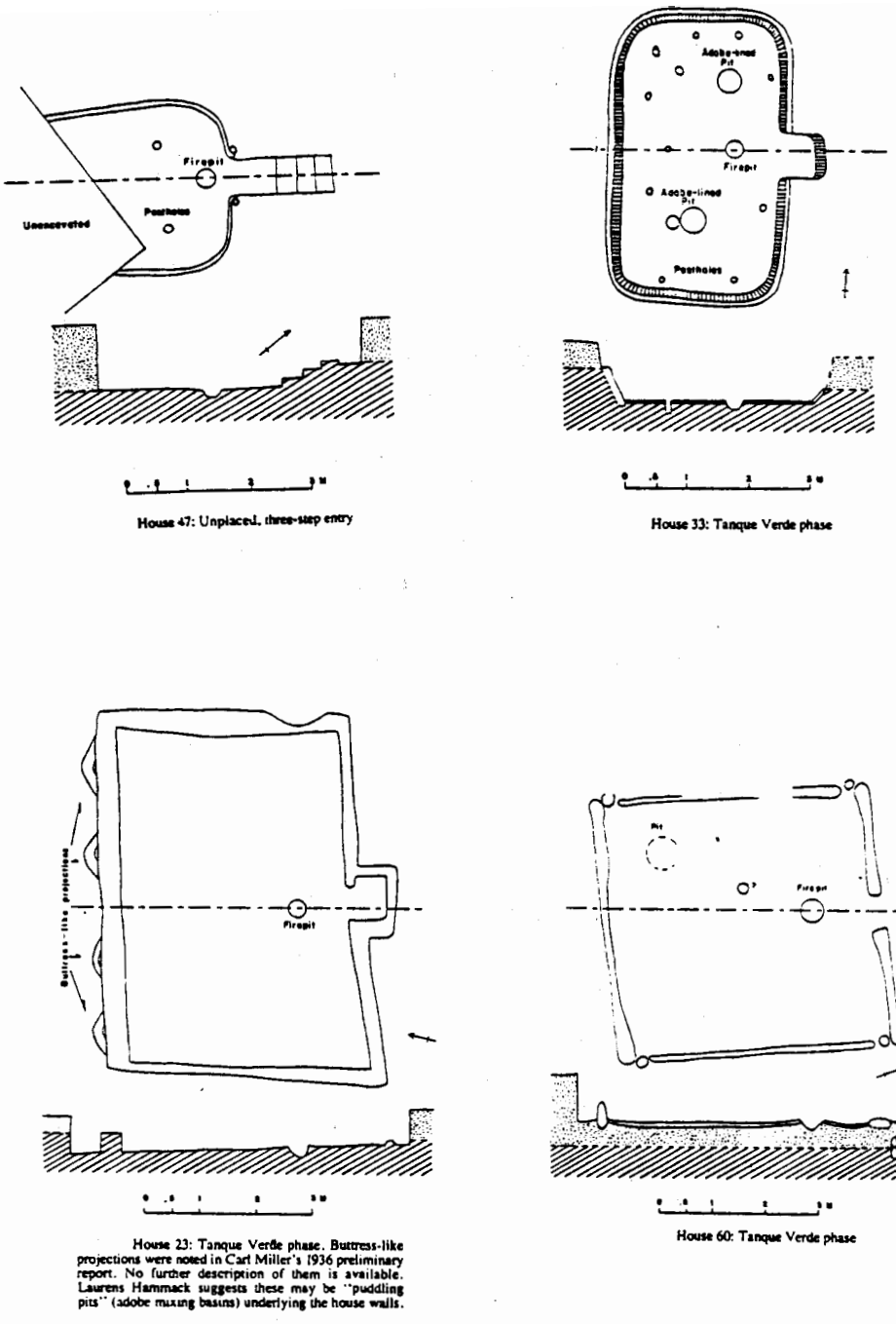
The early Tanque Verde house (Haury's type 1, Kelly's slant-wall type) was rectangular with rounded corners and was seated in a pit dug two to four feet below the surface. Excavated surfaces were usually plastered with clay. Four or more roof supports were set in from the wall from 18-24 inches. Rooms were fairly large, averaging 16 by 11 feet, and a side entry was the rule (Haury 1928a:1; Zahniser 1965b:24; Kelly 1978).

Late Tanque Verde phase houses (Haury's type 2, Kelly's standing-wall type) continued to be rectangular but with square corners. In contrast to the earlier style, floors were dug only where needed to provide a flat surface. Walls were of adobe with boulder reinforcement, and more support was often provided by an internal line of posts or the use of an exterior and interior line of uprights (Zahniser, 1965b; Greenleaf 1975:36-37). At Punta de Agua, these uprights were of ponderosa pine and juniper at House 18, revealing a mountain source. At other structures, these uprights were of hackberry and mesquite (Greenleaf 1975:43). Walls were plastered, and the use of plaster was extended to the entire floor instead of just the area near the hearth as had been done earlier (Greenleaf 1975:36-37). Hearths tended to be larger and deeper, with a higher lip than in structures of previous phases (Greenleaf 1975:36-37). The absence of the earlier bulbous Hohokam vestibule entry is considered a diagnostic of Tanque Verde phase architecture (Greenleaf 1975:36-37).

Some structures at Punta de Agua had special architectural features, including a 10 centimeter adobe curb rim enclosing the house and entry of House 5 at BB:13:16. Such a curb rim was also reported at earlier structures at Snaketown (Gladwin et al. 1938:62-67), the Hodges ruin (Kelly 1978), and Paloparado (DiPeso 1956:121-126).

Some structures also featured entryway adobe cones, some with fluted impressions. The function of these cones is unknown (Greenleaf 1975:41), although two houses at Roosevelt:9:6 had similar features (Haury 1932). The Tanque Verde phase house at BB:13:50 at Punta de Agua yielded an archeomagnetic date of AD 1240 $\pm$ 65 (Greenleaf 1975:21).

Houses in the San Pedro Valley have only recently been assigned to the Tanque Verde phase at Second Canyon ruin, Peppersauce Wash, and Twin Hawks (BB:6:20). Tanque Verde phase components at these sites seem to lack congruence of features. For example, pit houses were still in use at this time at Second Canyon ruin, whereas above-ground architecture was the rule at the same time at Twin Hawks (Franklin 1978:370). Twin Hawks is one of the few excavated sites from this period. The site has not been reported by the excavator, but other accounts describe several rectangular cobble and adobe structures without entries. These structures



House 47: Unplaced, three-step entry

House 33: Tanque Verde phase

House 23: Tanque Verde phase. Buttress-like projections were noted in Carl Miller's 1936 preliminary report. No further description of them is available. Laurens Hammack suggests these may be "puddling pits" (adobe mixing basins) underlying the house walls.

House 60: Tanque Verde phase

Figure 35. Tanque Verde Houses at the Hodges Ruin. By permission from The Hodges Ruin; A Hohokam Cummunity in the Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.

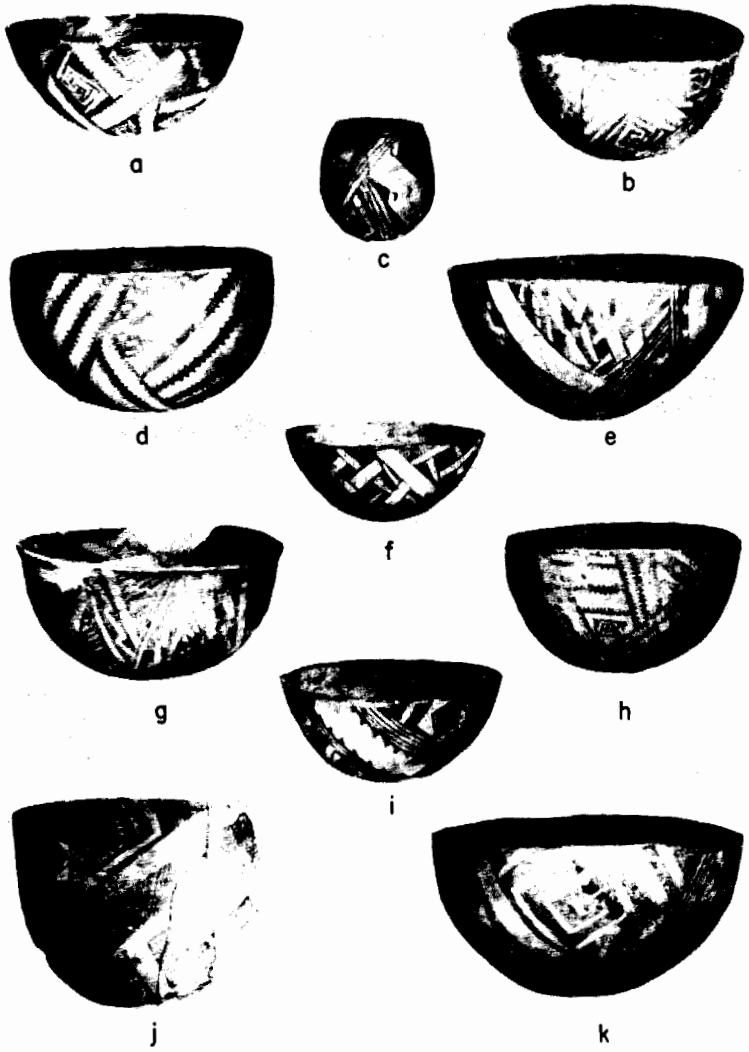
are enclosed by compound walls and associated with Tanque Verde Red-on-brown, corrugated utility wares, Tularosa Black-on-white, St. John's Polychrome, and San Carlos Red. Findings at this site suggest a shift in exchange networks toward the Middle Gila or Tonto Basin, which possibly pre-dates the influx of the Salado into the San Pedro Valley around AD 1300 (Franklin and Masse 1976:50; Franklin 1978:205). Nearby are the remains of check dams, contour terraces, and other signs of dry farming.

The diagnostic ceramic for the phase is Tanque Verde Red-on-brown. Although known for a long time (e.g. Fraps 1935), the type was not formally described until 1957 (Hayden 1957:220-224). Tanque Verde Red-on-brown is a poorly smoothed ware with a sandy paste and quartz sand temper; smudging and fire clouds are common, often creating a gray color. Common shapes include hemispherical bowls, compressed neck jars, Gila-shouldered jars, and seed jars. Designs consist of pendant rim triangles and panels of such motifs as cross hatching, dotted interlocking rectangular scrolls, sawteeth, solid triangles with angled hooks, dotted rectangles, and triangles. The overall effect is one of weaving, with elements passing over and under; angular designs are dominant (Hayden 1957:221-223).

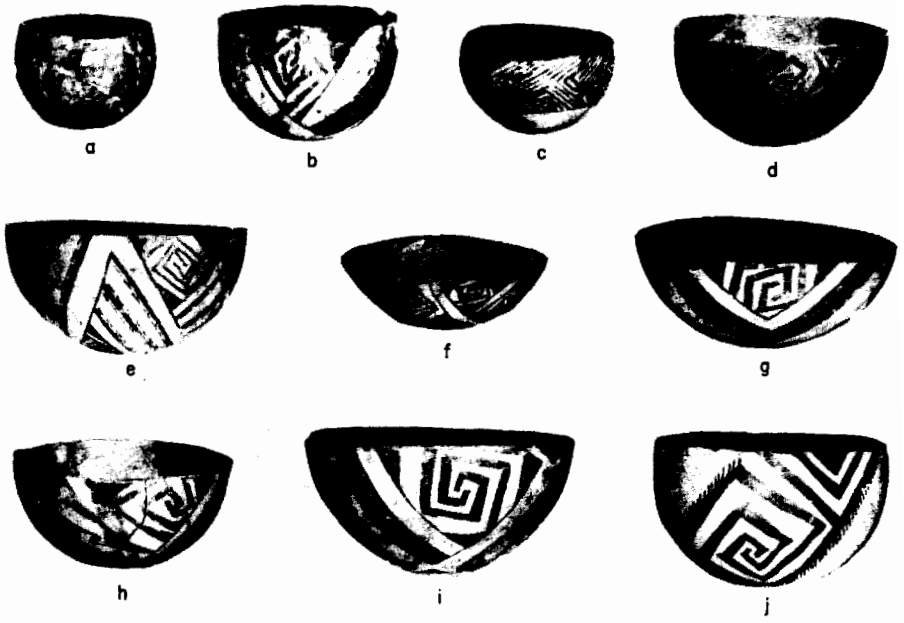
The designs are part of a broad ranging stylistic tradition, which includes San Carlos Red-on-brown in the middle Gila region and Casa Grande Red-on-buff in the Gila-Salt Basin (Hayden 1957:221-223). Grebinger and Adam used canonical variate and discriminant analysis to evaluate design variability from five Hohokam Classic period sites in the Tucson Basin (Hodges ruin, Martinez Hill, Rabid ruin, University Indian ruin, and Whiptail). Seventy attributes were examined on a presence/-absence basis. The results revealed detectable stylistic differences in Tanque Verde Red-on-brown between the Tanque Verde and Tucson phases. Although these differences had been known before, Grebinger and Adam (1974:223) felt their results were an objective confirmation. More importantly, their analysis revealed the presence of stylistic micro-traditions in Tanque Verde Red-on-brown among villages, indicating some measure of stability and endogamy. Late Classic sites showed a more even distribution of attributes, possibly as a result of population relocation and aggregation (Grebinger and Adam 1974, 1978).

Hayden also defined a related type, Pantano Red-on-brown, largely from the presence of mica (absent in Tanque Verde Red-on-brown) and poor execution of designs (Hayden 1957:225-226). Pantano Red-on-brown is now generally regarded as a variant of Tanque Verde Red-on-brown (e.g. Grebinger 1971; Grebinger and Adam 1974, 1978).

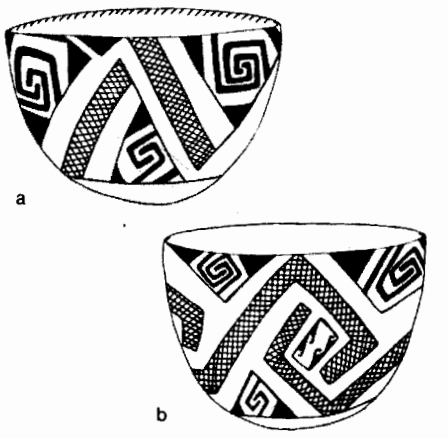
As was characteristic of Classic period sites throughout the Hohokam area, redwares increased in relative frequency just before and during the Tanque Verde phase and succeeding Tucson phase of the Classic period. Sand-tempered plainwares largely replaced the previous micaceous wares (Kelly 1978). Some corrugated wares were found at the Whiptail site, which led to consideration of the possibility of a site unit intrusion from that area. These wares, however, occur at only a few structures, dated AD 1250-1300 and may simply represent the presence of a few potters from that region (Grebinger 1976a:43).



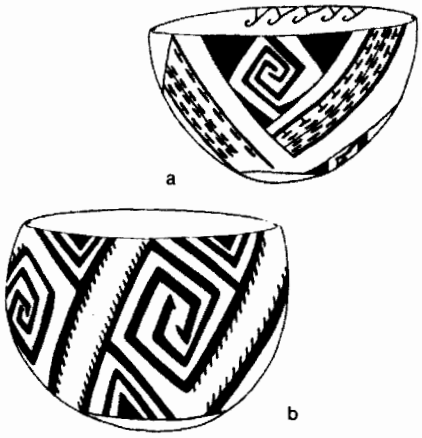
Tanque Verde Red-on-brown: Bowls. Note holes drilled in *h*. Maximum rim diameter of *k*, 34 cm.



Tanque Verde Red-on-brown: Bowls. Note use of square and interlocking scrolls and opposed pendants. Maximum rim diameter of *i*, 36 cm.

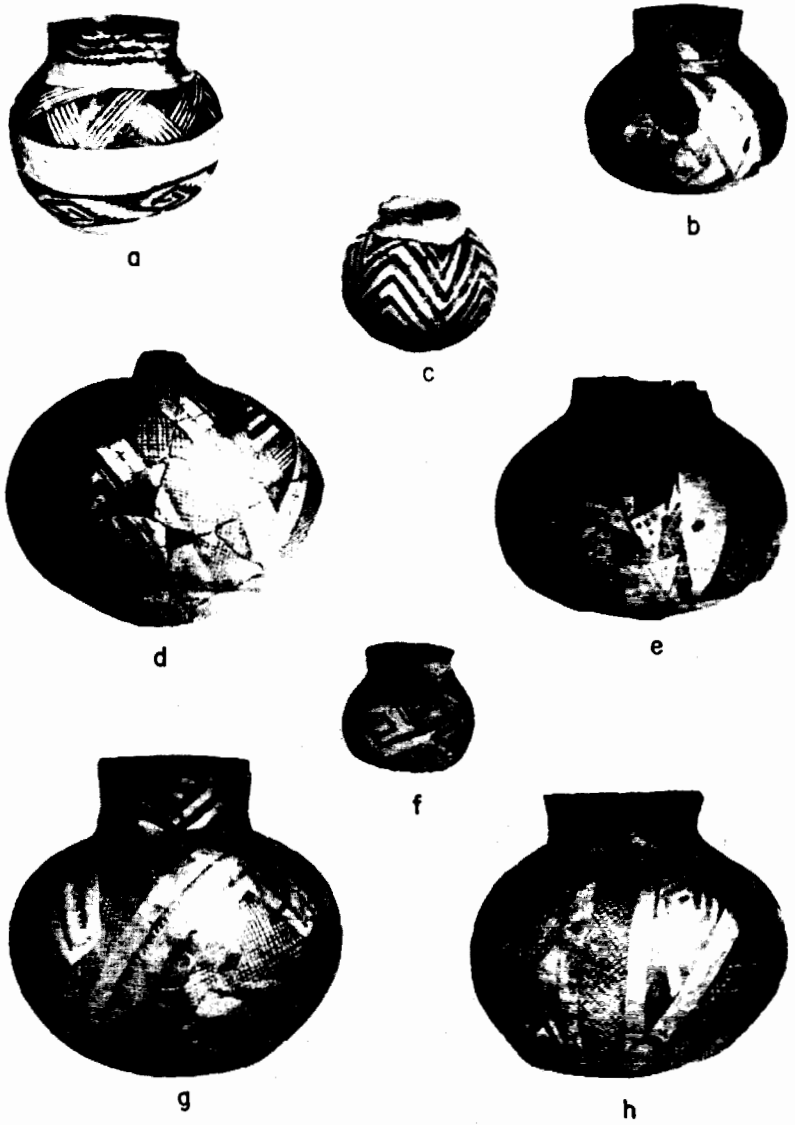


Tanque Verde Red-on-brown: Bowls. *a*, banded, opposed pendants; *b*, banded, figured and repeated, interlocking.

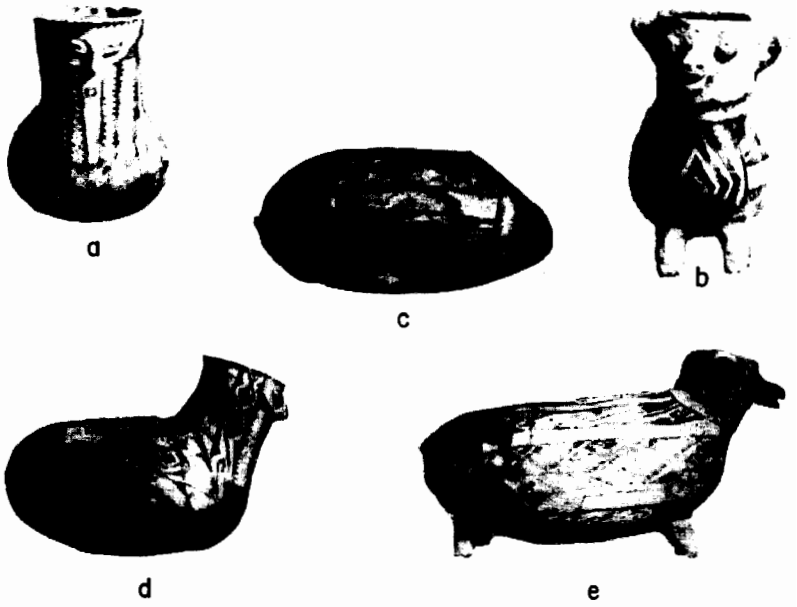


Tanque Verde Red-on-brown: Bowls. *a*, banded, opposed pendants; *b*, banded, figured and repeated, interlocking.

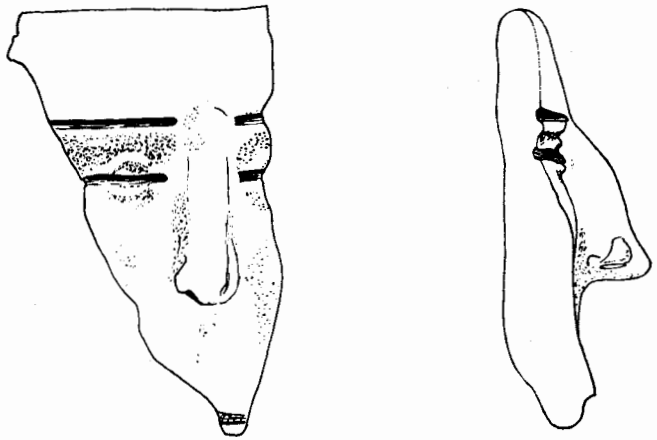
Figure 36. Tanque Verde Red-on-brown from the Hodges Ruin. By permission from The Hodges Ruin: A Hohokam Community in the Tucson Basin, by I.T. Kelly, Tucson: The University of Arizona Press, copyright 1978.



Tanque Verde Red-on-brown: Jars. Maximum diameter (non-rim) of *g*, 39 cm.



Tanque Verde Red-on-brown: Effigy vessels. *a* and *b* are frontal views of *d* and *e* and are not at the same scale as *c*, *d*, *e*. *d* measures 28 cm from breast to tail.



Human figurine fragment from floor of Tanque Verde phase House 42

Figure 37. Tanque Verde Red-on-brown and Human Figurines from the Hodges Ruin. By permission from The Hodges Ruin; A Hohokam Community in the Tucson Basin, by I.T. Kelly, Tucson: The Univeristy of Arizona Press, copyright 1978.

Eight unpainted spindle whorls were found at Punta de Agua. Greenleaf (1975:78) suggested that these whorls may have originated in the Guasave region of Sinaloa (cf. Haury 1975:119). Similar spindle whorls were also found in Classic contexts at Paloparado (DiPeso 1956:387-394) and in Sedentary period contexts at the Hodges ruin (Kelly 1978).

Urn burials and inhumations were the modes of disposal of the dead throughout the Hohokam world in the Classic period. Doyel's (1979a) review of the literature reveals that Tucson Hohokam burials were usually accompanied by many grave goods. At the Hodges ruin, for example, Kelly (1978) reported a diversity of goods in association with cremations throughout the site's occupation. At Rabid ruin, 66 percent of the Tanque Verde phase burials had shell artifacts, including 1,253 Olivella shell beads, 7,126 shell and stone disk beads, and 70 ceramic vessels (Doyel 1979a:24). Interments at BB:13:14 were similarly well endowed; at both BB:13:14 and at Rabid ruin, inhumations tended to be of subadults and accompanied by more grave goods than the primary cremations (Doyel 1979a:24). Interments at BB:13:14 also yielded relatively large amounts of turquoise with two burials, one of them an infant.

In contrast, Tanque Verde phase burials at Punta de Agua were accompanied by few goods, perhaps as a function of village status (Doyel 1979a:24). Only two pieces of turquoise were recovered at Punta de Agua, and only five were recovered from the Hodges site. The turquoise at BB:13:14 came from the Tombstone-Gleeson area, judging from its color (Doyel 1979a:24). Another unusual find at BB:13:14 was a red ocher layer beneath the burials, an occurrence not reported for any other site in the area (Doyel 1979a:24).

The great diversity of funeral customs in the area after AD 1100 suggests great changes from previous practices of cremation burial in discrete cemetery clusters, possibly with the use of perishable grave markers (Doyel 1979a:24). Greenleaf (1975:104) suggested that the spread of urn burials may have had its origins in a southern tradition, on the basis of somewhat earlier appearances of this practice at Paloparado and the Hodges ruin. If so, the diversity may be due to the mingling of two different prehistoric groups--the Hohokam from the Gila-Salt Basin and indigenous southern groups. This contention is further supported by the presence of contemporaneous differing social groups at Paloparado (Brown and Grebinger 1969).

More diversity is evident in the Classic burials at Paloparado (Grebinger and Adam 1974, 1978) and at EE:9:68 near Nogales, where the early appearance of urn burial during the Colonial period may also suggest a southern origin for the practice (Reinhard 1978). As with the other sites, interments at EE:9:68 featured an array of burial goods, including local ceramics and wares from the Tucson and Trincheras areas, as well as shell items, incised bone, and a slate palette, a pattern similar to both Paloparado (DiPeso 1956:540) and the Baca Float sites (Doyel 1977b; Reinhard 1978). Accordingly, the post-1100 mortuary diversity suggests much population movement and aggregation, culminating in the few

large Tucson phase sites of the late Classic, a contention born out by Grebinger and Adam's (1974; 1979) analysis of Tanque Verde Red-on-brown, as discussed earlier.

Inhumations continued as well at such sites as the Hodges ruin (Kelly 1978), Punta de agua (Greenleaf 1975), the Zanardelli site (Wright and Gerald 1950), and Martinez Hill (Gabel 1931), although the Punta de Agua inhumations may be historic (Greenleaf 1975:104). As mentioned earlier, all 12 inhumations at Rabid ruin were of subadults (Doyel 1979a:24).

In the lower San Pedro Valley, populations began to decline after AD 1000, perhaps due to climatic shifts that reduced the viability of dry farming. By AD 1200 if not before the area was largely abandoned, leading Masse (1980:24-25) to call the period from AD 1000-1100 the retraction period. This conclusion, however, is based largely on valley floor survey. Limited work on the pediments suggests a large early Classic population similar to the Tanque Verde phase in the Tucson Basin (Franklin and Masse 1976:50), in contrast to the relatively smooth Sedentary-Classic transition in the Tucson Basin. Doyel (1977b) reported the abandonment of several sites near Tumacacori around this time, and some sites were abandoned in the Tucson area as well (Betancourt 1978a, 1978b).

Some isolated Classic period houses near the Big Ditch site have been excavated at Ash Terrace by Michael B. Bartlett under the auspices of the Arizona College of Technology. But these excavations have not been formally reported. Preliminary reports reveal the presence of early Classic architecture similar to the Bylas phase (Johnson and Wasley 1966) and a ceramic assemblage dominated by San Carlos Red-on-brown and corrugated wares. No Tanque Verde Red-on-brown has been reported (Masse 1980:28).

At Second Canyon ruin, however, Franklin (1978:51) excavated some Tanque Verde phase houses similar to those at the Hodges and Whiptail ruins, but without surface contiguous structures. Some contiguous surface dwellings are reported from the Twin Hawks site near Oracle, but these findings have also not been reported (Franklin 1958:51). Tanque Verde Red-on-brown sherds were found at Second Canyon ruin. Although the period is poorly known, its importance in this area lies in the evident reorientation of the region toward the northeast and away from the Gila-Salt Basin, which in some way may be related to the arrival of the Salado in the San Pedro Valley around AD 1300 (Franklin 1978:204). The twelfth century Bylas phase sites (AZ.V:16:8 and AZ.V:16:10) (Johnson and Wasley 1966) have a mix of cultural elements from the surrounding area, but represent a local adaptation to the middle Gila Valley.

The late Classic Tucson phase (AD 1300-1500) is one of continued marked changes. It is known mainly from excavations at University Indian ruin (Hayden 1957), but portions of the Martinez Hill ruin (Gabel 1931) probably also date from this period. Although the Paloparado site (DiPeso 1956) has been considered a Tucson phase site (e.g. Westfall 1979), it is discussed in the Chapter 6 discussion on the protohistoric period.

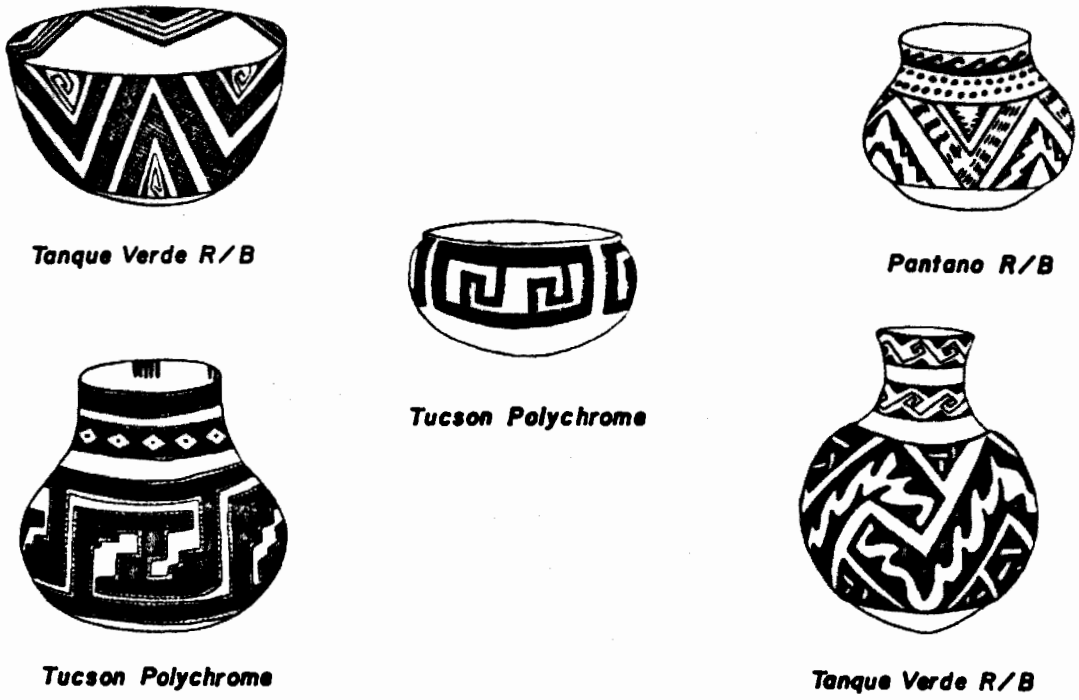


Figure 38. Classic Hohokam Pottery from University Indian Ruin. (Hayden 1957) Courtesy Arizona State Museum.

During the late Classic Tucson phase, major changes occurred in both architecture and ceramics. At University Indian ruin, the most notable innovation is an artificial mound topped by contiguous massive walled rooms. Nearby was a compound of similar rooms built on the ground surface (although the houses were "pit houses with surface walls"). The Tanque Verde phase dwellings were found in group 1 (Hayden 1957:130-132).

As with similar mounds in the Gila-Salt Basin (e.g. Los Muertos, Haury 1945a), the mound was built by filling in a massive walled single pit house, with the addition of retaining walls (Hayden 1957:194). The semi-subterranean Hohokam pit house of earlier periods is gone, replaced by compound structures built of adobe with posts incorporated in the walls and linked together within compound walls. Sites are newer but larger and suggest population aggregation near major drainages (Betancourt 1978a:20). The trincheras at such sites as Black Mountain and Tumamoc Hill in the Tucson Basin also have been assigned to the Classic period, but are discussed later.

In ceramics, Tanque Verde Red-on-brown continues, although marked by the addition of mica to the paste ("Pantano Red-on-brown"). The diagnostic of the phase is Tucson Polychrome. The rough paste consists of fine to coarse granite, quartzite, and mica temper and red slipped surfaces. Designs are in black, outlined by fugitive white and were polished over

after painting. Designs are always banded, with one or two black lines outlined in white below the rim. They usually consist of stepped patterns of triangles, squares, hatching, zigzags, and diamonds. Scrolls are rare (Hayden 1957:227-228). The shapes are similar to Gila Polychrome bowls and jars, but on the basis of strong design similarities, Hayden (1957:227-228) felt that the type was derived from Kiet Siel Polychrome, perhaps by way of Point of Pines.

The predominant plainware, Gila Plain (Tucson variety) is a local version of the widespread Gila Plain from the Gila-Salt Basin, but has a darker paste and rougher finish (Hayden 1957:229-231). As such, this plainware is part of a continuum of plainwares across southern Arizona, which are extremely difficult to differentiate. The most common intrusives are Gila Polychrome, Gila smudged, Sells Red, San Carlos Red, and San Carlos Red-on-brown, all of Salado or middle Gila origin. In general, however, such wares are more common to the east in the San Pedro Valley (Sauer and Brand 1931; Franklin and Masse 1976).

Closed end trough metates predominate in the lithic assemblage, along with rectangular manos. Mortars and pestles are present, as well as a large number of uniface and biface choppers. Chipped stone hoes (or saws) and three- quarter grooved axes also occur (Hayden 1957:231-232). Edge wear analysis and experiment suggest some hoes may be ground stone planes (Brown and Grebinger 1969:190). Projectile points were scarce but the abundance of small mammal remains revealed possible use of wooden tipped points (Hayden 1957:174) or nets and snares.

Although shell artifacts were uncommon at University Indian ruin (Hayden 1957), several large caches have been reported, often in association with Tanque Verde Red-on-brown or Gila Polychrome ceramics. These caches reveal continued extensive use of shell and stone for ornament.

In the San Pedro Valley, a shell and bone necklace was recovered from a burial exposed in a riverbank near a ruin with Tanque Verde Red-on-brown sherds. The burial was associated with a Hohokam three-quarter grooved axe and plainware sherds (Carpenter 1977).

In 1957, 41 Glycymeris blanks were found near Flowing Wells Road in Tucson in association with plainware sherds that had probably been a jar covered by an inverted bowl. Thirty-nine of the shells had the lip chipped off, possibly to facilitate transport (Stanislawski 1961).

At the Flieger ruin on the lower San Pedro near the Big Ditch site, two three-quarter grooved axes and two manos were found with 3,153 shell beads, representing four species: Cardium elatum, Conus perplexus, Olivella dama, and Nassarius (sp). Olivella was the most common. These materials were found in a large Tonto Polychrome jar with a smaller Gila Polychrome jar in the neck. They were evidently buried in a prehistoric trash area sometime between AD 1300-1400 (Stanislawski 1961).

Perhaps the largest cache ever found in the study area was discovered in 1949 by Ray Romo on the west side of the Catalina Mountains. At site BB:9:37, he found a Tanque Verde Red-on-brown jar with a Tanque Verde Red-on-brown cover bowl. Inside were approximately 100,000 stone beads and 25 to 30 small spheroidal copper bells cast by the lost wax process each with a ring eyelet for suspension. Just over half the beads were of red ferruginous aphanitic matrix; 40 percent were of black steatite and talc, and 2 percent of the beads were chrysocolla and turquoise. About 12 shell beads were also found (Haury and Gifford 1959).

Only three cremations and four inhumations were found at University Indian ruin. The presence of inhumations has been considered one of the characteristics of the Classic period, along with platform mounds and Salado Polychromes. These innovations have generally been ascribed to the Salado influence or presence, particularly in the Gila-Salt Basin (e.g. Haury 1945a) or Casas Grandes migrants (e.g. Doyel 1979b). As Westfall (1979:40) has noted, however, typical Salado Polychromes are rare in the Tucson basin, and existing evidence indicates that inhumations have been a component, albeit a minor one, of Hohokam burial traditions in the study area since earliest times.

Recent research has suggested that platform mounds may also have their roots in indigenous Hohokam practices (e.g. Wilcox and Shenk 1977; cf. Doyel 1974a for a general developmental sequence of Hohokam mounds) and the whole issue of the causes of Classic period changes has not been resolved. A number of approaches that focus on the role of indigenous factors in bringing about these changes are discussed below.

TRINCHERAS

Trincheras are hilltop complexes of dry-laid stone walls often associated with terraces, stone rings, trails, rock art, and other features. Known by the Europeans since the Spanish conquest, they are found from the northern Sonoran Desert into northern Sonora, Mexico and date from the Classic period (Stacy 1974). Research in the study area and elsewhere indicates that Hohokam sites are usually found below the hill on which the trincheras are located (e.g. Fontana et al. 1959; Gabel 1931; Grady 1976; Johnson 1963, 1966; Wilcox and Larson 1979; Stacy 1974; Stacy and Hayden 1975; Downum et al. 1981; see Fontana et al. 1959:47-49 for a list of trincheras sites in southern Arizona).

A variety of functions have been proposed for trincheras: Defense, ceremony, agriculture, and habitation sites (Fontana et al. 1959:50). Although early explanations favored defense, two comprehensive studies within the study area suggest a variety of functions. At Tumamoc Hill and Martinez Hill, trail use patterns at the summit were similar to use patterns in the sites at the bottom (Hartmann and Hartmann 1979). Similar food processing stations were reported at the base and summit of Tumamoc Hill (Larson 1979), suggesting some role in a plant procurement system. Detailed investigation of soil profiles and structures at Los

Morteros reveals use both as residential terraces and agricultural terraces (Downum et al. 1981).

Claims for defense have rested on intuition and the opinion of native informants, although as Wilcox has pointed out, the trincheras were built long before European arrival, and continuity between the builders and historic Pimans is questionable (Wilcox 1979:15). Wilcox tested several implications of the defensive refuge hypothesis, based on accessibility and architectural features, and found the hypothesis supported at Tumamoc Hill. Evidently the trincheras at this site served as a sporadic refuge for one or more nearby communities. The presence of rock art in restricted areas of these trincheras sites (e.g. Fontana et al. 1959:44; Ferg 1979), however, suggest some ceremonial use as well.

CONTINUITY, SUBSISTENCE, AND SOCIAL ORGANIZATION

Hohokam-Papago Continuity

When the Spaniards entered the Gila-Salt Basin, they found the Pima people irrigating crops and living in shall pit houses in a dispersed settlement pattern. Many archaeologists regard the Pima as the descendants of the Hohokam (e.g. Haury 1945; Hayden 1957; Ezell 1963). Although the issue of Hohokam descendants is discussed more fully later in this overview, many problems are involved in assuming a similar continuity between the Hohokam of the Santa Cruz and San Pedro Valleys and the Papago or other groups such as the Sobaipuri. For one, only four sites in southern Arizona have been reliably dated after AD 1400, using archeomagnetic dating: Escalante (U:15:3), Las Colinas (T:12:10), (U:13:22) near Snaketown, and the Hagan site (Fritz 1977:10). The earliest historic material is a burial at San Xavier, dated to AD 1700 from an associated Hopi Polychrome bowl. Thus, a 300-year gap exists in our knowledge of the study region (Fritz 1977:10).

A second related problem is our ignorance of early Piman material culture. A number of ancestors have been claimed for the Papago, including the Trincheras culture (Sauer and Brand 1931:117-119), the O'otam (DiPeso 1956), the Sinagua (Schroeder 1953a), and the Hohokam (Hayden 1957:191-201; Gladwin 1957:344-345).

The ancestors of the historic Sobaipuri, who inhabited the Santa Cruz and San Pedro Valleys until the 1700s, are similarly unclear. Some claim Salado origins (Gladwin 1957), and others claim O'otam origins (DiPeso 1956, 1979). An attempt to approach the problem from a study of early historic Papago ceramics resulted in an admission that a definite connection between the Hohokam and Papago could not be made from vessel forms. Instead, the overall impression was one of "sharp discontinuity in this one item of culture" (Fontana et al. 1962:101).

In part, the confusion also stems from a lack of understanding of the differences among the Pima, Papago, and related Sobaipuri peoples and

what these differences mean. Linguistic evidence shows that Pima and Papago became differentiated as late as AD 1750 (Hale 1958); historical evidence reveals that these people have considered themselves to be one, separated only by the accident of reservations and amount of European contact (e.g. Spicer 1962). Accordingly, attempts to distinguish prehistoric Piman peoples from the archaeological record may reveal adaptational differences rather than ethnic ones.

Finally, the search for ethnographic analogies should consider that historic Pimans differed greatly from the Hohokam. Existing evidence reveals that the Hohokam had a much more complex social organization than the historic Pima, who were early affected by Spanish diseases and inroads into the riverine environment. Later, the settlement patterns and social organization of the Pimans underwent drastic changes in the face of Apache pressures (Underhill 1939:18). Dobyns (1976a) thoroughly evaluated Piman demographic studies and provided an excellent introduction to the literature. His bibliography should be consulted by anyone concerned with the problems of cultural continuity and reconstruction and ethnographic analogy in the study area.

Hohokam Subsistence

The Hohokam of the Gila-Salt Basin have been traditionally regarded as horticulturalists dependent on canal irrigation for their sustenance. Indeed, the early appearance of canals in the pioneer period Vahki phase at Snaketown constituted a major justification for the idea that the Hohokam represented a migration from an unknown Mexican point of origin (e.g. Haury 1967, 1976; Gladwin et al. 1938). Further work at Ventana Cave (Haury 1950) and elsewhere in Papagueria (Scantling 1939, 1941; Withers 1944) led to defining another Hohokam branch, the Desert branch, having a foraging subsistence base and largely unaffected by Gila-Salt Basin developments.

More recent research has shown that Hohokam buffwares are found in the Papagueria (Rosenthal et al. 1978:214; Masse 1980) and that subsistence techniques there and in the Gila-Salt Basin had a striking number of parallels (Masse 1980). Hohokam subsistence included the use of non-riverine resources, most notably cactus but also mesquite and paloverde (Doelle 1978), perhaps even as early as late Colonial times in the Gila-Salt Basin and its peripheries (Ackerly 1979:405). At Snaketown the ratio of saguaro seeds to volume of charcoal suggested that crop deficits were compensated by saguaro harvest and reliance on mesquite and screwbean in conjunction with an agricultural cycle of two crops a year (Bohrer 1967).

The role of irrigation agriculture in Hohokam subsistence in the study area is not clear. Although the Tucson Basin Hohokam were initially defined in part by the absence of canal irrigation (e.g. Haury 1978), segments of prehistoric canals have been found in the Tucson Basin (Fritz 1974a; Kinkade and Fritz 1975) and in the San Pedro Valley (Masse 1980). Grebinger (1976b) has regarded Hohokam expansion into the area as

largely due to the suitability of the region for irrigation farming by colonists from the Gila-Salt Basin (cf. Weaver 1972). In his view, the Hohokam fully depended on canal irrigation by the start of the Rincon phase (Grebinger 1976b:40). By the Tanque Verde phase expansion away from the Santa Cruz River had led to the use of almost all the arable land in the basin through floodwater and dry farming techniques (Grebinger 1976b:40).

In contrast, Doyel (1979b:553) has questioned the viability of irrigation in the San Pedro and Santa Cruz Valley and instead regards farming in the floodplains and foothills as the major techniques, resulting in a pattern of a few large villages and many small sites away from these villages. Though Grebinger (1976b) regarded irrigation agriculture as best suited to ramages or expanding lineages with resultant ranked descent groups, Doyel (1979b:553) felt that little need existed for political centralization due to smaller populations, seasonal mobility, and the lack of canals.

In all likelihood, Hohokam subsistent patterns in the study area were a complex mix of different techniques and crops. The Tucson Basin received more rainfall than much of southern Arizona and had a correspondingly high diversity of flora and fauna. The presence of two distinct wet seasons and a growing season of 250 days allowed the Hohokam to exploit a variety of agricultural microenvironments and wild plants and animal species habitats (cf. Yang and Lowe 1955).

The most comprehensive study of agricultural features in the study area was conducted in the bajadas near Tumamoc Hill (Masse 1979). Most of the terrain consists of broad, flat bajadas with slopes of less than 5 degrees, and the most common features were rockpiles and contour terraces (long stone alignments across hillslopes), designed to aid in soil and moisture retention, often in conjunction with check dams. The rockpiles may represent ground clearing for planting or attempts to protect the thin soils from the wind (cf. Woosley 1980:328; Doyel 1977a for a discussion of farming systems in the Santa Cruz Valley).

Similar features have been reported near Continental (Woosley 1980:328). Masse also reported bordered gardens, the first time such features had been reported in the Tucson Basin. Many of these gardens were used in association with channeling borders, which directed water into specific areas (Masse 1979:162-172). These features employed seasonal precipitation and constituted a dry farming system that Masse (1979:172) contrasted with floodwater farming systems based on the use of overflow from permanent and intermittent water bodies. Such systems operated along the floodplains of the Santa Cruz River and its tributaries, probably in conjunction with the limited canal irrigation needed by the intermittent nature of the drainage (cf. Doyel 1977a:98-99).

Several agricultural processing sites were defined from ceramic vessels, chipped stone debitage, the absence of shell and ground stone, and the scarcity of formalized chipped stone tools. Additional limited activity areas represented short-term single-episode plant procurement (Masse

1979:151-154). These areas were probably used in conjunction with processing camps and field houses during the Rillito-Rincon transition, not only in the Tucson Basin (e.g. Hartmann and Hartmann 1979; Larson 1979) but also in the San Pedro Valley (Masse 1979:173; Franklin and Masse 1976). Such camps would have been occupied as part of the seasonal round. For the Papago these camps included agricultural settlements and wild plant and animal food processing stations where materials were processed for ultimate transport to the village (cf. Stewart and Teague 1974).

The Rillito-Rincon transition, to which most of the Tumamoc Hill remains dated, was probably the period of greatest Hohokam expansion in the study area. Similar agricultural features have been reported elsewhere in the Tucson Basin (Frick 1954), the lower San Pedro Valley (Masse 1980; Franklin 1978), the Safford area (Woosley 1980), and the Gila River between Kearney and Florence (Debowski et al. 1976). Many dryland farm sites containing rockpile fields, terraces, and check dams occur in the area.

A current investigation of the early Classic Trincheras site of Los Morteros is including a study of irrigation canals, floodplain occupation, terraces, and other rock features on the hillside (Downum et al. 1981). These features are being extensively mapped in conjunction with detailed soil and palynological analyses. Some terraces are residential, dating to the Tanque Verde phase. Over 150 features are agricultural. Downum and others have suggested that the primary function of these terraces was to increase water delivery to crops by tapping catchment areas above and between terraces and improving moisture retention (Downum et al. 1981:4). The hillside terraces may also have been less susceptible to frosts and freezes due to temperature inversions. Terraces, thus, may have provided a longer growing season, an important consideration for double cropping (Downum et al. 1981:4).

Pollen analysis of soils from Los Morteros revealed that corn was a major crop. Two varieties were recovered from Punta de Agua - Onaveno (a flint corn) and Reventador (a flour corn) (Greenleaf 1975; Masse 1979). The uniform kernel size of Onaveno corn from caches suggests that these kernels have been intended for use as seed corn (Greenleaf 1975:106). Both varieties were recovered from the St. Mary's Hospital sites as well as another flour variety, harinosa de ocho (Miksicek 1979). An unnamed variety of flint corn was also recovered at Hodges ruin (Kelly 1978; Masse 1979). Onaveno is drought-resistant; varieties identical to those from the St. Mary's Hospital site were grown by the historic Papago (Castetter and Bell 1942; Miksicek 1979). Other cultigens reported in Rillito and Rincon contexts include tepary beans (also drought resistant) and jack beans (Masse 1979:174).

Other crops that have been reported for the Hohokam outside the study area include the common bean, pumpkins, gourd, cotton, and possibly tobacco (Haury 1976:118). Haury (1928a:5) reported the finding of two pot sherds with impressions of cotton fabric at the Tanque Verde ruin (BB:14:1) but it is uncertain if cotton was actually grown in the study

area. Charred cotton fabric was also recovered from an inhumation at Martinez Hill (Gabel 1931:69). In addition to fiber, cotton seeds were parched and eaten by the historic Pima and Papago, who prized them for their oil (Castetter and Underhill 1935; Russell 1908).

Analysis of carbonized plant remains from Punta de Agua also revealed the use by the Hohokam of a number of the same wild plants used by the Pima and Papago, including tansy mustard (Descurainia sp), pigweed (Amaranthus or Chenopodium sp), stick-leaf (Mentzelia sp), and charred cholla buds (Opuntia sp) (Bohrer at al. 1969).

The analysis documented the first human use of stick-leaf in the Lower Sonoran life zone. Six of the seven identified species were found in separate storage jars, primarily from the storeroom, House 12, at BB:13:50 (Greenleaf 1975:106). In contrast to the Snaketown archeobotantical record (Bohrer 1967), saguaro was noticeably absent, although this absence may have resulted from incomplete sampling necessitated by the highway right-of-way (Greenleaf 1975:106). Remains appeared not to be associated with particular vessel types, a pattern also shown by pollen analysis of remains from Whiptail (Lytle-Webb 1978:21). Some deliberate planting of wild plants may also have occurred. Yucca/sotol pollen was identified in pollen profiles from terraces at Los Morteros, although they do not grow near the site today (Downum et al. 1981:5).

A great dependence on small mammals was shown by the numerous animal bones mainly jackrabbit and cottontail recovered from University Indian ruin (Hayden 1957:101). To some extent, hunting or processing of animal remains may have been the domain of specialists. At BB:13:14, Hemmings (1969:203) reported the flexed burial of a middle-aged male with 830 Olivella beads. Behind his back was a well-made basalt mortar, two cylindrical basalt and quartzite pestles, and ten chipped stone tools, evidently for delicate cutting and scraping of small game. Although no ceramics were associated with the burial, Rincon and Tanque Verde Red-on-brown sherds were found in the grave fill (Hemmings 1979:203). A possible flint knapping kit was associated with an inhumation at Martinez Hill (Gabel 1931:69).

Even using a broad range of wild and domestic resources, prehistoric Hohokam populations may have received inadequate nutrition. Although the Hohokam custom of cremation generally precludes further osteological analysis, several burials from BB:13:14 on the San Xavier Reservation were excavated and analyzed in 1979. The results showed the presence of porotic hyperostosis. This condition results from iron deficient diets and is often found among populations dependent on corn for a major part of their subsistence (Doyel 1979a:25).

In the lower San Pedro Valley, flotation analysis has also shown that corn was the major staple (Klie et al. 1978; cited in Masse 1980). Because the river terraces are from 10-50 meters above the river level and are often dissected by arroyos, extensive irrigation systems could not generally be used. Here floodwater farming seems to have been the major farming technique (Masse 1980:7).

Hohokam Social Organization and Change

Attempts to understand Hohokam social organization in the study area have focused on the changes occurring during the Sedentary-Classic transition, with the appearance of platform mounds and compounds, inhumation, and Salado Polychromes. Past explanations have often concentrated on the role of external factors in effecting such changes. Haury (1945a; 1967; 1976) has stated that the transition is due to the migration of the Salado from the Tonto Basin, where may of these traits seem to have occurred somewhat earlier. In contrast, DiPeso (1956:265) regards Classic period manifestations as a reassertion of the indigenous people, the O'otam, who had incorporated many traits and ideas of the pochteca merchant overlords. Additional changes in the late Classic period are due to an influx of refugees from Casas Grandes after the city's downfall (DiPeso 1974:314; 1979:95). Finally, Schroeder (1953b; 1960) saw Sinagua expansion down the Verde River as the major cause of the transition, particularly in the Gila-Salt Basin.

In the 1970s, a number of researchers began to look at the role of endogenous factors in bringing about change in the Hohokam system. One of the first of these regarded the Hohokam as colonists from the Gila-Salt Basin who expanded into the Santa Cruz Valley by exploiting areas suitable for irrigation agriculture (Grebinger 1971a, 1976b; Grebinger and Adam 1974, 1978). Presumably the same processes were responsible for Hohokam expansion into the San Pedro Valley as well (Franklin 1978:361). According to Grebinger's model, the control of irrigable locales by the pioneer families ultimately led to the development of ranked societies whose economies were based on redistribution (after Service 1971).

By the start of the Rincon phase, the Hohokam fully depended on canal irrigation. As populations continued to increase, dry farming and floodwater farming techniques were incorporated into Hohokam agriculture, as well as increasing reliance on wild resources (Grebinger 1976b:40). The ball court or dance floor in the village of the founder would have acted as a redistributive locus, possibly in conjunction with pochteca mercantile families operating out of Casa Grande. The presence of the ball court in turn would have reinforced the prestige of the founder village (Grebinger 1976b:40).

This system began to break down in early Rincon times under the impact of deteriorating environmental conditions related to changes in periodicity of rainfall and arroyo cutting (Martin 1963b; Weaver 1972). As a result, many populations relocated upstream to avoid problems caused by lowering water tables. Throughout the Tucson Basin, population aggregation occurred as people were forced away from traditional agricultural locales (Grebinger and Adam 1974:235-236). The result of these changes are manifest in the Tucson phase. As arable land became scarce, agricultural practices were intensified, and religion began to emphasize supernatural control of the environment. The development of platform mounds may then represent a focal point of new ceremonies, which superseded older practices that used the ball court or dance floor (Grebinger 1976b:42). By the Tucson phase, the peripheries of the Tucson Basin were

abandoned, and populations were concentrated into a few large sites near farmland (Grebinger 1976b:42).

Although not enough data exists to permit adequate testing of Grebinger's model, the rise of divergent Classic burial and ceramic traditions (Doyel 1979b) shows increasing population localization. Grebinger, however, has been criticized on several grounds. First, although some irrigation canals have been recorded in the Tucson Basin (Fritz 1974a; Kinkade and Fritz 1975; Betancourt 1978a), irrigation farming appears not to have been a major component of Hohokam subsistence in the area. If many canals had been present, they would have been used by the early American settlers, much the way Hohokam canals were re-used in the Gila-Salt Basin (Masse 1979). Further, the hydrology and topography of the Tucson Basin and lower San Pedro Valley are not highly suitable for irrigation (Doyel 1977a, 1977b:553). Surveys have shown the use of a broad range of water control devices (e.g. Frick 1954; Masse 1979). The data presents a pattern of dispersed settlements that would reduce the possibility of control of agriculture land or other resources by a few villages (Masse 1979:177).

In addition, little evidence exists for centralized storage and redistribution of goods by elites. Instead, goods may have been controlled by household units. Doyel (1979b:552) suggested the possibility of Hohokam integration through a Mesoamerican style market system, in which chiefs of lineages were primarily political rather than economic. Their duties involved establishing schedules, resolving conflicts, and participating in ceremonies. Even so, elite control of exotic items may have furthered their own prestige.

Masse's work in the study region reveals colonization by founder grandparent villages and offspring settlements, a mechanism similar to the ideas of range expansion and budding outlined by Grebinger (1971a). Thus, colonization resulted from the development of dry farming in the Gila-Salt Basin, population increases, and emigration (Masse 1979, 1980). In such a system, grandparent villages may have been provided with food by dependent offspring villages in return for a variety of social, economic, and religious services and goods (Masse 1980:22). Here too, the central village may have served as a central place for redistributing exotic goods and conflict resolution, with cultural integration possibly effected by ball court related activities (Masse 1980:22; cf. Rathje 1972 for a Classic Maya model of this kind of interaction). The Big Ditch site on the lower San Pedro has one Casa Grande style ball court and one Snaketown type (Masse et al. n.d.). The social complexity evident in differences among grandparent villages as well as differences within villages in the distribution of Gila-Salt ceramics and other exotics and differential mortuary goods all argue for the existence of chiefdom level societies in the Santa Cruz and San Pedro Valley (Masse 1979:180; Wilcox et al. 1979:192).

The cause of the Sedentary-Classic changes is difficult to pinpoint, particularly in the absence of systematic pollen analyses or other paleoenvironmental interpretations that could confirm climatic deterioration

(Wilcox et al. 1979:181). The evidence for climatic change has come from outside the area (e.g. Weaver 1972), and evidence for such change in the study area after AD 1000 is weak (Masse 1979:181).

Climatic change has also been invoked as an agent of social change in Wilcox's (1979) tribute-system model. Here, the rise in regional distinctiveness after AD 1100 would have led to increased conflict over resources. Such conflict would have led to the imposition of a tribute system by the Hohokam in the Gila-Salt Basin (and by extension in the Tucson Basin) on peripheral groups. As demand for labor increased, greater tributary populations would have been needed to supply the demand, creating a rise in overall population levels. Specialized settlements in the bajadas would harvest legumes and cacti for tribute. Continued labor demands would have led to increased conflict, rebellion and rivalry among elites, requiring the building of defensive trincheras.

Reorganization around AD 1300 permitted the people of the Tucson Basin to deal with the Gila-Salt Hohokam as military equals, removing the need for trincheras. This reorganization took the form of population aggregation in sites with platform mounds and compound walls and may have been caused by a combination of excessive tribute demands and climatic stress (Wilcox 1979).

From surveys of north central Papagueria and the Lower San Pedro Valley, Masse (1979:180) argued for a marked reduction in population during the Sedentary-Classic transition, in contrast to the rise predicted by Wilcox. In fact, surveys in the southern Tucson Basin (Frick 1954; Doyel 1977a, 1977b) reveal that Classic sites may actually outnumber those of the Colonial and early Sedentary periods (Masse 1979:180). Masse (1979:180) also suggested that Classic sites in the bajada may be overrepresented because of their greater visibility. Recent research has shown that when samples of sites have small numbers of datable components, the proportion of the later occupation is usually overestimated (Ackerly 1981).

These views of Hohokam social organization in the study area are untested statements derived from ethnographic analogy, limited studies of agricultural intensification, and attempts to relate material culture to general levels of social organization. Although the need for detailed studies of adaptations to specific environments has been recognized, such studies have just begun. Until we have more precise information about climates and environments in the study area, we will be limited to broad-scale processual statements about resource stress and population pressure, more programmatic than factual.

ORIGIN AND RELATIONSHIPS

General Mogollon

The Mogollon have been described as a mountain and transition zone agricultural adaptation (Martin and Plog 1973:181-182). Aspects of Mogollon material culture were reported as early as 1907 by Hough (Martin et al. 1949:17). However, only after Haury's (1936) work at Mogollon village and the Harris site was the Mogollon recognized as a prehistoric cultural manifestation in its own right. As a result of further work in western New Mexico, the separate status of the Mogollon was confirmed (Martin et al. 1949:20). Although Haury suggested that the Mogollon had Caddoan origins, later research indicated the transition from the Cochise Archaic to the horticultural Mogollon (Sayles 1945; Martin et al. 1949; Martin et al. 1952). Mogollon roots in the Cochise culture have been clearly shown through stratigraphy (Martin et al. 1952; Dick 1965). These connections, however, are further suggested through a continuation of house types and stone tool types.

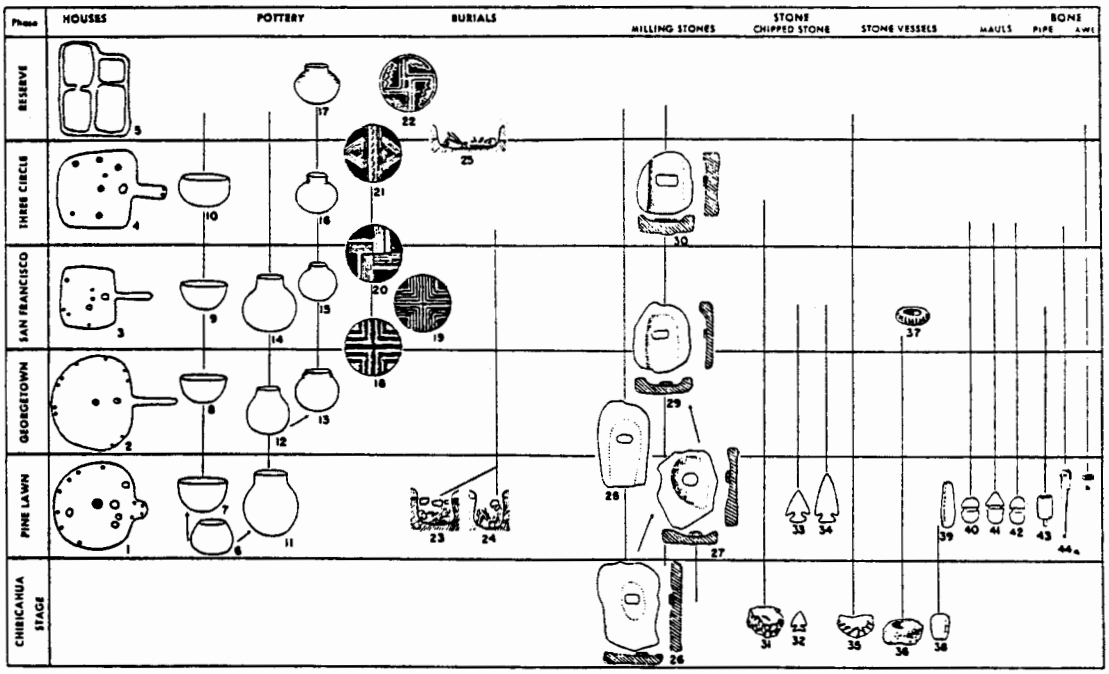


FIGURE 39. The Development of Mogollon Culture from its Chiricahua (Cochise) base. (Martin, Rinaldo, and Antevs, 1949) Courtesy Arizona State Museum.

The transition from the Archaic Cochise to sedentary horticultural ceramic-using villages is best understood in the San Simon Valley. Here Sayles outlined numerous continuities between the final, San Pedro, stage of the Cochise and the earliest phase of the San Simon branch of the Mogollon. These continuities included basin metates, flat grinding slabs, hand stones or manos, mortars, pestles, projectile points, flake choppers and knives, keeled end scrapers, stone and shell ornament styles, and simple bone awls (Sayles 1945; Wheat 1955).

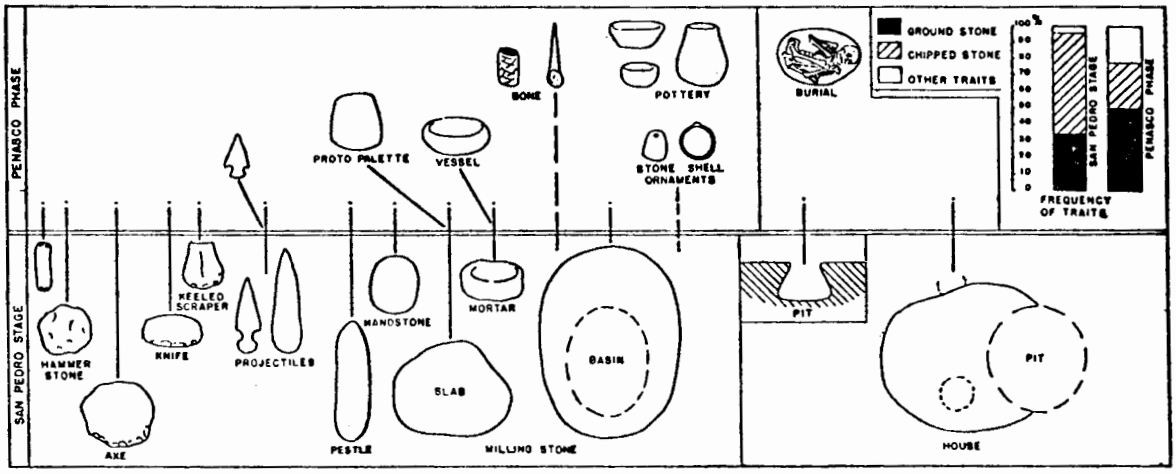


Figure 40. The Evolution of the San Simon Branch from the Cochise Culture as Shown by the Persistence of Traits of the San Pedro Stage (Cochise) into the Penasco Phase (San Simon). (Sayles 1945) Courtesy Arizona State Museum.

Although the Cochise had initially been defined as lacking houses (Sayles and Antevs 1941:8), excavations at Pearce:8:4(GP), Benson:5:10(GP), Benson:8:3(GP), and Pearce:8:11(GP) (in the upper San Pedro Valley) uncovered shallow pithouses which were prototypes of subsequent Penasco phase houses (Sayles 1945:3). Both late San Pedro and Penasco phase houses were characterized by shallow oval floors with poorly defined fire areas and no definite evidence of roof supports. The main differences were a gradual trend toward smaller interior storage pits, larger floors and increasing use of extramural storage pits (Sayles 1945:3). In fact, the similarities were such that only the presence of ceramics in the Penasco phase distinguished it from the San Pedro stage of the Cochise Archaic (Sayles 1945:14). Similar transitional sites have also been reported on the western margin of the San Simon Valley in the lower bajadas of the Dos Cabezas Mountains (e.g. CC:9:3, CC:9:4), although these have not been excavated (Simpson et al. 1978:84-85), and at Timber Draw on the lower San Simon River southeast of Safford (Kinkade 1981, personal communication).

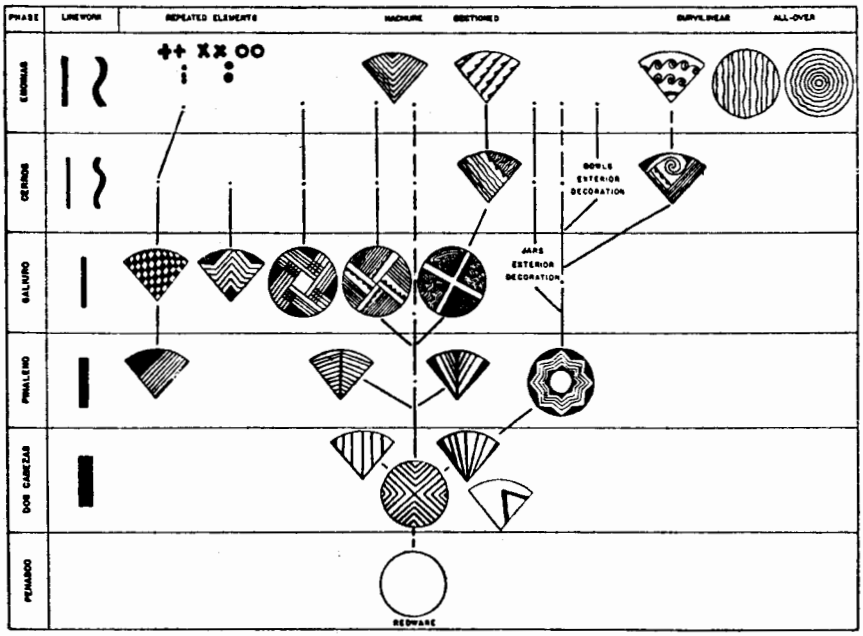


Figure 41. Main Trends in Design Elements and Layout.
Trends, rather than the life history of each trait with all of its variations, are shown.
Repeated elements are found only in the Encinas Phase.
The redware of the Penasco Phase is the painted type in the later phase.
(Sayles 1945) Courtesy Arizona State Museum.

TABLE 8

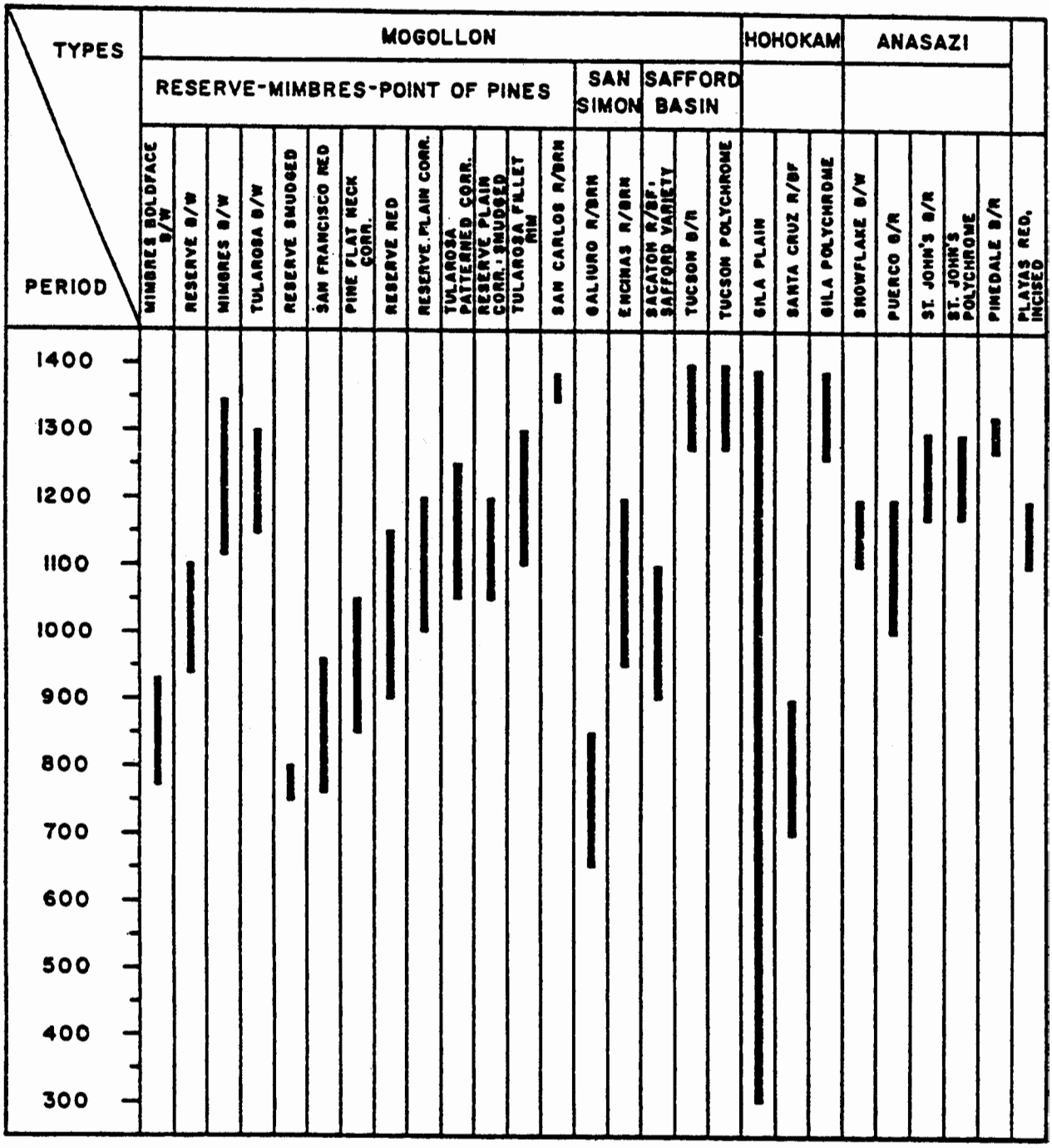
DURATION OF MOGOLLON POTTERY TYPES

PHASE	ALMA P_AIN			PAINTED					SAN FRANCISCO RED		
	LATE	NORMAL	EARLY	ENCINAS RED-ON-BROWN	CERROS RED-ON-WHITE	GALIURO RED-ON-BROWN	PINALENO RED-ON-BROWN	DOS CABEZAS RED-ON-BROWN	LATE	NORMAL	EARLY
ENCINAS											
CERROS											
GALIURO											
PINALENO											
DOS CABEZAS								SPECULAR IRON			
PENASCO											

(Sayles 1945) Courtesy Arizona State Museum.

TABLE 9

DIAGNOSTIC CERAMIC TYPES BY CHRONOLOGICAL ASSOCIATION



(Simpson and Westfall 1978) Courtesy Arizona State Museum.

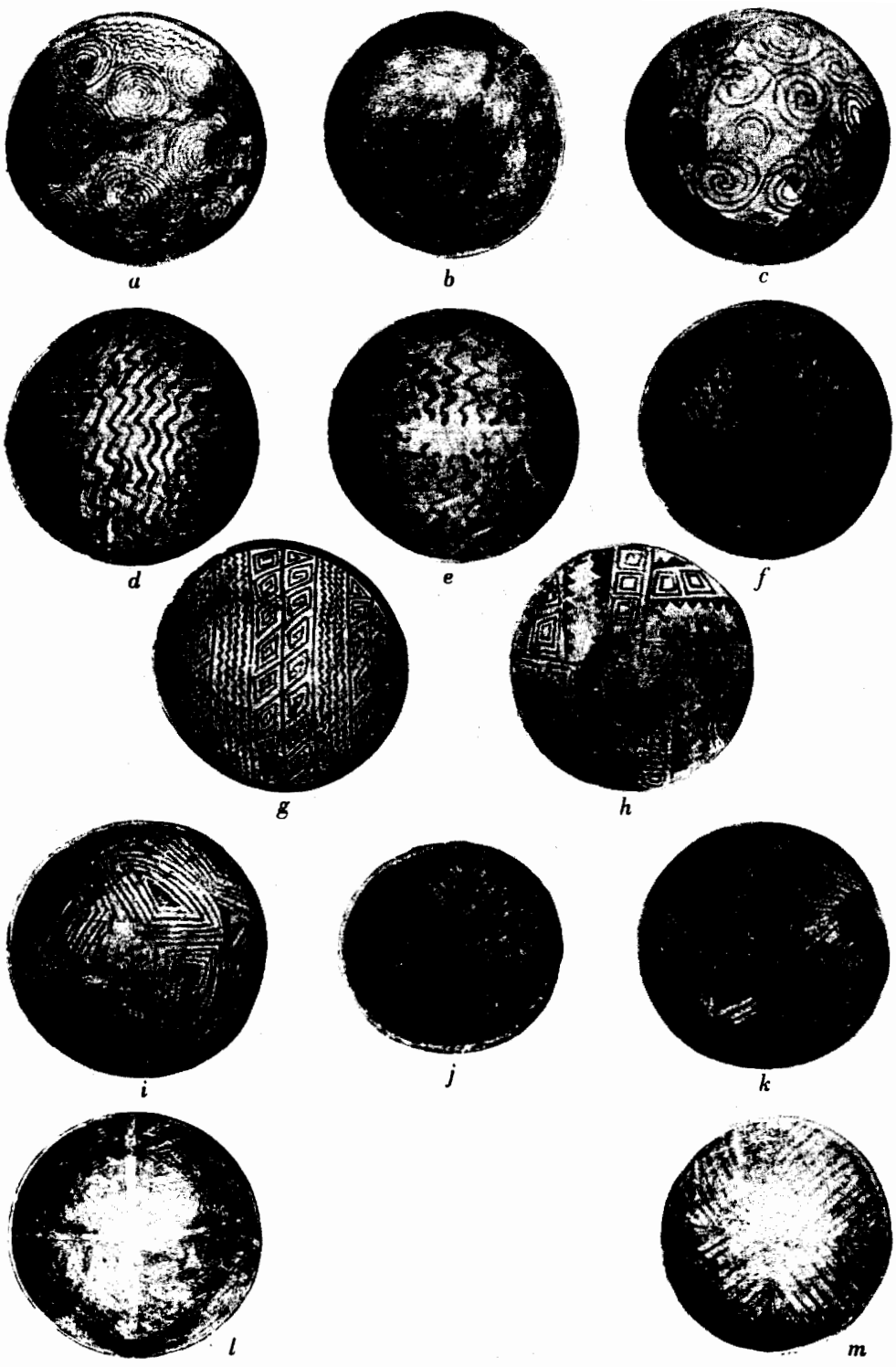


Figure 42. San Simon Mogollon Pottery Designs.

BOWL INTERIORS

Showing designs characteristic of various types. *k.* Exterior decoration

Encinas Red-on-brown: *a–h.* Polished over decorations.
Cerros Red-on-white: *i–j.* White slip.
Galiuro Red-on-brown: *l.* Narrow lines, combined with other elements in a quartered pattern.
Pinaleno Red-on-brown: *m.* Medium lines, pendant to rim and joining sectioning lines; also forming triangles pendant to the rim. (Earliest decorated type: broad line designs, characteristic of Dos Cabezas Red-on-brown, *not* shown.

(Sayles 1945) Courtesy Arizona State Museum.

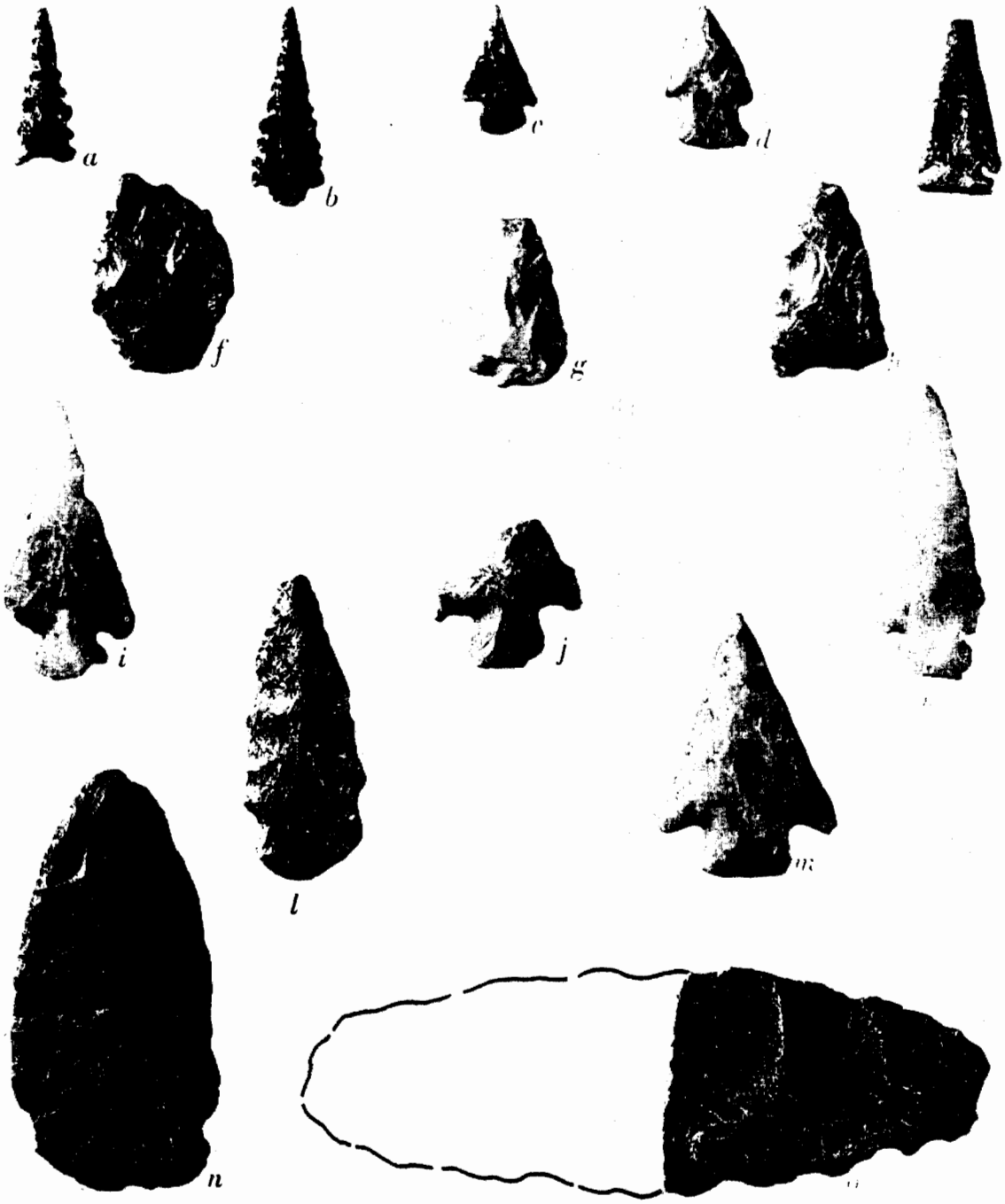


Figure 43. Projectile Points and Blades from Cave Creek and the San Simon Village.

Chalcedony, obsidian, quartzite. Actual Size

a. Triangular, with indented base; edges serrated. *b*. Stemmed; serrated edge. *c*, *d*. lateral notch. *e*. Oblique lateral notch. *f*, *g*, *h*. Leaf-shaped; *h*, indented base, the others rounded. *i*, *j*, *k*. Heavy, with deep lateral notches and rounded base. *l*. Shallow side notches and round base; edges slightly serrated; thick through mid-section. *m*. Stemmed; straight base; long barbs. *n*. Leaf-shaped; shallow side notches; rounded base. *o*. Pointed (?), leaf-shaped blade.

Frequencies:

PHASE	*a*	*b*	*c-d*	*e*	*f,g,h*	*i,j,k*	*l*	*m*	*n*	*o*	TOTALS
ENCINAS											0
CERROS	1						1				2
GALIURO							1				1
PINALENO					1						1
DOS CABEZAS						3					3
PENASCO			1							1	2
UNPLACED		1	1	1	2			1	1		7
TOTALS	1	1	2	1	3	3	2	1	1	1	16

(Sayles 1945) Courtesy Arizona State Museum.

Although origins in the Cochise are supported for the Mogollon in general, a single chronology for the Mogollon has proven difficult to produce. Regional variations within the Mogollon have made describing phases for the entire subarea difficult. Elements of material culture varied temporally between regions, often with minor variations. Wheat (1954, 1955), however, has offered a period sequence that crosscuts regional differences. Pit house shape and ceramics were the primary factors used to distinguish these periods. But this sequence is not universally accepted because it does not thoroughly account for regional variation.

Regional variation among the Mogollon may be explained in part by the Mogollon adaptation to the diverse environment of the southeast portion of the Southwest. In addition, the influence of both the Hohokam and Anasazi have contributed to regional variation. Although agriculture and pit houses may have originated in the Mogollon area, Anasazi developments surpassed and in later Mogollon times dominated Mogollon material culture and architecture. Anasazi above-ground architecture was reflected in Mogollon Pueblos and in subterranean pit house Kivas in the north. Pottery also reflects the Anasazi influence throughout much of the late Mogollon.

The Hohokam influence is most clear in the San Pedro River Valley where Mogollon, Hohokam, and perhaps O'otam influences have a complex interaction. Although the Hohokam influence was more widespread than the Mogollon evidenced by the use of cotton cloth throughout much of the Mogollon area, the Anasazi played a more influential role in general than did the Hohokam.

Mogollon within the Study Area

In the study area, Sayles (1945) defined the San Simon branch of the Mogollon in the San Simon Valley. Sites of the Mimbres branch were also reported (e.g. Sayles 1945:2). It soon became apparent that southeast Arizona was peripheral to the center of the Mogollon area and to the Hohokam area as well and that culture areas could not be so clearly delineated. Cultures were defined from limited excavation within a particular river valley, often with inadequate stratigraphic sequences and poorly known regional settlement patterns (cf. Masse 1980). Such definition created an impression of regional diversity that masked significant similarities.

To bring about some understanding of prehistoric cultural process at a regional level, archaeologists tried several approaches. In keeping with the culture area approach, some regarded prehistoric manifestations in the study area as Hohokam with Mogollon influence (Trischka 1933; Fulton 1938; Fulton and Tuthill 1940; Tuthill 1950) or as Mogollon with a strong Hohokam veneer (Sayles 1945; Wheat 1955). Tuthill grouped the Texas Canyon, Gleeson, Westfall, and Tres Alamos sites as part of the Dragoon complex (Tuthill 1950). Still other researchers felt that areal traditions were part of a Sonoran Brownware complex (Masse 1980), an indigenous O'otam culture (DiPeso 1956, 1958, 1979), a multi-tradition

zone (Goree et al. 1972) or just unknown (Tuthill 1947). The prehistory of the study area, particularly in the San Pedro Valley and eastward, is a complex one, with strong influences from the Hohokam, the Mimbres, and Casas Grandes playing important roles in different time periods (e.g. DiPeso 1951a, 1953; Franklin 1978; Franklin and Masse 1976; Westfall et al. 1979).

The most influential attempt to deal with the prehistoric cultural diversity in the study area has been DiPeso's O'otam concept (1956, 1958, 1979). According to which, the O'otam were the indigenous culture of the study region (DiPeso 1979:92). Their heartland extended from south of the Gila Valley, west to the Colorado River, east to the San Pedro Valley, and south to the Middle Yaqui.

Historic peoples in this area shared a common Piman language and broadly similar lifestyles with ultimate origins in the Cochise Archaic. Elements of this lifestyle included dispersed villages of shallow pit houses with wall step or inclined entries, a ceramic complex of brown-wares with rectilinear designs and unsmudged redwares, block or basin metates, triangular side-notched projectile points, proto-pallettes, three-quarter grooved axes, and flexed inhumations (DiPeso 1958:13, 1979:92). The O'otam as a prehistoric cultural entity includes such archaeological complexes as the San Simon Branch of the Mogollon, the Dragoon Complex, the desert Hohokam, and the Pioneer period Hohokam, particularly the Vahki phase (DiPeso 1979:91). Throughout their history, the O'otam (from a Piman word for "tribesmen") have been the recipients of ideas and traits from a variety of donor cultures, including the Hohokam (seen here as an intrusion from Mesoamerica about AD 800), Casas Grandes, western Mexico, and late Anasazi (DiPeso 1979:93-98).

The O'otam concept has been criticized on several grounds. In part, the temporal sequence of cultural contacts has been questioned by recent data from southern Arizona (e.g. Masse 1980) and nearby areas (LeBlanc 1980). Other criticisms have stemmed from the implicit use of the culture area approach in which the degree of relationships among cultural complexes is assessed from the shared presence or absence of specific items of material culture (e.g. Fritz 1977). Such an approach focuses on traits rather than behavior as units of comparison. Many of the traits, however, relate to architecture and subsistence practices, which are integral parts of human adaptation to specific environments. Yet DiPeso's approach seems to suggest that the only factor responsible for the presence or absence of traits is cultural preference. This approach overlooks the roles of differing adaptations or social systems in cultural manifestations (cf. Grebinger 1971a:165-166).

Others have criticized DiPeso for oversimplifying his view of historic Pimans, and creating a false impression of cultural homogeneity, a criticism again stemming from his use of the culture area approach (Doelle n.d.:3). Similarly, the role of the O'otam as passive recipients of influences from other cultures reduces the role of new ideas and traits in the O'otam adaptive system. Numerous studies have shown that more than knowledge of foreign ideas is needed for their incorporation

into a cultural system (see e.g. Woodburn 1968 on the non-adoption of agriculture by the Hadza; Boserup 1965 for factors in the adoption of intensive agricultural practices; Steward 1938 for the non-adoption of agriculture by the Great Basin Paiute; Dobyns and Euler 1967 for the differential adoption of the Ghost Dance by Pai bands.)

Finally, DiPeso's conceptualization of the nature of the Hohokam and Mesoamerican presence has varied from conquest (DiPeso 1968) to intrusion (1979) to a few merchants (1956, 1979), overlooking the differences inherent in these varied models. Accordingly, Doelle (n.d.:4) regards the O'otam-Hohokam scheme as inadequate for research direction because it minimizes cultural diversity, regards the interaction as undirectional, and overlooks the role of adaption to specific local environments.

SUBDIVISIONS OF MOGOLLON IN THE STUDY AREA

To further an understanding of the operation of cultural processes among the prehistoric complexes of the study area, a four-fold chronological scheme will be followed. Following Martin (1979:62), the discussion of each period attempts to present a cluster of specific attributes that prehistoric complexes share and that distinguish one period from others.

Period 1 is typologically equivalent to the San Simon early period, the Dos Cabezas and Pinaleno phases of the Intermediate period (Sayles 1945:62-64), the Formative Plainware period of DiPeso (1979:92-93), and the Mogollon 1 (Wheat 1955:185).

Period 2 is equivalent to the Galiuro phase and part of the Cerros phase of the San Simon Intermediate period (Sayles 1945:67-68), the Formative Painted Ware period (DiPeso 1979:93), and Mogollon 2 and 3 (Wheat 1955:185). It also includes Masse's (1980:3) initial Colonization period in the San Pedro Valley.

Period 3 is equivalent to the Encinas phase of the San Simon late period (Sayles 1945:68-69), includes part of DiPeso's Hohokam intrusion and part of his Casas Grandes intrusion events (DiPeso 1979:93-95), and overlaps with his O'otam reassertion (1956, 1958). It is partially contemporaneous with Mogollon 4 and 5 (Wheat 1955:185). Period 3 includes the Efflorescence and Retraction periods delineated by Masse (1980:3) in the San Pedro Valley.

Period 4 includes the Tanque Verde and Tucson phases of the revised Tres Alamos sequence (Franklin 1978) as well as the Huachuca phase and the early Babocomari phase (DiPeso 1951a) and the West Mexican trade contacts and Anasazi site-unit intrusion events of DiPeso (1979:98-99).

In general, chronological considerations are based on the most recent analysis of ceramic associations in the study area (Franklin 1978) (see Table 7 in Hohokam section of this chapter).

TABLE 10
O'OTAM AND MOGOLLON CHRONOLOGICAL SEQUENCES

Date	Bronitsky 1981	Di Peso 1979	San Simon Valley Sayles 1945		San Simon Revisions Franklin'78	Tres Alamos Tuthill 1947	Revised Tres Alamos Franklin'78	Late Sequence Di Peso 1951, 1953, 1958
1692	Period 4	Anasazi Site Unit Intrusion AD 1450						Bobocomari Phase AD 1450-1692 San Salvador de Baicatcan
1500		W Mexican Contacts AD 1350				Tucson Phase AD 1200-1450	Tucson Phase AD1350-1450	Boquillas Ruin (Peck Phase) Huachuca Phase AD 1250-1450
1400							Tanque Verde AD1225-1350	
1300		Casas Grandes Intrusion AD 1060-1340						Fairbank-Bidegain Phase AD1250-1300
1200	Period 3		San Simon Later Period	Encinas Phase AD 900-1200	Encinas Phase AD 900-1200	TanqueVerde AD1100-1200	Tres Alamos AD 900-1200	Fairbanks Phase AD 1150-1250 (Sosa Phase)
1100		Hohokam Intrusion AD 800				Tres Alamos Phase AD 900-1100		
1000					Overlap			
900	Period 2			Cerros Phase AD 700-900	Cerros Phase AD 800-1000	Cascabel Phase AD 700-900	Cascabel Phase AD 500-900	
800		Formative Painted-Ware Period						
700			San Simon Intermediate Period	Galiuro Phase AD 500-700	Galiuro Phase AD 500-900			
600		Formative Plainware Period						
500	Period 1			Pinaleno Phase AD 300-500				
400								
300				Dos Cabezas Phase AD 100-300				
200								
100			San Simon Early Period	Penasco Phase 300 BC-AD 100				
AD 1								
100								
200								

This chronological approach recognizes the criticisms of Wheat's five traditionwide periods (e.g. Bullard 1962:68-87) as well as Franklin's (1978:220ff) critique of the early San Simon Phases, incorporating a compression of these early phases. This compression is also implicit in the Formative Plainware period of DiPeso, which begins at AD 1, rather than 300 BC assigned to the start of the San Simon Penasco phase (Sayles 1945). A similar compression of phases and upward revision of dates also is evident in Lipe's (1978:360) recent review of the Mogollon.

Period 1

Period 1 is best known from the work of Sayles (1945), who excavated seven Penasco phase houses at Cave Creek on the east side of the Chiricahua Mountains and a total of 66 structures at San Simon Village 10 miles west of Bowie, near the Dos Cabezas Mountains. These excavations were the basis for the definition of the San Simon branch of the Mogollon. The San Simon branch was the southern and westernmost of any Mogollon branch in Arizona. Its northern boundary followed the Gila River. It had an undefined southern boundary and it gradually merged and interspersed with the Mimbres Mogollon on the east and the Dragoon tradition on the west (Wheat 1955:27). The appearance of settled villages in the San Simon Valley marks one of the earliest appearances of the distinctive culture of the Southwest (Willey 1966:189). The San Simon branch is also unique in lacking the larger, presumably ceremonial, pit houses of the other Mogollon branches (Wheat 1955; Willey 1966; Martin 1979).

At Cave Creek, structures were built in shallow pits with floor depressions, which may have been fire pits. Some depressions evidently held central support posts. In all likelihood, the butts of the posts may have rested directly on the ground around the pit. Patches of plaster in some structures suggest that floors and walls were plastered. No effort, however, was made to obtain level floors or straight walls, and large boulders were left in place. The result was a generally oval or circular structure with one or more flattened sides and rounded corners. Only one house at Cave Creek has an entryway (Sayles 1945:7).

Of the San Simon Village pit houses assignable to the Penasco phase, 60 percent were similarly rounded in outline having one or more flattened sides and lacking entryways. Another 15 percent were quadrangular in outline, again without lateral entries. The remainder of the houses had only short entries (Sayles 1945:19ff; Wheat 1955:40-42). In general, the floor area was smaller than in other branches of the Mogollon, averaging 9.9 square meters. Pit depth was also shallower than in other Mogollon branches, averaging 39 centimeters (Wheat 1955:41).

Material culture innovations during this first phase of the San Simon branch were limited to the pebble hammerstone, incised bone tubes, and rock cairn burial (Sayles 1945:66). The paucity of these innovations again reveals major continuities for the Cochise.

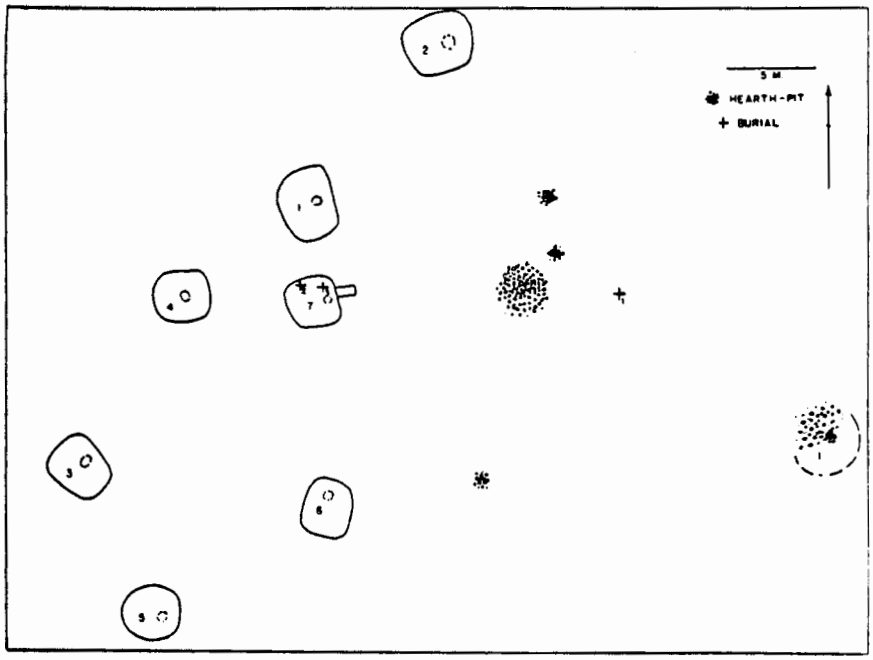


Figure 44. The Cave Creek Village. Houses, hearths, and burials. (Sayles 1945) Courtesy Arizona State Museum.

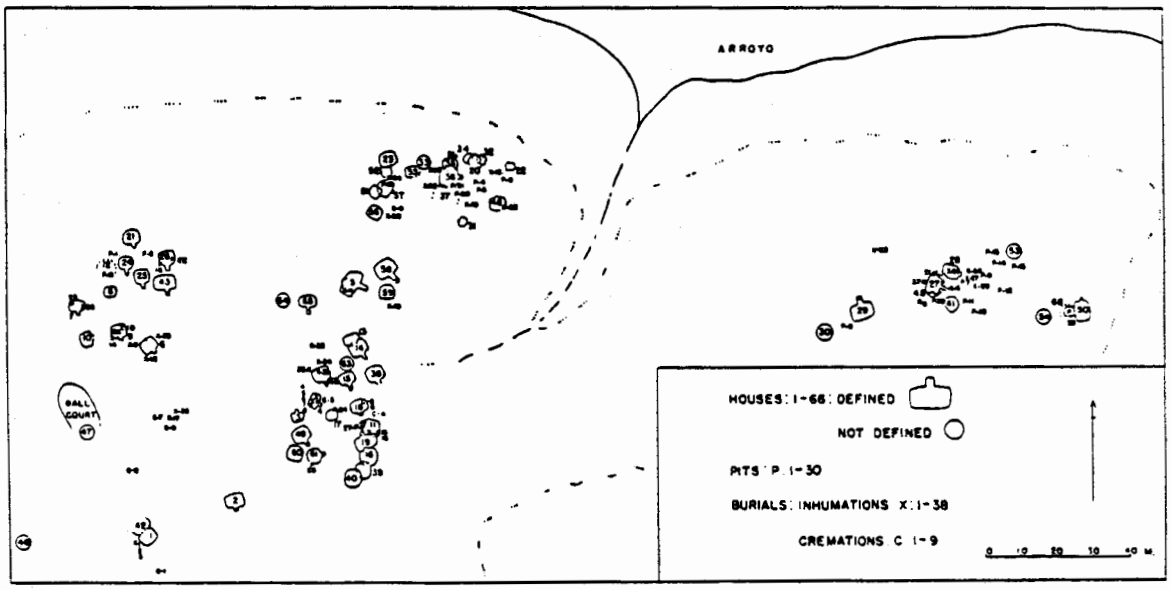


Figure 45. The San Simon Village. (Sayles 1945) Courtesy Arizona State Museum.

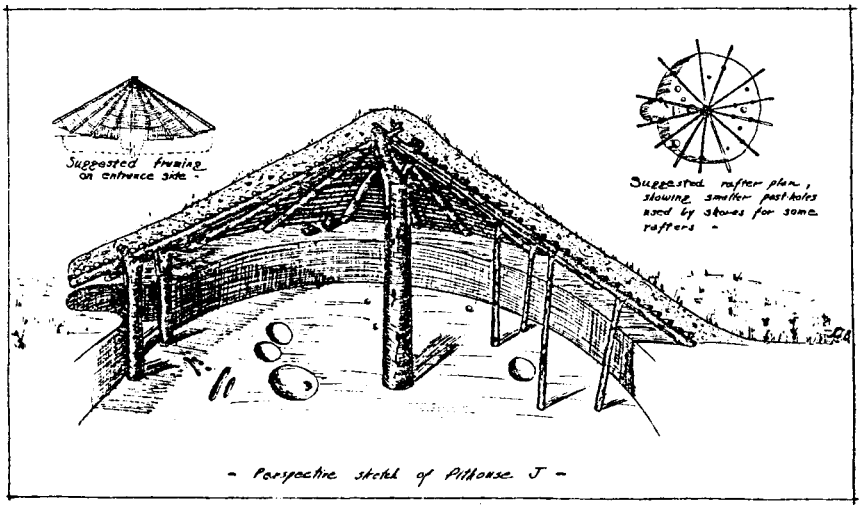


Figure 46. Reconstruction of a Mogollon Pithouse (Pine Lawn Phase).

Pithouse J, SU site, New Mexico. Diameter, 6.65 m. No fire-pit or deflector stone was found. A number of pits were dug in the floor and one contained a stone mortar. The roof was supported by a large central post and 20 smaller ones.

(Martin 1943) Courtesy of the Amerind Foundation, Inc., Dragoon, Arizona.

The earlier absence of rock cairn burial may simply be due to lack of archaeological recognition. Although Sayles presents no figures, inhumations during this period were commonly flexed on the side and interred in a pit, usually outside the house. Offerings are rare (Sayles 1945:62; Wheat 1955:66).

The major break with the Cochise was the appearance of ceramics. Although Sayles mentioned the indigenous manufacture of an early variant of the San Francisco Red and an early variant of Alma Plain, these variants lack adequate type descriptions (Sayles 1945:67; Wheat 1955:77). These wares were well made, and knowledge of techniques of manufacture probably diffused to both the San Simon and Mimbres branches from a common northern Mesoamerican source. These wares continued to occur throughout the later San Simon phases.

The earliest village excavated in the area was the Mesa Top site located on the Upper Gila River near Clifton. Carbon-04 dates for the two occupations are AD 55 ± 130 and AD 355 ± 65. Excavations yielded three pit houses, six hearths, two trash mounds, three lithic manufacturing areas, and four food processing areas (Berman 1978). The ceramics consisted of Alma Plain and San Francisco Red. Similarities and differences with both the Mimbres and San Simon branches of the Mogollon were observed in these ceramics.

The later Dos Cabezas and Pinaleno phases are distinguished mainly on ceramic grounds. Only three houses at San Simon Village were assigned to the Dos Cabezas phase, all with entries. Most houses at the site, however, were not assigned to particular phases, and the structures of these periods most probably lacked entries as well. Structures generally follow the Hohokam trend of rectangular outlines increasing and lateral entries lengthening through time (Sayles 1945:67; Wheat 1955:43-46).

In contrast, to the pattern in the Pine Lawn Valley (Martin et al. 1949), San Simon houses become larger, with a mean area of 13.2 square meters by the Pinaleno phase. Pits, however, remain shallow (Wheat 1955:47). Side-flexed burials continued although some seated burials also occurred and ceramic offerings increased in frequency through time (Sayles 1945:67).

The hallmark of the Dos Cabezas phase is Dos Cabezas Red-on-brown, the first decorated ware in the San Simon series and one of the earliest in the Mogollon as well. In general, San Simon ceramics have rectilinear designs with a pattern of quartering of the surface or pendant bands of design elements at the rim. Designs are red (hematite) on a reddish brown background. Shallow hemispherical bowls with direct rims predominated in the early forms. Early vessels featured decoration only on bowls, and then only on interior surfaces. Later both bowls and jars were painted on their exteriors (Sayles 1945:41). Jars were unusally globular with no neck or with large orifices with straight or flaring rims. Through time, the trend was away from early, incurving rims, accompanied by a shortening and thickening of the neck and reduction of the size of the orifice of jars (Sayles 1945:41).

Dos Cabezas Red-on-brown is very much a part of this tradition, with sectioned pattern designs of broad rectilinear lines and pendant rim triangles and bordering lines. Designs are polished over the decoration, and firing clouds are frequent (Sayles 1945:42). Dos Cabezas Red-on-brown differs from the later Pinaleno Red-on-brown, the diagnostic of the Pinaleno phase, in that the latter has narrower lines, exterior slipping and occasional bands below the rim of series of pendant rim triangles, and opposed triangles separated by a series of zigzag lines (Sayles 1945:42) (see Figure 20).

Although Dos Cabezas Red-on-brown was a typological forerunner of Pinaleno Red-on-brown, it occurred stratigraphically below Pinaleno Red-on-brown in pure association (Wheat 1955:85). The phases were dated through intrusive Mogollon ceramics, but the only non-local types found in association with Dos Cabezas Red-on-brown were San Francisco Red (hammered surface) and Alma Plain (textured surface), whose long period of use renders them difficult to use for chronological purposes (Sayles 1945:47).

Dos Cabezas Red-on-brown has no parallel in the Mimbres area. From the similarity of the crudely drawn broad-lined designs, Wheat (1955:86) claimed that San Lorenzo Red-on-brown in the Pine Lawn Valley is roughly equivalent to Dos Cabezas Red-on-brown. However, as Bullard (1962:80) has noted, San Lorenzo Red-on-brown does not occur as an intrusive at San Simon Village until the later Pinaleno phase. Instead, San Lorenzo Red-on-brown is typologically more advanced. As a result, Bullard (1962:80) contends that the Dos Cabezas phase was contemporaneous with the Georgetown phase in the Mimbres. The picture, however, is complicated by the temporal overlap between Dos Cabezas Red-on-brown and Pinaleno Red-on-brown in the later phase.

The earlier appearance of decorated wares in the San Simon area implies that Red-on-brown styles are earlier here than in the Mimbres region. That designs on Dos Cabezas Red-on-brown are virtually identical to the contemporaneous Estrella Red-on-gray in the Gila-Salt Basin suggests that this earlier appearance is related to geographical closeness to an unknown Mesoamerican or Hohokam source (cf. Wheat 1955:200). If so, the spread of this style to the Mimbres must have occurred near the beginning of the Pinaleno phase (Bullard 1962:80). Other Hohokam similarities are evident in similar ceramic design trends and changes in bone tubes. In fact, San Simon wares are almost impossible to distinguish from Hohokam wares at this time (Brody 1977:72).

From radiocarbon dated deposits in Tularosa Cave, Martin has posted a date of approximately 300 BC for the earliest Mogollon ceramics (Martin et al. 1952). Bullard, however, has questioned this early date, in part because of the absence of any dendrodates before AD 300 (Bluff ruin, Haury and Sayles 1947; Bullard 1962). As Lipe (1978:360) has noted, this problem in dating is complicated by problems of phase designation, with both the Pine Lawn and later Georgetown phases in use in the Pine Lawn Valleys but only the Georgetown phase employed in the Mimbres chronology.

Using dendrodates from both Georgetown and Pine Lawn phases between AD 400-600, Lipe has grouped both together into one temporal unit dating AD 250-650, merging Wheat's Mogollon Periods 1 and 2 and revising the dates upward. Wheat largely distinguished these two periods on the basis of the appearance of Dos Cabezas Red-on-brown as an early Mogollon decorated ware. Lipe's revision of the general Mogollon sequence supports the contention (Franklin 1978) that the dates from the early San Simon phases are too old.

Period 2

Period 2 represents a major expansion, with the appearance of sedentary ceramic-using communities first evident in the upper San Pedro Valley (Cascabel phase at Tres Alamos using Franklin's revised sequence) and Sulphur Springs Valley (Gleeson site). This expansion largely serves as the basis for distinguishing Period 2, Pinaleno Red-on-brown and the later Galiuro Red-on-brown, (hallmark of the Galiuro phase of the San Simon) as "sequent peaks in a single continuous development" (Wheat 1955:88). The isolation of the two as separate types is based primarily on stratigraphic evidence showing Pinaleno Red-on-brown as transitional between Dos Cabezas Red-on-brown and Galiuro Red-on-brown (Wheat 1955:88). Galiuro Red-on-brown has modified sectioned pattern designs and further modified bands of pendant rim triangles. Design elements are similar to Pinaleno Red-on-brown, with the presence of checkerboard and elaborated combinations of earlier elements. Lines usually are narrow, but medium and broad lines also occur (Sayles 1945:42). As the latter description indicates, these early San Simon ceramic types are not well defined. They are separated primarily on stratigraphic grounds rather than by stylistic-typological criteria. Other material culture remained unchanged.

Although a transition from the Cochise Archaic to the San Simon is well documented, no evidence exists for a similar transition in the valleys to the west of the San Simon--the Sulphur Springs and San Pedro Valleys. The reasons for this lack of evidence are unclear, but no types from these areas are equivalent to Penasco, Dos Cabezas, or Pinaleno Red-on-brown (Franklin 1978:92). The presence of sites like the Gleeson site in the Sulphur Springs Valley late in this period (AD 800-1000, Fulton and Tuthill 1940:47) and Tres Alamos near Benson in the San Pedro Valley (AD 700-1400, Tuthill 1947:17) without apparent precursors suggests some sort of population movement. Although the sequences at these sites have been given different phase designations and slightly differing chronological placements, architectural, ceramic, and material culture all show many similarities between these sites as well as with Texas Canyon (Fulton 1934a, 1934b, 1938) and Pearce:7:1(GP) near Bisbee (Trischka 1933). Tuthill (1950) grouped these sites as part of the Dragoon complex.

Franklin's review of the origins of the Dragoon complex considered three possibilities: (1) Hohokam expansion upriver with strong San Simon influence; (2) Mogollon expansion downriver, influenced by the Hohokam; and (3) Cochise origins, with strong Hohokam and Mogollon influences (Franklin 1978:367). After considering the available evidence, he concluded that the Dragoon complex and upper San Pedro Valley complexes in general were not Hohokam, who were adapted to the Lower Sonoran biotic province, but that Hohokam influence increased through time. Instead, ceramic evidence (strong ceramic affinities of the earliest Dragoon Red-on-brown ceramics to contemporaneous San Simon ceramics) suggested a Mogollon origin, with the Hohokam-Mogollon boundary located in the Benson area at the interface of the Chihuahuan and Sonoran life zones. The boundary was not a static one; considerable overlap is evident between "pure" Hohokam sites and Mogollon sites upriver, with the greatest amount

of overlap present between Benson and Redington (Franklin 1978:367-369). Both Hohokam and Dragoon complex manifestations end at the same time around AD 1200.

The earliest manifestation outside the San Simon Valley is the Tres Alamos site north of Benson on a terrace above the San Pedro River. As a result of the excavations, four phases were defined--Cascabel (AD 700-900, Tuthill 1947:17; AD 500-900, Franklin 1980:220); Tres Alamos (AD 900-1100, Tuthill 1947:17); Tanque Verde (AD 1100-1200, Tuthill 1947:17; AD 1225-1300 in earlier part of report), and Tucson (AD 1200-1450, Tuthill 1947:17; AD 1300-1450 in earlier part of report).

The ceramic hallmark for the Cascabel phase is Cascabel Red-on-brown, typologically equivalent to Galiuro Red-on-brown and sharing strong similarities with San Lorenzo Red-on-brown and Mogollon Red-on-brown (Franklin 1978:224; Tuthill 1947:50; Haury 1936:6-17). Deep hemispherical bowls are the major shape, and interiors are unslipped. Design elements are again rectilinear with varying line width. As with Galiuro Red-on-brown, designs are polished over. Exteriors are slipped and smoothed or polished. Temper is fine quartz sand, and the paste often has a gray core (Tuthill 1947:50-51). From its association with Gila Butte Red-on-buff and Santa Cruz Red-on-buff from the Gila-Salt Basin, Franklin suggested the type and phase date approximately AD 500-900, giving an earlier starting date than Tuthill.

The design elements are reminiscent of Hohokam styles, but the red paint, coil-and-scrape technique of manufacture, polishing, and bowl form are Mogollon, a combination characteristic of the entire Dragoon series (cf. Franklin 1978:198). Hohokam elements increase in frequency through time, accounting for the divergence between Dragoon and San Simon ceramics. These elements are much less prevalent east of the San Pedro Valley (Franklin 1978:198). Although Tuthill (1947) alluded to San Simon and San Pedro relationships, he did not elaborate (cf. Fulton 1938:21).

DiPeso has stated that, although Sayles, Fulton, and Tuthill were doing their ceramic analysis at the same time, they did not compare their respective collections or discuss their similarities or differences. The Red-on-brown's in all three areas are so similar that they probably should not have been placed in separate ceramic series (Kinkade 1981, personal communication).

Pit houses of the Cascabel and Tres Alamos phases are similar. Both the Mogollon pit house and Hohokam "house in a pit" occur in about the same numbers, with a slight predominance of the Mogollon type in the Cascabel phase. Several Hohokam type pit houses lacked the peripheral postholes normally associated with the Gila Basin type (Tuthill 1947:30). As with the San Simon, Mogollon pit houses tend to be shallower than those described by Haury (1936b), but both stepped and ramp entries were present. Mogollon pit houses were square with plastered side walls. Hohokam pit houses were even shallower and almost rectangular with straight or bulbous lateral entries and two roof support posts along the long axis. Fire pits were small clay-lined basins generally located between the entrance and the long axis (Tuthill 1947:30-33).

Figure 47. Pottery Designs on Red-on-brown Bowls from Tres Alamos. (Tuthill 1947) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.

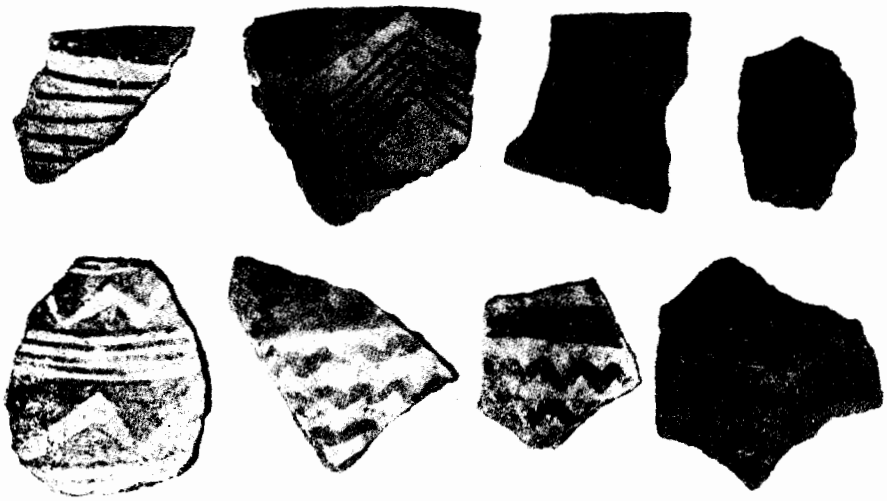


Figure 48. Period 2 Decorated Sherds. Cascabel-Galiuro Red-on-brown (above), Cerros Red-on-white (below). (Franklin 1980) Courtesy Arizona State Museum.

The Hohokam pit houses were essentially identical to the four or five Santa Cruz (Cascabel) phase pit houses (of the sixteen excavated), found downstream at Second Canyon ruin (Franklin 1978:38). The major difference was the presence of stone-outlined enclosures around two pit house clusters at Tres Alamos. The function of these enclosures is not known, although there is no evidence the low walls were defensive (Tuthill 1947:34). A unique variant at Tres Alamos was a type of Hohokam pit house with an entry opening into a depressed area around the fire pit, some 4-8 inches below the floor level (Tuthill 1950:55).

Other distinguishing features include a variety of pit ovens. At Tres Alamos, two pit ovens were flare-rimmed like the Hohokam type, and two were of the Dragoon type, a unique regional variant that had an olla- or bell-shaped profile. Some had plain bottoms, whereas others, such as those at Pearce:7:11(GP), had an arrangement of central and lateral holes whose function is unknown (Trischka 1933). At Gleeson and Texas Canyon, some later pit ovens had a circular arrangement in the bottom or crossed trenches or patterns of trenches and holes (Tuthill 1950:55-56). The elaboration of pit ovens appears to be unique to the Dragoon area. The presence of fire-cracked rock and the absence of animal bones suggest a use in processing mescal or other plant foods.

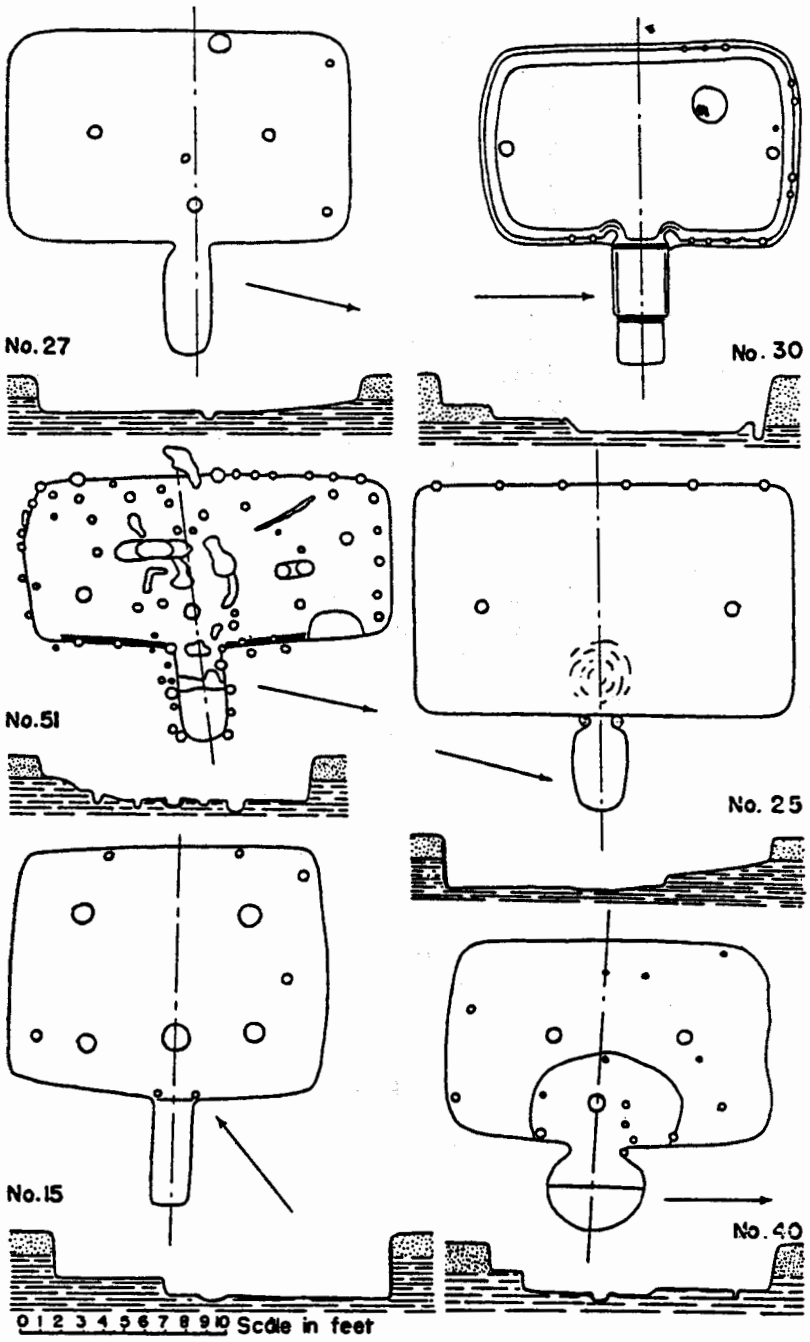


Figure 49. Plans and Sections of Pithouses of the Tres Alamos and Cascabel Phases.

Nos. 15, 25 and 27 are of the Mogollon type with plastered side walls. Nos. 30, 40 and 51 are of the Hohokam type. No. 40 has the recessed floor area around the fire pit that is typical of some pithouses of the Dragoon region.

(Tuthill 1947) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.

The stone, bone, and shell assemblages at Tres Alamos reveal strong affiliations with Hohokam peoples to the west (Tuthill 1947:64). Present were three-quarter grooved axes with longitudinal grooves on the bottom, possibly to facilitate hafting with a wedge, stone palettes of the Santa Cruz and Sacaton types, plain and carved stone bowls, bone awls and shell, carved bone, and stone ornaments in Hohoham styles (Tuthill 1947:64ff).

Thirty-one complete and fragmentary female human figurines of fired clay were found at Tres Alamos. Most were found with cremations and resemble the Sacaton and Santa Cruz phase figurines from Snaketown (Gladwin et al. 1938:234-235), complete with "coffee bean" eyes, headdresses and other decorations. One figurine was quite Mesoamerican in appearance with red pigment, headdress, and ear spools (Gladwin et al. 1938:81).

In contrast, the later figurines from Texas Canyon and Gleeson lacked these features and much of the elaboration (Fulton 1934a, 1934b, 1938; Fulton and Tuthill 1940). Such figurines do not occur at San Simon Village until the Cerros-Encinas phases (Period 3), suggesting a time lag in the west-to-east transmission of Hohokam ideas.

Representations of looped netting were found in the plaster on the walls of Pit House 16 at Tres Alamos, providing one of the few indications of textiles in the area (Tuthill 1947:64). Four stone spindle whorls also were recovered from late Tucson phase contexts (Tuthill 1947:72).

Projectile points of the Cascabel and Tres Alamos phases were long and slender, with serrated edges, again similar to Hohokam prototypes.

The majority of metates at Tres Alamos were of the open-ended trough type, although a few early basin-shaped metates were also found. the trough metate does not appear until the Cerros and Encinas phases at San Simon (Period 3) (Tuthill 1947:76; Sayles 1945:68), again suggesting a lag in the transmission of ideas from the Hohokam.

Period 3

Period 3 is marked by the introduction of white-slipped backgrounds to Red-on-brown pottery accompanied by design changes in Red-on-brown wares. The idea of white-slipped backgrounds had its origin in Three Circle Red-on-white in the Mimbres, dated AD 750-950 or 1000 (Breternitz 1966:97). It appears as Cerros Red-on-white (AD 850-950) in the San Simon branch and, slightly later, as a Tres Alamos Red-on-white variant of Tres Alamos Red-on-brown in the San Pedro Valley (approximately 900-1000) (Sayles 1945:42-43; Tuthill 1947:51). In the original definition, Sayles (1945:42) described Cerros Red-on-White as possibly "merely a variant of Three Circle Red-on-white. Both types coexisted with rather than replaced Red-on-brown types--Encinas Red-on-brown in the San Simon area and Dragoon Red-on-brown and Tres Alamos Red-on-brown in the San Pedro Valley (Sayles 1945:42). The similarities in design are such that

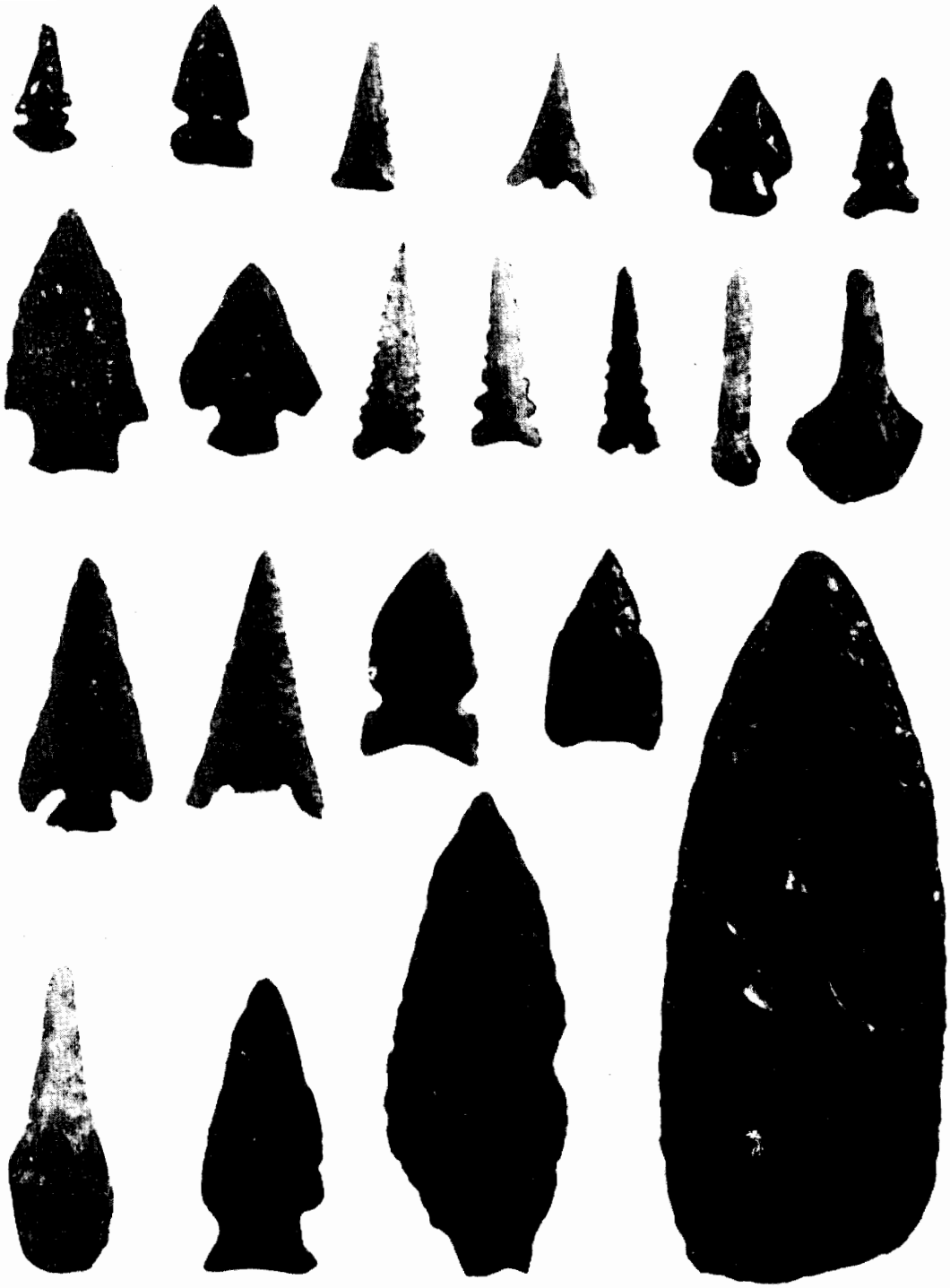


Figure 50. Projectile Points and Blades from Tres Alamos. Length of large blade is 4 11/16 inches. (Tuthill 1947) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.

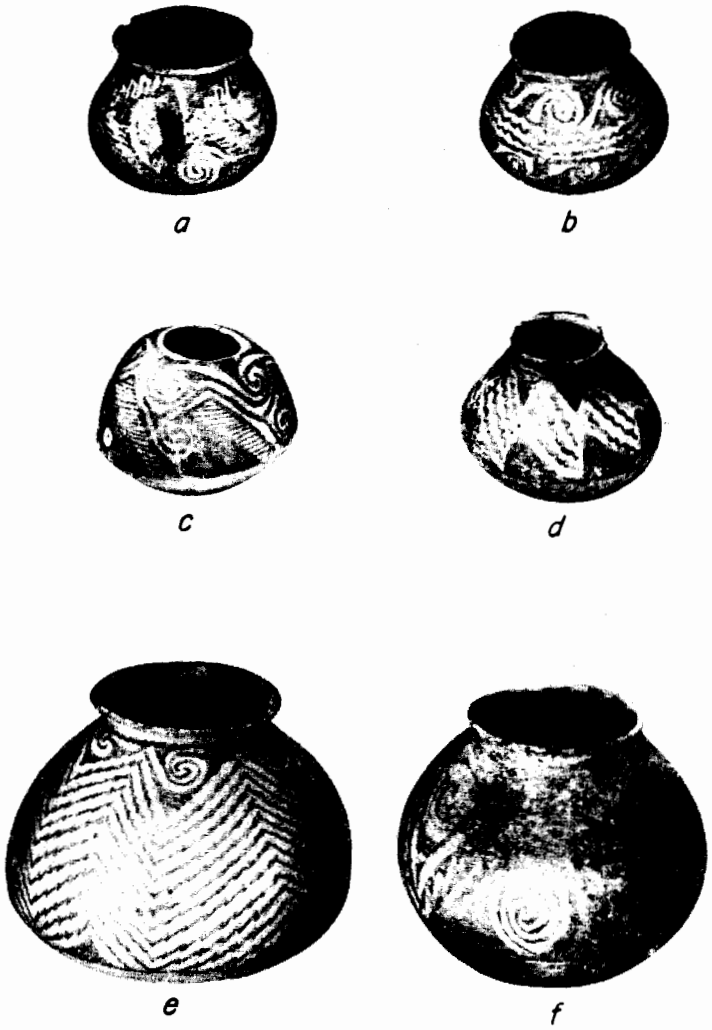
Franklin has called for recognition of these types as regional variants of the same type (Franklin 1978:225). Tuthill has suggested that Tres Alamos Red-on-white was made at the same time as Dragoon Red-on-brown, and both types have strong stylistic similarities with Sacaton Red-on-buff, further supporting the idea of contemporaneity (Tuthill 1947:83; Franklin 1978:225; cf. Fulton and Tuthill 1940:41; vs. Wheat 1955:96).

Cerros Red-on-white is similar to Galiuro Red-on-brown, the preceding type. The main difference is white-slipped backgrounds and the first appearance of curvilinear designs such as scrolls and squiggly lines. These Hohokam design elements, however, are found in a continuing Mogollon tradition of polishing over design and red paint (Sayles 1945:42-43). The Tres Alamos white-slipped variant had a similar white-slipped background, although polishing over the design is not common. Design elements are both rectilinear and curvilinear, with wavy lines and scrolls again most common in the curvilinear. Design layouts continue the quartered and banded patterns of Cascabel Red-on-brown, and temper continued to be sand and quartz grains, with gray paste cores (Tuthill 1947:52-53).

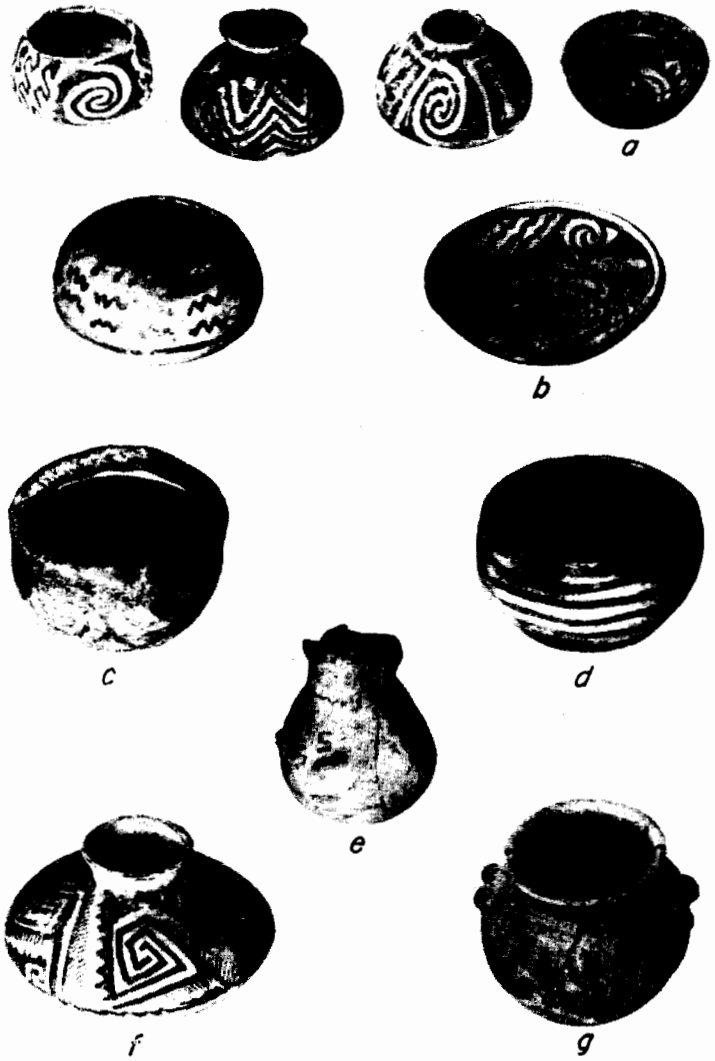
Tres Alamos Red-on-brown is the same as the white-slipped variant in all other features except white slip, and may be a regional version of Dragoon Red-on-brown, first described from excavations at Texas Canyon (Fulton 1934a, 1934b, 1938) and Pearce:7:11(GP) (Trischka 1933). The use of both paddle-and-anvil and coil-and-scrape finishing techniques and the presence of Gila-shouldered forms and curvilinear design elements, however, led Fulton and Tuthill to described this type as a Hohokam variant, a further indication of the melting-pot role of the San Pedro Valley in regional prehistory (1940:41). Here again, temper was of sand with quartz grains.

Bowl interiors were not always slipped (unlike Cerros Red-on-white) but were usually smoothed or polished before decoration. Exteriors were usually left unfinished. Shapes include platters, globular ollas, Gila-shouldered vessels and bowls, both with incurving rims and hemispherical flare-rimmed vessels. In contrast to the other wares, almost no polishing occurs over decoration. Designs, however, are similar with curvilinear motifs such as scrolls and rectilinear elements. Design layouts are trisected, quartered, sectioned, or banded with other variants also present. Moreover, four-pointed stars are often used as quartering lines, a characteristic of regional wares that DiPeso has claimed for the O'otam (Fulton and Tuthill 1940:43, 44; DiPeso 1981, personal communication). Associated intrusive wares include Santa Cruz Red-on-buff, Sacaton Red-on-buff, Three Circle Red-on-white, Mimbres Classic and Bold Face Black-on-white, Rincon Red-on-brown, and Rillito Red-on-brown (Sayles 1945:47; Tuthill 1947:59; Fulton and Tuthill 1940:47). Mimbres Black-on-white and Rincon Red-on-brown were found in the Fairbank phase at Quiburi, but destruction of the village remains for adobe by later Spaniards rendered any further comparison impossible (DiPeso 1953:60).

The last ceramic type in the San Simon series is Encinas Red-on-brown. It is similar to Cerros Red-on-white except for the absence of a



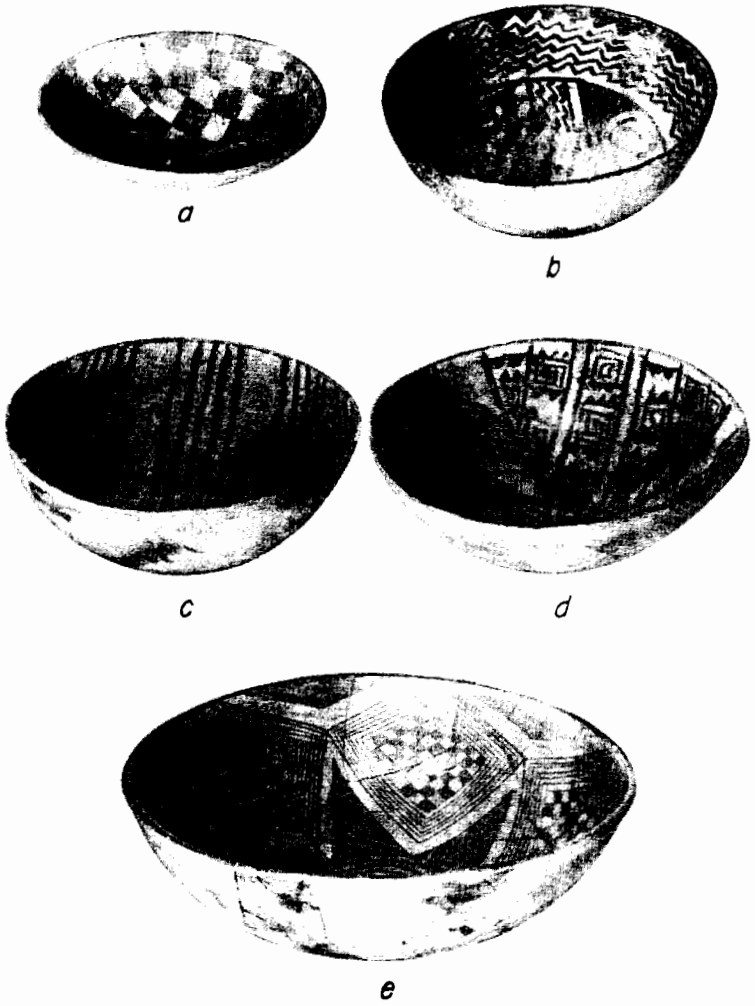
RED-ON-BROWN OLLAS. *a* AND *e* ARE RINCON RED-ON-BROWN. *b*, *d* AND *f* ARE TRES ALAMOS RED-ON-BROWN. *c* IS DRAGOON RED-ON-BROWN. DIAMETER OF *e*, 11½ INCHES.



SMALL BOWLS AND OLLAS. *a*, *b*, *c* AND *d* ARE TRES ALAMOS RED-ON-BROWN. THE REST ARE HOHOKAM. *c* IS THE ONLY BOWL WITH A HANDLE. DIAMETER OF *f*, 6¼ INCHES.

Figure 51. Bowls and Ollas from Tres Alamos.

(Tuthill 1947) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.



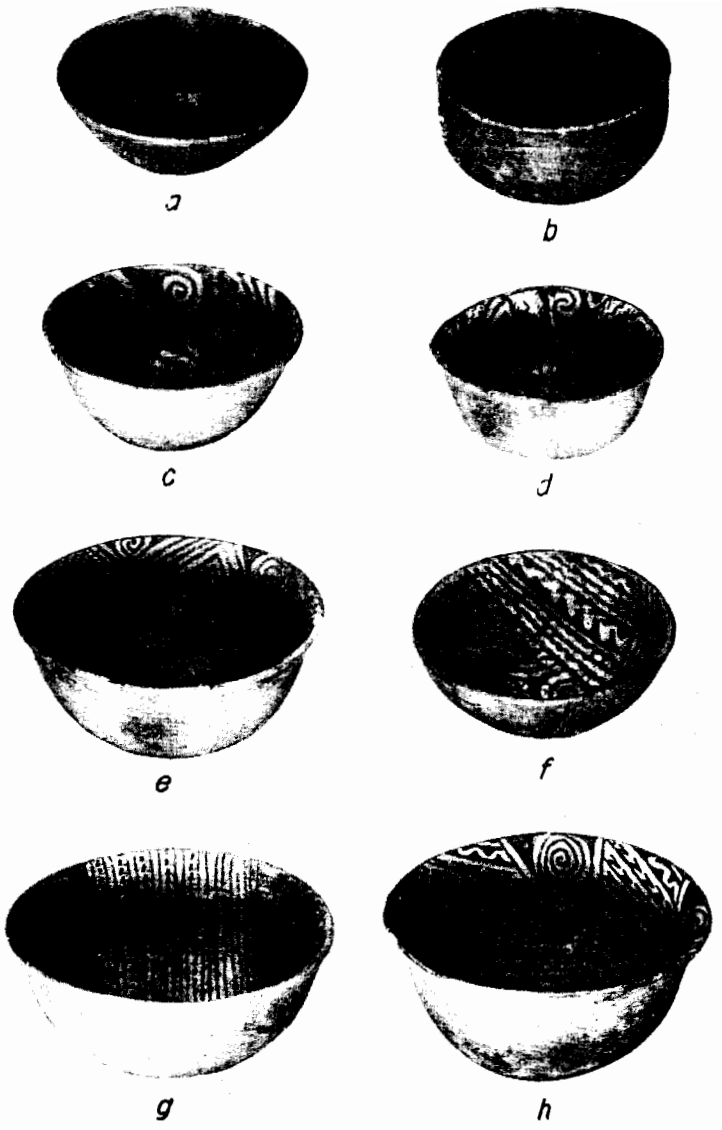


Figure 52. Bowls from Tres Alamos.

RED-ON-BROWN BOWLS. *a* AND *b* ARE TRES ALAMOS RED-ON-BROWN. *c* AND *d* ARE ENCINAS RED-ON-BROWN. *e* IS DRAGOON RED-ON-BROWN. DIAMETER OF *e*, 15¼ INCHES.

REDWARE AND RED-ON-BROWN BOWLS. *a* IS SAN FRANCISCO RED; *b*, DRAGOON RED; *c*, DRAGOON RED-ON-BROWN; *d*, RINCON RED-ON-BROWN; *e*, *g*, *h*, DEEP WELL RED-ON-BROWN, A VARIANT OF RINCON; *f*, TRES ALAMOS RED-ON-BROWN. DIAMETER OF *h*, 10¾ INCHES.

(Tuthill 1947) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.

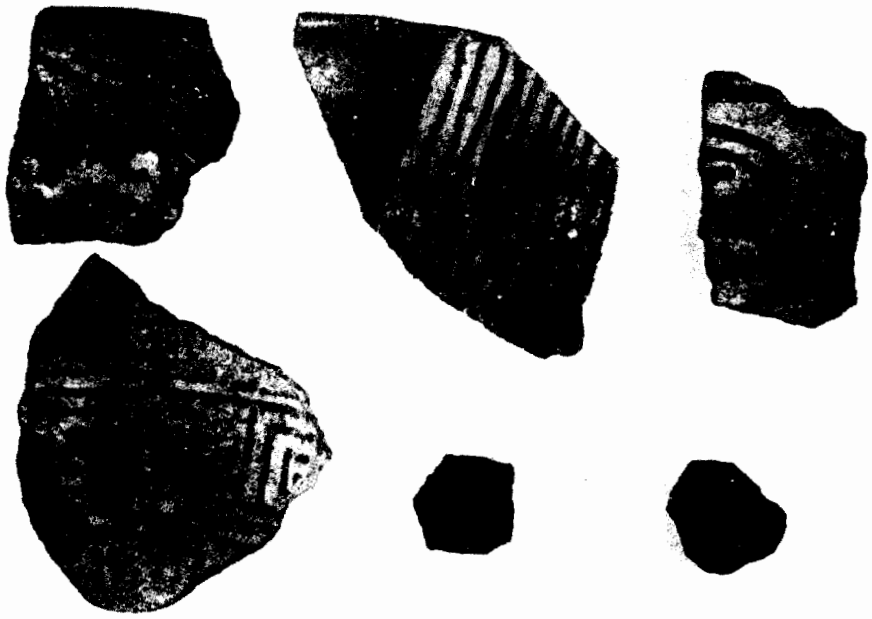


Figure 53. Encinas Red-on-brown Pottery. (Franklin 1980) Courtesy Arizona State Museum.

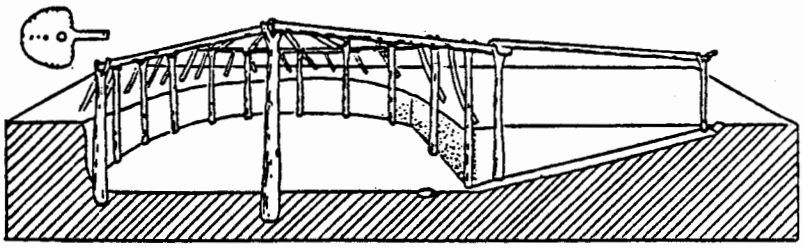
white slip. Both types may be variants of the same theme, much like Tres Alamos Red-on-brown and its white-slipped variant. Designs consist of rectilinear, curvilinear, and repeated small elements such as crosses, circles, and dots, often in bands or sections. Fuzziness of design line shows continuation of polishing over design (Sayles 1945:43).

Encinas Red-on-brown sherds were also recovered from excavations at CC:10:1, a San Simon pit house near Willcox (Kayser and Fiero 1970). Although the wares are not described, Johnson and Thompson (1963:476) reported several pit house villages with Red-on-brown wares similar to Encinas Red-on-brown from survey in the adjacent Sulphur Springs Valley. Kinkade (1981, personal communication) has reported that San Simon ceramics have also been found to the west (e.g. Paloparado, DiPeso 1956:363-365).

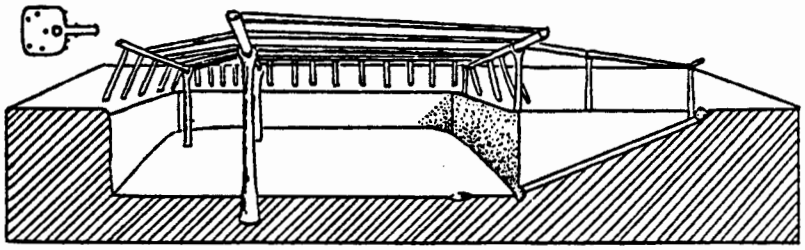
Domestic architecture continued largely unchanged. In the San Simon Valley, pit houses continued a trend towards more rectangular shapes, often with a stepped entry on the long side and two roof support posts along the long axis (Sayles 1945:68). Similar lack of change is evident at Tres Alamos (Tuthill 1947:30).

At the Gleeson site, 22 houses were excavated. Six of these were Fulton and Tuthill's type I, which were unique to Gleeson, with a depressed area of from 4-8 inches around the fire pit, a reed groove around the edge of the floor, and lateral entries (all short, straight-sided and without steps). Type I structures resembled some at Roosevelt:9:69(GP) (Haury 1932) (Fulton and Tuthill 1940:14).

Type II pit houses at Gleeson were similar to type I but lacked the depressed area, resembling Gila Butte and Santa Cruz phase structures at Snaketown (Gladwin et al. 1938). Nine houses were of this type (Fulton and Tuthill 1940:16). The remaining domestic structures (types III-VI) were similar to Mogollon pit houses of the Three Circle and San Francisco phases, with deeply excavated pits, straight walls, square corners, long entries with one step, and four roof support posts at the corners (Fulton and Tuthill:17-19). Here again, pit ovens resembled those at Pearce:7:1(GP), Texas Canyon, and Gleeson and most were undercut and olla-shaped (Fulton and Tuthill:20).



a



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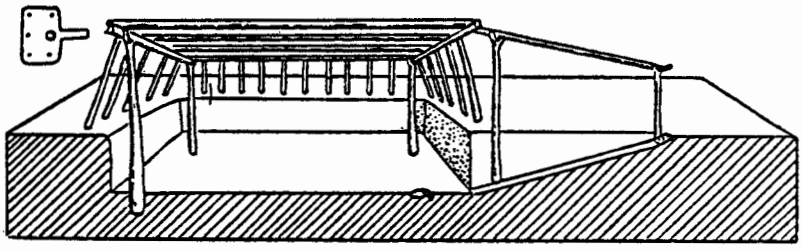


c

Figure 54. Mogollon Pithouses. Postulated reconstructions of the dewlling units of the three Mogollon phases represented by the houses in the Harris Village. a. Georgetown, b. San Francisco, c. Three Circle. (Wormington 1961) Courtesy Arizona State Museum and Denver Museum of Natural History.

Material culture at Gleeson was strongly Hohokam in character. Artifacts included three-quarter grooved axes, stone palettes and combs (the combs similar to specimens from Pearce:7:1(GP), Trischka 1936), carved stone bowls, a ceremonial point of calcite reminiscent of Gila-Salt Basin points, simple human figurines, and effigies of animals. Projectile points were serrate, triangular, stemmed, and laterally notched (Fulton and Tuthill:28ff).

No diagnostic projectile points were defined at San Simon Village, but Sayles (1945:51) reported two types of points. One was a heavy, lateral, and diagonally notched type; the other was lighter, serrated, and triangular. Sayles did not make any temporal distinctions due to insufficient data, but he regarded the heavy points as similar to Mimbres points and to some of the Gleeson points. Westfall et al. (1979:52) noted a similarity between the small triangular San Simon point and the Sacaton phase point.

Turquoise was abundant at the Gleeson site, and several ornament manufacture areas were present. Turquoise is still mined nearby, and the Gleeson inhabitants also exploited this resource (Fulton and Tuthill 1940:36). A similar abundance was reported at the nearby site of Pearce:7:1(GP) (Trischka 1933:425).

A variety of shell ornaments were found at Gleeson, including one cache of 34 shell bracelet fragments. Shell ornaments were all in the Hohokam style (Fulton and Tuthill 1940:37-38).

By the Encinas phase, Hohokam and Mimbres influences (the latter especially in ceramics) were strong enough to practically obliterate the distinctive San Simon characteristics (Sayles 1945:68; cf. Quinn and Roney 1973:19). Although flexed inhumations and the general San Simon house type continued, Hohokam style shell bracelets, pendants, figurines with "coffee bean" eyes, three-quartered grooved axes and palettes, and incised stone vessels were part of the San Simon assemblage, all indicative of Hohokam contacts. The stone bowls are similar to those from other contemporaneous sites (e.g. Pearce:7:1(GP), Trischka 1933:426). Shallow rectangular pit houses with stepped entry and postholes along the long axis and around the edge are also reminiscent of Hohokam types. Also during this phase appeared secondary cremations in shallow pits, although flexed inhumations accompanied by ceramic offerings continued (Sayles 1945:62, 69).

More than just Mimbres influence in ceramics is evident in the study area; several pure Mimbres sites have been reported as well. From architecture and ceramics, Sayles (1945:2) classified some sites in the San Simon area as Mimbres, and Sauer and Brand (1930) noted other Mimbres sites in this valley. Late San Simon sites, however, are marked by many Mimbres characteristics, making field identification difficult. A number of Mimbres sites have been recorded to the northeast of the study area in the Gila Mountains and to the north in the lower Blue River drainage (Danson 1957:27, 97-106). Mimbres sites also occur in the Safford area (Sauer and Brand 1930:428-429; Kinkade 1981, personal communication).

Mimbres sites are interspersed with San Simon sites in the San Simon Valley, but the nature of the interaction between the two branches is unknown.

The mix of Hohokam and Mogollon elements is also noticeable in mortuary customs in the study area. At Gleeson, 111 burials were recovered, only 9 of which were cremations, a phenomenon Fulton and Tuthill (1940:25) felt was difficult to explain in a community evidently so strongly Hohokam. Five of the cremations were primary and without ceramic accompaniments; the other four cremations were of the urn type. All the inhumations were flexed, usually on the back, but the body had no consistent orientation. Forty-seven of the inhumations (47 percent of the total) were accompanied by grave goods, ranging from a small turquoise bead with an adult to a necklace of turquoise, shell and stone beads, eleven shell bracelets, and five ceramic vessels with the inhumation of a child. Most ceramic vessels in graves had been "killed." No specific burial area was found. Most interments were found between domestic structures (Fulton and Tuthill 1940:25-27).

In contrast, at Tres Alamos, 35 cremations and 20 inhumations were found. Of the inhumations, only one, that of a child, had accompanying grave goods in the form of two Red-on-brown bowls and a plainware olla, dating to the Tres Alamos phase. Because of the lack of offerings, the rest of the inhumations could not be placed as to time. Thirty of the 35 cremations had accompanying offerings, usually vessels or sherds. Again, the most offerings were found with the cremation of a child--eight ceramic bowls, stone and shell ornaments, and a bone ring (Cremation 25). It is unclear on what basis the age identification was made; it is usually difficult to assess the age of an individual from cremated remains.

The evaluation may have been made from the amount of bone present, although no systematic comparison of cultural practices has been undertaken in this regard. At Cremation 3, six complete clay figures and the fragments of three others were found. Only one crematory pit was found, suggesting that use of a funeral pyre was the common custom (Tuthill 1947:43-50).

At Texas Canyon, both inhumation and cremations were reported, some of the cremations in Gila-shouldered vessels with cover bowls (Fulton 1934b, 1938). Finally, at Pearce:7:1(GP), only extended inhumations were reported (Trischka 1933). The general spatial distribution suggests that inhumations were introduced from the Mogollon and become less frequent the closer to the Hohokam (cf. Tuthill 1947:50; Franklin 1978:352).

Perhaps the most impressive Hohokam manifestations in the study area are the ball courts, whose range of variation suggests diffusion of the concept, rather than direct introduction. At BB:15:3, near Redington on the lower San Pedro River, DiPeso (1951b) excavated a ball court of the Casa Grande type. As defined from excavations at Snaketown, the Casa Grande type is smaller than the Snaketown type, much more oval, and has much smaller end passages. Like the Snaketown type, it has a center marker. Elsewhere, such ball courts date to the Sedentary and Classic

periods (DiPeso 1951b; Wasley and Johnson 1965:84). The curved walls of this type have led to the suggestion that they may have actually served as dance plazas (Ferdon 1967).

The ball court at BB:15:3 had a north-south longitudinal axis oriented at 2 degrees west of true north and three goals on the long axis. Given the presence of such courts in the San Simon Valley and at Tres Alamos, DiPeso (1951b:258) suggested that other ball courts probably exist in the area.

The ball court at San Simon Village was also of this type with an oval floor area. But it lacked any visible end passage at the north end and the south end has been destroyed by later Encinas phase San Simon house construction. The only floor features were a depression 10 centimeters deep and 45 centimeters in diameter at the center and a nearby posthole. No definite markers were found. This ball court was oriented about 30 degrees west of true north (Sayles 1945:31-32).

The oval 190-foot-long ball court at Tres Alamos appears to represent a fusion of both Gasa Grande and Snaketown types. The playing area is 170 feet long, and the court is 75 feet wide at its widest. The court also features a north-south orientation, and low places in the wall at each end served as end passages. A stone marker was found in the south end of the playing floor. The orientation and oval shape are reminiscent of the Casa Grande type, but the size of the court and length of the playing field suggest a Snaketown court (Tuthill 1947:38-40). The few sherds found in the fill revealed a temporal placement in the Tres Alamos or late Cascabel phases (Tuthill 1947:38). Several stone paddles were found in and around the ball court, averaging 8-9 inches long. A similar paddle was found at San Simon Village (Sayles 1945:54, 68; Tuthill 1947:41). Such stone paddles are unique to this area and have not been reported elsewhere. It is not known whether the presence of paddles in this area reflects a difference in game play or the lack of preservation of wooden paddles in other regions (cf. Tuthill 1950:57).

DiPeso (1956, 1979) has ascribed many of these changes to intrusion by successive Hohokam and Casas Grandes mercantile thrusts into the O'otam heartland at AD 800 and AD 1060-1340, respectively. Current research, however, has not supported such a large intrusion. LeBlanc's (1980) re-analysis of the dates from Casas Grandes places the expansionist Medio period at AD 1150-1300, long after the initiation of many of the changes during Period 3.

Period 4

Period 4 began with the cessation of indigenous ceramic styles, such as the Dragoon and San Simon series, throughout the area. No further developments are apparent in the San Simon Valley (Sayles 1945) or in the Sulphur Springs Valley (Johnson and Thompson 1963). In the San Pedro Valley, the Tres Alamos phase was followed by the Tanque Verde phase, which is known only from "a sackful of sherds" (Tuthill 1947:59). The

paucity of sites at this time (AD 1225-1300) suggests a population decline accompanied by a reorientation away from the Gila-Salt Basin toward the Tucson Basin (Franklin and Masse 1976:49). Hohokam sites in the lower San Pedro Valley were also abandoned at this time (Franklin and Masse 1976:49).

Dudley Mead, the excavator of the Twin Hawks site (Hohokam) has suggested the existence of several large Mogollon villages in the pediments of the mountains flanking the San Pedro Valley, environments similar to Mogollon areas to the north (reported in Franklin and Masse 1976:50). Until the results are released, the relationships between these villages and groups outside the area must remain speculative.

At Tres Alamos, the Tanque Verde phase is followed by the Tucson phase (placed by Tuthill (1947:17) at AD 1200-1450 but considered to date AD 1350-1450 in the Tucson Basin). Three adobe-walled compound structures dated from this period, one with three integral and contemporaneous pit houses, much like Second Canyon ruin (Franklin 1978:76). Only two of the compounds were excavated. Three one-room surface structures were also found at Tres Alamos. In contrast to Salado compounds in the Gila-Salt Basin (e.g. Los Muertos, Haury 1945a), the compound walls were relatively thin. In Tuthill's (1947:22-23) view, these compounds are a result of Salado "inspiration," not immigration, but in all likelihood they are another manifestation of the Salado phenomenon.

Each compound consisted of 20 surface rooms clustered into small groups around the edge and connected by compound walls. The rooms were fairly large (mean dimension of 12 by 14 feet); small rooms were probably used for storage. Room hearths were clay-lined basins nearest the wall forming the inside of the patio. The standard roof support pattern consisted of two posts along the long axis, a pattern matched by the three one-room surface structures.

The three pit houses in Compound I had entrances inside the patio, but the bodies of these structures lay outside the compound. Evidently they were built before the compound walls were finished. All three houses had subsurface walls of puddled adobe filled with rocks. Surface walls were built the same way. As with the surface structures, hearths were located in front of the entrance. The pit houses were probably domestic rather than ceremonial (Tuthill 1947:18-23).

In the courtyard of Compound II were several granaries, consisting of low circular adobe walls or rock platforms and unique to Tres Alamos (Tuthill 1947:27). Both the compounds and contemporaneous pit houses (but not the granaries) are essentially identical to Salado structures at Second Canyon ruin, which have been discussed in a previous part of the report (cf. Franklin 1978:76).

Period 4 is best known from the work of DiPeso (1948, 1951a, 1953a, 1956, 1958, 1979) in the San Pedro, Babocomari, and Santa Cruz River Valleys. This work was designed as a long-term study of the late prehistoric and early historic periods in an attempt to understand the relationships between archaeological complexes and historic groups found by

the Spaniards (cf. DiPeso 1948:14). For DiPeso, Period 4 is equivalent to the period of O'otam reassertion after the explusion of the Hohokam by the indigenes (DiPeso 1956:19).

The earliest manifestation of this reassertion is the Fairbank phase, known from excavations at the site of Quiburi (EE:8:1) in the San Pedro Valley near the town of Fairbank (DiPeso 1953a). This phase is known from the excavation of three houses underlying the earliest Sobaipuri horizon at the site. Most of the material of this phase had been destroyed by late Spanish construction. The houses were rectangular with rounded corners. They averaged 4 meters long and 3.5 meters wide and were cut into shallow (17 centimeter) pits (DiPeso 1953a:123). Remnants of mud wall sections from House C with branch impressions revealed probable wall construction of jacal. No definite entries were found, and only House C had a fire hearth of circular adobe construction with a low rim.

A total of 936 sherds were recovered from these structures, 71 percent of them plainwares. A tentative occupation date of AD 1150-1250 was assigned from associated sherds of Tanque Verde Red-on-brown and Mimbres Black-on-white. More recent evaluation of area ceramics reveals that these materials may be somewhat younger because Tanque Verde Red-on-brown dates post AD 1200 (e.g. Franklin 1978; Kelly 1978). DiPeso (1953a:268) reported that a few sherds of San Carlos Red-on-brown were found. In the Tucson Basin, this type occurs late in the span of Tanque Verde Red-on-brown (Kelly 1978:59). The site was then abandoned, and no links were found with later Sobaipuri occupations (DiPeso 1953a:125).

To the north, excavations at the Bidegain site (BB:11:13) near Cascabel revealed an occupation similar to that at Quiburi (DiPeso 1958:7). Although it is not reported in detail, resemblances with the Fairbanks material led DiPeso to propose a Bidegain-Fairbank phase, dated AD 1250-1300 from associated ceramics. Of the decorated wares, 18 percent were Rincon Red-on-brown, 12 percent were of the later Tanque Verde Red-on-brown, and 7 percent were the earlier Rillito Red-on-brown. This ceramic assemblage probably dates to the twelfth century, a supposition supported by the presence of associated Encinas Red-on-brown, whose manufacture ended around AD 1200.

The Bidegain site was evidently a small stockaded hilltop village of oval shallow pit structures (DiPeso 1958:7). Both the Bidegain site and the Fairbank occupation at Quiburi may be equivalent to the sites of Twin Hawks and Bartlett's excavations near the Big Ditch site, particularly the Twin Hawks site with its Tanque Verde Red-on-brown and San Carlos Red associated ceramics (Franklin and Masse 1980:50; Franklin 1978:205; Masse 1980:28). The lack of reports from these sites, however, prohibits further comparison. DiPeso (1958; 1979) mentioned a Sosa phase in the San Pedro Valley and a Peck phase in the Santa Cruz Valley, AD 1200-1540 (DiPeso 1956:270, Figure 40) as the temporal equivalent of the Bidegain and Fairbank material but provides no real definition. Both materials are regarded as Classic period manifestations, probably late Classic equivalents of the Tucson phase in the Tucson Basin (DiPeso 1956:270).

Rex Gerald test excavated the site of Boquillas ruin (EE:8:4) on the San Pedro River near Fairbank (DiPeso 1953a:52). It was occupied after the Fairbank horizon at Quiburi (DiPeso 1953a:49). Several test pits yielded 283 sherds from three houses. Again, most sherds were plainwares, ranging from 81 percent of all the sherds at House 2 to 88 percent at House 1. The predominant decorate types were Tanque Verde Redlon-brown (7 percent of all sherds at House 3, 6 percent of all sherds at House 2) and Gila Polychrome (5 percent of all sherds at House 3, 8 percent at Houses 1 and 2), showing an occupation postdating the Bidegain and Fairbank horizons. At House 1, 4 percent of the sherds were Tonto Polychrome, also showing a relatively late temporal placement in the span of Tanque Verde Red-on-brown (DiPeso 1953a).

One cobble masonry room was excavated at San Salvador de Baicatcan, probably a prehistoric Salado site. A total of 132 floor sherds were recovered; 53 percent of these were plainwares and 47 percent were Gila Polychrome (DiPeso 1953a:136). The room's architecture resembles the Babocomari Village site (EE:7:1), which also had a high frequency of Gila Polychrome in the first, Huachuca, phase (DiPeso 1951a). The Babocomari Village lies between the Huachuca and Whetstone Mountains in the Babocomari River Valley on the west side of the San Pedro Valley. It was excavated to learn more about a possible Salado migration into the San Pedro Valley after AD 1400. No evidence was found for such a movement (DiPeso 1951a).

DiPeso's Huachuca phase dates from AD 1250-1450. During this period, the village plan at Babocomari consisted of house clusters around a central plaza. A second group of houses in a semi-circle bordered the western section of the plaza. These houses were built of puddled adobe walls with a trench foundation. The roof supports system consisted of three rows of parallel posts, usually six to a row. Over 50 percent of the houses had a cache in or near the postholes, possibly for dedicatory offerings. Axes, fleshing knives, and shaft smoothers were recovered from these caches. At this time, the doorway was simply an opening in the wall facing the plaza. Hearths consisted of shallow basins, sometimes plastered, and always in front of the doorway, thus, facing the plaza. Ash pits were situated behind the hearth (DiPeso 1951a:26ff, 210).

Several shallow round pits with evidence of jacal superstructures were interpreted as women's houses, from an ethnographic analogy with historic Pimans. The pit houses contemporaneous with compound structures like Tres Alamos and Second Canyon may have served a similar function (DiPeso 1951a:30). A ceremonial room was also identified from the presence of an adobe banquette and an unusual arrangement of fire hearth and ash pits. Otherwise the room resembled those just described (DiPeso 1951a:24).

Three types of outdoor cooking pits were excavated, generally 2-5 meters in from the inner plaza wall of house groups. The most common type was a simple shallow pit. Deep pear-shaped pits and stone-lined cists were also found (DiPeso 1951a:93). Several adobe borrow pits, a possible water cisterns, and a ramada were also excavated in the plaza area (DiPeso 1951a:992-93).

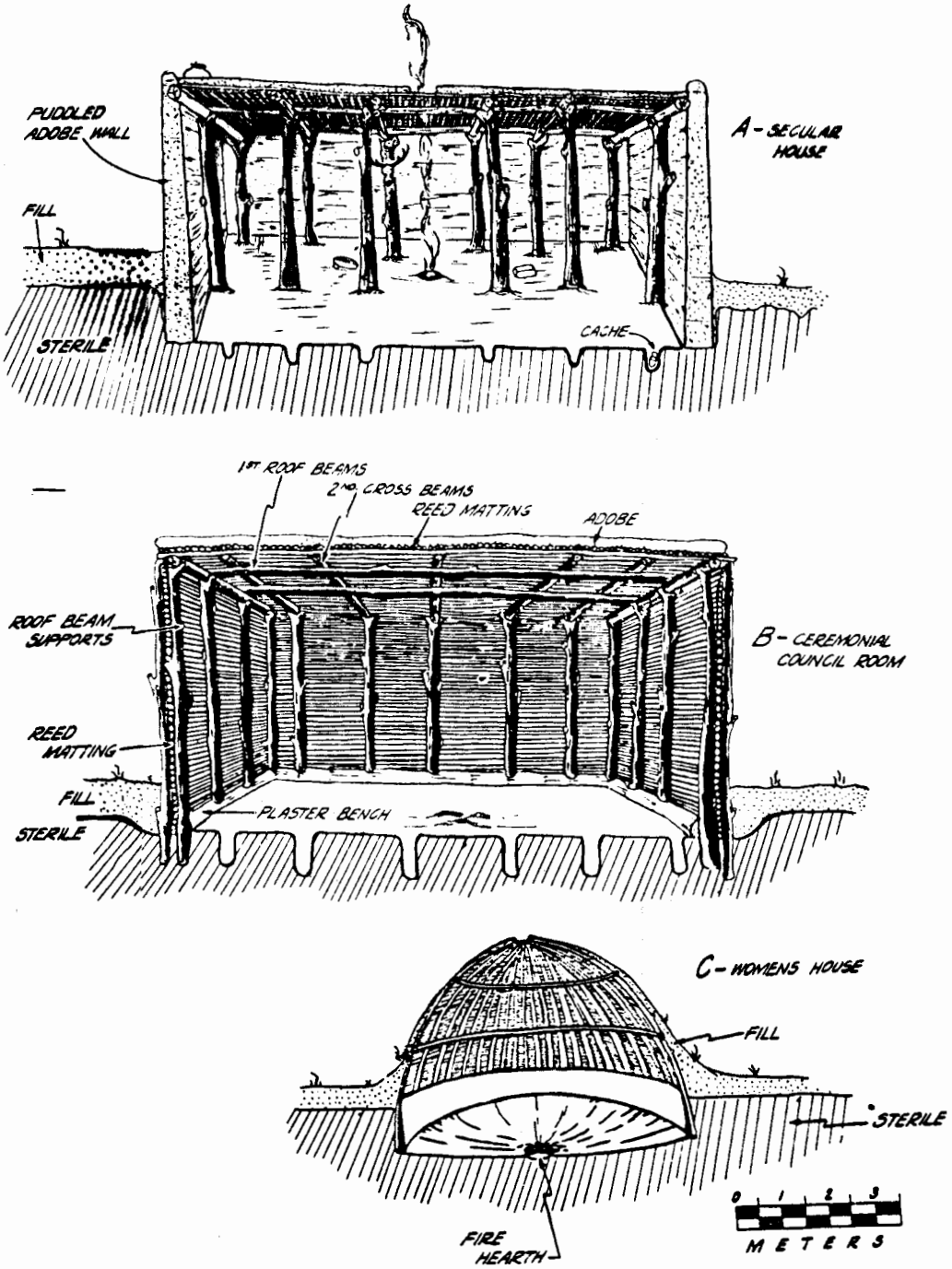


Figure 55. Architecture of the Babocamari Village.

A hypothetical reconstruction of the three types of house constructions located at the village.

A. Seculor house — Type 1.

B. Ceremonial council room — Type 2.

C. Women's house — Type 3.

(Di Peso 1951a) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.

Shell ornaments were traded from the west at a relatively late date, although the site had evidence of Olivella working. Shell workmanship was generally inferior to Gila-Salt Basin examples. No carving, overlay, or inlay were found.

Several turquoise ornaments were also found. The turquoise source evidently lay in the Gleeson area where evidence of manufacture was found at several sites (DiPeso 1951a:183-193). Other material culture included a few animal figurines, modeled spindle whorls of Mexican type and some disk types, full-trough metates and some slab metates, three-quarter grooved axes, small arrowshaft smoothers, hoes, and fleshing knives (DiPeso 1951a:170ff).

Ninety-seven cremations and three inhumations (all infant) were excavated. Of the cremations, only three were of the urn type. The remainder were cremation in trenches (DiPeso 1951a:195ff). Interment practices varied among the five cremation areas. In Cremation 1, funeral caches were accompanied by great quantities of slate beads, projectile points, burned shell bracelets, and tinklers. Cremations here were marked by finely burned bone buried in shallow pits. Nine of the twenty-three cremations were of children.

At Cremation 2, pits were deeper, and cremations were accompanied by different goods, including tools, whole vessels, and unburned beads. Bone fragments were larger and less completely calcined, and all the cremations were of adults. Only six cremations were found at Cremation 3, two of them children. One cremation was accompanied by fourteen slate beads, and the rest had only sherds.

Cremation 4 was also small, with only five interments, two of them children. Here offerings varied and presented no consistent pattern. Finally, at Cremation 5, plainware sherds constituted the only offerings for one cremation with a Gila Polychrome bowl and four with decorated sherds (DiPeso 1951a:201-204). The reason for these differences is unknown. The absence of sherds with cremations from Cremation 1 prevented meaningful temporal comparisons.

Given the close relationship of the Babocomari Village site to three other villages on the nearby eastern slopes of the Huachuca Mountains (EE:11:1, Tanner Canyon ruin; EE:11:2, Ramsay Canyon ruin; EE:11:3, Miller Canyon ruin), the cremation patterns may reflect micro-traditions resulting from population aggregation analogous to that existing between the Ringo and Kuykendall Salado sites. A dog burial was also excavated, as well as an apparent ritual burial of a bison, consisting of the head, leg, and ribs. Some of the bones were burned, cracked, and painted (DiPeso 1951a:207-209). From this burial and the excavation of Bison bison from a non-archaeological site at Murray Springs, Agenbroad and Haynes (1975) have proposed the presence of buffalo in the San Pedro drainage from AD 1200-1610.

The second phase, the Babocomari, is dated AD 1450-1692. Architectural changes included a loose clustering of houses and a trend toward

smaller structures. Entries were more elaborate, featuring an adobe step or covered entrance. Ash pits were no longer used. Many of the preceding Huachuca phase structures were abandoned and used as trash dumps (DiPeso 1951a:26, 210).

The main changes occurred in trade wares. Both phases featured a variety of indigenous plainware forms, including large jars with recurved or straight rims, medium storage jars with beaded rims, cooking jars, and hemispherical bowls reminiscent of those from earlier O'otam sites. All these wares were finished by the paddle-and-anvil technique (DiPeso 1951a:112-123). A few sherds of a thick unpolished redware were also found, resembling Dragoon Red (DiPeso 1951a:123).

The primary indigenous decorated type was Babocomari Polychrome, the early Chihuahuan Polychrome of Sauer and Brand (1930:437, Figure 2; cf. Kidder's unnamed polychrome, Kidder et al. 1949:137). The paste was buff to brown, usually lacking core streaking and featuring angular fragments of quartz and mica. Bowls were white-slipped on bowl interiors and exteriors; jars were unslipped. designs of red and black in bands consisted of such elements as straight lines, triangles, interlocking scrolls, heavy hatching, checkerboards, diamonds, crosses, and dots. Wavy lines were uncommon (DiPeso 1951a:123-129). Shapes included jars with recurved rims and hemispherical bowls.

Babocomari Polychrome resembles Santa Cruz Polychrome, the major difference being the absence of mica and presence of a crackled slip in Santa Cruz Polychrome. DiPeso identified the Santa Cruz Polychrome identified by Tuthill (1947) as actually Babocomari Polychrome. Babocomari Polychrome constituted 72 percent of the decorated ceramics from the site (DiPeso 1951a:218). Forms are reminiscent of earlier types in the study area, especially the hemispherical bowls.

In the Huachuca phase, Babocomari Polychrome was associated with Tanque Verde Red-on-brown, Gila Polychrome, Tucson Polychrome, Santa Cruz Polychrome, and San Carlos Red-on-brown. These trade wares constituted 3.54 percent of the total pottery found during that phase (DiPeso 1951a:125, 214). In the later Babocomari phase, all trade wares disappeared except for Gila and Tonto Polychromes (26 percent of the sherds from that period). The reasons for this apparent end to most trade is unknown. After its end, the quality of Babocomari Polychrome declined markedly (DiPeso 1951a:219).

From the excavation of walnut shells (the first recovery of English walnut in a North American archaeological context) and peach pits, DiPeso (1951a:6) suggested that the Babocomari was occupied at European contact and that it may have been the village of San Joaquin mentioned by Kino in 1706. By inference, Gila Polychrome may also have lasted until Spanish contact, at least in parts of the San Pedro Valley (DiPeso 1951a:239), not only at Babocomari but at San Salvador de Baicatcan (DiPeso 1953a).

DiPeso's conclusions about the late date of Gila Polychrome at Baicatcan has been strongly questioned. The sole room at San Salvador de

Baicatcan is probably prehistoric. The only evidence used to substantiate an early historic date is one complete plainware plate similar to historic Sobaipuri Plainwares (Fritz 1977:24). As Fritz has pointed out, prehistoric and early historic plainwares are almost indistinguishable. The use of such ceramics to infer an early historic occupation is questionable. In fact, Fritz (1977) believed that DiPeso excavated the wrong site and that Baicatcan has yet to be discovered.

The affiliations of the Babocomari Village people are unclear. DiPeso (1951:13-14, 21, 110, 209, 217) stressed the non-Salado nature of the remains at the site, citing as evidence the absence of domestic turkey in the faunal remains, the non-protective nature of the circumplaza walls, the paddle-and-anvil finishing technique of indigenous ceramics, the general absence of inhumation, and the low frequency of Salado wares. The meaning of these differences is difficult to assess. Some may be due to a particularly local adaptation, such as the absence of turkeys, whereas others may reflect a stronger Hohokam heritage than that of other Salado sites (e.g. the paddle-and-anvil finishing technique). Further, not all Salado compound walls are defensive.

The site appears similar to such Salado occupations in the San Pedro Valley as Second Canyon and Tres Alamos, judging from such features as hearth and post placement in rooms, wall construction, and other architectural similarities. Only in the low frequency of Gila Polychromes does the Babocomari Village site significantly differ from Salado occupations elsewhere as summarized by Franklin and Masse (1976).

The similarities of Babocomari Polychrome with Tanque Verde Red-on-brown suggest ties to the north and west; the site may well be a peripheral Hohokam group (DiPeso 1951a:239). The site may also be affiliated with one of the poorly understood peripheral Chihuahuan cultures first defined by Amsden (1928; cited in DiPeso 1951a:234). The architectural similarities suggest that Babocomari Village was part of a late prehistoric regional expression, the ceramic evidence suggests participation in a different sort of economic network than was the case with sites to the north.

CONTINUITY, SUBSISTENCE, AND SOCIAL ORGANIZATION

Cultural Continuity

The onset of Period 4 is marked by cessation of indigenous ceramic and cultural traditions and marked population shifts, perhaps accompanied by great population declines. DiPeso (1958:567) attributed these impeding changes to drought irrigation agriculture and resulting in Hohokam abandonment of the area and a cultural reassertion by the O'otam (DiPeso 1958:567). The extent of the changes make assessment of cultural continuity difficult. As Doyel has noted, "It remains to be seen if different groups of people were moving into the area, or the changes in the local culture, whether O'otam or Hohokam may be explained by participation in a widespread trade and interaction network" (Doyel 1977b:6).

DiPeso posited direct lines between the O'otam and historic Piman and Sobaipuri groups, but this position has been sharply criticized (e.g. Doyel 1977b; Fritz 1977; Gerald 1968, cited in Fritz 1977).

No work has been done on continuity of the Mogollon east of the San Pedro in the Sulphur Springs and San Simon Valleys. Haury has encouraged research on this and suggests that the Tarahumara of northern Mexico should not be ignored in these studies (Haury, discussant at the special topic session, spring meeting, Arizona Archaeological Council, 1982).

Subsistence

Although the existence of sedentary ceramic-using populations in the study area presupposes an agricultural base, relatively little direct archaeobotanical evidence has been found. At the Babocomari Village site, excavations yielded the remains of maize (unidentified as to race), the common bean (Phaseolus vulgaris), domesticated squash (Cucurbita pepo), yucca (Yucca sp), walnut shell fragments, and peach pits, the latter two of European origin (DiPeso 1951a:15-17). The Babocomari maize was similar to that from the Paloparado site. The maize from the historic occupations at Quiburi differed in having a higher row number (mean = 13.3) and thinner kernels (mean = 3.5 mm). Phaseolus vulgaris was also found at Paloparado (DiPeso 1956:460). Charred maize kernels, again unidentified as to race, were also found at the Gleeson site (Fulton and Tuthill 1940:56). No direct evidence of agriculture was found at Cave Creek or San Simon Village (Sayles 1945:53) or Tres Alamos (Tuthill 1947). Much indirect evidence, however, has been found in the form of ground stone tools, the Tres Alamos granaries (Tuthill 1947), and the small canals and terraces found near Pearce:7:1(GP) (Trischka 1933:433). Terraced fields also have been identified from aerial photographs on the bajadas east of Duncan, which are probably Mogollon (Kinkade 1981, personal communication).

The abundance of pit ovens suggest a great reliance on wild plant foods such as agave, sotol, or yucca, although the only archaeological remains of wild plants recovered in the area were yucca (DiPeso 1951a:15-17). Faunal analysis at the Babocomari Village site found remains of mule deer, pronghorn antelope, jackrabbit, cottontail rabbit, wild duck, and bison (DiPeso 1951a:13-14). Sayles (1945:58) reported high incidences of dog, jackrabbit, deer, and pronghorn antelope from San Simon Village. Though no plant remains were found, their use was inferred from the many grinding tools found at the site. The scarcity of bison remains reveals that, although bison inhabited the San Pedro Valley (Agenbroad and Haynes 1975), they were never more than a minor component of subsistence.

The discovery of a probable hunting shrine in the Winchester Mountains also points to the importance of hunting in regional subsistence strategies (Fulton 1941). Most of the material discovered consisted of miniature bows and arrows. The presence of sherds and unused cordage suggested manufacture of ceremonial offerings, because the sherds were

brought in as such and evidently did not represent vessels broken in the cave. Nine pairs of sherd disks were found, wrapped face to face. Several cane tubes were found, further suggesting a ceremonial use of the cave. Ceramic types represented included Mimbres, Dragoon, El Paso and Hohokam wares, all in contemporary association.

Survey of a right-of-way corridor between Clifton and Willcox in 1976 revealed a large number of limited activity sites, some possibly associated with O'otam or Mogollon complexes. Lack of diagnostic ceramics or lithics at most sites precluded temporal placement (Simpson and Westfall 1978; Simpson et al. 1978; Westfall et al. 1979:75). Most of the sites were lithic sites, although a few plainware sites were found (e.g. CC:6:7, Westfall et al. 1979:326). The range of activities at these sites, including quarrying, lithic reduction, plant food processing, and animal processing, point to a diverse economic round, possibly followed by the O'otam groups in the area (Westfall et al. 1979).

Social Organization and Settlement Pattern

No formal attempts have been made to reconstruct Mogollon social organization. Most often, historic Piman social structures have been extrapolated into the past in the form of untested ethnographic analogy (e.g. DiPeso 1956, 1979; see cf. Doelle n.d. for a critique of this approach). The presence of low stone walls enclosing pit house clusters during the Cascabel and Tres Alamos phases at Tres Alamos (Tuthill 1947:34) suggests the existence of some sort of defined social grouping, as does the clustering of pit houses into three widely separated groups at San Simon Village (Sayles 1945:5; cf. Woodbury and Zubrow 1979:57). At Gleeson, however, houses appear randomly distributed (Fulton and Tuthill 1940).

These clusters may in turn be linked to the development of later stockaded villages such as the Bidegain site (DiPeso 1958a:7), but not enough data exists to assess this contention. Through time, the number of houses per cluster or compound increased suggesting a shift in the size of the basic social unit (Martin and Plog 1973:177). The distribution of houses around plazas at the Babocomari Village site also suggests some affinity with compounds at sites like Tres Alamos and the stockade enclosure at the Bidegain site (Martin and Plog 1973:177).

DiPeso (1958a:23) suggested that the Babocomari Village pattern resembled the extended family compounds of historic Pimans, although house-row alignments were also present. From ethnographic analogy with historic groups, DiPeso (1958a:23) felt that the O'otam were organized into partilineal moieties with a bilateral kinship system. The diversity of burial practices at several sites suggests the possibility of the mixing of small-scale local traditions at later aggregated sites.

It is often claimed that early Mogollon villages tend to be located on high promontories overlooking nearby arable land, possibly for defense. Through time, village locations reportedly shifted toward more

riverine locales (Lipe 1978:360ff). Existing data does not permit a thorough evaluation of this shift for the O'otam and Mogollon in the study area, and exceptions seem to be as common as the rule. The early site of Cave Creek Village was not on a promontory but near the mouth of Cave Creek on the eastern slope of the Chiricahua Mountains. San Simon Village had a similarly open location (Sayles 1945:vii), as did the recently discovered Mogollon villages at Timber Draw on the lower San Simon River (Kinkade 1981, personal communication). The majority of Mogollon sites found on the AEPCO project were also in low open locations. But the San Simon Village and Timber Draw sites were occupied from early to late Mogollon times. Tres Alamos, however, was located on the first terrace above the San Pedro River, a location favored by later Salado occupants of the region (Tuthill 1947:11). The Gleeson site also lay on a low ridge just south of the Dragoon Mountains (Fulton and Tuthill 1940:11). Such sites may reveal some difference in preferred site locations, although all sites tend to be near arable land and sources of water (e.g. the spring near the Gleeson site, Fulton and Tuthill 1940:11).

Although some of the ridge sites may be defensive, they have little evidence of defensive structures such as walls, in contrast to later Salado sites in the area (e.g. Reeve ruin, DiPeso 1958a). Trischka (1933:433) reported no evidence of defensive walls at Pearce:7:1(GP), but noted several circular stone walls atop nearby Abbot's Peak. The peak is topped by a limestone cliff, which allows entry from only one place about 50 yards wide. At this narrow juncture Trischka found several parallel defensive walls, whose description is reminiscent of trincheras in the Tucson Basin and further west. Like trincheras sites, habitation remains lay at the base, although Trischka did not report on the ceramics or other cultural materials that could permit temporal or cultural placement of the Abbot's Peak complex.

SALADO

Salado is the name given late puebloan manifestations in the study area, often defined by such traits as above-ground compound architecture, inhumation, and certain distinctive ceramic types present between AD 1250-1400 (Gladwin and Gladwin 1935:27). The concept was first introduced by Schmidt (1928), but much of our understanding of the Salado is based on the pioneering work of the Gladwins (1930, 1931, 1934, 1935).

ORIGINS AND RELATIONSHIPS

The Gladwins classified the Salado as a late Mogollon development, located below the Mogollon Rim but above the southern Arizona desert and particularly concentrated in the Tonto Basin and the upper drainage of the Salt River. The Salado were distinguished by a cluster of ceramic types, most notably Gila Polychrome but also including Pinto Polychrome, Tonto Polychrome, Salado Red, Gila Red, Roosevelt Black-on-white, and corrugated utility wares.

According to the Gladwins, the earliest Salado phase, the Roosevelt (AD 110-1250), represented a westward move of peoples from the Little Colorado area into the Tonto-Globe area under pressure from Apachean incursion (Gladwin and Gladwin 1935). The development of the distinctive Salado culture in the later Gila phase (AD 1250-1300) was partly due to the immigration of proto-Hopi peoples from the Little Colorado area (Gladwin 1957).

Research in the Tonto-Globe area, however, revealed the development of the Salado as early as AD 900 due to migration of peoples from the upper Gila who made black-on-white ceramics and small stone masonry pueblos (Hawley 1930, 1932). These people were later joined by people from the north who made Little Colorado Black-on-red wares. The resulting fusion of ceramic traditions gave rise to Pinto Polychrome, which in turn was a forerunner of Gila Polychrome. From his analysis of the Los Muertos materials, Haury (1945) also regarded the Salado as a blend of Anasazi and Mogollon traditions in the area below the Mogollon Rim, which became culturally distinct by AD 1250.

With the awareness that Salado ceramics were widely distributed over southern Arizona and parts of southern New Mexico, the problem of defining the Salado became more complex. Reed (1948; 1950) defined prehistoric Western Pueblo as a late Mogollon development characterized by polished brownwares, three-quarter grooved axes, rectangular kivas or no kivas, extended inhumations, and polychrome ceramics. The Western Pueblo area included the upper Gila drainage, the White Mountains, the Tonto Basin, and the Verde Valley (Reed 1948; 1950).

Following Reed's lead, several archaeologists used the more general term of Western Pueblo to describe late prehistoric sites with compound architecture and polychrome ceramics (e.g. DiPeso 1958a, Reeve ruin; Johnson and Thompson 1963b, the Ringo site). Here again, these sites were seen as one manifestation of a broad southward movement of puebloan peoples, which began around AD 1100 and ultimately incorporated traits from the Anasazi, Mogollon, and Hohokam (e.g. McGregor 1965;365; cf. Johnson 1965; see Young 1967 for extended treatments of this idea).

Still other archaeologists saw the Salado as originating in non-Mogollon developments. According to Schroeder (1953a), the Salado were a blend of the Hohokam and Sinagua that resulted from Sinagua incursions into the Gila-Salt Basin and migrations into the Tonto-Globe area. The

presence of paddle-and-anvil ceramics and the general absence of kivas in both areas were seen as supporting evidence. The presence of polychrome wares was due to trade rather than local manufacture.

Excavations at the site of Casas Grandes in Chihuahua, Mexico revealed the existence of a complex agricutural society that was a major trading center in northwest Mexico (DiPeso 1974). The Medio period (in which Gila Polychrome pottery was present), the cultural peak at Casas Grandes has been dated from AD 1050-1200 (DiPeso 1974), but a recent re-analysis of the dates reveals the possibility of a later date for the period from AD 1150-1300 (LeBlanc 1980). DiPeso has implied that the Tonto Basin was an outpost of Casas Grandes (1968, 1974) although he had earlier favored a Western Pueblo origin (DiPeso 1958a:83). Still other archaeologists favor the concept of the Salado as traders operating out of Casas Grandes. This concept would help explain the heavy concentration of Salado Polychromes in the San Simon drainage, which extends to the Casas Grandes area (Young 1967). More recently, LeBlanc and Nelson (1976:78) suggested that the Salado may represent an influx of people from Casas Grandes into southern Arizona. They based this hypothesis on the close temporal association of the Salado with the fluorescence and collapse of Casas Grandes, the use of adobe construction in both areas, and the early occurrence of Gila Polychrome south of the Tonto Basin.

Still more recently, archaeologists have begun to study the Salado by studying developments within limited regions rather than making broad-scale attempts to explain the entire Salado phenomenon. Brown (1973; 1974) attempted to test several hypotheses of Salado migrations into the Pueblo Viejo area (Safford Valley) but lacked the evidence to test all the hypotheses. Here a variety of architectural styles were identified, from contiguous blocks of rooms around plazas with kivas (e.g. Earven Flat, Majijilda ruin) to boulder-abode compound clusters (e.g. the Buena Vista site; Brown 1973, Franklin 1978). Two phases were identified on the basis of ceramics, although these did not correlate with any architectural changes. The first, pre-Salado occupation, was derived from the Maverick Mountain or Tularosa Phase in the Point of Pines area.

The ceremonial cave on Bonita Creek (W:14:1) reported by Wasley provided further evidence of this move (Wasley 1962). Artifacts included wooden flowers and cones, strings of miniature baskets, terraced wooden objects, a wooden pendant, cotton cloth, and miniature bows and arrows. Most of the items were deposited in a Maverick Mountain Polychrome jar covered with a smudged brownware bowl, dating to the late thirteenth or early fourteenth centuries. Wasley interpreted the artifacts as belonging to a group of migrants from the Kayenta area who settled in the Point of Pines area just to the north around AD 1280 (Wasley 1962:380).

At Point of Pines the Salado was most clearly manifested as a shift in trade patterns at many sites where Tularosa Black-on-white and White Mountain Redwares were replaced by Salado Polychromes (Brown 1973:44).

The second, Salado, period in the Safford Valley was characterized by high frequencies of Salado polychromes, and stratigraphic evidence definitely indicated a shift from Maverick Mountain Black-on-red to Gila Polychrome through time (Brown 1973). This latter phase was dated between AD 1200-1300 and had strong architectural ties with regions to the north, as already discussed, suggesting that Western Pueblo culture played an important role in the subsequent development of the Salado (Franklin 1978:80).

These remains are similar to the two Bylas phase sites, V:16:8, V:16:10, (ca. AD 1100-1200) excavated by Johnson and Wasley on the San Carlos Apache Reservation (Johnson and Wasley 1966). Here too architecture consisted of surface rooms, often contiguous and grouped around enclosed courtyards. Wall construction was of rock-reinforced adobe for lower walls, with possible wattle-and-daub construction for upper portions and roofs.

Cremations and semi-flexed inhumation were both present, but no Gila Poly-chromes were found, probably because the sites were too early. Instead, the dominant indigenous painted types were Casa Grandes Red-on-buff, Safford Variety, and San Carlos Red-on-brown.

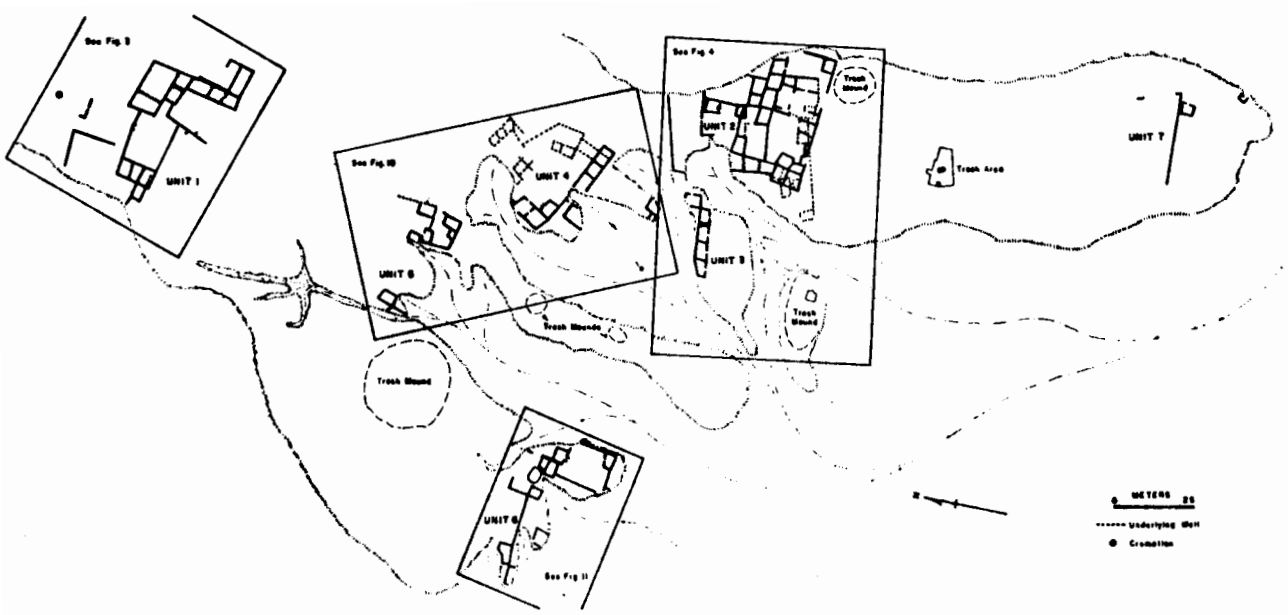
Based on the absence of kivas, as well as the architectural features, Brown (1973) classed the Bylas phase sites as a local manifestation of Western Pueblo. Above-ground pueblo-style architecture occurs before Salado polychromes at these sites and again suggests a southward movement into the Middle Gila Basin during the Thirteenth Century. Since the Salado artifact assemblage includes such Hohokam traits as the three quarter grooved axe, the presence of a Hohokam occupation in the Middle

Gila and the early occurrence of pueblo features in the area indicate it played a crucial role in the development and spread of Salado culture, although the exact nature of that role is still poorly understood.

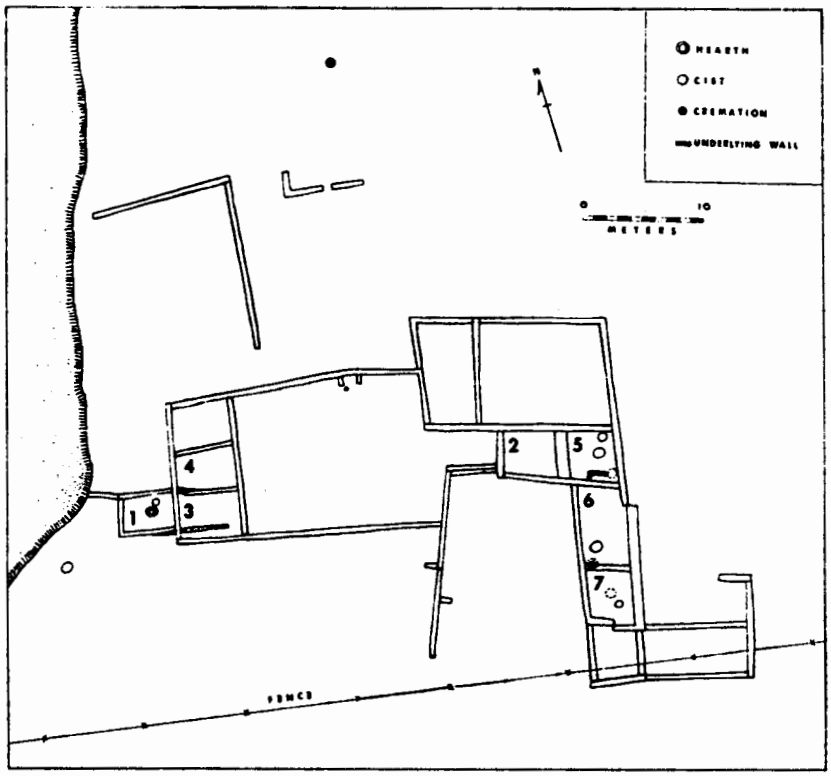
Three transitional or pre-Salado sites have been excavated in the San Pedro Valley: Reeve Ruin and the Bidegain site (BB:11:13) (DiPeso 1958a); and the Twin Hawks site. The Twin Hawks site is a compound village associated with Tanque Verde Red-on-brown, Roosevelt Black-on-white and corrugated jars (Franklin and Masse 1976:50).

The Glass Ranch site near Portal may also be a transitional site. It has above-ground architecture and a predominant plainware ceramic assemblage (Mills and Mills 1966).

In the Globe-Miami area, the Hohokam occupation was followed by a brief hiatus, in turn followed by a short-lived occupation, the Miami phase (AD 1150-1200), characterized by non-contiguous above-ground architecture enclosed by compound walls and Western Pueblo ceramics (Doyel 1976b:249-250). In many respects, it resembles the pre-Salado sites identified by Brown (1973) in the Safford Valley.



Arizona V:16:10.



Arizona V:16:10, Plan of Unit 1.

Figure 56. The Bylas Site. (Johnson and Wasley 1966) Courtesy Arizona Archaeological and Historical Society.

Figure 57. San Carlos Red-on-brown Sherds and Jar. (Franklin 1980) Courtesy Arizona State Museum.

In southwest New Mexico, the Salado are represented by the Cliff phase (AD 1375-1450). Here on the eastern edge of the Salado, Gila Polychromes occur as part of a widespread copying of Casas Grandes styles by many ceramic traditions. The Cliff phase tradition populations entered by the Mimbres drainage with a fully developed Salado pattern. No evidence exists for its evolution from the preceding Animas phase (LeBlanc and Nelson 1976).

In the San Pedro Valley, the Salado presence also is interpreted as representing a migration (cf. DiPeso 1958, the site-unit intrusion at Reeve ruin) based on Franklin and Masse (1976). Franklin and Masse applied Rouse's (1958) criteria for migration, and concluded that the Salado are clearly intrusive in the San Pedro area, probably from the Globe-Tonto area. In all likelihood, this intrusion occurred after the area's abandonment by the Hohokam and other indigenous peoples. No excavated site shows continuity of occupation from the last Hohokam phase to the Salado (Franklin and Masse 1976:53).

The Salado have often been invoked as an explanation for the changes in the Hohokam Classic (e.g. Haury 1945a; Hayden 1957; Wasley 1966). A study of the Classic period in the middle Santa Cruz Valley has reported that the Salado as an archaeological culture cannot be supported by data from that region (Grebinger 1976a:39). Instead, the material culture usually defined as Salado is claimed to be the product of changes in social and economic systems brought about by environmental shifts. These changes were linked to the emergence of a "Hohokam interaction sphere" in which males expanded contacts beyond the Tucson Basin and introduced many puebloan traits, particularly from the Bylas phase of the Safford Valley (Grebinger 1976a:45; Johnson and Wasley 1966). The presence of Gila Polychrome is, thus, seen as simply another indication of already established contacts with the Safford and San Pedro areas rather than the migration of the Salado into the Tucson Basin (Johnson and Wasley 1966).

The study of Salado interrelationships has focused on research problems dealing with specialized production and exchange networks, with Gila Polychrome ceramics being the most common subject of investigation. Recent studies elsewhere in the southwest have indicated the growth of economic specialization in the production of tools, ornaments, and food as well as ceramics (e.g. Bronitsky in press; Cordell and Plog 1979; Hantman et al. 1979; Lightfoot 1979, 1980; Upham 1979; Whittlesey 1974; Willcox and Masse 1981; Warren 1969). Given the demonstrated preference for specific lithic materials discussed earlier, the possibility exists that specialized production and exchange networks were an integral part of the Salado economy.

Sites with Chihuahuan ceramics have been reported from the poorly known San Bernardino Valley in the study area (some have been reclassified as Babocomari, an early protohistoric complex (DiPeso 1951a:11)), as well as sites with Mimbres ceramics and Salado sites (e.g. Sauer and Brand 1930). Occasional finds of isolated Chihuahua pottery have been reported in the Safford area (Kinkade 1981, personal communication). The interaction among these sites is unclear although Sauer and Brand have

suggested that the passage from the north to the Bavispe River and then to the Yaqui Valley in Sonora was a route of trade and that at times different prehistoric cultures established outpost settlements in this north-south corridor (Sauer and Brand:445). Such settlements could have been linked into a specialized trade network, perhaps initially centered around Casas Grandes. Detailed studies of source materials and production areas could begin to provide information on the economic systems operating in the area.

Although Casas Grandes has been regarded as the prime mover in the economy of the late prehistoric Southwest (e.g. DiPeso 1968, 1974), almost nothing is known of the goods supplied, the cultural context of the interaction, and the mechanism of economic exchange. Since the Salado are a relatively brief phenomenon in the area, it provides an ideal framework for the investigation of the relationships among population growth, subsistence, environmental diversity, technology and exchange.

SUBDIVISIONS OF THE SALADO WITHIN THE STUDY AREA

Salado sites are widely distributed in the study area, suggesting a successful adaptation capable of supporting a larger population than previously possible. Remains are found in all the southern tributaries of the Gila River, including the Sulphur Springs Valley (Johnson and Thompson 1963b; Mills and Mills 1969).

In the San Pedro Valley, sites are almost continuous along the bluffs from the mouth of the river to the town of Benson. Gila Polychrome is the main decorated type, and sites range from a few to over 100 rooms (Breternitz 1978:18). DiPeso's survey also found that sites with compound architecture and Gila Polychrome, such as the Lopez Ranch site (BB:11:2(AF)), the Muniga Ranch site (BB:11:3(AF)), and others, were also located on the first terrace, often in defensive locations. In contrast, Hohokam sites such as the El Embudo site (BB:11:6(AF)) were situated in non-defensive locations (DiPeso 1953a:53). At some sites such as Reeve ruin, the defensive location was further improved by the building of walls to reduce access (DiPeso 1958:19).

Danson's (1946:13ff) survey of the lower Santa Cruz Valley found six sites with compound architecture, four on the bluffs overlooking the San Rafael Valley and two on the bluffs above the Santa Cruz Valley. Although the survey was not systematic and some areas were not covered (cf. Stacy and Hayden 1975 for further discussion), the results again show a preference for site location on the first ascending terrace.

In the Safford Valley, vandalism and agricultural operations have obliterated many sites, but early reports also show a heavy concentration of Salado sites above the river (Fewkes 1904:168-173; Sauer and Brand 1930:442ff; Brown 1973). From Fewkes' description and information from local informants, Gilman and Sherman (1975:5-6), concluded 50 200-room

villages had occupied the entire length of the Gila Valley, and more large sites lay in the foothills of the Pinaleno Mountains. Cliff phase Salado sites are also densely distributed in southwest New Mexico, although LeBlanc and Nelson (1976) gave no information on site locations.

SALADO PHASE DESIGNATIONS

The Salado occupation in the study area will be treated as a single unit, although temporal and spatial variations will be briefly considered. The Salado have been divided into several phases on the basis of diagnostic ceramics.

The Gladwins defined the earliest phase of Salado occupation as the Roosevelt phase in the Tonto Basin and Globe-Miami areas, characterized by Roosevelt Black-on-white and Pinto Polychrome ceramics, compound architecture with boulder foundations, three-quarter grooved axes, inhumation and cremation, and a range of shell, bone, and stone ornaments (Gladwin and Gladwin 1935:27). The diagnostic value of many of these criteria, however, has been criticized (Doyel 1976b:254). The Gladwins estimated this phase to date from AD 1100-1150, but more recent research has found the date of the Roosevelt phase to be AD 1200-1300 (Doyel 1976b:255; after Johnson 1965).

In part, the dating confusion stems from the paucity of single component Roosevelt phase sites and problems with dating the type ceramics of Pinto Polychrome and Roosevelt Black-on-white. The Roosevelt phase is probably represented by such sites as the Marijilda ruin in the Safford Valley, although no separate phase designation has been created. At least in the Globe-Miami area, evidence from the Miami Wash project shows a continuity between the Miami and Roosevelt phases, particularly in plainwares and redwares. Striking changes, however, occur in decorated wares, as well as small changes in other artifacts (Doyel 1976b:257).

The Gladwins defined two Salado phases after the Roosevelt phase: The "Classic Salado" Middle Gila (AD 1250-1400) and Tonto (AD 1400-1450) (Gladwin and Gladwin 1935). These phases are differentiated mainly from an increase in the frequency of Tonto Polychrome, Gila Polychrome, and Jeddito Black-on-yellow. Doyel has, therefore, grouped these phases into a single phase, the Gila phase, dated AD 1300-1400 (Doyel 1976b:257-258, after Pierson 1962).

SALADO MATERIAL CULTURE AND DESCRIPTIVE TRAITS

Ceramics

Salado Polychrome was first called Polychrome Redware (Kidder 1924) and Middle Gila Polychrome (Hawley 1929, 1930, 1932). The names now in use--Pinto Polychrome, Gila Polychrome, and Tonto Polychrome--were

bestowed upon them in 1930 (Gladwin and Gladwin 1930). Pinto Polychrome is dated between AD 1200-1300 (Doyel 1976b:255) and has a red to gray paste with sand temper, often containing some mica. The only forms known are bowls with red-slipped exteriors. Interiors are white-slipped with dull black watery carbon-paint designs. Designs resemble Tularosa Black-on-white, with balanced solid and hatched elements. The distinguishing element of design is extension of the design to the rim. There are no separating white or black lines (after Gladwin and Gladwin 1930; Hawley 1936; McGregor 1965; DiPeso 1958a).

The most widespread Salado Polychrome is Gila Polychrome, dated from AD 1300 to some time after AD 1400. Gila Polychrome resembles Pinto Polychrome, but in addition to the dominant bowls, forms also include jars and effigies. Interiors are white-slipped with black design. Exteriors are primarily red. And a wide black line separates the design from the vessel rim. The black line is often broken at some point and is called a "life line." Designs feature massed black elements, such as triangles or serrations (DiPeso 1958a).

Dating between AD 1300-1400 (Breternitz 1966), Tonto Polychrome is very similar to the other Salado Polychromes, except that the white-slipped background has a black and red design that gives the appearance that red is the base color. Bowls are decorated on interiors and exteriors; designs are similar to Gila Polychrome (Breternitz 1966).

Several redwares and plainwares may also be associated with the Salado. Gila Red has a porous paste and micaceous temper. Forms include jars, bowls, pitchers, and animal forms. Gila Red is distinguished by interior smudging, often polished, and parallel striations on the exterior, arranged to form a design radiating from the center. Vessel exteriors are slipped bright red (cf. Gladwin and Gladwin 1930; Hawley 1936; McGregor 1965). Gila Red, however, occurs in a limited distribution primarily in the Gila-Salt Basin and not in sites in the eastern portion of the Salado range (Franklin, 1981 personal communication).

Salado Corrugated, a poorly understood type, is roughly dated between AD 1150-1250. The paste is red or brown, with sand temper and some mica. Bowl and jar exteriors are corrugated with indented oblique marks, usually obliterated by smoothing (cf. LeBlanc and Nelson 1976:75 for a similar type in the later Cliff phase). Vessel exteriors are reddish, with occasional chalky white designs of pendant dots and triangles. Interiors are always smudged.

In addition, Gila Black-on-red and Pinto Black-on-red are also associated with Salado Polychromes but have never been well defined (cf. DiPeso 1958a:98, 101). They occurred with Gila Polychrome at Los Muertos (Haury 1945:65), and a few sherds were found at University Indian ruin (Hayden 1957:125). These types, however, are not mentioned by Hawley or the Gladwins.

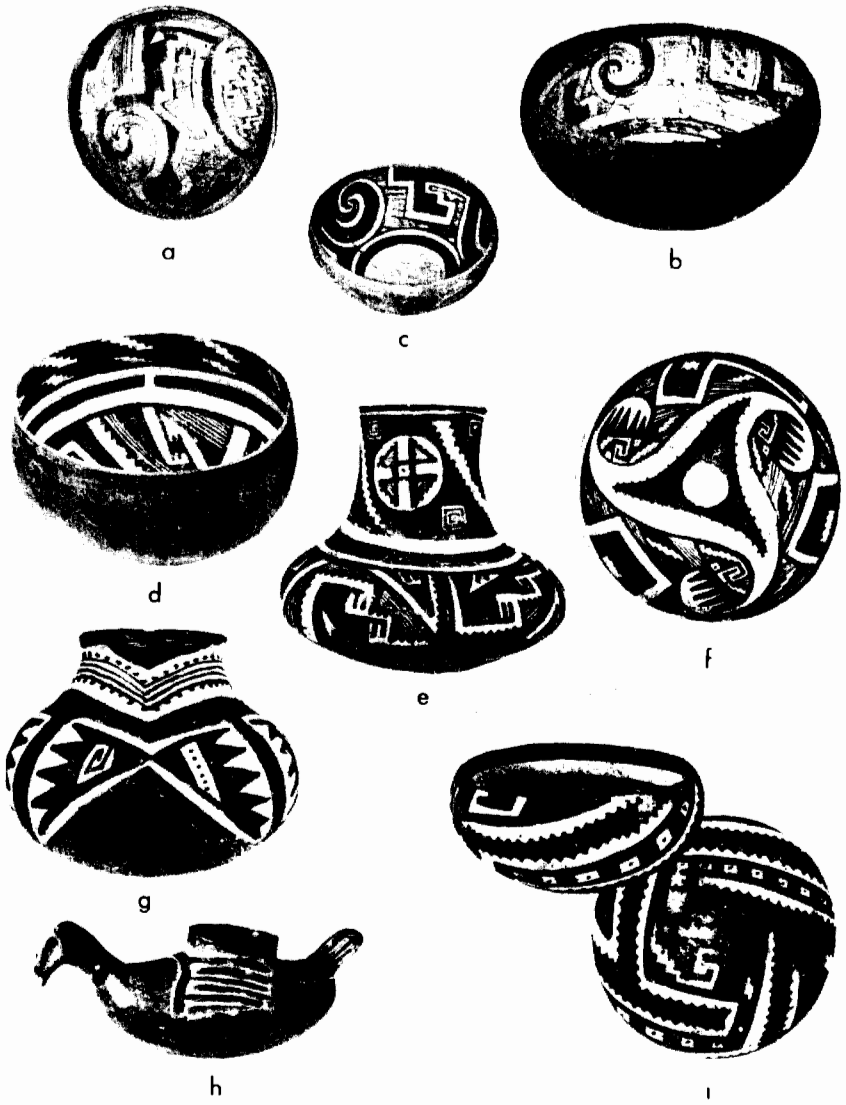


Figure 58. Salado Polychrome Pottery from the Arizona State Museum.

a-c, Pinto Polychrome; d-f, Gila Polychrome; g-i, Tonto Polychrome; i is two views of same vessel. Vessels a and b are from Grasshopper Pueblo; c, g, and i are from the Roosevelt Lake area, Tonto Basin; d is from Bead Mountain Pueblo near Miami, Arizona; f is from Gila Pueblo, Globe, Arizona; e and h are from unknown locations, presumably the Roosevelt Lake area. Items are not to scale.

(Doyel and Haury 1976) Courtesy Arizona State Museum, University of Arizona.

TABLE 11

SALADO POLYCHROME ASSOCIATIONS

Salado polychromes are associated with other pottery types of more limited distribution in different parts of their range. Some of these decorated types may be listed as follows

Globe-Miami, Tonto Basin: Roosevelt Black-on-white, White Mountain redwares, San Carlos Red-on-brown, Casa Grande Red-on-buff (Safford Variety).

Mogollon highlands: White Mountain redwares.

Gila Basin: Casa Grande Red-on-buff.

Tucson Basin: Tucson Polychrome, Tanque Verde (Pantano) Red-on-brown.

San Pedro Valley: San Carlos Red-on-brown, Tucson Polychrome, Tanque Verde (Pantano) Red-on-brown.

Safford area: San Carlos Red-on-brown, Maverick Mountain Polychrome.

Sulphur Spring Valley: Tucson Polychrome, El Paso Polychrome, Chihuahua polychromes.

Red Rock Valley: El Paso Polychrome, Tucson Polychrome, Chupadero Black-on-white.

Hidalgo County, New Mexico: Ramos Polychrome.

Chihuahua-Casas Grandes: Ramos Polychrome; Escondida, Villa Ahumada, Babicora, Carretas, Corralitos, and Dublan Polychromes.

(Franklin 1980) Courtesy Arizona State Museum.

TABLE 12

DISTRIBUTION OF SALADO POLYCHROMES

Sites	Gila Polychrome Percentage of Total	Gila Polychrome Percentage of Decorated	Pinto Polychrome Percentage of Total	Pinto Polychrome Percentage of Decorated	Tonto Polychrome Percentage of Total	Tonto Polychrome Percentage of Decorated	Tucson Polychrome Percentage of Total	Tucson Polychrome Percentage of Decorated	Salado polychromes Percentage of Total
Besh-ba-gowah (Vickery 1939)		C		C		A		R	
Mogollon									
Kinishba		C				C			
Grasshopper									
Point of Pines									
Sulphur Spring Valley									
Ringo Site (Johnson and Thompson 1963)	<0.1	1.7	0.3	8.8		A	0.3	9.1	0.6
Kuykendall (Mills and Mills 1969)	15.0	43.5		A	10.0	29.0	<0.1 (5 sherds)		25.0
Middle Gila									
Safford area (Brown 1973)									
Marijilda		60.0	Included in Gila Polychrome			A		A	
Witmer		92.3	Included in Gila Polychrome			A		A	
Spear Ranch (upper levels)		46.0	Included in Gila Polychrome			A		A	
Buena Vista		94	Included in Gila Polychrome			C		A	
Red Rock area (Lekson 1978) RS-4 site		63.0		A		2.6		6.4	
Cliff Valley (Hammack, Bussey, and Ice 1966)									
Kwilleylekia		C		A		C?		?	
Hidalgo County, New Mexico									
Pendleton Ruin (Kidder, Cosgrove, and Cosgrove 1949)	1.8			A	Included in Gila Polychrome			R	1.8
Cave sites (Lambert and Ambler 1961)	0.7	2.0		A		A		A	0.7
Clanton Draw	0.1	0.8		A		A		A	0.1
Box Canyon (McCluney 1962)	2.3	44.2		A		A	0.2	3.8	2.5
Chihuahua									
Casas Grandes (DiPeso 1974)	3.0	15.3		A	0.5	2.4		A?	3.5

Key: A = absent
R = rare
C = common

(Franklin 1980) Courtesy Arizona State Museum.

TABLE 12
Continued

Sites	Gila Polychrome Percentage of Total	Gila Polychrome Percentage of Decorated	Pinto Polychrome Percentage of Total	Pinto Polychrome Percentage of Decorated	Tonto Polychrome Percentage of Total	Tonto Polychrome Percentage of Decorated	Tucson Polychrome Percentage of Total	Tucson Polychrome Percentage of Decorated	Salado polychromes Percentage of Total
San Pedro									
Second Canyon	7.6	60.0	0.0	0.0	<0.1	0.2	0.5	4.1	8.2
Second Canyon without Hohokam, Ootam		68.7		0.0		0.2		4.7	
Davis Ranch (Gerald 1975)	20.4	85.0	0.1	0.6	0.4	1.9	0.3	1.2	20.9
Reeve Ruin (DiPeso 1958)	16.8	77.3	0.3	1.4	0.3	1.4	2.0	9.2	19.4
Tres Alamos (Tuthill 1947)		C		R		R		R	
Tucson Basin									
University Ruin (Hayden 1957)	4.1	20.0 to 30.0		R		R		2.0 to 6.1	
Gila Basin									
Los Muertos (Haury 1945)		C		R		C		A	
Las Colinas (Hammack 1969)	2.5	40.0							
Escalante (Doyel 1974a)	8.5	72.0		A	1.8	15.8		A	10.3
Adamsville	1.0								
Casa Grande (Hayden 1957)	1.9								
Casa Grande	1.7	14.2		A		A		A	1.7
Tonto Basin, Globe-Miami									
Tonto Ruins (upper) (Steen 1962)	17.5	71.0	<0.1	0.2	Included in Gila Polychrome			A	17.5
Tonto Ruins (lower) (Pierson 1962)	5.0	45.0	0.2	1.7	Included in Gila Polychrome			A	5.2
Gila Pueblo									
Scorpion Ridge (Windmiller 1974)		A		A		A		A	
Miami Wash (Doyel 1974b)									
Arizona V:9:55		C		R		A		A	
Arizona V:9:56		C		C		A		A	
Arizona V:9:57		C		A		A		A	
Arizona V:9:59		C		A		C?		A	
Arizona V:9:61	no decorated								
Arizona V:9:62		C		C		R		A	
Arizona V:9:63	no Salado polychromes								

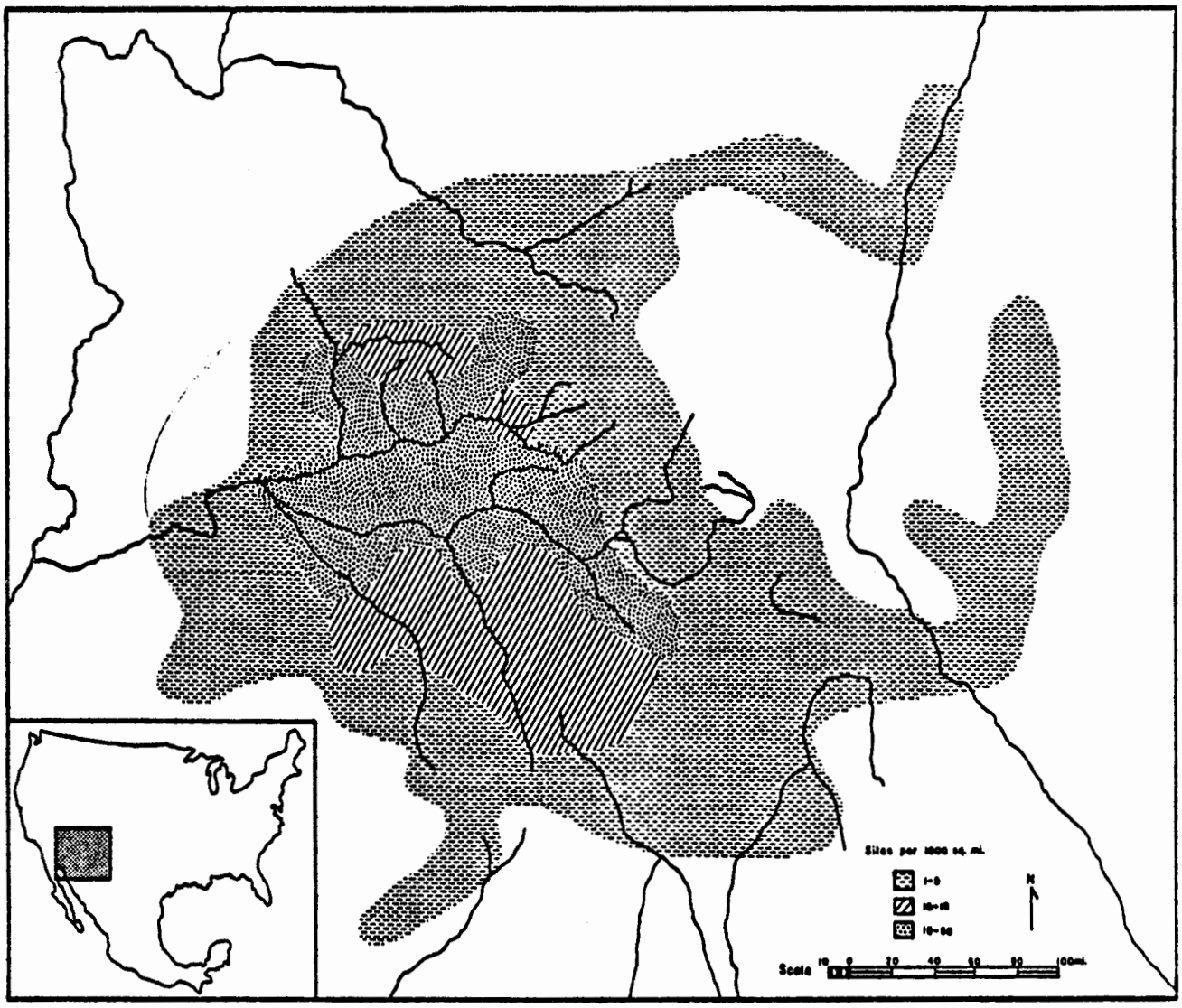


Figure 59. Distribution of Salado Polychrome Ceramics. (Young 1967) Courtesy Department of Anthropology, University of Arizona.

Problems exist with the dating of these types, particularly Pinto Polychrome (see Doyel 1976b:255 for a review). In addition, the similarity between Gila and Tonto Polychrome prompted Steen (1962) to merge the two as Gila Polychrome because Gila Polychrome is only found in bowls, and Tonto Polychrome are jars of the same type. Gila Polychrome jars and Tonto Polychrome bowls, however, do exist, and the validity of the distinction has been further reinforced by temporal differences in cross-dated ceramics associated with the different types.

Research in the Miami Wash area and at Second Canyon revealed that Pinto and Tonto Polychromes are mutually exclusive in time, with Pinto occurring early and Tonto late (Doyel 1974b; Franklin 1978). The absence of Pinto Polychrome in Cliff phase sites may then be a function of the late date of these sites rather than a function of the operation of Casas Grandes influence (LeBlanc and Nelson 1976). Although Breternitz (1966:77) claimed that Gila Polychrome may have occurred earlier in the Casa Grandes area than in the Tonto Basin, recent evaluation of the occurrence of this type in both areas questions Breternitz's claim (Doyel 1974b; LeBlanc 1980).

These Salado wares increase in frequency in later sites, whether in the San Pedro Valley (where Gila Polychrome constituted 87 percent of all decorated sherd at Reeve Ruin, for instance) (DiPeso 1958a), the middle Gila, the Cliff Valley or Casas Grandes (although implications of LeBlanc's revised dates for the latter (1980), if accepted, have yet to be worked out) (Franklin 1978)).

A variety of mechanisms have been suggested to account for this wide distribution. Petrographic analysis has shown that these types were locally made rather than produced in a few areas and then traded (Danson and Wallace 1956; DiPeso 1974; Franklin 1978). Young (1967) suggested manufacture by traveling potters operating out of Casas Grandes. Other explanations have included widespread imitation of designs originating in Casas Grandes (LeBlanc and Nelson 1976), a horizon style marker, much like Chavin in Peru (Franklin 1978:208), or even a fad (DiPeso 1958a:175).

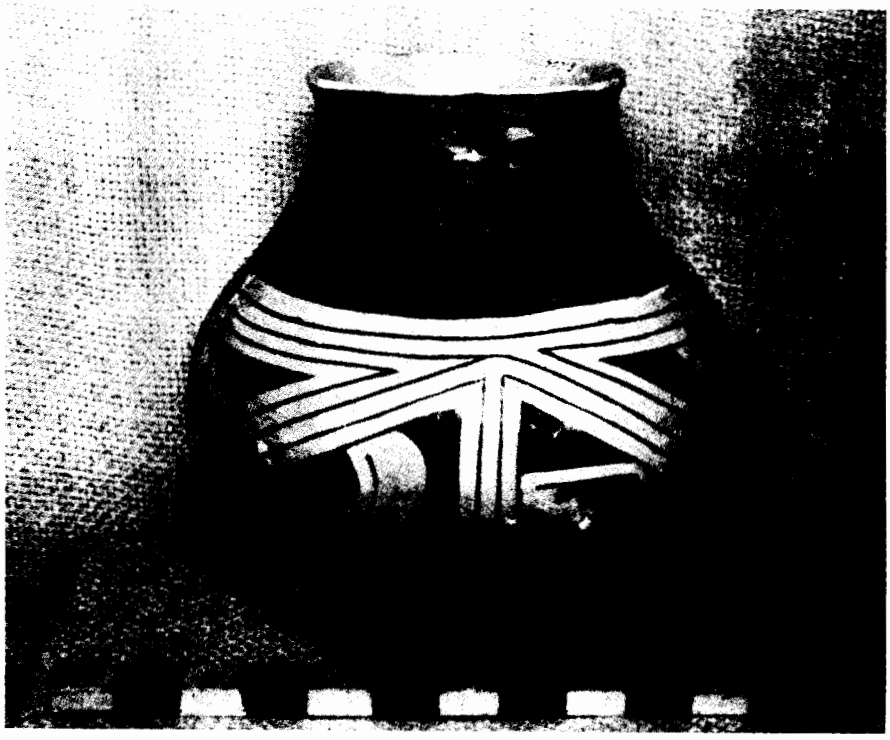
In all likelihood, the distribution of these wares resulted from a complex interaction among numerous populations in the transition zone between the southern Arizona desert and the Mogollon Rim, an interaction that involved broad-scale shifts in trade networks through time (Doyel 1976b; Brown 1973).

In this connection, the absence of Mogollon or Chihuahuan intrusive ceramics at Salado sites in the San Pedro Valley, in contrast to their common occurrence at other Salado sites, suggests synchronic differences as well (cf. Franklin 1978:226ff).

Architecture

The distinctive Salado architecture complex consists of above-ground contiguous-walled adobe rooms, generally with boulder reinforcement and

A Ramos Polychrome jar (#4070) from Room 3, House One.



A Ramos Polychrome/Madera Black on Red jar (#4071) found in Rooms 3 and 12, House One. All scales in inches.

Figure 60. Ramos Polychrome Jars from Slaughter Ranch Site. (Mills and Mills 1971) Courtesy El Paso Archaeological Society, Inc.

trench foundations or stone masonry rooms. Entry is usually in one of the long walls and facing the plaza; raised lips or steps or adobe aprons are common. Room interiors feature a frequent two-post roof support pattern along the long axis with a hearth between the entry and the room center. Room clusters are enclosed by a compound wall (e.g. Brown 1973; DiPeso 1958a; Danson 1946; Duffen 1937; Franklin 1978; Gerald 1975; Hammack 1970; LeBlanc and Nelson 1976; Mills and Mills 1969; Sauer and Brand 1930; Doyel 1976b; Johnson and Wasley 1966).

The sudden and widespread appearance of this architectural complex after AD 1250, often superimposed over earlier pit house villages, is often cited as evidence for a Salado migration rather than an indigenous development (e.g. Franklin 1978:73). Some regional differences, however, do occur as well as temporal changes. Further, not all Salado sites are large ones. Most Gila phase sites recorded by systematic survey for the Miami Wash project were one to two non-contiguous room habitations (Doyel 1976b:259).

The absence of ceremonial structures is often considered an additional Salado architectural hallmark. Ceremonial structures, however, have been reported at the Davis site in the San Pedro Valley (Gerald 1975), at Earven Flat and Goat Hill in the Safford area (Brown 1973), the Bonita site (Duffen 1937), the Ringo site in the Sulphur Springs Valley (Johnson and Thompson 1963b), and probably at the Kuykendall site in the Sulphur Springs Valley (Mills and Mills 1969).

At Reeve ruin in the San Pedro Valley, the ceremonial structure (Room 15, House Block 1) was located in a compound and had an eastern entry. The major feature was a natural rock platform in the western half of the room. The fireplace consisted of a rectangular slab hearth rebuilt in an older large pit hearth. A single posthole near the hearth was filled with ash. In the southern portion of the room, two rows of five small postholes were filled with ash; these probably were loom uprights (DiPeso 1958a:30).

At the Davis site, across the river from Reeve ruin, the ceremonial room also featured a raised platform and rows or probable loom posts, as well as benches along the walls (Gerald 1975).

Test excavations at the Ringo site were conducted in a large circular depression between two room blocks, marked at the perimeter by a low earthen ridge. These excavations revealed adobe walls and a possible side entrance, but insufficient time prohibited further investigation (Johnson and Thompson 1963b:469).

Room 32 at the Kuykendall site had a rounded adobe platform topped by a firepit. The platform lay in an annex formed by an extra wall along the west and south, which was lower than the outer room walls (Mills and Mills 1969:37).

The ceremonial structures at Earven Flat and Goat Hill consisted of shallow depressions with slightly raised outlines (Brown 1973). From the

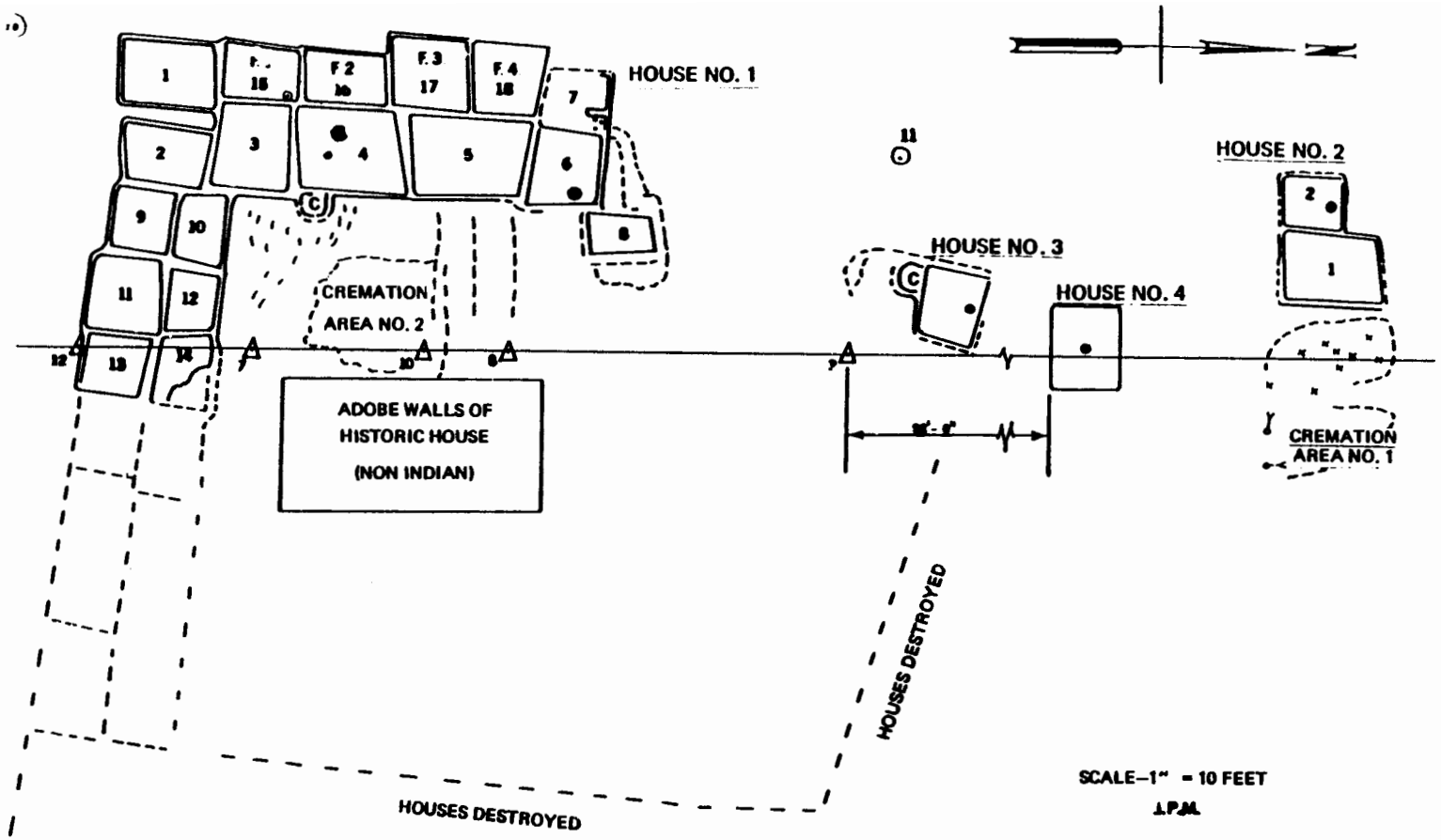


Figure 61. General Site Plan of the Slaughter Ranch Site (Mills and Mills 1971) Courtesy El Paso Archaeological Society, Inc.

surface, they appear to resemble the ceremonial room excavated at the Bonita site (Duffen 1937:13). The ceremonial room at the Bonita site was rectangular, measuring 25 by 17 feet, with a slab-lined fire pit and an unshaped stone in the floor at the edge of a circular pit. This pit in turn was set into a large narrow depression similar to one at Kiatuthlanna in eastern Arizona (Roberts 1931). Traces of green and white plaster and the absence of utilitarian objects further supported the purported ceremonial use (Duffen 1937:13).

Some artchitectural variations reflect the availability of suitable resources. At Reeve ruin, postholes are rare and roofs were probably supported by walls alone (DiPeso 1958a:35). Coursed stone walls were used rather than the usual boulder and adobe walls found elsewhere, and hearths were slab-lined rather than adobe-lined. DiPeso felt these differences represented a "Western Pueblo" occupation as well as the presence of a kiva but the coursed stone masonry was probably due to use of sandstone slabs from the nearby river. Such slabs are rare elsewhere (Franklin 1978:74). Slab masonry is also found at Marijilda ruin in the Safford area (Brown 1973).

The large Kuykendall site in the Sulphur Springs Valley is an example of population aggregation. Although earlier sites, such as the Ringo site, consist of two or three compounds, the 40-acre Kuykendall site consists of many compound units, with room blocks as much as four houses deep (Mills and Mills 1969). Ceramic evidence reveals that the Kuykendall site was occupied late in Salado prehistory and may represent the aggregation of inhabitants from several smaller sites, perhaps in response to environmental stress (Gerald 1975; Franklin 1978).

Some sites feature pit houses that were apparently contemporaneous with above-ground structures. Four were excavated at the Garden Canyon site near Sierra Vista (Young 1972b). Two are known from Second Canyon (Hammack 1970; Franklin 1978), as well as at the Davis site (Gerald 1975). The function of such rooms is unclear; their material culture assemblage is generally utilitarian and no evidence exists for ceremonial use.

A variety of features are reported for plazas. Ramadas were used at the Reeve ruin (DiPeso 1958a), probably in conjunction with a variety of open air activities. Earth ovens are known from the Reeve ruin (DiPeso 1958a) and at Second Canyon (actually large rockfilled surface hearths), although these ovens are probably early historic Apache or Sobaipuri (Franklin 1978). Hearths, fire pits, cooking pits, and caliche mixing basins were also found at Second Canyon (Hammack 1970), and a storage pit at the Ringo site (Johnson and Thompson 1963b). Plazas were also used as mortuary areas. At the Kuykendall site, Gerald excavated a walk-in well, the only one reported for a Salado site in the area. It lay in the section of the village furthest from the streambed and was probably used for obtaining water for domestic consumption. The surface was a circle of stone 25 feet in diameter, and the center was 4.5 feet below the surface (Mills and Mills 1969:133). Two archaeomagnetic dates of AD 1385 + 23 and AD 1375 $\pm$ 18 were reported from the site (Mills and Mills 1969:168).

Lithics and Ornaments

Lithic artifacts excavated at Second Canyon ruin included bifacial and unifacial manos, full trough unshaped metates, three-quarter grooved axes, a possible double-bitted axe, mescal knives, grinding slabs, polishing stones, arrowshaft straighteners, mortars, pestles and miniature pestles, abraders, small triangular points, both side-notched and unnotched and with indented bases, drills, and leaf-shaped blades (Franklin 1978:294).

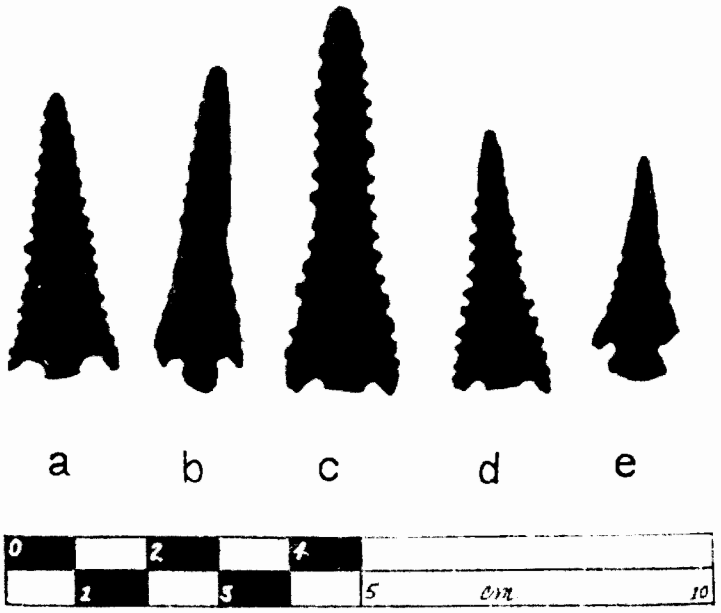
These artifacts appear to be fairly representative of the Salado lithic inventory as a whole, with the addition of picks, slab metates, and handstone at other sites. Some of these artifacts may represent carry-overs from the Hohokam, particularly the three-quarter grooved axe and the palettes, although Salado palettes are far cruder than Hohokam examples.

Franklin (1978:297) has further noted a Salado preference for chalcedony and jasper, both obtainable locally, and obsidian from near Superior, Arizona. This Salado preference contrasts with the Hohokam preference for chert and fine-grained volcanic materials like basalt and shows a Salado predilection for specific lithic materials over a wide region. Caches of quartz crystals and concretions have also been reported at Salado sites (e.g. DiPeso 1958a; Mills and Mills 1969). No thorough typological studies have been made of Salado lithics (cf. Fitting 1971a, 1971b, 1971c; cited in Martin 1979:73).

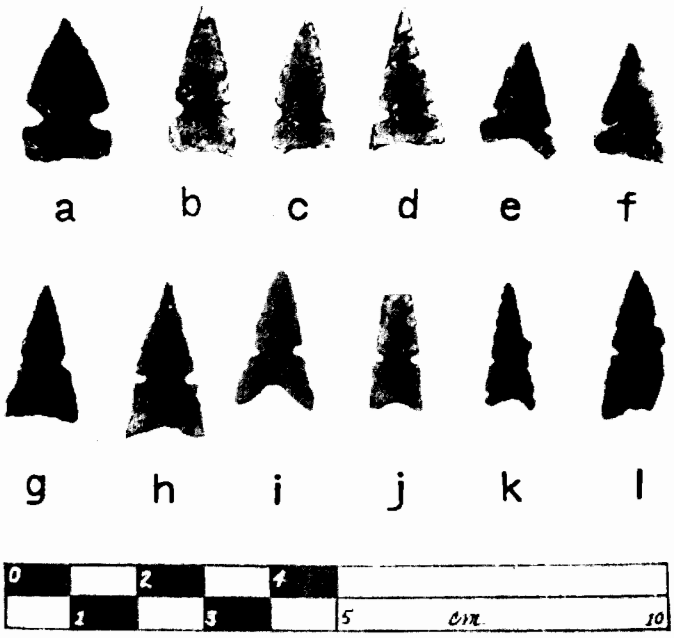
Site reports from the study area reveal a highly differential distribution of shell and stone ornaments and manufacture areas. At Reeve ruin and the Davis site few nonperishable ornaments were found, although such were abundant at slightly later dates, such as San Cayetano de Tumacacori (e.g. two stone beads at Reeve ruin, 63,735 at San Cayetano) (DiPeso 1958a:138). In contrast, turquoise was common at the Bonita site, including a mosaic of several hundred bevel-cut stones on a wooden base in the form of a frog. Shell ornaments were also abundant, and evidence of stone ornament manufacture was reported (Duffen 1937). At Second Canyon, stone ornaments were scarce, and shell ornaments showed clear ties with the Gila Basin (Franklin 1978:319). DiPeso (1958:138) has suggested that ties with the Gila Basin represent a difference between the Salado and the Western Pueblo complex as manifested at Reeve ruin. But other explanations may exist. Fewkes (1904:186) also reported an abundance of shell ornaments at sites in the Safford Valley. The Buena Vista site contained shell rings, pendants, bracelets, and beads (Brown 1973:91).

Mortuary Practices

Although the practice of inhumation is customarily associated with the Salado, a review of Salado burial practices reveals much areal difference (Franklin 1978:344ff). In the Tonto-Globe and Gila-Salt Basin

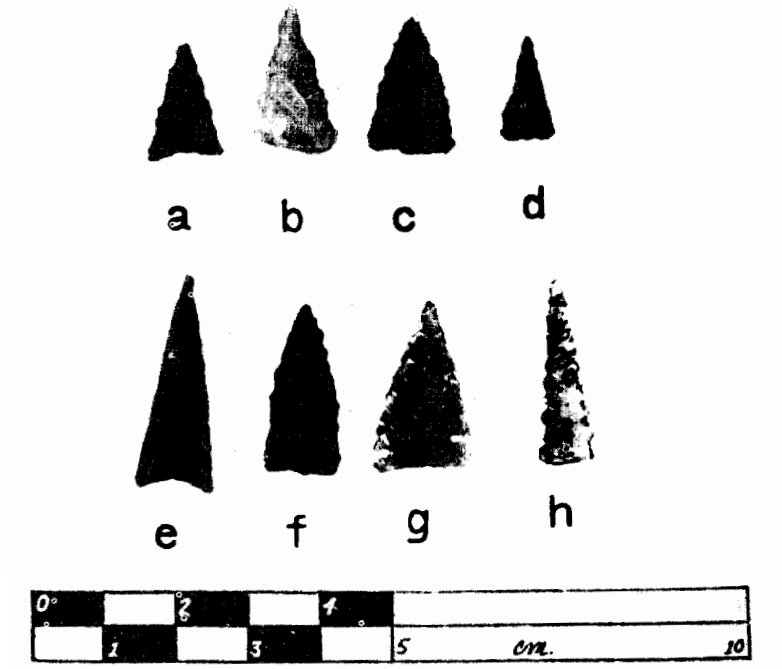


Projectile points, Type II

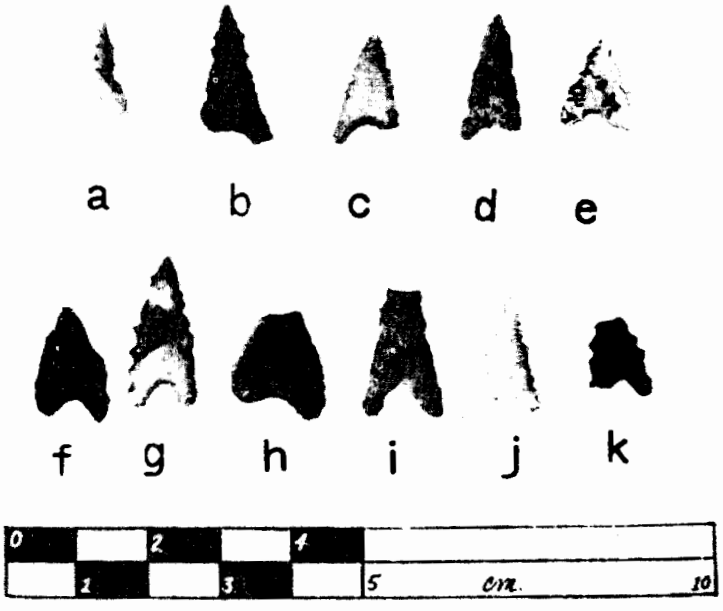


Projectile points, Type III

Figure 62. Salado Projectile Points from Second Canyon Ruin. (Franklin 1980) Courtesy Arizona State Musium.



Projectile points, Type IV



Projectile points, Type V

Figure 63. Salado Projectile Points from Second Canyon Ruin. (Franklin 1980) Courtesy Arizona State Musium.

areas, inhumations were extended with no consistent orientation. Placement was quite varied and included abandoned rooms and subfloor interment. In southeast Arizona, inhumations were generally semi-flexed, with a fairly consistent orientation of the head to the east. Burials were generally placed in trash areas; subfloor interment was found only at the Ringo site. Burial goods are rare.

Salado cremations generally took the form of secondary cremation in vessels accompanied by objects of ornamentation or ceremonial significance. Cremations were usually placed in plaza areas. The significance of the differences between inhumation and cremation are unknown, but the general impression is that cremation was favored in sites with strong Hohokam influence, not just for the Hohokam, but for Sonoran Brownware/-O'otam sites as well (Franklin 1978:344ff).

For example, in the Safford Valley both cremation in urns and inhumations were present at Buena Vista and Epley's ruin. Burials tended to be of infants, and associated with ceramics (Fewkes 1904:175). Urn cremations are also reported from Cliff phase sites in New Mexico (LeBlanc and Nelson 1976:76). At the Kuykendall site in the Sulphur Springs Valley, which is probably affiliated with the Cliff phase (LeBlanc and Nelson 1976:75), 146 of the 175 cremations were primary cremations in extended crematory pits; the remainder were in small pits or in litter piles (Mills and Mills 1969:140).

At the Ringo site, which was probably ancestral to the Kuykendall population, three primary inhumations and two cremations were reported. Two inhumations were of infants, buried beneath room floors. Both were extended, one oriented northeast-southwest, the other northwest-southeast. The third inhumation was of an adult buried below the floor of a plaza in an extended position with a northeast-southwest orientation. Some shell beads and fragments of brownware bowls were also located beneath the plaza floor and were the primary type associated with fragments of a miniature vessel, turquoise mosaic fragments, a sherd disk, a quartz crystal, an Olivella shell bead, and several shell disk beads (Johnson and Thompson 1963b:470). The adult inhumation at the Ringo site resembles the sole inhumation reported at the Bonita site. Here, excavation revealed an inhumation of an extended adult oriented west-east and associated with a small brown corrugated bowl with black polished interior, probably Salado Corrugated (Duffen 1937:13).

At Second Canyon ruin, only one burial was recovered. Of the 24 secondary cremations reported, 14 were assignable to the the Salado component at the site. Four primary cremations in Plaza V also probably dated to the Salado occupation (Franklin 1978:344-345). The secondary cremations were located in plazas away from room walls, often in clusters. The resemblances between cremations in the same cluster in terms of accompanying goods, pit depth and amount of bone suggested the possibility of some sort of relationship among the deceased. Cremations differed among room blocks in terms of placement and associated ceramics, indicating the existence of several microtraditions within the site

(Franklin 1978:352). These cremations contrasted with the Hohokam practice of placement in urns in special cremation areas or in trash mounds (Franklin 1978:356). The mortuary microtraditions may be a reflection of population aggregation similar to that noted for the Kuykendall site.

At Reeve ruin most cremations were found in a mortuary area near the secondary defense wall. Calcified bones and burned artifacts were found in the top soil but only one urn cremation was excavated, suggesting that some of the dead were disposed of by dispersal of the cremated remains (DiPeso 1958a:26). At both Reeve ruin and the Davis site, inhumations were placed in trash layers and were semi-flexed on the side without obvious orientation. Although few ornaments accompanied the inhumations, numerous ceramic vessels were recovered (DiPeso 1958a; Gerald 1975).

CONTINUITY, SUBSISTENCE, AND SOCIAL ORGANIZATION

Cultural Continuity

The relationship between the Salado and historic groups is unknown. DiPeso excavated a single room of a cobble-walled compound at Baicatcan which he felt indicated Salado presence in the San Pedro Valley until historic times, on the association of Gila Polychrome and a plainware plate similar to historic Sobaipuri wares (DiPeso 1953a:61). In this view, the Sobaipuri were the descendants of the Salado (DiPeso 1953a:138). Fritz has criticized the assumed historic date on the grounds that the materials are all prehistoric and that plainwares are poorly known and quite difficult to differentiate; in his view, it is a prehistoric Salado site (Fritz 1977:24). Given problems of ceramic typology of plainwares in the area, the historic association at Baicatcan is questionable at best.

Gladwin postulated that the Salado abandoned the Middle Gila after AD 1400 and moved through the San Pedro Valley and to the east and southeast under the pressure from Apache raiders (Gladwin 1957; cf. DiPeso 1958a for a similar view in which the historic Sobaipuri are Salado descendants). More recent research has shown Salado occupation throughout the study area by AD 1300. Moreover, Salado migrations to the east would have taken them into the heart of historic Apache country. The Apache are not likely to have been present in the study area at this early date. In historic times, Apache raids on the Sobaipuri and Spaniards of the San Pedro and Santa Cruz Valleys did not result in abandonment until the middle of the eighteenth century (DiPeso 1953a), suggesting that Apaches were not a major threat until their adoption of Spanish horses and weapons. Intervillage competition may have been a factor in Salado abandonment, accounting for the evidence of burning of Salado sites in the San Pedro region and elsewhere (Franklin 1978:379).

Although the Salado have been linked to the prehistoric Western Pueblo complex as defined by Reed (1948, 1950), specific descendant populations cannot be identified. The fifteenth century was a time of disruption and migration of many communities in the Southwest. People moved

in complex patterns, probably adopting new cultural and subsistence patterns to survive. The resulting changes probably were responsible for the disappearance of the distinctive Salado pattern.

Subsistence

Throughout the study area, Salado remains are associated with extensive agricultural features. In the San Pedro Valley, these features include large cleared areas on the first and second terraces and on the floodplains of small tributary drainages. Fields are marked by rockpiles, cleared areas, linear borders, check dams, and gridded garden features (Agenbroad 1967a:68; Breternitz 1978:18). Contour terraces have also been reported near the pre-Salado Twin Hawks site near Oracle (Franklin and Masse 1976:50). Remnants of an irrigation canal were excavated near the Big Ditch site (Franklin 1978), but results of the excavation have never been formally reported (Masse et al. in preparation).

The hydrology of the San Pedro River probably prevented the extensive use of irrigation agriculture. Rock-edged depressions 25 feet wide, however, were reported crossing the bluffs above the Santa Cruz River, bisecting a compound habitation site to the center of the bluff, and ending where the bluff fell away to the valley bottom. Danson (1946:17) considered that these depressions might be the remains of ditches, but they probably represent water control structures used with dry farming.

Similar irrigation canals have been reported near the Buena Vista site (e.g. CC:1:10 Fewkes 1904:178; Doelle 1975a:12). None have been confirmed or excavated. Both Fewkes and Hough report the remains of terraces and gridded gardens in the Safford Valley (Fewkes 1904:168ff; Hough 1907:33ff), but their cultural affiliation is unknown. Aerial photographic interpretation has identified canals that cross the slopes of the Pinaleno Mountains south of Safford and end at either agricultural fields or habitation sites. These canals may be Salado in origin (Kinkade 1981, personal communication). It is possible that small sites in the Safford area such as CC:1:12 are the remains of seasonally occupied field houses (Doelle 1975a:12). The variety of agricultural features reported from the Safford Valley probably represent a response to specific environmental conditions (Doelle 1975a:19).

The remains of Salado foodstuffs have been reported from the Kuykendall site (Mills and Mills 1969), Reeve ruin (DiPeso 1958), and the Methodist Church site in Safford (Brown 1973). At Reeve ruin, most of the plant remains were found in a subfloor cache reminiscent of the Pueblo sipapu. The remains included maize, beans (Phaseolus vulgaris), cotton seeds, the stem and seeds of domesticated squash (Cucurbita pepo), and the remains of wild plants, including mesquite bean seeds and pod fragments, and seeds and rind of the wild gourd (Cucurbita foetidissima) (Mills and Mills 1969:135). Six ears of corn were found at Reeve ruin. Each ear had eight rows of kernels, which were moderately thick with medium wide cupules. Such corn has been found elsewhere in late Mogollon context (e.g. Point of Pines) and has been reported for the modern

Papago, Hopi, and Zuni (DiPeso 1958a:122). The Methodist Church remains consisted of mesquite beans and portions of three corn cobs (10 and 12 rows) (Brown 1973:35, 39).

Several sites have yielded faunal remains. At the Kuykendall site, "numerous" deer bones were recovered, as well as antelope and peccary remains (Mills and Mills 1969:135). A horn core of a mountain sheep was found on the floor of a Salado room at Second Canyon ruin (Franklin 1981, personal communication). Faunal analysis of materials from Reeve ruin found a high occurrence of Sonoran whitetail deer remains and no antelope or jackrabbit remains. In contrast, Babocomari and San Cayetano del Tumacacori had abundant mule deer and pronghorn antelope remains, as well as jackrabbit (DiPeso 1958a:115). The abundance of hunting tools such as fleshing knives, arrow-making kits, and projectile points all suggest some measure of dependence on wild animals. It is unclear if the differences in faunal remains are due to cultural or geographic factors or some combination of these.

Although Salado subsistence practices supported many people, most sites were evidently abandoned around AD 1400. In part, abandonment may have been due to the inability of the Salado to cope with prolonged environmental deterioration. Franklin (1978:378-379) suggested that the drought of the late 1200s, which affected the Anasazi area, also struck southeast Arizona, depopulating at least the San Pedro Valley. These conditions may have improved by AD 1300, permitting resettlement. The environmental conditions may have ultimately worsened, resulting in final abandonment (Franklin 1978:378-379). Studies at the Reeve and Davis site reveal settlement during relatively moist conditions. The large ceremonial room at the Davis site was built at this time and may have served to integrate several nearby communities such as Reeve ruin.

The onset of increasingly dry conditions, however, led to intercommunity competition. The Davis site was fortified with a perimeter wall and was ultimately abandoned. The population probably joined the inhabitants of Reeve ruin at its more easily defended location (Gerald 1975:193).

Gerald's analysis of architectural and ceramic changes at the Davis site and Reeve ruin revealed reduced interaction between households due to competition for resources and enlargement of food storage areas, as well as increased wild plant food collection and a decline in consumption of large mammals (Gerald 1975:194). These changes were related to the onset of drought as revealed by shifts in pollen spectra and mammalian and avifaunal remains at the sites (Gerald 1975:197). All of these lines of evidence show an environmental change from a precipitation pattern in which most moisture occurred during the warm season toward a more even distribution of precipitation similar to the region's present day climate (Gerald 1975:197).

In all likelihood, the decline in summer moisture was an added stress on a subsistence system pushed to its limit by the large populations already exploiting the agricultural potential of the drainages and nearby areas. In the absence of systematic pollen profiles and other paleoenvironmental studies on a regional basis, however, the operation of such

factors in the Salado abandonment of southeast Arizona and southwest New Mexico must remain speculative.

Social Organization

Social organization of the Salado has been studied extensively only at the Davis site. Here analysis of ceramic design element distribution and wall types suggested a probable virilocal residence pattern with indications of marital alliances with two other communities, probably nearby villages (Gerald 1975:196; after Longacre 1970).

Reconstruction of social organization from ceramic and other evidence, however, has been criticized (e.g. Allen and Richardson 1971; Stanislawski 1973) on theoretical and methodological grounds. The relationship between material culture and social organization appears to be much more complex than was apparent in earlier formulations. On a more general level, DiPeso (1958a:22) has inferred a Western Pueblo form of social organization from the Reeve ruin settlement pattern. But these resemblances are quite general, and the nature of the relationship between the Salado and archaeological Western Pueblo complex on the one hand and ethnographically known Western Pueblos (Eggan 1950) on the other has not been well defined.

PROTOHISTORIC CULTURE HISTORY AND LIFEWAYS

CHAPTER 6

The protohistoric period has been defined as the "times immediately preceding historic time" (Webster's Third New International Dictionary 1961:1825). For the purposes of this overview, the protohistoric period will include the sixteenth and seventeenth centuries, ending in the 1980s. During this period, the Spaniards began sporadic contacts with native peoples of the study area. As the frontier of New Spain expanded north, these contacts intensified, ultimately culminating in the epic missionary effort of the Jesuit priest, Eusebio Francisco Kino. By the time of his death in 1711, Kino had directly or indirectly affected most of the native peoples, particularly the Pimans (cf. Spicer 1962:118ff). As used in this overview, the Protohistoric period is roughly equivalent to DiPeso's period of "Sporadic Spanish Contacts" (AD 1500-1700) (DiPeso 1958a:172).

Two major groups were present in the region at Spanish contact. In the northern part of the study area were the Apache, Athapaskan speakers, related to the Navajo and to groups in Canada and Alaska. Current evidence indicates they were latecomers to the area, and this overview treats them separately. The second major group was the Pima.

THE PROTOHISTORIC UPPER PIMA AND SOBAIPURI

ORIGINS AND RELATIONSHIPS

The Pima are members of the Pimic family of Utoaztekan linguistic stock (see Lamb 1964 for a history of the classification of this stock). Pimic is composed of Pima and the closely related Tepehuan language of Durango (Goss 1968). Pima is in turn divided into Lower Pima or Nebomes, spoken in Sonora, and Upper Pima, spoken in Arizona. Upper and Lower Pima are essentially identical languages. The distinction is largely a geographic one, the two groups being separated by the Opata (Ellis 1968).

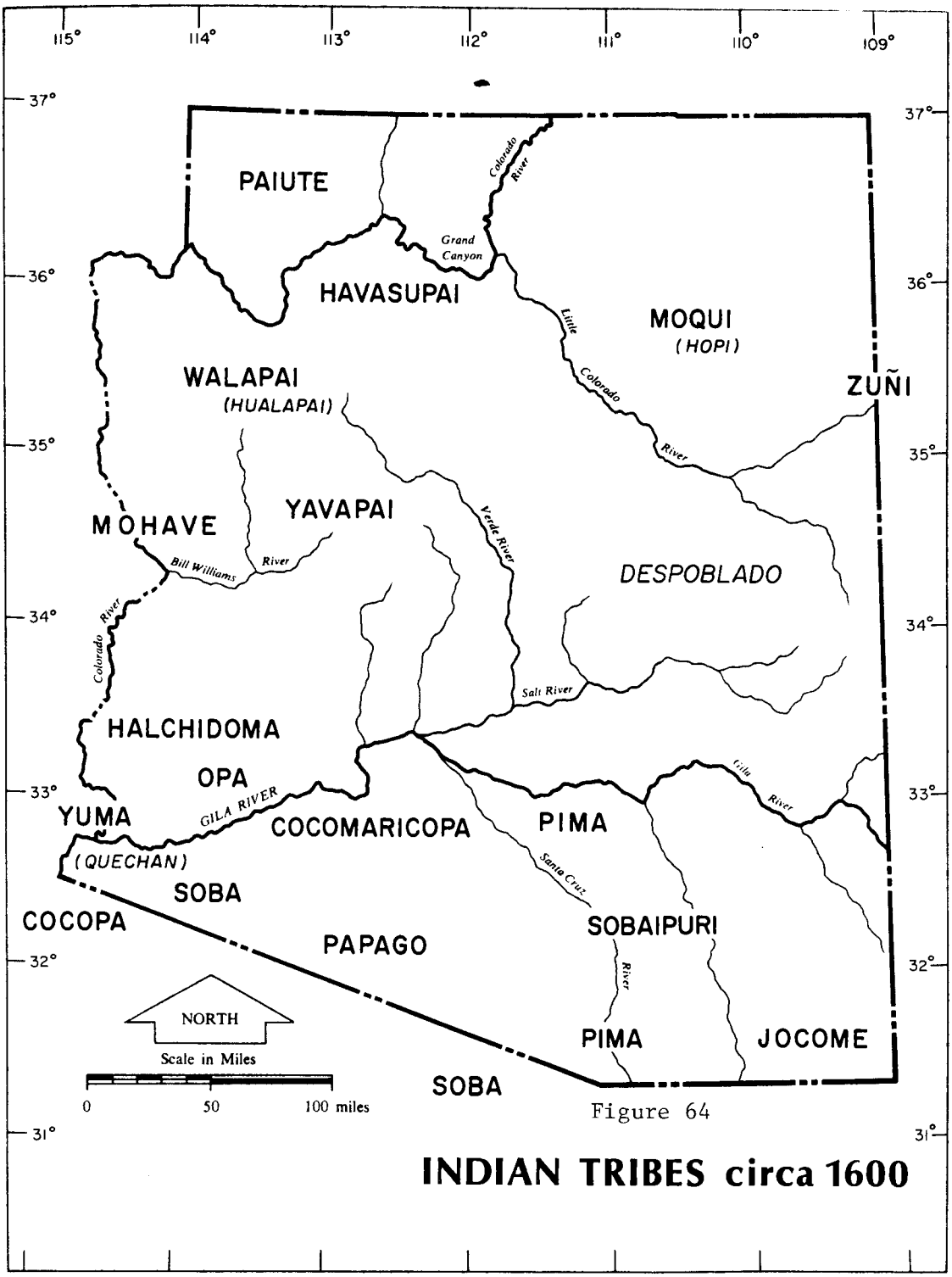


Figure 64

From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

Father Kino reached the area that is now northern Sonora in 1687. As he explored the country to the north, he found five different groups of Pimans, all speaking closely related dialects. In Kino's terms, these groups were: (1) the "Pima proper" of northern Sonora, who lived along the headwaters of the Altar and Santa Cruz Rivers; (2) the Sobaipuri of the Santa Cruz and San Pedro River Valleys; (3) the Gileno, who lived along the Gila River as far as the present town of Gila Bend; (4) the Papago of the southern Arizona deserts; and (5) the Soba of the San Ignacio River and the coast of the Gulf of California (Bolton 1936:246-248).

The differences among these groups were primarily economic, with some variations in dialect. Most of Kino's terms referred to groups at a particular location. It is unclear whether these groups were self-perceived as distinct, particularly the Sobaipuri and the Pima. The Papago lived in the arid environments of southern Arizona in an area of no permanent streams, requiring greater dependence on wild plant foods and a two-village annual pattern (cf. Underhill 1940). In contrast, the Pima and Sobaipuri lived along permanent rivers. Their subsistence was based on agriculture with some dependence on irrigation, at least among the Sobaipuri (see Doelle 1975b for a review of Gila Pima irrigation at Spanish contact).

Kino found both Sobaipuri and Pima villages along the Santa Cruz River (Bolton 1936), but in historic times the ethnic composition of the valley population underwent major changes. San Xavier del Bac is now a Papago mission, yet it was founded in 1700 as a mission to the Sobaipuri (DiPeso 1953a:9). The Santa Cruz Valley was largely abandoned after 1773 due to disease and Apache raids (Winter 1973), and a major Papago influx did not begin until the Franciscans brought in a number of converts to augment the declining native population in the early 1800s (Spicer 1962:132).

The natives of both the Santa Cruz and San Pedro Valleys intermarried and took joint action when needed. When the Apache and Jocome attacked the Sobaipuri village of Gaybanipitea in 1698, they were met and repulsed by a force under the leadership of Coro, a Sobaipuri. The force was made up of Sobaipuri from the San Pedro Valley and natives from the Santa Cruz Valley (Bolton 1948, 1:178-181). Spicer (1962:127) called these Santa Cruz natives Sobaipuri; DiPeso (1956:44) called them Pima.

The archaeological investigations of Upper Pima and Sobaipuri as separate entities have been questioned. From excavations at Quiburi and Gaybanipitea, DiPeso (1953a:141) regarded the Sobaipuri of the lower San Pedro as descendants of the late prehistoric Salado, due in large part to the presence of a number of puebloan traits among the Sobaipuri and their present day descendants, the people of the village of Archie on the Papago Reservation. A Pima origin, however, has also been claimed for these same traits (Spicer 1949:68). Evidence exists for Pima-Sobaipuri interactions even before the migration of the Sobaipuri to San Xavier del Bac in the eighteenth century (cf. Russell 1908:23). Doyel (1977b:138-139) also denied the Salado-Sobaipuri link. Instead, he regarded the Sobaipuri as descendants of the indigenous red-on-brown ceramic tradition. DiPeso

(1953a:138-139) also suggested this continuity for the upper San Pedro area, but in the lower valley he saw the Sobaipuri develop out of Salado (DiPeso 1953a:139; Doyel 1977b:134-135).

Many of the differences between the Pima and Sobaipuri relate to the existence of a more centralized leadership among the Sobaipuri as well as their warlike nature.

> The most warlike among all the Pimas are those we call the Sobaipuris (sic), for they are born and reared on the border of the Apaches (Anonymous 1951:192).

As this eighteenth century account states, these differences were probably due in large measure to the location of the Sobaipuri on the northeast frontier of Pimaeria Alta and to their role as a buffer between the Spaniards and the Apache.

The protohistoric period is best known from the pioneering work of DiPeso in the 1950s (1951a,b; 1953a; 1956). From his excavations at Quiburi (1953a) and Paloparado (1956), and on historic accounts, DiPeso has distinguished between the Sobaipuri and the Upper Pima of the Santa Cruz Valley.

On the other hand, Doyel (1977b) denied the validity of this distinction, on the basis of his own work at a protohistoric site in the middle Santa Cruz Valley and of comparisons with other, largely unreported, excavations at sites of this time period. Instead, Doyel (1977b:134-135) regarded protohistoric sites in both valleys as almost identical. The archaeological pattern is one of similar assemblages and adaptations during the protohistoric period in the Santa Cruz and San Pedro Valleys. Recent work has found Upper Piman sites to have oval alignments of stone cobble house foundations, undecorated and unslipped ceramics, minimally-shaped grinding tools, and a chipped stone assemblage marked by small triangular points with indented bases and fine, often roughly trapezoidal, retough (Doyel 1977b; Fritz 1977; Michael B. Bartlet 1981, personal communication). Sites generally are small and lie on ascending terraces. Although mountain sites are known, they have not been fully reported.

Differences existing before Spanish contact may have resulted from different agricultural strategies. To the west, the Pima on the Gila practiced floodwater farming without irrigation (Doelle 1975b) or possibly with some small scale irrigation (Winter 1973). In the Santa Cruz Valley, irrigation was much more important (Doelle 1975b). In the late seventeenth century, Kino reported over 2000 people living in fifteen villages, depending on irrigation to raise maize, beans, squash, and cotton (Bolton 1936:269ff).

Given the linguistic, cultural, and archaeological similarities, it is difficult to differentiate between Pima and Sobaipuri and it is unclear whether these distinctions were meaningful to the people themselves. For this overview, protohistoric manifestations in the San Pedro and Santa Cruz Valleys are treated together under the term Upper Piman, following Doyel's use of the term as a geographic referent for people with similar

languages and minor local adaptational differences who inhabited southeast Arizona at contact (Doyel 1977b:135). Use of a common term focuses attention on the evident similarities, many of which were masked by the operation of a variety of factors in the contact situation. Such factors may even have led to the misidentification of several sites as Sobaipuri or Piman (Gerald 1968; Fritz 1977).

Briefly stated, four major theories have been proposed about the relationship between the Hohokam and the historic Upper Piman peoples: (1) Upper Piman descent from the Hohokam (Bandelier 1892:463-464; Haury 1945a:211-212, 1950:542-543, 1976:355,357; Ezell 1963; Hayden 1957:191-210; (2) Upper Pimans from the aboriginal O'otam who overthrew the Hohokam invaders (DiPeso 1956:19, 1958a:175, 1979:99; Hayden 1970); (3) Upper Pimans descent from Sonoran groups who entered the study area after the departure of the Hohokam (Sauer and Brand (1931:117-119; Fritz 1977:14-16; and (4) DiPeso's (1953a:139) theory of lower San Pedro Sobaipuri from the late prehistoric Salado. These theories have been generally based on comparisons of traits rather than on detailed studies of the nature and modes of adaptation (see cf. Debowski 1976 for an extended critique of this approach).

Some of the theories questioning the continuity of Hohokam-Pima relationships have been based on studies of peripheral groups, whose differences from the pure Hohokam may be more adaptational than cultural (e.g. DiPeso). Other critiques have been based on a reading of a limited series of Pima and Papago myths (e.g. Hayden 1970; see Bahr 1971 for an analysis of the much broader range of Piman myths about the Hohokam, which contradicts Hayden's view that the Hohokam became the Buzzard moiety). These criticisms also overlook many continuities in subsistence (e.g. Spicer 1949:15; Haury 1976:117) and ceramics (Haury 1976:197), as well as architecture (e.g. the presence of some round houses resembling historic Pima structures at sites such as Paloparado (DiPeso 1956:127, 224-225).

SUBDIVISIONS OF THE PROTOHISTORIC UPPER PIMA WITHIN THE STUDY AREA

San Pedro Valley

As discussed earlier in this report, a number of sites in the valley span the protohistoric period, including the Babocomari Village site (DiPeso 1951a) and San Salvador de Baicatcan (DiPeso 1953a). According to DiPeso and on the basis of the association of Gila Polychrome with a Sobaipuri Plainware plate and Spanish accounts of the village, the presence of Gila Polychrome at San Salvador de Baicatcan suggested that this ceramic type was used into historic times in the San Pedro Valley (DiPeso 1953a:133-134). The plainwares of the study area are confusing and poorly understood. Fritz (1977:24) objected to identifying the site as early historic on the grounds that no other historic materials have come from Room 1a and that the remains are identical to those of the Salado, present in the area until around AD 1450. The implication is that DiPeso excavated the wrong site and that Baicatcan has yet to be discovered.

The first site that is generally considered protohistoric in the San Pedro Valley is Gaybanipitea (EE:8:15(ASM); EE:8:5(AF)) (DiPeso 1953a; cf. Fritz 1977:27; Doyel 1977b:126; Ferg 1977a). The site was the scene of a battle between the Sobaipuri (and Pima?) and the Jocome and Apache in 1698. It was identified and excavated by DiPeso (1953a:49) to find data to fill the gap between the Fairbank phase at Quiburi and the later San Pablo de Quiburi phase. The remains of twenty-one structures were found, consisting of boulder foundations in a roughly rectangular outline with rounded corners. One house, House 5, was round in plan. Structures ranged in size from 7.0 meters by 1.9 meters (House 10) to 3.60 meters by 0.95 meters (House 8); the mean size was 4.9 by 2.1 meters. Although no remains of superstructures were found, DiPeso inferred the use of jacal and thatch from historic accounts. Each house had a side entry and easily definable hard-packed floor. Eleven of the structures had hearths consisting of three stones forming a small firebox (DiPeso 1953a:128). A single mescal pit was found on the western edge of the site. Attempts were made to locate trash areas in order to deal with questions of historical continuity, but none were found (DiPeso 1953a:131).

The large size of the site may be due to aggregation in response to Apache raiding or a more productive subsistence system than employed at other sites. Alternately, the smaller sites may have been short-term specialized activity sites. A small adobe fort was built at the site by the Spaniards, but the remains were not found (DiPeso 1953a:132). No items of material culture were found in association with the structures, except for 155 sherds in floor contact. Of these, 95 percent are not associated with the Sobaipuri.

As known from Quiburi and Santa Cruz de Gaybanipitea, Whetstone Plain is associated with Sobaipuri Plain, Sobaipuri Red, and Spanish ceramics at Quiburi. It was finished by the paddle-and-anvil technique. The paste is reddish-brown and lacks a carbon streak. Temper consists of mixed angular and rounded sand particles. Interior and exterior surfaces are hand smoothed, with no striations or polishing marks. Surface color is reddish-brown, and fire clouds are common. Vessel walls are thin and shapes are limited to globular jars and shallow bowls. Rims on large jars are beaded. On smaller jars rims are recurved, and bead rims are also present (DiPeso 1953a:146ff).

The absence of European ceramics suggested such items did not enter the valley until after 1704. This conclusion was based on work at Gaybanipitea and at Quiburi (DiPeso 1953a:128). Some metal items and glass beads were found, and cow bones were also recovered from Gaybanipitea (DiPeso 1953a:132).

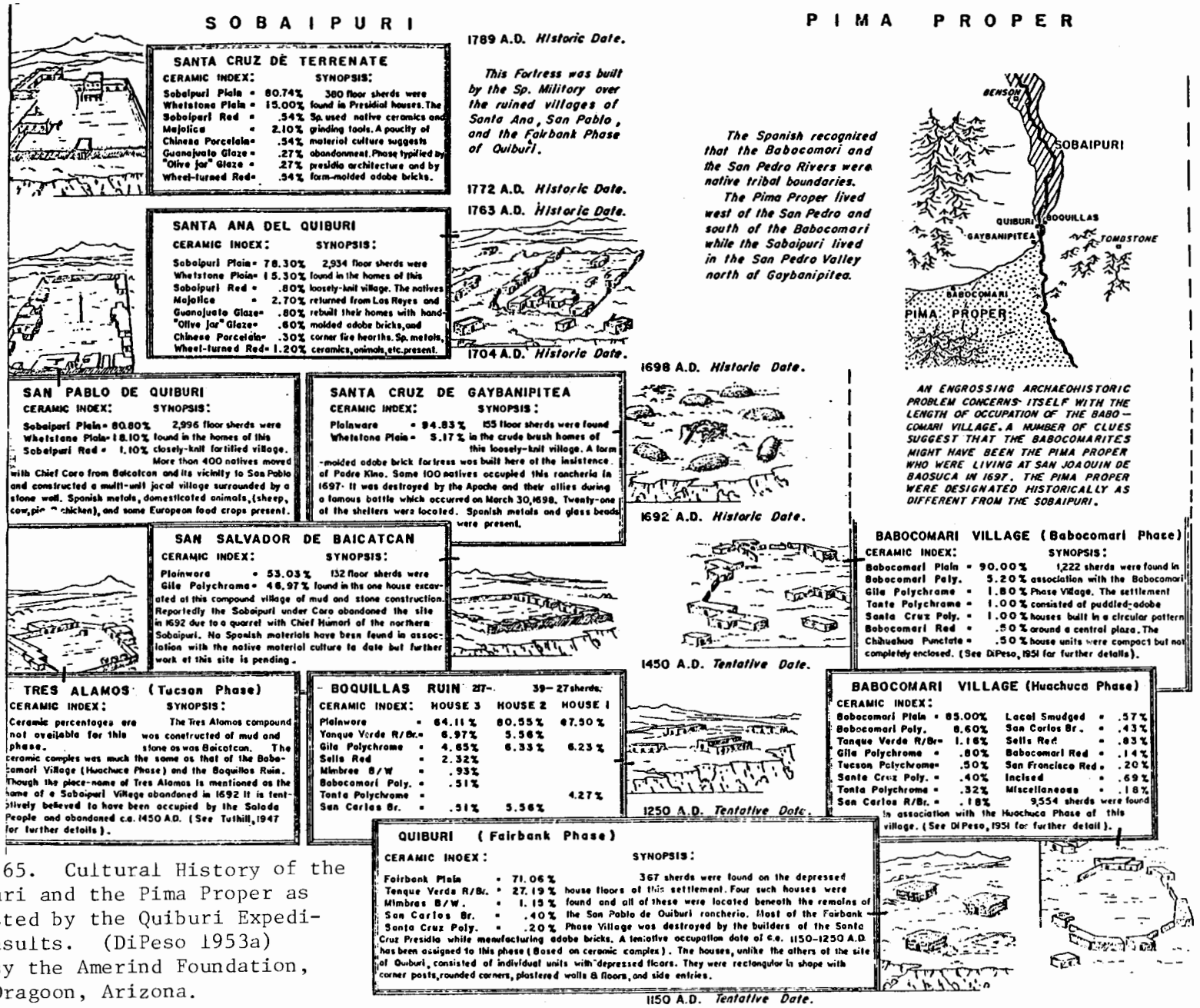


Figure 65. Cultural History of the Sobaipuri and the Pima Proper as Manifested by the Quiburi Expedition Results. (DiPeso 1953a) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.

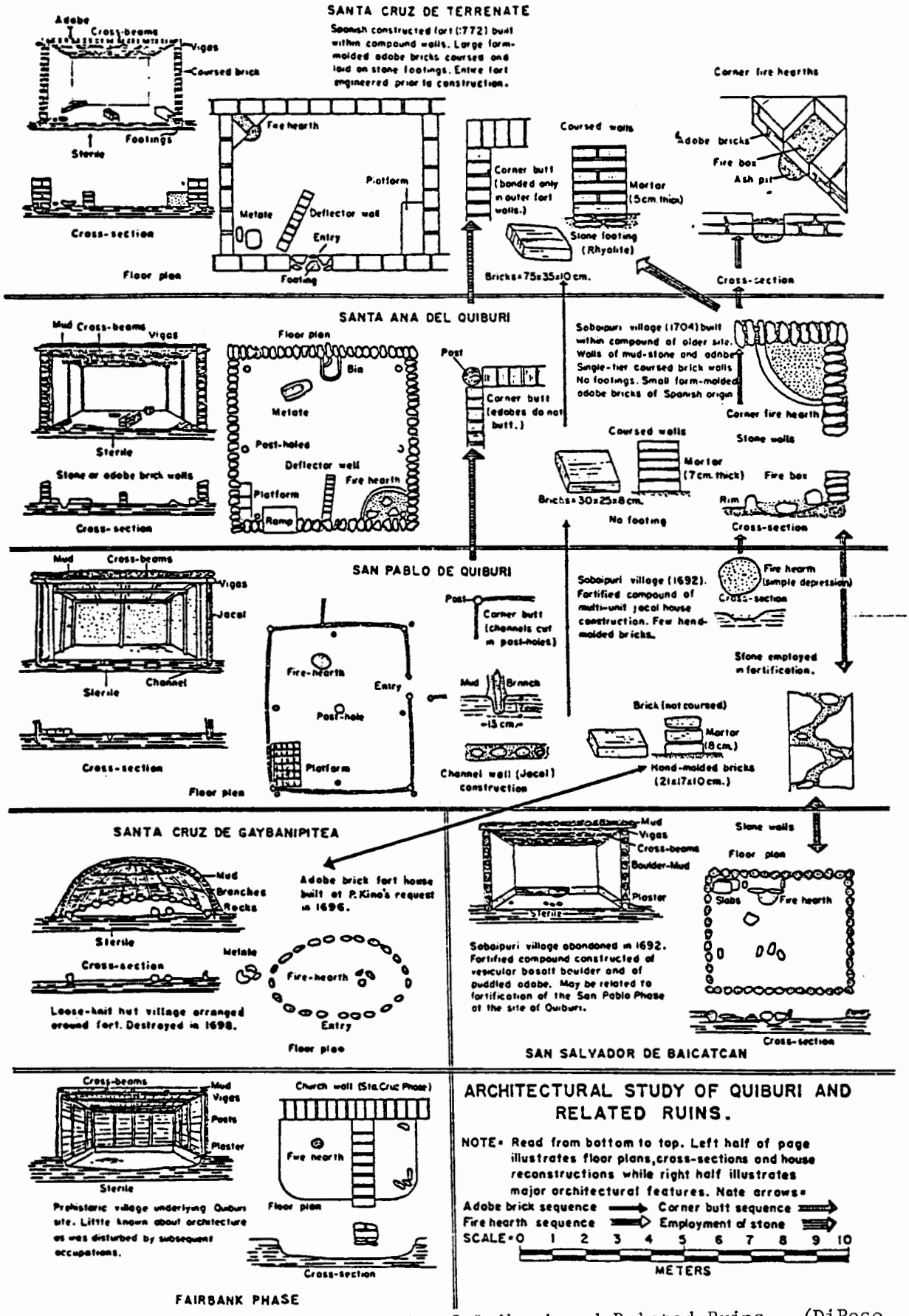


Figure 66. Architectural Study of Quiburi and Related Ruins. (DiPeso 1953a) Courtesy Amerind Foundation, Inc., Dragoon, Arizona.

The major protohistoric site in the San Pedro Valley is Quiburi (EE:4:11(ASM); EE:8:1(AF)), north of Fairbank. DiPeso identified the site with the village of Captain Coro, an important Sobaipuri leader. The site was excavated in 1950-1951 to find out more about the transition to the historic period (DiPeso 1953a:1). According to DiPeso, (1953a:121) the village was built by Sobaipuri after the abandonment of San Salvador de Baicatcan in 1692 and in turn abandoned in 1698 after being razed and burned by the Apache in retaliation for their defeat at Gaybanipitea. During its brief occupation, Quiburi was the largest settlement on the San Pedro River, consisting of over 500 people (DiPeso 1953a:120).

Sixty-six structures were excavated at the site and assigned to the San Pablo phase (AD 1692-1698) on the basis of similar construction, lack of Spanish majolica, multi-unit association, stratigraphic position, and evident destruction by fire (DiPeso 1953a:111).

The village plan during this period was outlined by a roughly rectangular stone wall with boulder foundation. Occasionally the wall was reinforced with wood posts. Within this enclosure, several multi-unit jacal houses bordered the wall, although they did not abut it. No structures lay along the western wall, which was used as a tie-wall facing the central plaza. The layout resembled the Tucson phase compounds at Tres Alamos (Tuthill 1947) as well as two sites described by Sauer and Brand (1930:425-426) and sites found by Amerind Foundation survey, all compound sites with associated Gila Polychrome (BB:11:2(AF), BB:11:3(AF), BB:11:4(AF), BB:11:5(AF), BB:11:7(AF)) (DiPeso 1953a:59).

The multi-unit structures were all of jacal with wall foundations set into a shallow trench. Large corner posts were the rule, with occasional center posts, suggesting heavy roofs and walls. Doorways average 0.9 meters in width and were framed by two upright posts. The multi-unit rooms shared common doorways, and all main doorways faced the central plaza. Most rooms lacked sills and lintels. Fire hearths, consisting of simple depressions, in the center of the structure or to the side of the center post, contained ash. Two rooms featured low adobe brick platforms, which were probably for sleeping (DiPeso 1953a:113-116). Three ramadas were also excavated in the plaza area; two had associated fire hearths. One of the fire hearths was associated with an ash pit similar to those at the Babocomari Village site (DiPeso:1951a; DiPeso 1953a:119-120).

Of the associated ceramics, 18 percent were Whetstone Plain, 81 percent were Sobaipuri Plain, and the remaining 1 percent were Sobaipuri Red. Sobaipuri Plainware has a black paste and generally a carbon streak. Temper consists of large angular sand grains with some vegetable matter; there is no mica. The surface color ranges from buff to brown to black, with occasional fire clouding. The exterior is rough and poorly polished. Plates are unpolished, and traces of the basket used as a base in its construction are sometimes present. Exteriors of large jars are polished. Bowl and dish interiors show striation marks and were polished parallel to the rim. The interior rim of jars are rubbed and polished. Bowl interiors are always smudged. Shapes include jars, deep and shallow

bowls, and dishes. Vessel walls are thicker than Whetstone Plain. Rims feature a diagnostic rim coil, as well as straight rims and recurved rims (DiPeso 1953a:148-149).

A variety of European items were found in floor contact in structures of the San Pablo phase. These items included cooper spectacles with one glass lens, a bronze collar shaft guard, an iron hinge key, an iron horseshoe nail, a lead disk, a piece of lead, an iron knife, an iron link, and a piece of bronze (DiPeso 1953a:118-119). Other items in floor contact included an antler, arrowshaft straightener, hammerstones, manos and metates, whetstones, pot polishers, a selenite slab, a stone anvil, a phenocryst of rhyolite cube, and charred basket fragments. A charred corn cob and a charred peach seed were also found (DiPeso 1953a:118-119).

DiPeso has interpreted the differences between Quiburi and the nearby site of Gaybanipites as reflecting cultural differences between southern Sobaipuri of Gaybanipitea, descended from the markers of red-on-brown ceramics, and the northern Sobaipuri, heirs of the Salado tradition (DiPeso 1953a:127,138). DiPeso also acknowledged the possibility that Gaybanipitea was a temporary settlement of single-unit summer homes, following Velarde's observations (Velarde in Wyllys 1931:124; DiPeso 1953a:126).

In contrast, Doyel (1977b:135) has interpreted the remains of Quiburi as the result of Spanish and Indian activity, further complicated by the mixing of early and late materials, which were analyzed as contemporary. In this view, the site is not at all representative of the Protohistoric pattern in the area. Gerald's earlier critique took these criticisms one step further, claiming the entire site of Quiburi was the post-Sobaipuri Spanish presidio (Gerald 1968, cited in Fritz 1977:26). If so, the question remains--why were none of the native structures described at the site by the Spaniards archaeologically visible? Given the limited extramural excavations at Quiburi, the remains may simply not have been detected. Later occupations at Quiburi are described in the historic culture history and lifeways chapter.

The multi-component Alder Wash Site (BB:6:9), on the Lower San Pedro River 40 miles north of Gaybanipitea and 10 miles north of the modern town of Redington, contains an Upper Piman occupation over earlier Hohokam and Mogollon pit houses. The site was excavated in the late 1960s but has never been fully reported. It is known from a brief preliminary report by Hammack (1971), a description by Breternitz (1978:21), and a final report by Masse (1985) which is almost ready for publication.

The protohistoric occupation consists of the surface oval outlines of rocks, similar to those at Gaybanipitea. Associated material culture included crude plainware ceramics, two Coous tinklers, one Glycymeris bead and one bracelet, 24 Olivella Vermicularia tubular beads, one piece of cut Anodonta shell, as well as several disk and cap beads (Urban n.d.; cited in Ferg 1977a:162), shell beads, small basally indented projectile points and such European artifacts as glass, beads and metal items. Other lithics included a few poorly worked grinding stones and finely retouched unifacial and bifacial flakes. The plainwares are similar to Whetstone

Plain. Masse (in Fritz 1977:27) believes that the site may be the late seventeenth century site of Cusac. A similar site to the north of Alder Wash may be the historic site of Jiaspi (Fritz 1977:27). Additional survey by Masse in 1976 has not been reported but evidently recorded numerous stone alignments similar to those from Gaybanipitea in association with Whetstone Plainware (in Fritz 1977:18). Finally, a few surface hearths were reported at Second Canyon Ruin, which may also be protohistoric or early historic upper Piman (or possibly Apache) (Franklin 1978).

The Santa Cruz Valley

The most important protohistoric site in the Santa Cruz Valley is Paloparado (DD:8:1), identified by DiPeso with the historic Upper Pima mission of San Cayetano del Tumacacori. The site was excavated in 1953-1954 to provide a greater understanding of the early history of the valley. In particular, DiPeso (1956:3) wanted to close the gap between AD 1450 and the entry of the Spaniards. DiPeso's excavations found two occupations, one the protohistoric Upper Pima component, the other a Hohokam component, with little or no break between them (DiPeso 1956:19). The validity of the two components has been criticized (e.g. Doyel 1977b:135; Fritz 1977:16-19). Doyel (1977b:136) has even suggested that the entire site represents a Classic period Hohokam occupation. Because the Paloparado site is generally considered protohistoric (cf. Haury 1976:271; Ferg 1977a:164), it will be so treated in this review.

Some 68 structures of the Upper Pima Village were excavated along with three Spanish visitas and two native ramadas (DiPeso 1956:118). Lying on a terrace on the west side of the Santa Cruz River at the mouth of Peck's Canyon, the site was enclosed by a low cobble wall built across the neck of the terrace. The low wall may have served for flood protection rather than defense. The site consists of twenty compounds, divided into an upper and lower village divided by another cobblestone wall (DiPeso 1956:118-119). The compound walls were made of puddled adobe or wooden posts on hill terrace levels or earth mounds. Each compound was composed of several houses, usually six grouped around a plaza. Each plaza had its own trash areas, cooking areas, and burial areas (DiPeso 1956:119).

Sixty of the 68 structures were of the "house in a pit" type. The most common type (DiPeso's Type 1a) was rectangular with rounded corners, averaging 8.4 by 5 meters. Roof supports consisted of two center posts. Hearths were small adobe-lined basins that faced the short lateral entry (average size--2.4 meters on a side). These entries sloped to the pit floor and were stepped. Twenty-four of the entries also had a large number of postholes, revealing the former presence of a raised floor. These structures also had two rows of six small postholes on one side. Other variants included a puddled adobe wall reminiscent of Tanque Verde phase structures in the Tucson Basin (Type 1b-1 structure), a Sacaton style pit house (Type 1c-1 structure), and one structure with a puddled adobe wall in a type similar to the houses at Babocomari (Type 1d; cf. DiPeso 1951a) (DiPeso 1956:123-125).

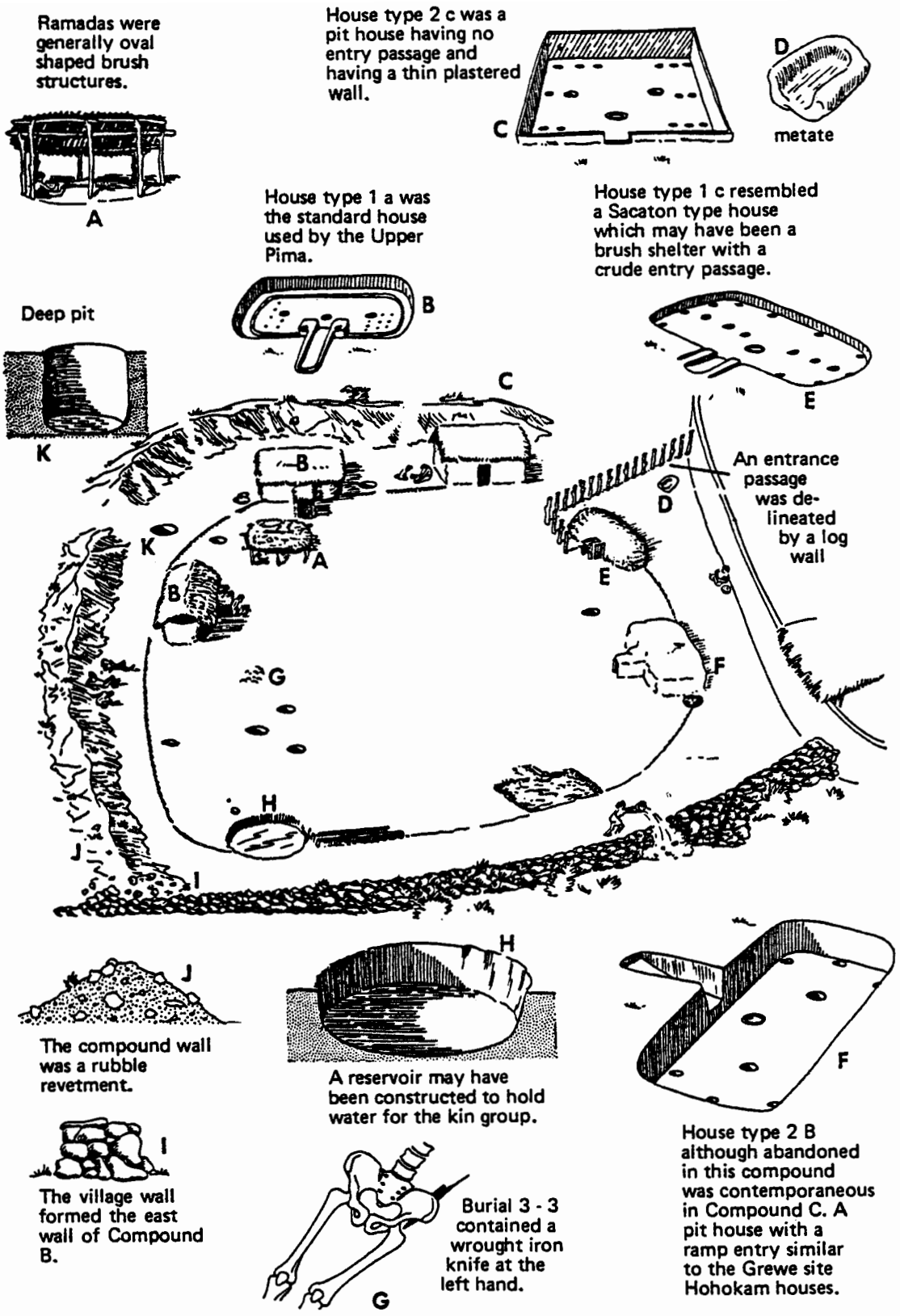


Figure 67. Reconstruction of Compound B, San Cayetano del Tumacacori. Courtesy the Amerind Foundation, Inc., of Dragoon, Arizona, and Fred Plog from The Archaeology of Arizona by Paul S. Martin and Fred Plog. Reprinted by permission of Doubleday and Company, Inc.

The remaining seven houses were of the "house over a pit" type, or true pit house. Three houses lacked side entries but had instead a step in one of the short walls (Type 2a). Two houses were designated as Type 2b, consisting of pit houses with a side entry, four corner poles and a fire hearth in front of the door. One room was square with a side door and plastered pit walls. It may have been occupied when the site was abandoned in 1751 (Type 2C). The remaining house was round, with a shelf along the northern portion of the pit wall (Type 2d) DiPeso (1956:126-127). In general, Type 2 houses appeared to date from late in the occupation at Paloparado. A trend was also evident in remodification of the fire pit into an adobe-lined hearth (DiPeso 1956:123,127).

The three Spanish visita structures were built sometime after Kino's visit in 1691 and differed markedly from native architecture. In all three, in Compound A, the walls carried the weight of the roof rather than corner and center posts in the native pattern. Similar Spanish architecture was evident in the last Santa Ana del Quiburi occupation at Quiburi and in the Spanish fort at Gaybanipitea (DiPeso 1953a:63-122, 125-132). All three structures were built with puddled adobe walls that abutted each other rather than being bonded together. Some walls were set into shallow pits. Floors were plastered, and entry was through a door in the wall. A Spanish-style stove, made of an adobe wall fire box, was in only one room (3-A). These rooms were probably built under the direction of the missionaries (DiPeso 1956:151-155).

A wide range of chipped and ground stone tools were associated with the Upper Piman remains at the Paloparado site. Six kits of arrow-making tools were found with adult male burials and on burned house floors, containing such artifacts as cores, spalls, antler tine flakes, arrowshaft smoothers, straighteners, wrenches, whetstones, drills, scrappers, and awls (DiPeso 1956:493ff). Some of these items found as kits may have served other functions as well, particularly the drills, scrapers, and awls. Six types of projectile points were distinguished. Thirty-five points were classed as Type 1, triangular points with serrated edges, ten as Type 2, plain triangular points, and twenty-six as Type 3, triangular side-notched points. In addition, six points were of Type 4, stemmed and notched, nine were Type 5, serrated leaf-shaped points, and two specimens were of Type 6, plain leaf-shaped points. Edgewear analysis found that Types 5 and 6 were actually used as knives (Brown and Grebinger 1969). The latter three may also represent reuse of earlier Archaic points, but DiPeso (1956:495-496) claims a strong similarity between Types 1-4 and historic Pima types. The triangular points with serrated edges (Type 1), however, are also similar to Sedentary period Hohokam projectile points (cf. Haury 1976:297).

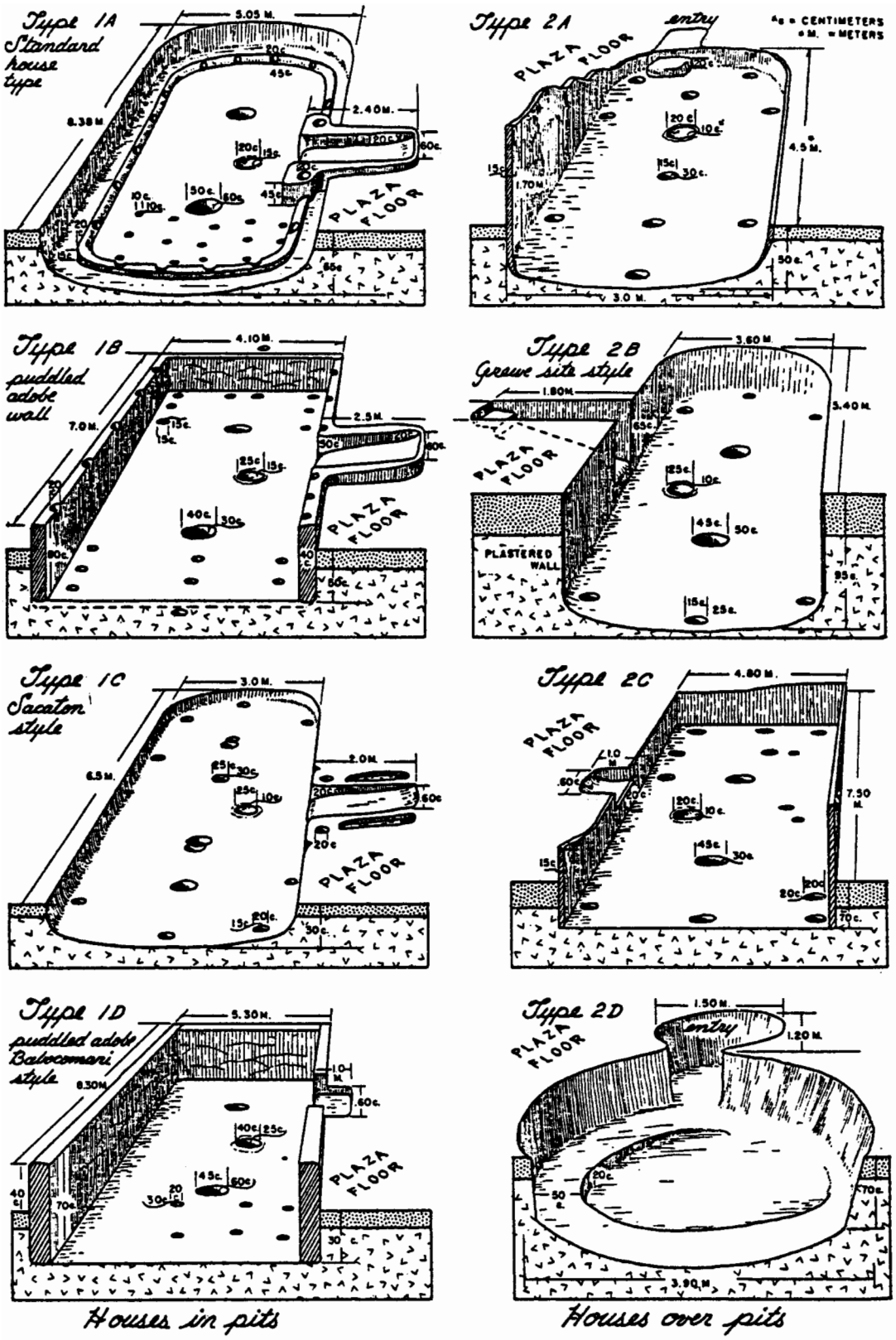


Figure 68

Upper Pima Architecture of San Cayetano

(DiPeso 1956) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.

DiPeso associated some ground stone tool types with house building, particularly the grooved axeheads and adzes and hoes or grass knives. Of the 110 axes recovered from the Upper Piman Village, all were of the three-quarter grooved Hohokam type, showing a continuation of this trait. The axes were differentiated by poll and blade characteristics. Thirty-seven had stub blades (Type 1), twenty-seven had long slender blades (Type 2), and five had a broad poll (Type 3). All lacked longitudinal grooves along the long axis, which DiPeso (1956:205-210) claimed was a Hohokam characteristic. Axes without these wedge grooves, however, were also uncovered at Snaketwon (Gladwin et. al. 1938:Pls. LXXVII and LXXVIII, Figure 48; Haury 1976:291:292).

Flat, thin blades with one sharp edge along the long axis were called hoes or grass knives (DiPeso 1956:215). Later microscopic edgewear analysis showed that two types of these implements were present, with different functions. Type A served as ground stone planes; Type B was actually a mescal knife (Brown and Grebinger 1969).

Most of the ground stone assemblage served as food preparation tools. Forty-three stone pestles were found, some deliberately shaped. Also found were hammerstones, stone hand pounders, and stone choppers and stone pestles, some also deliberately shaped (DiPeso 1956:451-456). Most metates were of the open trough type (Type 1--35 specimens). Slab metates (Type 2--17 specimens), basin metates (Type 3--12 specimens), and slab metates with mortar holes (Type 4--5 specimens) were also found (DiPeso 1956:463-467). A total of 483 manos were excavated and grouped into three general types on the basis of crosssection block (Type 1--313 specimens), taper trough (Type 2--102 specimens), and loaf trough (Type 3--68 specimens) (DiPeso 1956:467-474).

Some of the artifacts found at the Paloparado site revealed the practice of weaving cloth and baskets. Although no cotton cloth fragments were found, some sherds were marked with cloth impressions. Historic accounts (e.g. Velarde 1716, cited in Wyllys 1931) and artifacts further supported the supposition of this practice. A number of spindle whorls were found. Many of these were of the ceramic hand modeled type, suggesting some connections with western Mexico. Analysis of modeled spindle whorls found in association with burials (43 percent of the total number of spindle whorls) revealed that both sexes did the spinning. Some spindle bases and possible yarn smoothers were also found (DiPeso 1956:387-404). A cache of wooden weaving tools was found on the floor of a burned house. These tools were identified as batten and heddle sticks. Several bone awls were also identified as cloth weaving tools from the wear pattern perpendicular to the long axis, the flat tips, and elliptical cross-section (DiPeso 1956:405-408).

Several burned fragments of coiled baskets were found, all either one rod, split stitch, or plainted in construction. Eighty awl fragments and thirty whole awls were found. These basket weaving tools were classified

according to length and type of tip. The types served in different grades of basketry, with fine pointed awls for close-coil work (Type 1 awls--17 of the whole awls), long-pointed awls for coarse-coil basketry (Type 2 awls--5 specimens) and square-pointed awls for plaited basketry weaves (Type 3--7 specimens) (DiPeso 1956:408-415).

Other items were classified as socio-religious from analogy with historic Piman or other southeast or northern Mexican groups. Musical instrument included scapula and antler rasps, and strombus shell trumpets. Twenty-three shaped stone balls may have been used in various races, perhaps at the dance courts or race tracks known from sites in southern Arizona (cf. the race track at Quiburi,DiPeso 1953a). Fourteen tubular stone pipes were found in Upper Piman context at the Paloparado site, 12 of these in a small cache, possibly representing a sacred offering. Several of the pipes were of vesicular basalt and seven were of steatite; all resembled historic "cloud-blower" type pipes used by Pueblo groups (DiPeso 1956:426-430). Caches at Snaketown were also specialized, some mainly of stone, others of pottery. The cache at Paloparado may represent a survival of this practice into historic times (cf. Haury 1976:190). Also found were a variety of quartz crystals, selenite slabs, natural concretions and questionable objects such as stone disks, mauls, and sherd disks (DiPeso 1956:430-434).

Perhaps the greatest diversity in Upper Piman artifacts found at the Paloparado Site was in ornamentation. Several bone hair pins were found, five of them made of human bone. Some were carved, and one was turquoise encrusted (DiPeso 1956:76-77). Most ornaments, however, were of stone or shell. Shell was the most popular, with 26,602 shell objects recovered at the site. An additional 17,075 stone ornaments were found. Most of the stone ornaments were of black graphitic slate, primarily disk beads, although three rattlesnake pendants of this material were also found. Turquoise constituted only 1.5 percent of the stone ornament assemblage, mainly as disk beads and inlay but also as bracelet beads, pendants, and a drop pendant. Other materials used as stone ornaments included green steatite (0.31 percent of total stone ornament assemblage), mica (0.03 present, white sugar (0.02 percent), felsite (0.02 percent), limonite (0.005 percent) and basalt (0.005 percent). These latter materials were primarily worked as beads or pendants (DiPeso 1956:83ff).

Ninety-seven percent of all shell ornaments were in the form of disk beads, unidentifiable as to species. Of the rest of the shell ornaments, the most popular were Olivella (1.2 percent of total), Nassa (0.78 percent), and Glycymeris (0.76 percent). Olivella shell beads were primarily used as anklet elements, as were the Nassa shells. Glycymeris shell was used mainly in bracelets and armlets, although bead, drop, and carved pendants were also made from this material. Other shell species recovered at the Paloparado site included spiny oyster (questionable identification), used in bracelets, Coous, used as rings and bead pendants, Haliotis worked into cut pendants, Pecteu, used for cut and drop pendants, and Turitella and Oliva, both used for drop pendants (DiPeso 1956:83ff.).

Ferg's (1977a) view of Upper Piman shell indicates that Paloparado produced shell in much greater abundance and diversity than other protohistoric sites. In part, this production may have been due to attempts to secure specific types of shell or, more likely, greater trade connections with the Spaniards, who obtained shell from the Yuman tribes of the California and the Gulf of California coasts (Ferg 1977a:163-164). This view contrasts with Urban's analysis of the shell from Alder Wash, in which she suggests the differential occurrence of shell may have been due to the site's closeness to major aboriginal trade routes (Urban n.d., cited in Ferg 1977a:163).

As with other Upper Piman sites, few ceramics were imported (0.39 percent of the sherds, 7.36 percent of the vessels). Of the indigenous ceramics, 88 percent were unslipped plainwares, classified as Ramanote Plain and Paloparado Plain by DiPeso (1956:273, 297-305). Both types were made in the Hohokam and Upper Piman occupations of the site, as defined by DiPeso. During the Upper Piman occupation, these types were associated with Tanque Verde Red-on-brown, Ramanote Red-on-brown, Sells and Peck Red, Sobaipuri Plain, Gila Polychrome, Babocomari and Santa Cruz Polychrome, and Spanish glazewares and metal. Both types had reddish-orange paste, often with a carbon streak. Surface colors ranged from gray to brown. Forms included large storage jars, ollas, eccentric lugged bean pots, double and single lugged bean pots, effigy jars, small handled jars and pitchers, shallow and deep bowls, cups, and miniature vessels (DiPeso 1956:272-302). Some variants of this type were scored, possibly due to use of a bundle of fibers, and stuccoed with course clay (DiPeso 1956:99). The major distinction between the two types was the presence of tool polishing marks on the interior and exterior of Paloparado Plain and hand finishing on Ramanote Plain. Later work by Brown and Grebinger (1969) found that both types of finishing occurred on the same sherds, rendering the distinction invalid. No new name has since been proposed for the plainware at Paloparado.

Redwares constituted 9 percent of the ceramic assemblage. Two types were distinguished, Sells Red and Peck Red (DiPeso 1956:307-313). Both had reddish-orange paste and occasional carbon streaks. Reddish slip was present on bowl interiors and exteriors and jar exteriors. The major distinction was the presence of polishing with a definite pattern of striation, namely parallel to the rim and at a right angle to the body in Sells Red. Peck Red lacked the striation pattern of Sells Red, and polishing marks overlapped with no apparent patterning. The validity of the distinction is unclear, given the problems with Ramanote and Paloparado Plain.

Red-on-brown ceramics constituted 2.6 percent of the ceramic assemblage. These ceramics included slipped and unslipped variants of Tanque Verde Red-on-brown and Ramanote Red-on-brown, both slipped and unslipped (DiPeso 1956:314-324). Since Tanque Verde Red-on-brown has already been discussed in the Hohokam part of the report, only Ramanote Red-on-brown will be discussed here. In general, Ramanote Red-on-brown is similar to Tanque Verde Red-on-brown in paste color, texture, rim shape, vessel shapes, and general design layout. The major differences are the use of a more watery and less vivid paint, absence of weave pattern of designs, and

infrequent use of quartered band designs in Ramanote Red-on-brown. The general impression is that designs are more poorly executed than with Tanque Verde Red-on-brown. DiPeso believed that this type is a ceramic link between Tanque Verde Red-on-brown and historic Papago Red-on-brown (cf. Haury 1950:350; DiPeso 1956:332-324).

A total of 186 burials were recovered from Upper Piman contexts at the Paloparado site, including 181 inhumations, two cremations, and three deliberate interments of animals (DiPeso 1956:514-537). Burial areas were located in each plaza, but some burial areas were not excavated, so more burials are probably present at the site. Of the inhumations, 105 were in the form of extended burial in grave pits the length of the deceased; five graves had side niches with burial goods, two pits had a series of eight postholes around the perimeter of the pit, suggesting some kind of superstructure, and one burial was in a deep circular pit. In addition, two burials of articulated but dismembered adult limbs in trash pits probably represented the remains of war trophies.

The two cremations consisted of one pit cremation in a burial area; the other was an urn with bowl cover, again in a burial area. Some 149 burials were checked for orientation; 90 were oriented to the east. About 86 percent of the burials had some sort of associated goods, usually mats, food, ceramic vessels, and personal ornaments. Ornaments were mainly associated with males.

The Palopardo Site presents a major problem in archaeological identification. DiPeso (1956:113) claimed that because of differences in village layout, house structure, ceramics, burial customs, and material culture, the protohistoric Upper Pima component was not closely related to the preceding Hohokam component at the site. Nonetheless, much overlap occurs between the components. As an example, three-quarter grooved axes are present in both (DiPeso 1956:205), as are Type 1 projectile points (DiPeso 1956:495, 502) (triangular points with serrated edges). Similarly, no Hohokam caches were recovered at Paloparado but most Upper Piman caches at the site contained Hohokam items (DiPeso 1956:222). Caches are abundant at other Hohokam sites (e.g. Snaketown, Haury 1976:175ff). DiPeso (1956:101) regarded the differences in shell ornaments between the two components as qualitative, with Hohokam materials better made, more elaborately executed and with more life forms, a characteristic of stone ornaments as well. In contrast, the Upper Piman occupation featured a greater variety of stone, although the carved animal pendants, mosaic plaques, and schist palettes of the Hohokam are absent (DiPeso 1956:114-115). At Snaketown, these features peak during the Colonial period (AD 700-900) and decline in quality and quantity (cf. Haury 1976:354).

In ceramics, Ramanote/Paloparado Plain and Rincon Red-on-brown occur in both components. DiPeso (1956:330) suggested that this occurrence supports the idea of a short gap between occupations. The major ceramic differences are a decline in eccentric and unusual forms in the Upper Pima

occupation, with a preference for deep hemispherical bowls (DiPeso 1956:324). Further, no indigenous decorated wares were produced during the Hohokam period. Most decorated wares during this time period came from the Middle Gila drainage (DiPeso 1956:347).

Overlap in architectural features and house types also occurred (DiPeso 1956:324). Eight Hohokam houses were reused by the Upper Pima, revealing to DiPeso that the Hohokam village was still standing or at least visible when the Upper Pima took over (DiPeso 1956:239). Yes this practice opposes the historic Pima practice of burning the house of the deceased and of avoiding the remains (Russell 1908:194-195). The major difference in house types was a Hohokam preference for rectangular structures with numerous interior and peripheral posts and stepped lateral entry. (See Figures 68 and 69). Upper Piman structures had generally rounded corners and a sloped lateral entry (DiPeso 1956:123ff, 229ff), a trend also evident at Snaketown (cf. Haury 1976:74).

Both occupations had one round house. Upper Pima Type 2d was 1 meter deep and 4.3 meters in diameter, with a bulbous entry. The Hohokam version was 3.6 meters in diameter but only 22 centimeters deep (Haury 1976:74).

The major difference in village layout was a trend away from the dispersed pattern of the Hohokam occupation to the contiguous walled compound pattern of the latter Upper Pima format (DiPeso 1956:218-220). Such a trend is now generally thought to be the result of indigenous developments rather than population replacement (cf. Wilcox and Shenk 1977).

Stratigraphic tests also support the idea of overlap or continuity. Upper Pima refuse was found in floor contact in several Hohokam structures. In fact, DiPeso (1956:239-241) has noted that the Hohokam structures had no associated Hohokam items, so that one cannot distinguish between Hohokam and Upper Pima artifacts in this context.

Accordingly, the major remaining difference between the two components appears to lie in treatment of the dead, with the Hohokam cremating theirs and the Upper Pima inhumating theirs (DiPeso 1956:540). Yet even here, some overlap may have occurred, at least in the use of mortuary areas. Each though the Upper Piman inhumated their dead in special areas associated with each enclosed plaza, they did not reuse the earlier central Hohokam area, suggesting at least that some sort of markers were still visible, if not an active community tradition (cf. Doyel 1979a:25). The Classic period Hohokam of the nearby Tucson Basin employed both cremation and inhumation (cf. Doyel's 1979a literature review).

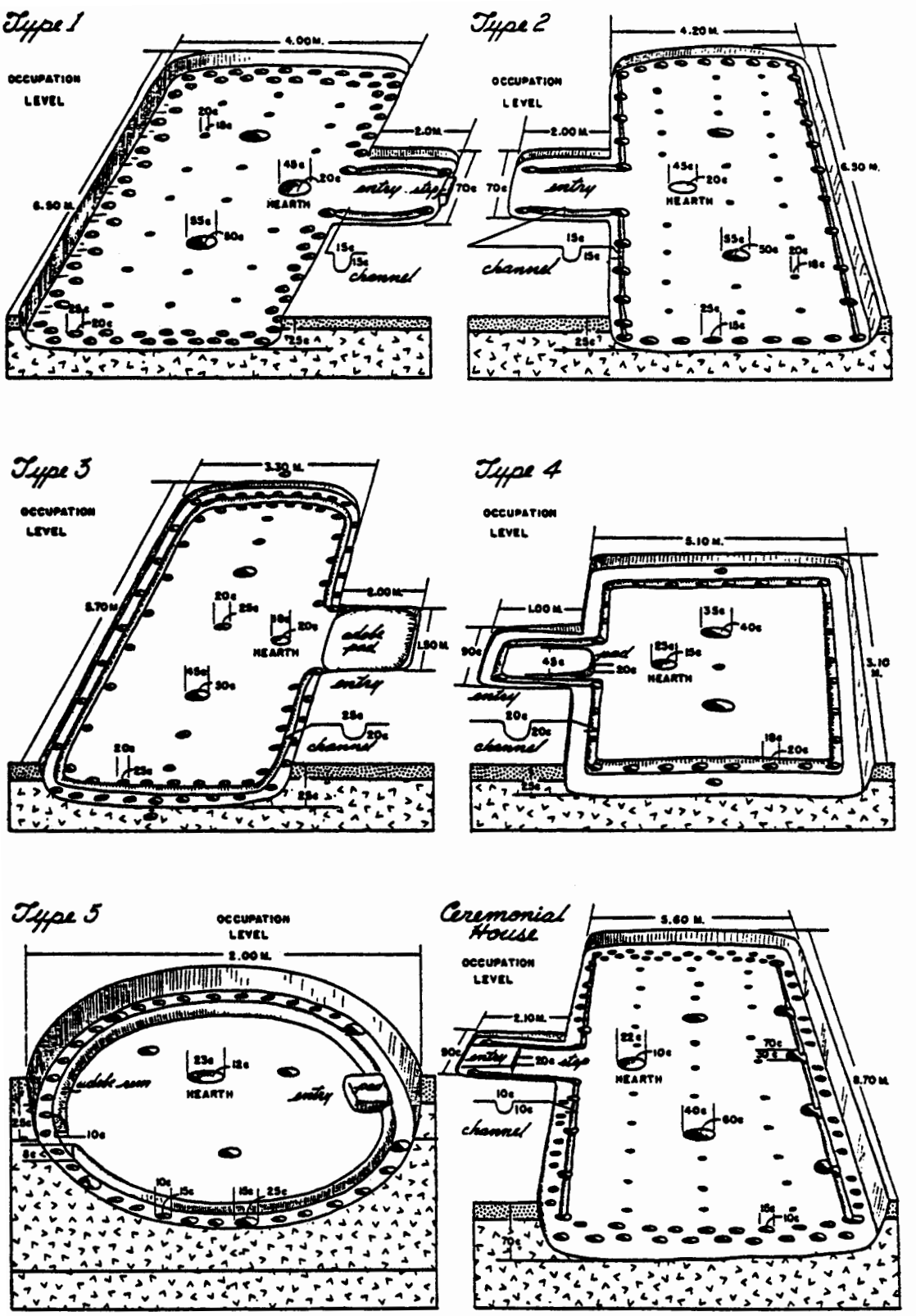


Figure 69

Hohokam Architecture of San Cayetano

(DiPeso 1956) Courtesy Amerind Foundation, Inc., Dragoon, Arizona.

A review of location of actual structures reveals that the Hohokam occupation was located to the west on the terrace. Village growth took an eastward trend, and the Spanish materials excavated at the site all came from the eastern edge of the site (DiPeso 1956:120-121). This trend suggests that DiPeso actually uncovered a single occupation, with apparent temporal differences due to a gradual shift in structure location. This shift would account for the absence of burned Hohokam houses, which would be expected if the Hohokam were expelled by indigenous O'otam (DiPeso 1956:265), as well as the "sharp differences" DiPeso noted between the Upper Pima at Paloparado and O'otam elsewhere (DiPeso 1956:510).

Doyel (1977b:135) has also termed the late occupation at Paloparado a Classic period phenomenon, possibly with some indirect contact with the Spaniards during the protohistoric period. Accordingly, he saw no connection between such Upper Pima sites as DD:8:129 (the England Ranch Site) and the Upper Pima component at Paloparado (Doyel 1977b:135). Fritz (1977:19) also grouped the site with the Hohokam occupation of the valley, pointing out that the temporal placement of the site was based on cross dating of intrusive ceramics (cf. DiPeso 1956:20). In Fritz's (1977:20) view, the Spanish materials are from either disturbed or post-abandonment contexts, especially the wrought iron artifacts from plaza burials, which could have been intruded at a later time.

The earliest definite upper Piman materials in the valley have come from DD:8:128, the Tinaja Canyon Site, and the England Ranch Site, both located on terraces above the Santa Cruz River south of Tumacacori (Doyel 1977b). At the Tinaja Canyon Site two oval cobble outlines at Locus B were identified as Upper Piman. No definable occupation surfaces or features were found but a diagnostic projectile point was recovered from mixed provenience. No ceramics were associated with the two structures. Evidently, the area was occupied to exploit the good quality lithic material eroding from the terraces. Lithic debitage revealed that primary reduction was a major activity (Doyel 1977b:89-91).

A major upper Piman occupation was found at the England Ranch Site, a "pure" Upper Piman site, with no other occupations in the area (Doyel 1977b:112ff). The site was marked by spotty, shallow surface trash, and 80 percent of the site was either excavated or surface collected. Ultimately, a total of six structures, five extramural hearths, and a small stone platform were excavated. The six structures were marked by a highly consistent style of oval cobble outlined floor plans ranging from 4.4 meters to 6.1 meters by 3.0 meters. Walls were simple cobble architecture, with stones placed either in individual holes, in trenches, or directly on the surface. Floors were difficult to determine as there appeared to be no prepared surfaces. Floor levels were defined by the presence of features, artifact levels or both, although there was generally little associated material.

Two of the structures had features. One was a trivet arrangement of three stones, probably as a pot support (cf. DiPeso 1953a:128 for similar features at Gaybanipitea). Another structure had a shallow oval fire pit filled with fire-cracked rock. A radiocarbon sample was taken from the

structure, although the results were not reported (Doyel 1977b:113). Because of erratic cobble placement in walls, entries were difficult to define, but three structures had entries facing east, as did the two at Tinaja Canyon (Doyel 1977b:117).

The extramural fire hearths lay to the east of the line of structures. They had a general lack of formal preparation except for two cases in which shallow pits were excavated. As, therefore, might be expected, hearth shapes varied from circular to semi-circular to amorphous, although all had a profile. Fill consisted of a layer of fire-cracked rock with ashy soil and charcoal, usually with sherds and flakes. A radiocarbon sample was taken from one hearth, but the results have not yet been reported (Doyel 1977b:117).

A stone platform was located about 100 meters west of the site. It was roughly circular and 2 meters in diameter. It was built of tabular volcanic rocks laid down to form a pavement on top of sterile soil. The platform showed no evidence of burning, and its function is unclear. DiPeso (1956:144) reported similar features at Paloparado as granary basket foundations, but the distance of this feature from the site renders this interpretation problematical at the England Ranch Site. Neither the Paloparado nor England Ranch structures resemble the granary platforms at Tres Alamos (Tuthill 1947:17).

The ground stone assemblage was marked primarily by its lack of standardization and general absence of shaping (Doyel 1977b:118). In contrast, the fifty projectile points recovered showed "remarkable intra-assemblage homogeneity" (Doyel 1977b:121). The differences were due primarily to the raw materials used. Almost all had concave bases and straight lateral borders. Some had fine serration. Bifacial thinning was apparent in 75 percent of the points. One triangular point was within the small size range of the others but was stemmed and had deeply serrated lateral borders (Doyel 1977b:121).

A total of 9,943 flakes and 138 cores were excavated. Only 5 percent of the flakes could be classified as tools. Primary and secondary flakes were equally represented, indicating that both primary reduction and tool manufacturing took place at the site. Edge angles were trimodally distributed. These tools were probably multifunctional (Doyel 1977b; cf. Cameron 1977). Analysis of edge angles revealed that both cutting and scraping activities were carried out.

Lithic raw materials also differed from the nearby Rincon Phase Hohokam sites. Jasper was the favored material, but significant increases were noted in chert and chalcedony, as well as a slight increase in obsidian (Cameron 1977). Although obsidian constituted only 1 percent of the lithic materials at the site, it was more common than at the other sites, suggesting the natives went to some effort to obtain it. Much of the obsidian was in the form of Apache tears used as cores, from which small flakes were then retouched to provide a variety of tools. The greater diversity of lithic materials also suggested some sort of trade network (Cameron 1977:154).

Shell also differed from that found at nearby Rincon Phase sites. Although Laevicardium and Olivella were the most common at both England Ranch and the Rillito sites, the England Ranch site had Seondylus, Vermicularia, Pyrene, and Conus (Doyel 1977b:122; cf. Ferg 1977a).

The relative diversity of lithic and shell materials contrasted with the ceramic assemblage. A total of 8287 sherds were excavated (no vessels were found), of which 97 percent were unslipped plainwares resembling but not identical to Whetstone Plain as described by DiPeso (1953a). Vessel paste was consistently black with inclusions of small angular white particules, probably crushed quartz. The ware was finished by paddle-and-anvil techniques and by hand wiping. About 25 percent of the sherds showed further surface modifications in the form of scoring or variable polishing. Polished and unpolished areas occurred on the same sherds, as at San Cayetano del Tumacacori (Brown and Grebinger 1969). Surface color ranged from dull orange to brown in contrast to earlier dark fire clouded surfaces of Rincon and Rillito ceramics. Shapes were difficult to determine due to the small size of the sherds, but jars evidently outnumbered bowls. Jar forms had short vertical necks and straight or slightly outflaring rims. Bowls featured rounded or flattened rims (Doyel 1977b:122, 126,128). The unnamed plainware differed from Whetstone Plain in the presence of scoring and polishing techniques, a slightly better surface finish, and general absence of rim coils (Doyel 1977b:126). As such, this plainware resembles ceramics from Alder Wash (Masse 1985).

Also found were a few slipped redware sherds that resembled the plainware just described but had a finer finish and thinner vessel walls. Slip color was deep red and applied over polished surfaces. In contrast to earlier Hohokam redwares, the red slip was applied uniformly to the vessel surface (Doyel 1977b:126). Doyel believes that this type is too finely made to be related to Sobaipuri Plain as described by DiPeso (1953a:147-148, 156; Doyel 1977b:129). With its black core and fine white temper, this type resembles Papago Red (DiPeso 1956), but Papago Red was manure-tempered. With its high polish, this type resembled earlier Classic wares such as San Carlos Red, but San Carlos Red was always smudged, unlike the England Ranch Redware (Doyel 1977b:129).

Sixteen sherds of decorated pottery were also found, five from the same vessel. These five sherds were marked by gray interiors and exteriors and their paste and temper resembled the plain and redwares. Decoration, limited to the interior, consisted of triangles in narrow lines made with a dense dark brown pigment. The other decorated sherds were red-on-brown, decorated with broad and narrow lines. Again paste and temper were identical to plain and redwares from England Ranch (Doyel 1977b:129-130). The red-on-brown sherds showed a tenuous resemblance to historic Pima and Papago ceramics (Doyel 1977b:130).

Intra-site patterning was characterized by a line of structures facing the river, with one exception (feature 1). Extramural fire hearths close to the structures, and debris revealed that activities involving ceramics and lithics occurred around the hearths (Doyel 1977b:131).

A probable protohistoric Upper Piman burial was recovered during monitoring for a sewage disposal plant north of Tucson--the Bechtel burial. Associated with the extended inhumation were several small triangular projectile points with basal notches. Several of the points also had serrated lateral borders. These points strongly resemble those from England Ranch and Alder Wash (Fritz 1977:18,27).

Another protohistoric/early historic burial was reported from the village of Bac. This burial of a woman was associated with a Hopi Polychrome bowl dated at approximately AD 1700 and a necklace of 187 Vermicularia tubular beads (Ayres 1970b). The absence of associated lithics renders comparison with the Bechtel burial difficult.

Surveys in the Santa Cruz Valley have also found probable protohistoric Upper Piman sites. Danson (1946:7,89) reported a number of house ring sites, which sound similar to those at Gaybanipitea and England Ranch but have never been relocated.

Hilltop sites on the east side of the Santa Rita Mountains included several stone ring structures, some of which were associated with Whetstone Plainware. These sites have not been fully reported (Fritz 1977).

At this point, the protohistoric ends as an archaeologically definable period. Spanish accounts are few after Kino's death, in part because of the Pima revolt of 1751 (cf. DiPeso 1956:54-65) and increasing Apache raids. Excavations at Spanish mission sites have yielded no remains dating before the late eighteenth century (cf. Guevavi, Robinson n.d.; San Xavier del Bac, Robinson 1963, Ciolek-Torello and Brew 1976, and Cheek 1974; Tubac, Shenk and Teague 1975).

CONTINUITY, SUBSISTENCE, AND SOCIAL ORGANIZATION

Cultural Continuity and Social Organization

Attempts to understand the continuity between historic and prehistoric groups have partly been hampered by a belief that the Upper Pimans had little contact with European after the death of Kino and that descriptions of such groups in the nineteenth century, with slight changes, can be accepted as representative of the way of life at first contact. To some extent, this belief has been based on Spicer's (1962) hallmark study of the impact of European and American civilization on the peoples of the Southwest. But this view overlooked the impact of later native rebellions, the establishing of Upper Piman military garrisons organized and directed by the Spaniards (Dobyns 1972), and Apache and Spanish conflicts (e.g. Winter 1973; Underhill 1939:18). Perhaps most importantly, such a view also overlooks the devastating effect of European-introduced diseases. An excellent introduction to this aspect of the contact situation is Dobyns study of the decline of the native population of the San Pedro

and Santa Cruz River Valleys between 1700-1850 (Dobyns 1963) and the corresponding growth of mestizo populations in the Tucson Basin (Dobyns 1976b).

Even so, the archaeological and historical record show much continuity in basic adaptations. The continuity has best been expressed by Emil Haury (1976:357):

> ...to assert that there was no connection between the Piman people and the Hohokam requires the removal of the latter from the area by about AD 1450 and the introduction of the Pimans with an impressively similar lifeway almost immediately. Contacts in the sixteenth and seventeenth centuries by Europeans indicate that the Pimas were comfortably adjusted to their desert habitat, a 'fit' that cultural adaptability...By placing primacy on the earth and by being protective of their environment, they forged a social and economic system that enjoyed 1500 years of ascendency, and endured, on a reduced scale, for nearly 800 years more to the present day. Few people can match that record.

The validity of the historic Piman analogy also bears on interpretations of social organization. Knowledge of historic Pima social organization is the primary means by which protohistoric social organization is tentatively reconstructed. The historic Piman system of social organization is described in the historic portion of this overview.

Upper Pima Subsistence

The general picture of Upper Pima subsistence is often one of great dependence on irrigation agriculture. In part, this view is based on accounts of irrigation among the historic Gila Pima (Russell 1908:86-89) and early historic accounts such as this account of Padre Leal's impression of the Tucson Basin in 1699:

> ...having traveled through the whole valley, the fields and the agricultural lands, and seeing them so rich and fertile and irrigated by many acequias, it seemed to him sufficient not only for a mission of three thousand Indians, but for a city of thirty thousand persons (in Cosulich 1953:17).

Similar accounts of early irrigation in the San Pedro Valley also exist (cf. DiPeso 1953a:235). Recent reviews, however, reveal that the Gila Pima were not irrigating at first contact. Instead, this technology became important later as European crops such as wheat were introduced and as new markets developed for them, such as California bound emigrants (Doelle 1975b). Excavated protohistoric materials from the study area show an economy with great reliance on wild plant and animal foods. The best evidence for irrigation comes from the sites of Quiburi (DiPeso 1953a:235) and Paloparado (DiPeso 1956:4, 203). Even granting these sites status as Upper Piman, the canals at Paloparado were shallow ditches (approximately 50 centimeters deep), resembling ditches in the Tucson

Basin (e.g. Kinkade and Fritz 1975). The temporal placement of these canals at Paloparado is unknown; given the chronological problems discussed earlier, these canals could well be Hohokam.

The foodstuffs from Quiburi show considerable European impact on native subsistence in the form of melons, wheat, barley, sugar cane, chile, sweet potatoes, and watermelons, judging from Spanish accounts (DiPeso 1953a:235). Maize, beans, squash, and cotton were also grown (DiPeso 1953a:235-238). Animal remains showed a preponderance of European domesticates, including the cow, sheep, and pig in the Santa Ana phase. Most bones were either charred or showed butchering marks (DiPeso 1953a:235-238).

Wild animal remains at the site included rabbit, hare, deer, fish, and possibly pronghorn antelope. A variety of wild plant food was also found (DiPeso 1953a:235-238). Hunting was evidently important at Paloparado, judging from the recovering of two pairs of headbearer antlers used in stalking deer (DiPeso 1956:445).

Vegetal materials excavated at Paloparado included maize, mescal (Agave parryi), beans, grass seeds, and pigweed seeds (Chenopodium) (DiPeso 1956:459-462). The maize was almost identical to modern Papago varieties and similar to that from Babocomari, although quite different from the maize at Quiburi (DiPeso 1956:459-462). Beans included the common bean, Pbaseolus vulgaris, and a few lima beans, Phaseolus lunatus. Tepary beans may have also been present, although they could not be positively identified. Grass seeds included Panicum fasciculatum from house fill, a vessel associated with a burial, and a stone lined cist. Also found were blue paloverde seeds (Cercidium floridum), which were sometimes ground and eaten by historic groups. Chenopodium fremontii seeds were recovered from a bowl associated with a burial. Various native grasses, including bear grass (Nolina microcarpa), were evidently used as thatching and mat materials (DiPeso 1956:459-462).

Evidence from the England Ranch ruin shows a much more diversified economy than at Quiburi. Less than fifty faunal elements were recovered, primarily from a communal trash dump. Only two species could be identified, deer and cottontail rabbit. Poor preservation did not allow most of the faunal material to be identified, a condition resulting from the largely superficial nature of the site (Olsen 1977). The abundance of projectile points reveals a great emphasis on hunting at the site an inference supported by the small number of ground stone tools found (Doyel 1977b:133). Doyel (1977b:132, 134) suggested that the subsistence pattern was one of hunting in the lowlands and plant gathering in the mountains.

In all likelihood, Upper Pima subsistence was based on the exploitation of a broad range of wild foodstuffs in a number of environments in addition to some agriculture, much like the fifty-fifty ratio of wild to domestic foods observed for the historic Pimas (Castetter and Bell (1942:56-57). Too few sites have been tested and reported, however, to allow further testing of this supposition.

APACHE IN THE PROTOHISTORIC

ORIGINS AND RELATIONSHIPS

After the abandonment of the San Pedro Valley by the Sobaipuri in 1762, the Apache were the sole native inhabitants of the study area east of the Santa Cruz River. A member of the Southern Athapaskan linguistic stock (also known as Apachean) the Apache are related to Athapaskan groups in Alaska, Canada, and northern California.

Two major groups occupied the region, the Western Apache and the Chiricahua. Each group was composed of a number of subdivisions. The Westerns Apache and Chiricahua differed in language, social organization, and other aspects, and both considered themselves to be separate groups (cf. Hoijer 1938). The Western Apache subtribal groups in turn considered themselves to be distinct, although the groups rarely conflicted (Goodwin 1942:9; Basso 1971:13-14). In contrast, relationships between the Chiricahua and Western Apache were much more strained, and raids and counter-raids occurred, particularly as the United States Army accelerated its campaign against the Chiricahua Apache (cf. the narrative of Mrs. Andrew Stanely in Basso (editor) 1971:205-219).

The Athapaskans probably arrived in the Southwest around AD 1500. Although glottochronological evidence has shown their origin in southern Canada (Hoijer 1956, 1971), no specific archaeological complexes have been linked to southward-moving Athapaskans in the Northern Plains. The Avonlea complex, however, has been suggested as a likely candidate (Wilcox 1973).

In all likelihood, the movement south began less than 1000 years ago and was related to the late prehistoric expansion of the buffalo into the south after AD 1300 (D. Gunnerson 1972; Dillehay 1974). The Dismal River aspect of Kansas and Nebraska has been suggested as the immediate antecedent of southern Athapaskans (Gunnerson and Gunnerson 1971). Further south, the Edwards complex of Oklahoma is represented by plain-surfaced sand tempered sherds, much like those of the Dismal River aspect. These sherds are usually found in association with Pacos Glaze II and V ceramics. Representative sites include the type site Edwards I (34Bk02), Taylor (34Gr-8), and Goodwin-Baker (34Rm-14). The Edwards complex has been dated between AD 1550-1650 (T. Baugh, 1979, personal communication). Edwards complex materials are probably related to the early historic Querecho and Teya nomads that Coronado and other early Spaniards found on the southern plains (Hammond and Rey 1940).

Moving north from central Mexico, the Spaniards found a number of nomadic and semi-nomadic peoples in northern Chihuahua, including the Jano, Jocome, and Suma (Sauer 1934). The relationship of these groups to later Apache peoples is unclear.

The term Apache was first used by Onate for a group west of the Rio Grande near Acoma (Hammond and Rey 1953), but references to Apache in the study area are problematical and rare before 1698. The first mention of Apaches in Mexico is in conjunction with a revolt of the Janos, Jacomes, and Sumas in 1682 (Forbes 1961:193). This occurrence, however, appears to be an expansion of Apache raiding range after the Spanish defeat in the Pueblo Revolt (Schroeder 1974, Part IV).

Coronado passed through southeast Arizona and mentioned finding no inhabitants. Only north of the Gila did he meet a small group called Nixoras. These people were probably the southeast Yavapai north of the Pima (Schroeder 1974:1), although Goodwin (1942:67) thought they may have been Apache. To the north of these people, the country was uninhabited from the Salt River as far as the Zuni country (Spicer 1962; Schroeder 1974). Later expeditions by Espejo in 1582-1583 and Onate north of the Mogollon Rim in 1598 also reported no Apache (Hammond and Rey 1928, 1940). The Apache may have been lying low as the Spaniards passed through, but they were probably not living south of the foot of the Mogollon Rim in the sixteenth century (Goodwin 1942:67). Western Apache mythology consistently describes a north-to-south movement of people (Goodwin 1942:65), but three out of the sixty Western Apache clans have southern or western origins (clans 36, 37, 60 in Goodwin 1942:616-617, 625-629). Goodwin also presented a short myth cycle about the Apache contacts with the inhabitants of a large prehistoric ruin at Dewey Flats (Goodwin 1942:63). According to the myth, these people ultimately moved to the Salt River where they became the historic Pima. The myth, however, may actually suggest some contact with late Saladoan peoples.

EVIDENCE RELATING TO PROTOHISTORIC APACHE

Except during spring planting and fall harvest, the Apaches were almost always on the move (Basso 1970:3). As a result, Apache sites lacked permanent architecture or large amounts of occupation-related debris (cf. Gunnerson 1979). This absence of archaeological visibility has contributed to our virtual ignorance of Apache archaeology (Basso 1970:168). In the study area, only a handful of sites have been described (Ferg 1977c; Gilman and Richards 1975; Schaafsma and Vivian 1975).

Apache archaeological sites have usually been identified from the presence of distinctive ceramics, probable tipi rings or historic accounts of camps near a given site, or some combination of these. Goodwin identified several pots in the Arizona State Museum as Western Apache, probably from their similarity to historic Jicarilla ceramics (cited in Gunnerson 1979:168-169), including such features as thin vessel walls, general absence of decoration, surface striations, and pointed bottoms. Sherds from similar vessels (although not described) were reported from U:9:57 in

the Tonto Basin and assigned to an Apache occupation from Goodwin's description of the nearby modern Apache site of Wheatfields (in Doyel 1976b). The sherds were not associated with any archaeological features and probably represent a limited and short-term occupation. Probable Apache sherds have also been reported from the Point of Pines area (Gifford 1957, cited in Gunnerson 1979:168) and the Verde Valley (Schroeder 1960).

Several Apache wickiups have been excavated. Generally, identification of these structures as Apache has been based on historic or ethnographic evidence rather than on any distinctive archaeological materials (Vivian 1970; Longacre and Ayres 1968; Brandes 1957; Gerald 1958; Touhy 1960). These wickiups have been dated no later than the nineteenth century, and all lie outside the study area. Fourteen stone rings were built on top of late prehistoric Point of Pines phase ruins at Willow Creek and these may be tipi rings (Asch 1960, cited in Gunnerson 1979:169). Several features of possible Apache origin were also recorded during the APS Cholla-Saguaro line survey, primarily structure foundations (Teague and Mayro 1979:216).

In a survey of Aravaipa Canyon in 1939, G. Goodwin recorded 15 rock shelters (Gilman and Richards 1975:12). One of the cave sites (BB:3:7) has sherds that may be Apache, although these were not described (Gilman and Richards 1975:19). A study of the pictographs at the Malapais Hill Pictograph site (BB:2:16), near the San Pedro River south of Winkelman, revealed that the site was one of only two known Western Apache ceremonial rock art sites in southern Arizona (Schaafsma and Vivian 1975:6). The other known site is in the Circle I Hills near Willcox (Schaafsma and Vivian 1975). One potsherd found at the Malapais site was tentatively identified as Apache. Danson also reported a probable Apache pictograph of a man on a horse, done in red pigment, at EE:9:49 in the San Cayetano Mountains (Danson 1946:18).

Excavations at Second Canyon ruin yielded the remains of surface hearths that may be Apache or Sobaipuri (Franklin 1978). An earth oven at the Ringo site may also be Apache, although the absence of associated cultural materials precluded identification (Johnson and Thompson 1963b:469).

In 1974, H. McCrorey discovered a probable Chiricahua Apache burial on the east side of the Chiricahua Mountains, which was later reported by Ferg (1977c). The burial consisted of a human skeleton, accompanied by a rusted metal knife, a complete gourd vessel, some yucca cordage, and a tiny cloth fragment. The skeleton was identified as that of a female between the ages of 18 and 23. Identification of the burial as Chiricahua was based almost entirely on the dating of the knife (Ferg 1977c). Another probable Chiricahua burial has also been reported in the Alamo Hueco Mountains of southwest New Mexico (Lambert and Ambler 1961). The burial conforms to the historic Chiricahua practice of burial away from habitation sites in caves or clefts in rock (Opler 1937:239); cf. Hagberg 1939).

CHAPTER 7

HISTORIC CULTURE AND LIFEWAYS

This chapter consists of two sections: the first is a culture history or historical chronology of the study area; the second is a discussion of historic period lifeways organized by theme.

CULTURE HISTORY

The historical development of the human occupation of southeast Arizona is a result of both external and internal factors. The overall trends of the Spanish and the later Anglo-American occupations were inspired and executed from distant political centers. The primary impact and the resultant events, however, occurred locally. The historical evolution in the study area thus has two aspects:

- o The expansion of the Spanish and Anglo-American frontiers into Arizona; and
- o The results of that expansion as evidenced by the chronological events in Arizona history.

This section emphasizes the second aspect, focusing more on social groups and the site locations of the events and less on ideological history. This section, in effect, is a historical chronology of the study area. To provide continuity in the chronological narrative, the first six subsections treat the development of southeast Arizona from the period of exploration to the present, presenting a history of the Spanish and Anglo-American impingement on aboriginal land and life.

THE PERIOD OF EXPLORATION 1534-1690

In 1536 Cabeza de Vaca returned to the safety of the Spanish empire in Sinaloa after a long and arduous overland trek across the northern frontier from Galveston Island off the Texas Gulf Coast. He and the few other survivors of the shipwreck passed through Texas and New Mexico and possibly southeast Arizona (Bandelier 1904). His exact route is unknown.

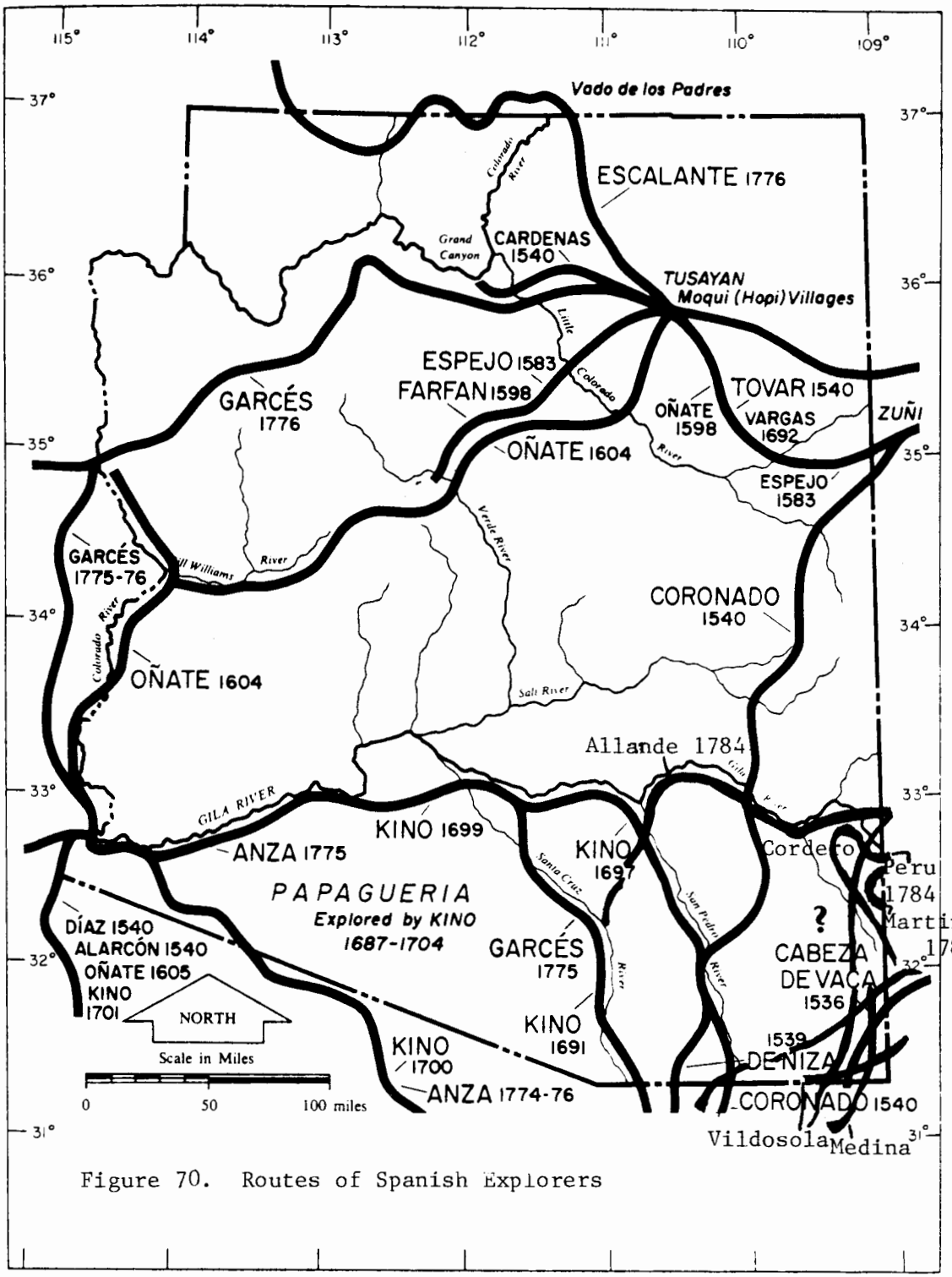


Figure 70. Routes of Spanish Explorers

Modified from Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

Like many accounts of early explorations, the information provided raises more questions than answers. The lack of intensive exploration and occupation and poor communication produced imprecise and contradictory observations. Besides the absence of any information we now consider critical, the names of places visited and peoples found were applied loosely and inconsistently. Because expeditions took place in unknown territory, different names were often given to the same landscape feature or aboriginal group, and each new expedition compounded problems of nomenclature and interpretation. These problems continue to plague historical reconstruction of the Spanish period.

In 1539 the Franciscan friar Marcos de Niza began his expedition from Culiacan in Sinaloa, moving north in search of the legendary Seven Cities of Cibola (Baldwin 1926; Hallenbeck 1949). Like Ponce de Leon, who searched for the Fountain of Youth in Florida, de Niza did not find the treasures he sought. The Indian Tejo, who in 1527 told the Spaniards of seven wealthy cities in the north, had a different cultural definition of wealth than the Spaniards, who always were disappointed in the Indians and cities they discovered on the northwest frontier of New Spain. Aboriginal societies did not measure wealth in gold and silver.

Even though Cabeza de Vaca declined the opportunity to guide Friar Marcos, to lead the party Viceroy Mendoza acquired the black slave Estaban, who survived the overland trek with de Vaca. Estaban lead the vanguard down the San Pedro Valley and on to the pueblos of eastern New Mexico.

On the basis of the report of Friar Marcos, Viceroy Mendoza and Francisco Vasquez de Coronado funded a large military campaign in 1540 to conquer the Indian cities that de Niza had found hostile on his arrival the previous year. Led by Friar Marcos, Coronado's party followed the same route down the San Pedro Valley that had been followed by the 1539 expedition (Bolton 1949; Hammond and Rey 1940). But again, the purpose of the expedition was to find the wealth of the pueblos of the Zuni and Hopi. The towns and inhabitants of southeast Arizona were not the focus of attention because of their lack of wealth.

Documentation of these early explorations has some value in reconstructing aboriginal lifeways. For example, Castenada, who reported on the Coronado expedition (Hammond and Rey 1940:249-250), noted the pole and grass mat construction of houses along the San Pedro River. This style was evidently common to the Sobaipuri, other Upper Piman groups, and even the Yavapai (Masse 1981:36). These observations, however, are rare and incomplete. DiPeso (Willcox and Masse 1981:117) noted that the discovery of Cabeza de Vaca's journal and map (used by Coronado) could provide valuable information. Other explorers passed through Arizona in the late sixteenth century, but bypassed the southeast corner by following the major rivers and population centers of the era (see Bolton 1952).

Archaeological remains from this period are difficult to locate or access because of the briefness of the expeditions and the fact that exploring parties were constantly on the move. In the San Pedro Valley,

the two most likely archaeological remains would be sites of the parties' encampments and Spanish artifacts found on Indian sites. Encampment sites are not likely to be found, because little evidence of overnight camps would be found after 500 years.

Artifacts of Spanish provenience would more likely be found on aboriginal sites. In this context, however, it is often difficult to prove that the artifacts resulted from contact with expedition parties rather than from trade with aboriginal groups further south who already had a history of interaction with the Spaniards. The Sobaipuri of the San Pedro Valley may not have encountered the Spaniards and their horses, but they could have acquired pieces of glass or metal via trade with other native groups.

The most lasting effect of the expeditions was the social upheaval caused by the foreigners who crossed land that previously was the sole domain of Indians. These expeditions not only opened up new frontier areas, but they also brought with them the diseases that figured prominently in the Colonial period. We do not know exactly how widespread epidemics were after the early expeditions. If they were prevalent, however, they could have dramatically changed aboriginal settlement and society, even before the missions brought the Indians into day-to-day contact with Europeans.

Whatever the effect of the 16th century explorations on the Sobaipuri of the San Pedro Valley, the Spaniards did not venture into southeast Arizona for a long time. During the seventeenth century the mission frontier gradually spread north through Sonora and into the land of the Zuni and Hopi, bypassing southeast Arizona. The Spaniards had previously seen the Indian settlement there and were not impressed with natives lacking wealth and other accutriments of higher civilization. Only in the late seventeenth century when the missions of Sonora had expanded far enough north, was it feasible to extend these missions into Arizona. By the 1690s extension was possible, but the Spaniards had little interest. The middle-aged Father Kino, however, was ready and anxious to spread the Jesuit missions north into Arizona, which would mark the beginning of the Colonial period.

SPANISH COLONIAL PERIOD 1691-1820

Father Eusebio Francisco Kino was the prime mover in the development of the mission system in Arizona. His mission field was the Pimeria Alta--the territory of the Upper Piman Indian groups in northeast Sonora and southeast Arizona. After his failure to establish lasting missions in Baja California, Kino moved into Sonora and Arizona with the ability and zeal to establish and maintain a significant extension of the Jesuit frontier.

The Colonial period in Arizona began in 1691 when Kino first visited Piman rancherias in Arizona. From this period an extensive body of documents relate to the earlier Jesuit and later Franciscan missions. The missions made both reports of their progress in establishing missions and records of the process of each mission. These documents provide a large body of data for historical studies.

At first, scholars concentrated on the life and writings of Kino (Bolton 1936, 1948; Burrus 1965, 1971; Smith, Kessell, and Fox 1966; Wyllys 1935). Recently, historians have expanded their interest beyond this one great man and are studying other documents to understand the conditions and style of life during the mission era (Donahue 1969; Kessell 1970, 1976; McCarty 1976). The Southwestern Mission Research Center (SMRC), the Documentary Relations of the Southwest (DRSW), and the American Division of the Jesuit Historical Institute (ADJHI) at the University of Arizona with allied scholars maintain an ongoing research program designed to inventory and report information from primary documents concerning the period (Barnes, Nayler, and Polzer 1981).

In 1691 Father Kino first entered the Santa Cruz Valley, visiting Indian rancherias at Tumacacori and Guevavi (Kessell 1966a). During the next twenty years he traveled up and down the Santa Cruz and San Pedro Valleys, visiting rancherias and organizing natives according to expectations of the Spanish mission system.

Periodic visits by one missionary, however, did little to change aboriginal ways of life. Kino evidently maintained good relations with the natives, even though he only occasionally saw most of them. During the last decade of the 17th century, Kino visited all the rancherias in the two valleys, giving them Spanish names and recording them on generalized maps of the region.

Because Kino's primary goal was to save souls, he concentrated his time and efforts in locales with the greatest population concentrations. Population centers corresponded to the most fertile lands in river valleys and excluded the more arid desert to the west and the intervening, rugged mountains. The first full-scale mission was established at San Gabriel de Guevavi, with major visitas at San Xavier del Bac, San Cayentano del Tumacacori (1696), and Quiburi. By 1701 the first resident missionaries were stationed at Guevavi and San Xavier, but practical problems prevented fulltime residency of priests at all missions at all times.

The Kino years provide an early baseline of information about the human occupation of southeast Arizona. Unfortunately, the information is limited to areas where Kino was active, the Santa Cruz and San Pedro Valleys. Kino worked with the Pima and Papago of the Santa Cruz Valley and the Sobaipuri of the San Pedro Valley. He and his military escort, Captain Manje (Karns 1954), briefly visited the Pimans on the Gila River between the Santa Cruz and the San Pedro in 1697, but little information exists on these Indians (Doelle 1981).

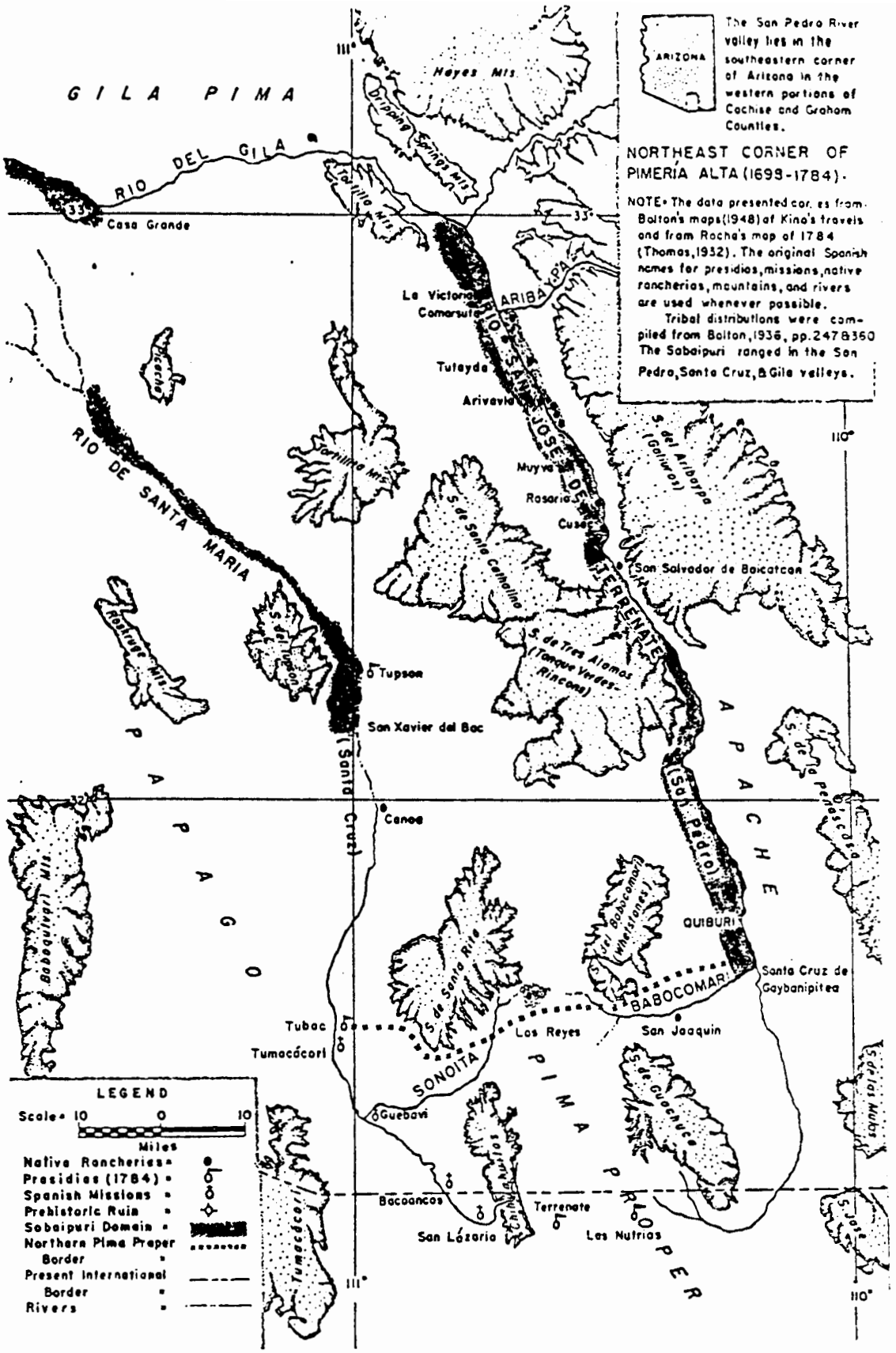


Figure 71. Sobaipuri Territory and Villages as Mapped by Kino. (DiPeso 1953a) Courtesy the Amerind Foundation, Inc., Dragoon, Arizona.

On his maps and in his narratives, Kino located the Apaches north of the Gila and east of the San Pedro (Bancroft 1962:363, 370-371). This information is one of the earliest historical identifications of the Apaches, who seem to have migrated into the area sometime during the 17th century. Before the Apache migration, the region east of the San Pedro may have been unoccupied since the last prehistoric occupation (Gregory 1981; Schroeder 1952b; Worchester 1941).

In the 1680s and 1690s the Apaches were just beginning to approach southeast Arizona from the headwaters of the Gila River (Schroeder 1974, Part IV). The upper Gila River was a major area of Apache settlement, and until 1796, Apaches west of the Rio Grande were referred to as Gila Apaches. Names for different Apache groups in this area did not appear until around 1800 (Schroeder 1974, Part IV). An expedition in 1691 journeyed from El Paso to the Sobaipuris on the San Pedro River but found Apaches only in what is now New Mexico (Espinosa 1940:28-29).

In 1697, Kino found hostility between the Apaches and the Sobaipuri when he visited Quiburi on the Upper San Pedro and saw Apache and Jocome scalps in the village (Bolton 1952:446-467). The scalps were the result of a recent Sobaipuri-Apache skirmish. In 1698, the Apaches, Jocomes, and Janos attacked the Sobaipuri Village of Gaybanipitea near the modern town of Fairbank on the San Pedro River. They were beaten back with many losses and this was their only attack in this area for several years (Bolton 1948(1):178-181). By this time, the Apache also were raiding both the Sobaipuri and the Spaniards in Sonora but the attacks on the San Pedro Valley were so great that Captain Coro moved all of his people to Los Reyes, near Patagonia, leaving the entire San Pedro Valley unoccupied for the next seven years (Spicer 1962:127).

Reported Apache contact with the inhabitants of the study area, particularly the Sobaipuri, all post-date the 1698 attack (Hammond and Rey 1940:74-75; Winship 1896:482,487; Bandelier 1892:153; Bolton 1948(2): 257). North of the Gila River in Arizona, mention of Apaches is problematical until 1767 (Schroeder 1974:ix). From 1699-1744, Kino, Velarde, and Sedelmayr all placed the Apaches on the Gila above the mouth and to the east of the San Pedro River (Wyllys 1931:139; Bolton 1948(1): 172, 198-199; Ives 1939:113). By 1750, the Jano, Jocome, and Suma had disappeared from the historic record. Forbes (1959:124) believed that they were absorbed by the Apache and claimed that the Janos and Jocomes merged with the Apache to become the Chiricahuas. Some evidence suggests the Jocome may originally have been Yuman speaking (Tevis 1954:121-122).

Kino died in 1711, leaving an infant mission chain in southern Arizona. Because few priests could man the missions, Father Augustin de Campos at San Ignacio in Sonora took over the mission circuit after Kino's death. On one trip up the Santa Cruz Valley in 1726 he named a rancheria Tubac, a short ride north of Tumacacori.

During this time, the missionaries were making such progress with the Sobaipuri that the native medicine men (hechiceros) were fiercely competing with priests for followers. The clash between the native and foreign holy men was partially responsible for the mysterious death of

Father Philipe at Guevavi (Kessell 1970:56). Some of the hechiceros' influence may have diminished when they were unable to combat the epidemics of smallpox reported to have passed through the mission Indians in the 1710s (Kessell 1970:35, 37).

During the 1720s, the Spanish military conflicted with the Jesuit leaders over the rights to Indian labor--a reoccurring problem on the Spanish frontier. Indian labor was in demand by the military, miners, and colonists, none of whom appreciated the exclusive contact exercised by the priests (Kessell 1970:38, 59; Spicer 1962:128).

In 1732 the mission at Guevavi was re-established after several years of neglect. By 1737 it had some material wealth. In the same year, Apache raiding lead to the Sobaipuri abandonment of the lower San Pedro. While Apache raiding was on the increase, the Jesuits were strengthening the earlier efforts of Kino. Civilian and military interest in Arizona increased after 1736 when Captain Maxica discovered silver at his mining camp named Arizonac.

The discovery at Arizonac initiated a temporary flurry of Spanish interest, but as the silver played out, so did interest, and the frontier relaxed again. But Piman dissatisfaction with the Spaniards was increasing. The western missions in Sonora had already experienced an uprising in 1695. In this same region in 1751, the charismatic Piman leader, Luis Oacpicagua, assembled a force of sympathizers in revolt. His party attacked several missions and settlements in Sonora and then fled north into Arizona where they hid out in the Santa Catalina Mountains. Fearing an attack, the Spaniards at San Xavier del Bac fled south where they were joined by those at Guevavi enroute to the presidio at Terrenate in northern Sonora. As Spicer (1962:129-130) pointed out, the Pima, Papago, and Sobaipuri of Arizona had little involvement or sympathy for Luis' war and were anxious to make peace, which was relatively easy after Luis surrendered.

In March 1752, Luis met in the village of Tubac with the Spanish Captain Carpio to accept terms. This meeting resulted in the establishment in 1753 of the Presidio San Ignacio de Tubac, garrisoned with 50 troops under Captain Beldarrain. For the first time, a presidio existed in Arizona. It lay strategically between the primary mission centers of Bac and Guevavi and provided some assistance in resisting Apache raiders from the east.

The presidio at Tubac changed the character of the Arizona mission area by bringing in military and civilian influences that directly competed with the missions. By 1756 the main mission at Guevavi survived after the abandonment at the three important visitas at Calabazas, Los Reyes de Sonoita, and Tumacacori (Kessell 1976:24). San Xavier del Bac stood somewhat isolated and dependent on the development of missions in Sonora (Donahue 1960). Apache raiding continued to plague settlement and kept Captain Anza, the younger, busy at Tubac during the 1760s (Bolton 1930). In the spring of 1766, de Anza with troops from other presidios chased Apaches into the Willcox and San Simon areas (Kessell 1968).

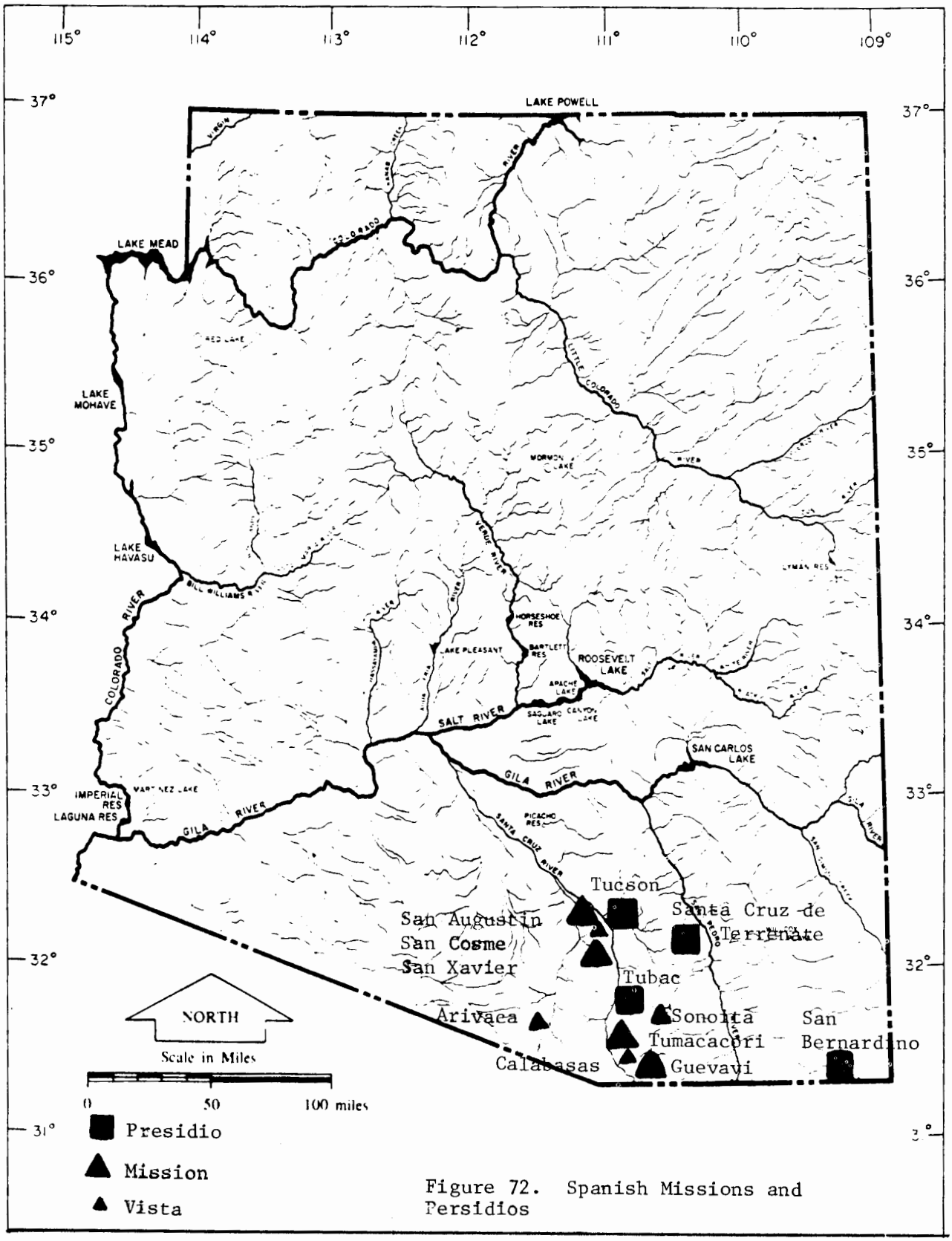


Figure 72. Spanish Missions and Persidios

Modified from Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

Kessell (1970:14) noted that during this time the Desert Pima-Papago gradually replaced the riverine Pima as the Riverine Pima's population declined due to disease and Apache raids.

The year 1767 brought a major change in the mission effort. The Jesuit Order was abruptly recalled from New Spain and missionaries suddenly left their stations. In southern Arizona after the Jesuit expulsion, the military turned over the keys to the granaries to the Indians at some missions (Kessell 1976:20) because they did not know if the missions would be re-established. In the next two years, the military offensive was curtailed due to the Seri War in Sonora.

The first Franciscan priest sent to Arizona in 1768 was stationed at Guevavi and began picking up the pieces of a broken mission system. The same year, most of the Pima population at Calabazas died from an epidemic. Later, Papagos repopulated the village that boasted a church structure without a roof (Ellinwood 1964). At most of the missions and visitas, the native population was declining (Dobyns 1963). At Tubac, the gente de razon population was beginning to outnumber the Indians (Kessell 1976:38-39). ("Gente de razon" is a term used by historians for those people of mixed blood who considered themselves socially and culturally Spanish. Anthropologists and archaeologists have used the term "mestizo" to describe the biological and cultural mix of Indian and Spanish societies that preceded the present people in Latin American countries.)

In the 1770s a measles epidemic spread through the Gila Pima villages to the north. To the south, Apache attacks on Calabazas and Sonoita crippled the missions so much that even Guevavi was abandoned by 1775. The Sobaipuri, who for so long served as a buffer to the Apaches, left the San Pedro Valley and dispersed to join other groups in safer locations (Kessell 1976:40).

Father Garces had found San Xavier del Bac and the surrounding rancherias to be full of a mixture of Indians and a few Spaniards (Kessell 1976:43). The heterogeneous settlement there became even more cosmopolitan when the presidio at Tubac was transferred to Tucson in 1776 as part of a new defensive maneuver to resist the Apaches. At the same time, the garrison at Terrenate was transferred to Quiburi for four years (Kessell 1966b). The new presidio there was named Santa Cruz de Terrenate by the Spaniards.

After the presidio was built at Tucson, Tucson replaced Tubac as the major population center (Dobyns 1976b; Greenleaf and Wallace 1962). Captain de Anza finished his term in the region by accompanying Father Garces of Bac in exploring a route to California (Garces 1968). The new commander at Tucson, Captain Allande, with only half of his allotment of troops (25), repulsed several Apache attacks on Tucson and even made periodic offensive sorties. In 1783 and 1785 he went as far as the Gila Valley and Huachuca Mountains. With a series of successful attacks on the Apaches, a period of rare peace began in the Santa Cruz Valley during

the 1790s. A new commander at Tucson, Captain Zuniga, brought in groups of Apaches, who settled at the pueblo. In 1795 Zuniga also made sorties as far away as the Zuni pueblos (Dobyns 1976b; Greenleaf and Wallace 1962; Hammond 1931).

The first period of peace in southeast Arizona began in the last decade of the eighteenth century. In 1786 the new Viceroy of Spain, Bernardo de Galvez, began a policy of pacification for all raiding Indian groups, including the Apache. His policy required a vigorous military campaign that would capture hostile bands and force them to live next to the presidio at Tucson. There they would be given gifts and alcohol to neutralize their desire to fight. The Galvez policy provided a period of peace in the region, which allowed a dense Spanish population (Faulk 1970:46).

By 1787 Tubac was reoccupied after twenty years of abandonment. The economy of the region developed with new ranches and mines. Residents felt secure enough to legally register their land claims (Mattison 1967). Franciscan mission buildings were built at Bac and Tumacacori. In Arizona, this quiet period of regional growth and development remained uninterrupted through the War of Mexican Independence.

Cultural resources in southeast Arizona representing the Spanish Colonial period are numerous. Standing architecture alone, which is notable at so many of the old sites, has made this period the most visible one in Arizona's history. In the Santa Cruz Valley, where Spanish occupation was the greatest, the ruins of Tumacacori and Tubac have been preserved, respectively as a national monument and a state park (Shenk and Teague 1975). Because of these protective measures, each enjoys both preservation and an on-going program of interpretation and research. The mission building at San Xavier del Bac, within the San Xavier Indian Reservation, still functions as an active parish. It is listed on the National Register of Historic Places and is a focal point of activities on the reservation. Many features of the mission have been studied, including its builders (Habig 1937) and its architecture (Duell 1919; Newhall 1954). Some archaeological work also has helped interpret the mission (Ayres 1970b; Olsen 1974; Robinson 1963).

Tucson has received more intensive study than any other Spanish period town in Arizona due to its rapid growth and development. The University of Arizona and the Arizona Historical Society have been active in preserving the history of Tucson. Archaeological studies have been conducted at the San Jose de Tucson Mission site (Smiley et al. 1953; Wasley 1956). Reynolds (1926) described the walled presidio, part of which was studied and preserved during the Urban Renewal Project in the 1970s (Ayres 1968). A recent archaeological study was conducted at the San Augustin Mission site (Hard and Doelle 1978), and Chambers and Sonnichsen (1974) reviewed its history.

Though the above-mentioned sites have received the most attention, other resources are associated with other Spanish missions and settlements. Stoner (1937) and Mattison (1946) reviewed early sites from a historical perspective. Some archaeological work has been done at

Guevavi (Kessell 1970). The presidio of Santa Cruz de Terrenate (Quiburi) was partially excavated in 1950-1951 by the Amerind Foundation under the direction of Charles DiPeso (1953a). The ruins at Calabazas have been assessed (Archaeological Research Services 1976) and fenced by the Arizona Historical Society. DiPeso's (1951a, 1953a) work for the Amerind Foundation has revealed historic period components.

Cultural remains of the Spanish period are primarily ruins and artifacts made of metal, ceramics, and glass. Though structural aspects of the ruins have been studied during archaeological excavations, artifacts have received less attention. Because of the number and the interpretative value of ceramics found in historic sites, ceramics have been studied the most. Goggins's (1968) and Caywood's (1950) early studies of Spanish and Mexican ceramics were significant in establishing basic identifications and chronological dimensions in the ceramic history of the region. Barnes and May (1972) and Barnes (1930) have updated and refined our knowledge of the ceramic sequence in the region.

MEXICAN PERIOD 1821-1848

This period could well be called one of transition. Southeast Arizona never really experienced a Mexican identity because of its remoteness and sparse population. The period from 1821-1848 refers only to official changes in political boundaries. Culturally, this period was one of transition from Spanish to Anglo-American control, which happened during a time of overlapping local interests. External political events had no immediate impact in the region, but they increasingly determined the course of history leading to the modern period.

By the 1810s, when the War of Mexican Independence began, southeast Arizona was still living in peace. During this decade, however, the Galvez system of native pacification began to experience economic and distribution problems. The Apache in the Tucson and Tubac areas were referred to as "Manso" (tame) Apaches (Spicer 1962:240). The Apache's primary contact with the Spaniards had been in battle and now in presidio ghettos. They never experienced the domestic mission life as did the Pima.

As the gift system wore down and the Mexicans won independence, the Apache grew more distant. During the 1820s and 1830s, the Apache murdered over 5000 Mexicans in Sonora (Spicer 1962). Military presence weakened to the point of offering little protection, but the Mexican Government followed the old strategy of warfare rather than pacification via dependency.

In 1821, the missionary at San Xavier del Bac refused to declare allegiance to Mexico and left the mission without a priest. Tumacacori

kept its pastor until the Mexican Congress expelled all foreign missionaries in 1827 (Faulk 1970:54). In 1834, the Mexican Government secularized all missions. Some Indians remained at Tumacacori until 1844. The land was auctioned off to a Mexican who kept a sheep and wool factory there until 1855.

The walled presidio at Tucson was left to defend itself and the region against increasing Apache hostilities. During the Mexican period, three different commanders were in charge of the presidio until it was occupied by the United States in 1856, eight years after the treaty of Guadalupe Hidalgo and three years after the Gadsden Purchase.

During the Mexican period, the Anglo-American frontier spread into southern Arizona. This vanguard to United States territorial years consisted of mountain men, trappers, and bounty hunters (Cleland 1963; Weber 1971). From 1824 to 1828, James Ohio Pattie (Thwaites 1905) trapped along the Gila and the lower San Pedro and San Francisco Rivers. The beaver were trapped out of the Gila by 1837, only eleven years after the first licenses were granted (Spicer 1962:245). In the 1830s, Apache scalps were hunted for bounty in Sonora. Some Anglo bounty hunters were drawn to the money offered for Apache scalps and, since they were indistinguishable, Mexican scalps. In the 1840s, increasing tension between the Americans and Mexicans ushered in the territorial years of the second half of the 19th century.

Cultural resources of the Mexican period are indistinguishable from those of the Spanish period except that they date from the latter years of the first half of the nineteenth century. Besides Spanish and Indian sites that contain artifacts from this period, evidence should exist of the "Manso" Apache occupation in the Tucson and Tubac areas. These sites represent a culture different than the Pima/Papago, as well as the different secular relationship between the Apache and the Spaniard.

ANGLO-AMERICAN TERRITORIAL PERIOD 1848-1912

As elsewhere in the American West, development proceeded at a rapid rate once the frontier opened. Though fur trappers and mountain men had been active in southeast Arizona, not until the Mexican War did the American Government take an interest in the region. Like much Anglo development in the western territories and states, a combination of both government and private interests opened new roads to settlement.

The Territorial period is the best known period of Arizona history. Not only do more records and documents exist from this period, but many of the historically conscious, current residents of Arizona trace their cultural roots to this period, a fact reflected by the emphasis on Anglo-territorial history by both the Arizona Historical Society and by various local historical societies. Even the academic historians express this bias in most Arizona history text books and journals.

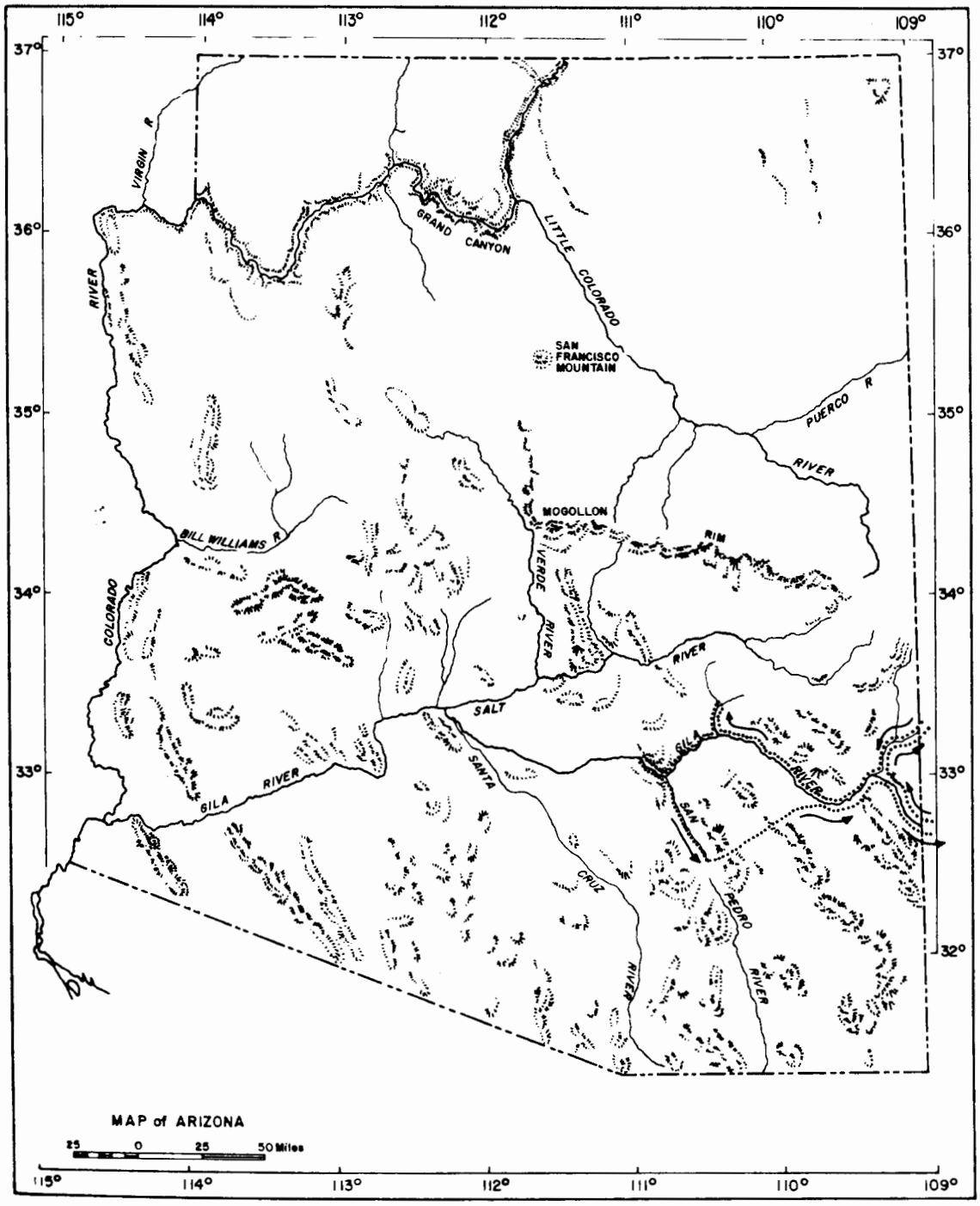


Figure 73

Route of James Ohio Pattie's 1st trapping expedition in Arizona, December 1824 - April 1825.

Courtesy G.P. Davis, Jr. (1982) and the Arizona Game and Fish Department.

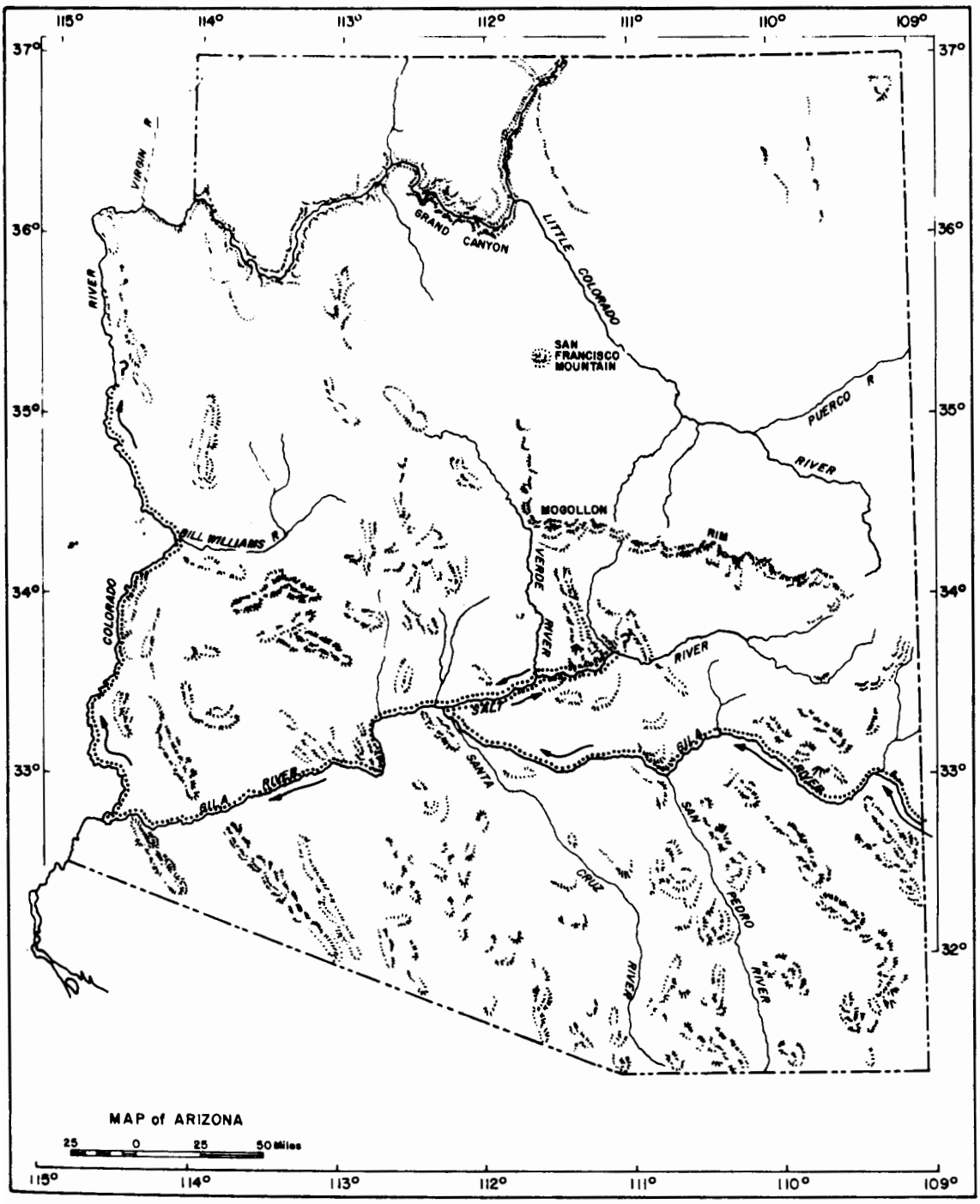


Figure 74

Route of James Ohio Pattie's 2nd trapping expedition in Arizona, January 1826 - April 1826.

Courtesy G.P. Davis, Jr. (1982) and the Arizona Game and Fish Department.

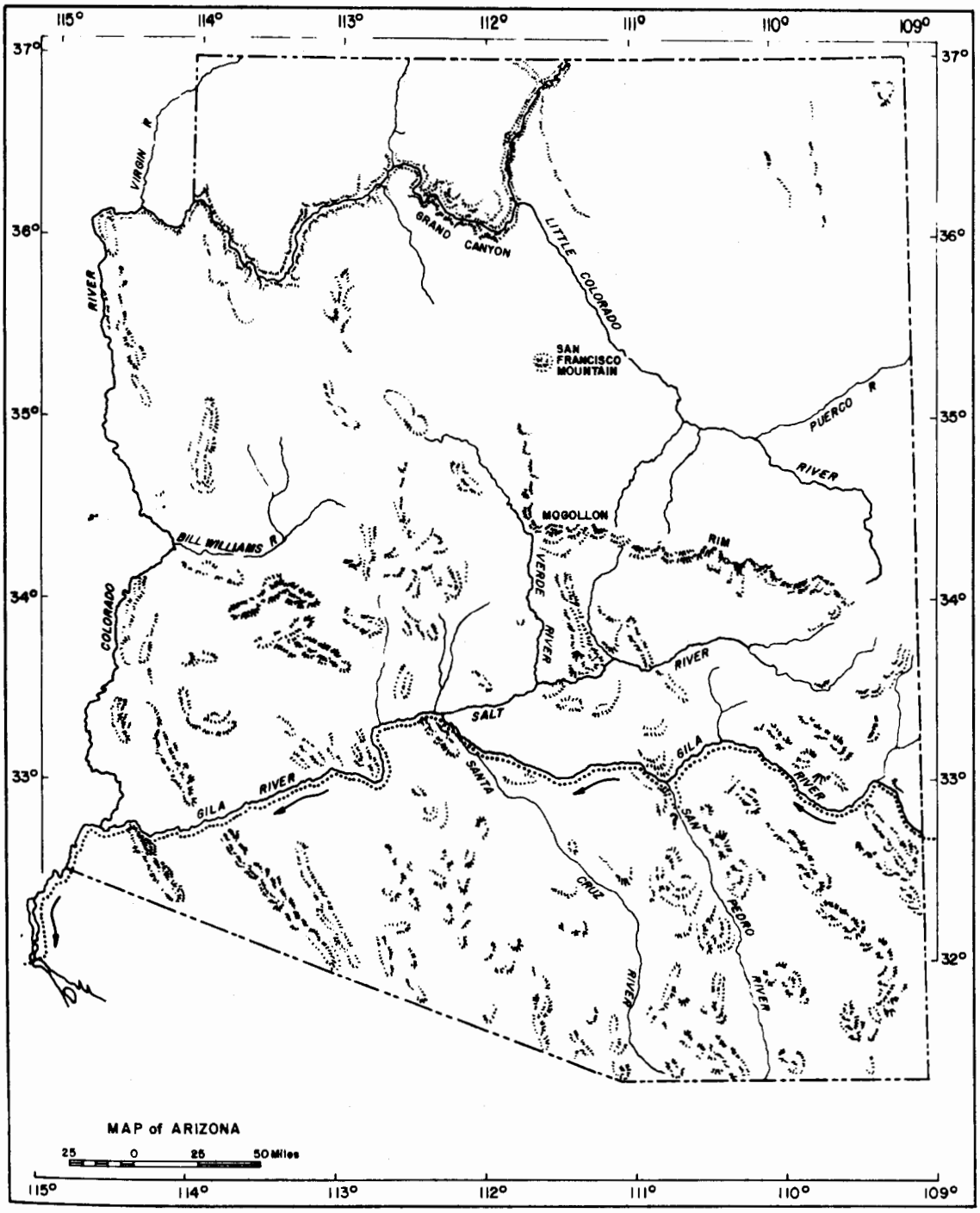


Figure 75

Route of James Ohio Patties 3rd trapping expedition in Arizona, October 1827 - February 1828.

Courtesy G.P. Davis, Jr. (1982) and the Arizona Game and Fish Department.

Only in recent years has the modern interest in ethic groups resulted in specialized programs and institutes that focus on the historical development of all segments and classes of Arizona society. This trend will probably continue as we become more aware of the reality and implications of our pluralistic society. The history of the Anglo military campaigns and later settlement in southern Arizona is the best known, but the history of social development in this Spanish-Indian-Anglo borderland remains to be written.

In May 1946 the United States declared war on Mexico. Colonel Stephen Watts Kearney organized the Army of the West. His goal was to subdue the Mexican settlements in the Southwest on his way to conquer California. His route followed the Gila River and became known as the Gila Trail (Hufford 1966; Faulk 1973; Emory 1848).

The Mormon Battalion, under Colonel Philip St. George Cooke, took a southerly route to open a wagon trail to California. It veered south of the Gila through Guadalupe Pass and stopped temporarily at the abandoned San Bernardino Ranch. From there it went to the headwaters region of the San Pedro and followed the valley north before heading west to Tucson and then down the Santa Cruz to the Gila (Bieber 1938; Golder et al. 1928; Utah Historical Quarterly 1931a, b).

In 1848, Lawrence P. Graham improved the road by continuing west from the San Pedro headwaters to the Santa Cruz and then due north to the Gila Trail. This final perfection of the route preceded its heavy use during the Gold Rush of 1949 to California (Aldrich 1950; Eccleston 1950; Evans 1945; Hammond 1950; Watson 1931).

After gaining control over Arizona north of the Gila after the Mexican War in 1848, the United States still desired a southern route to California and a port on the Gulf of California. The Gadsden Purchase in 1853 compromised these goals, by allowing the trail route but not the port. During this time large numbers of soldiers and immigrants passed through the region but local life remained about the same. Residents did not mind that Mexican troops stayed until 1856 when the first United States soldiers replaced them. Their main concern was protection from the Apache, not what flag flew over the land.

After the Gadsden Purchase, and during the boundary controversy, several more routes were surveyed. Emory, Bartlett, and Gray retraced the Gila Valley route and Grahams Trail. In search of a rail route, Parke crossed Apache Pass in 1854 and a year later discovered the shorter route between Mt. Graham and the Chiricahua Mountains (Goetzman 1959). The Anglo movement west required exploration of new routes, since the Spanish had always moved north and south.

Though few of those passing through Arizona settled there, old residents, as well as new arrivals, desired military protection. Because the Purchase area was considered part of the Territory of New Mexico and was remote from California, there was little civil government, and the military presence consisted of those who could be spared from more important posts.

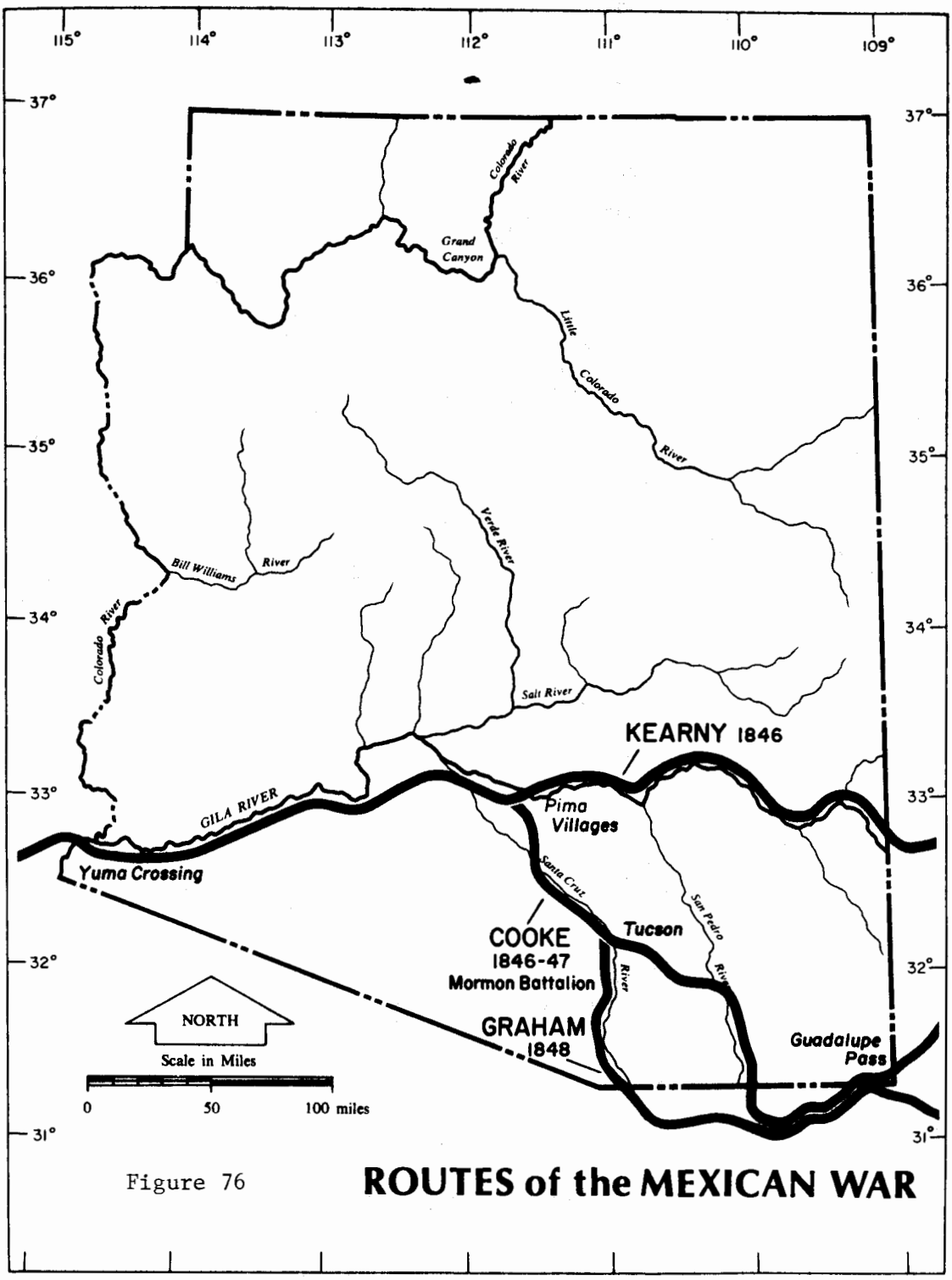


Figure 76 **ROUTES of the MEXICAN WAR**

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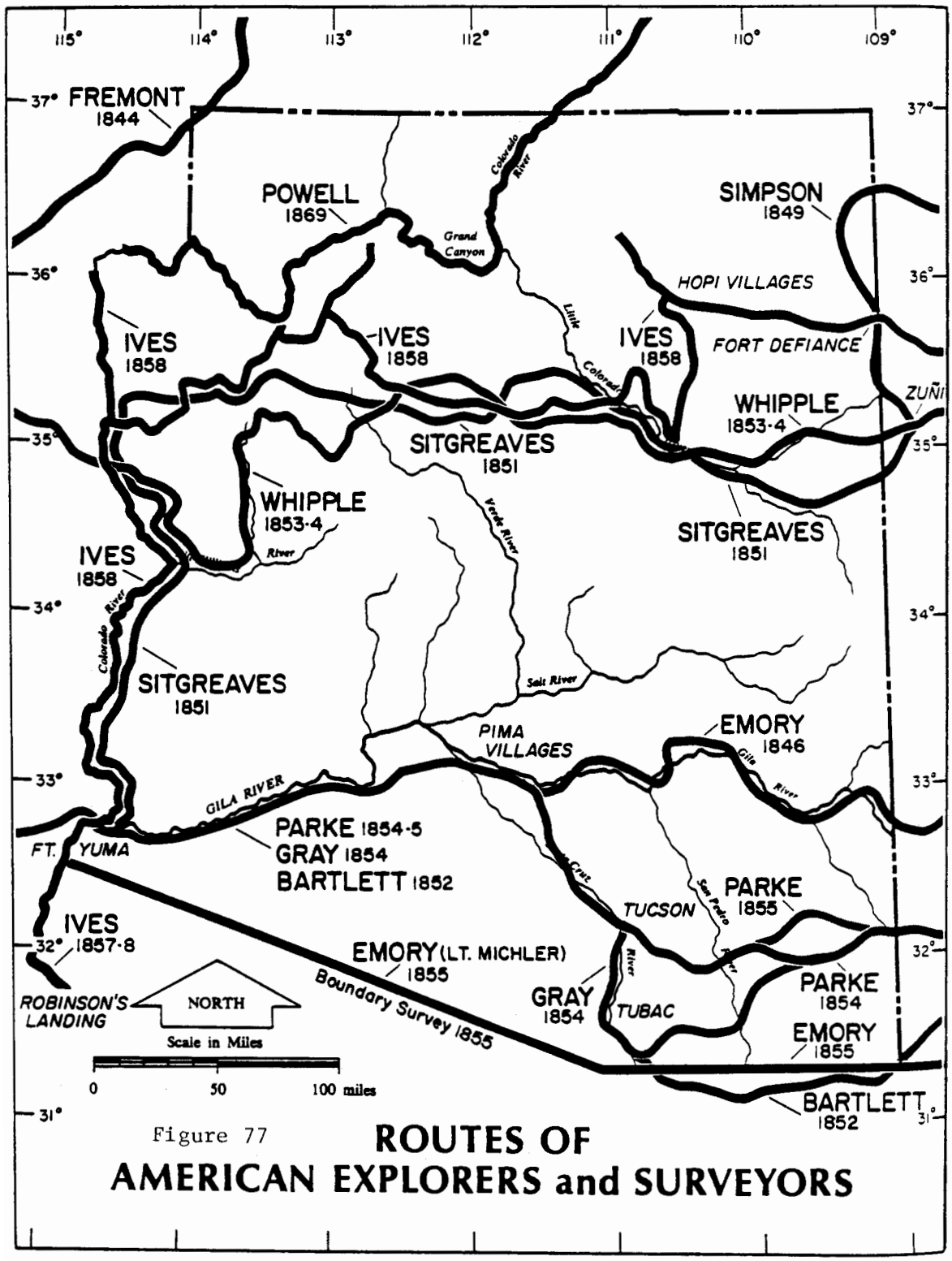

Figure 77 **ROUTES OF AMERICAN EXPLORERS and SURVEYORS**

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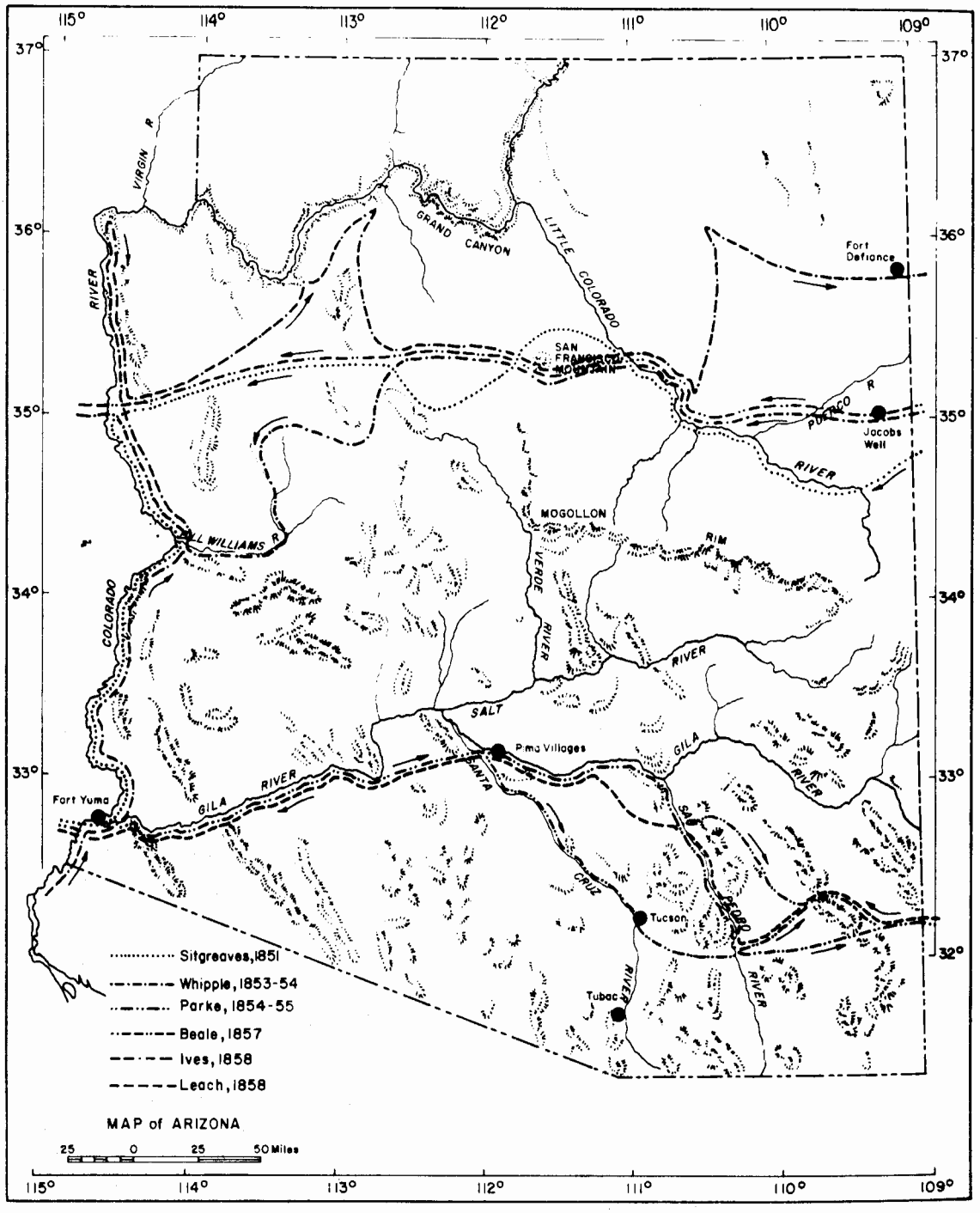


Figure 78

Transportation route surveys in Arizona, 1851-1858.
Courtesy G.P. Davis, Jr. (1982) and the Arizona Game and Fish Department.

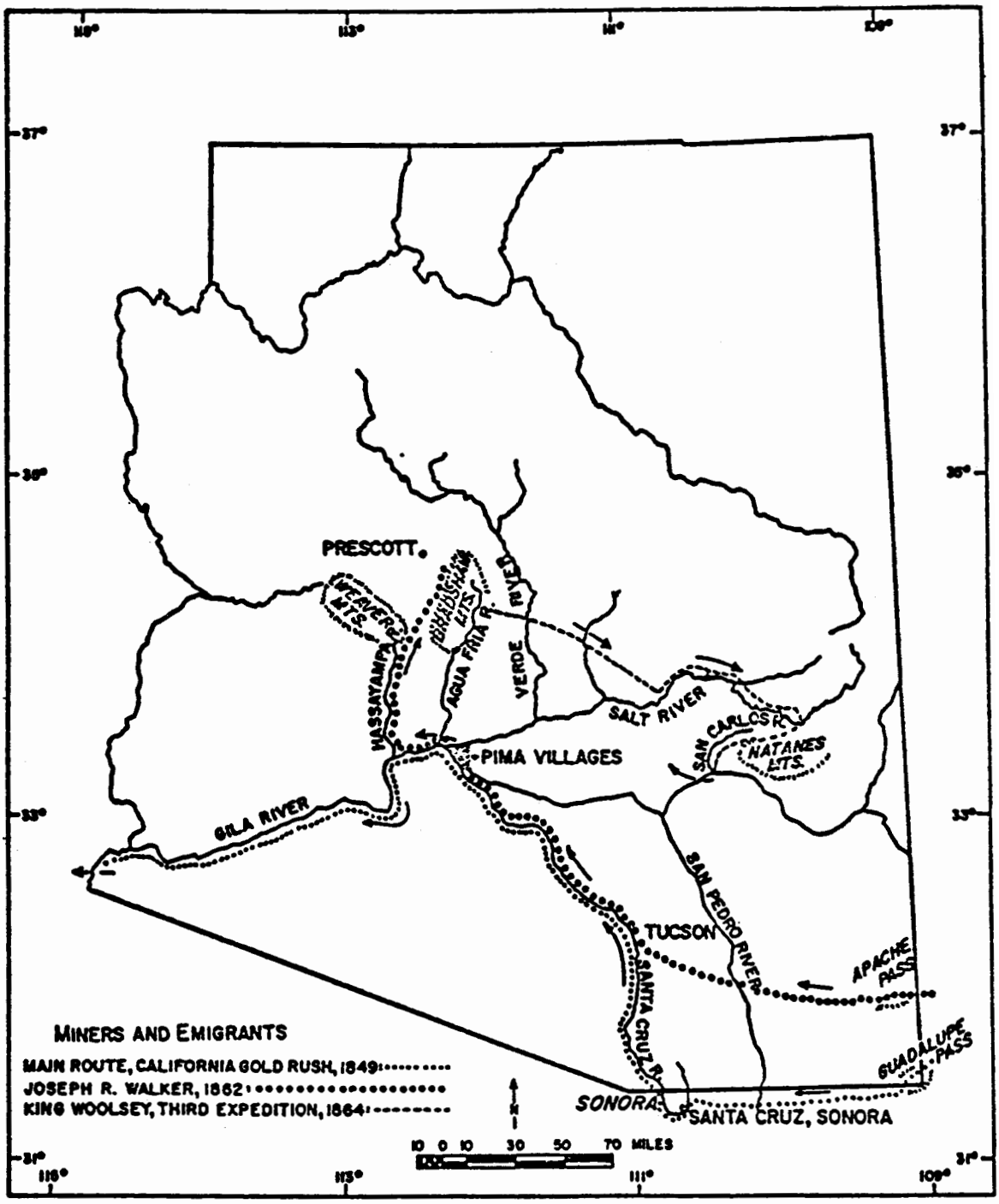


Figure 79

Major Routes Followed by Gold Prospectors to California and Central Arizona, 1849-1864

Courtesy G.P. Davis, Jr. (1973)

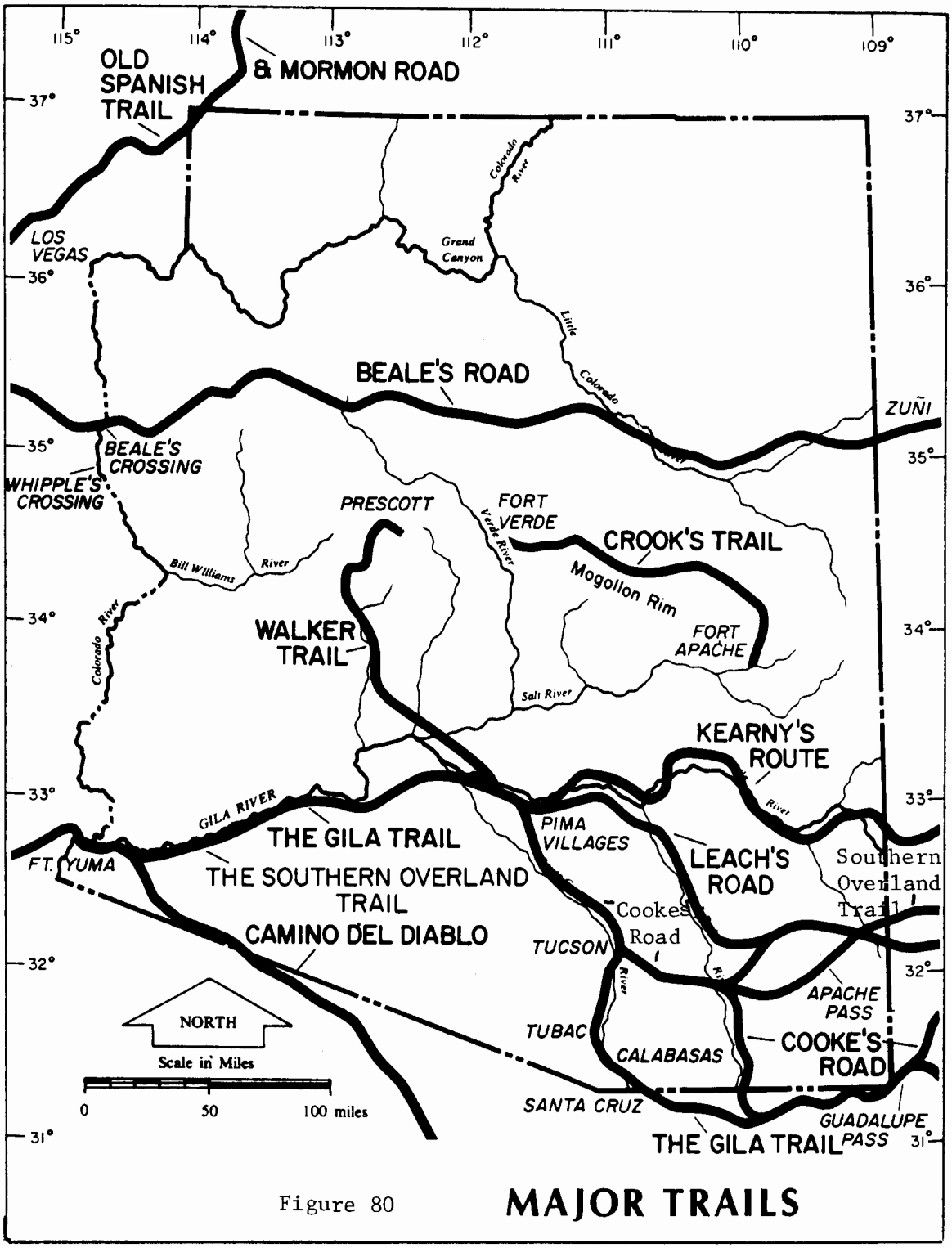


Figure 80 **MAJOR TRAILS**

Modified from Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

These camps were established before the Civil War: Fort Buchanan near Sonoita in 1856; Fort Aravaipa (Breckenridge) on the lower San Pedro River in 1860; and, Camp Tucson in 1860 (see Figure 81). In 1857 and 1858, the San Antonio and San Diego Mail line--the "Jackass Mail" (Duffen 1960)--firmed up Parke's route over Apache Pass to Tucson and was then later used heavily by the Butterfield Company during its tenure, 1858-1861 (Theobald and Theobald 1961; Conkling and Conkling 1947; Moore 1958). While these developments established the east-west route, the older south-north route of the Colonial period remained in use. Goods were transported from Sonora through its port at Guaymas into Arizona (Walker 1970).

Exploration of east-west routes, as well as new stage coach and mail routes, helped open the area to settlement after the Purchase. At this time some of the most notorious, early settlers moved into southern Arizona. Their ambitions were focused on areas of potential mineral wealth and fertile valleys. After exploring the Purchase area for mineral prospects, Charles Debrillo Poston established the headquarters of the new Sonora Exploring and Mining Company in the abandoned fort at Tubac. From this base, he managed silver mines in the Santa Rita Mountains, which were productive enough to give Arizona a good name in mining circles back East.

Sylvester Mowry was also attracted by the mining potential. In 1857 he organized the Arizona Land and Mining Company and purchased the Sopori Land Grant. Three years later he bought the old Patagonia silver mine and changed its name to Mowry.

The other prominent pioneer of the era was Pete Kitchen. Kitchen was mainly interested in ranching and farming rather than mining. His ranch, a few miles north of present Nogales, was a large operation that produced meat and produce for transport as far as Yuma and El Paso. For labor, he employed Opata Indians and Mexicans. Because of Apache hostilities, his ranch also served as a fortress not unlike earlier frontier settlements in the East (Eaton 1933). Kitchen became an important businessman and with Poston and Mowry became active in territorial politics.

In the 1860s southern Arizona experienced both internal and external strife. The Apache had not been hostile for sometime. Although they had a history of antagonism toward the Spaniards and Mexicans, they had been relatively passive with the Americans. As more Anglos moved into Arizona, however, the Apaches became more aware that Americans had basically the same goals as the Spanish--to occupy their territory. This rising tension came to a climax in 1861 with the infamous "Bascom Affair" (Utley 1961). Historians have considered this event critical to the later Apache war, which continued until Geronimo's surrender in 1886.

The Bascom Affair began when a rancher in the Sonoita Valley, John Ward, falsely accused Cochise, the leader of the Chiricahua Apache, of kidnapping his stepson and stealing some cattle. Lt. George Bascom and fifty-four troops went from Ft. Buchanan to Apache Pass to recover the boy and cattle from Cochise in early 1861. After meeting with Cochise, Bascom refused to believe that the Apaches did not commit the crimes, and

he proceeded to hold Cochise and the rest of his party captive. Cochise managed to escape and then waged war on the Americans. In the next two days, Indians attacked the Butterfield station and a wagon train in Apache Pass. These attacks were badly timed for southern Arizona, as many troops were in the East fighting the Civil War.

The Civil War had little effect on southern Arizona. Though sympathies for both sides ran high, the area's sparse population did not allow significant involvement.

By 1862, Confederate sympathizers had gained control of Tucson, and Colonel Carleton's California volunteers were ready to squash southern resistance. Carleton left Ft. Yuma with a force of about 1800 troops in April 1862 to subdue Tucson. A party of Confederates met Lt. Barrett's detachment and engaged in battle at Picacho Pass. The skirmish ended with five dead, including Barrett. Although the Confederates held their position, they could not successfully withstand a force of 1800 men.

After the battle, the Confederates retreated to New Mexico. Union troops occupied Tucson and moved east into New Mexico. On the way, a large detachment which preceded Carleton was attacked by Cochise and some 700 Indians at Apache Pass. This engagement was the largest battle between Americans and Apaches in Arizona and resulted in Carleton ordering the establishment of Ft. Bowie to command the Pass.

In 1863 Arizona became a United States territory separate from New Mexico. The first territorial capital was established at Prescott in 1864 but was moved to Tucson in 1867. Anson Peacely-Killen Safford was appointed as the second governor by President Grant in 1869. The establishment of Arizona as an official territory required, for the first time, formal political organization and elected officials. It also allowed for more intensive military activity, which was desperately needed to deal with the Apache. The intensification began when an Army district, independent of New Mexico, was approved in 1865. In 1870 Arizona became a department separate from California. All military forts established to resist the Apache were built before 1877 when Apache raiding was the greatest. All except Ft. Huachuca were abandoned after the surrender of Geronimo in 1886. These middle years of the second half of the century saw the most military activity in Arizona's history.

Though many smaller military camps were occupied for only a short time, those in the most critical places survived through the years. The Garrison at Tucson was moved east of town and renamed Ft. Lowell. Ft. Buchanan was replaced by Camp Crittenden. Camp Grant replaced Ft. Breckenridge (and was later moved east to the Pinaleno Mountains and became Fort Grant).

In 1871, a large group of Aravaipa Apache surrendered to the military at Camp Grant in the Aravaipa Valley on the lower San Pedro. While the Apache settled down to a domestic life, the citizenry grew anxious about the captives' presence there. In the spring of 1871 a group of Americans, Mexicans, and Papago left Tucson to avenge the actions of the Apaches.

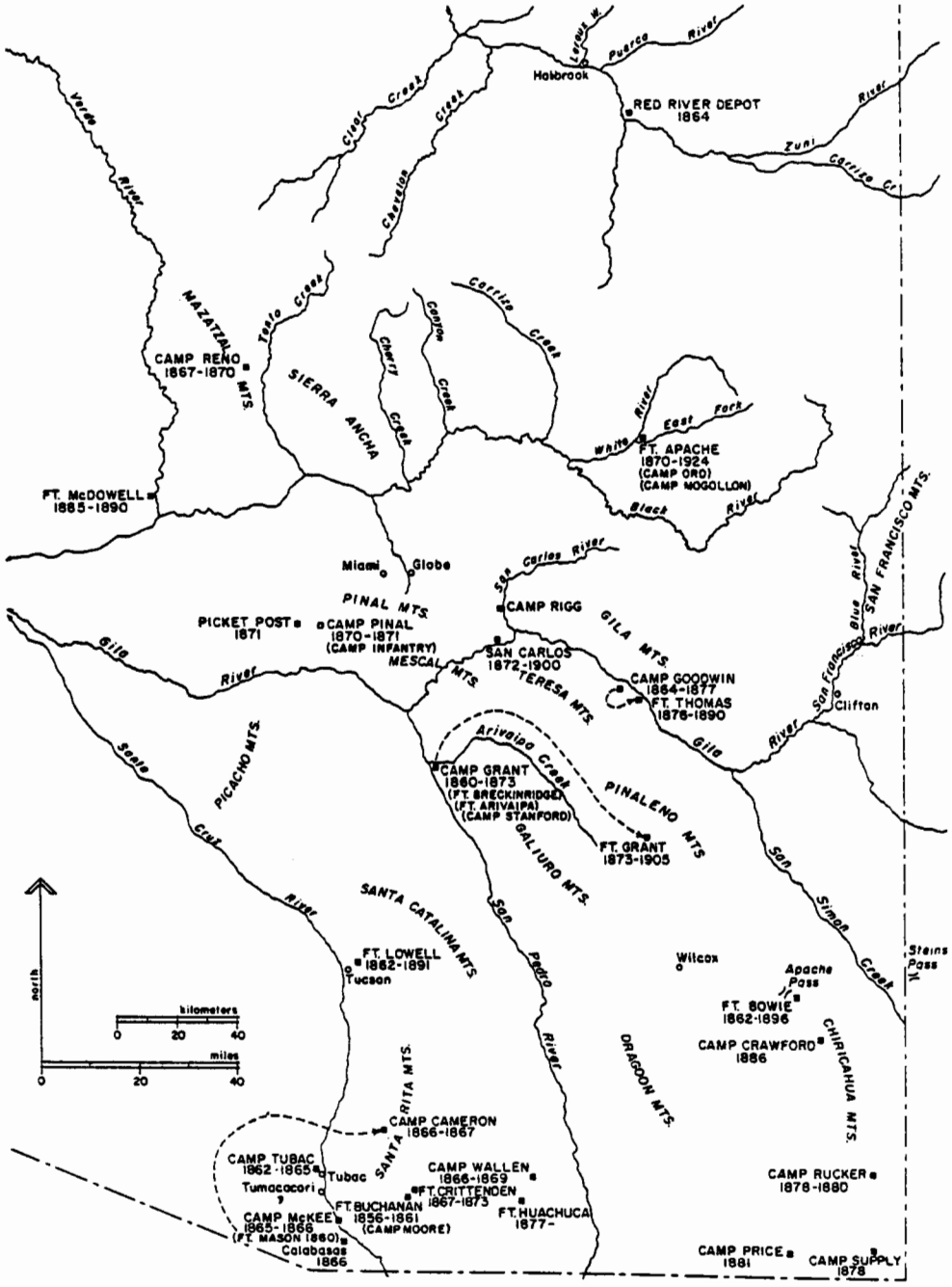


Figure 81. Military Posts in East-Central Arizona. (McGuire 1980) Courtesy Arizona State Museum and Garland Publishing, Inc.

At the Camp Grant Massacre over 100 Apache were killed during the surprise attack (Hastings 1959a). The Massacre focused the government's attention on Apache problems and set the stage for the most dramatic period of the Apache War with Lt. Colonel George Crook in command in southern Arizona.

Before Crook took over, some peace had been made with Cochise and the Chiricahua band. Oliver Otis Howard negotiated a peace treaty, which included establishing a Chiricahua Reservation of some 55 square miles in the southeast corner of the territory. This treaty satisfied Cochise's band until Cochise's death in 1874.

This treaty allowed Crook to concentrate his efforts on other renegade bands. His guerrilla style of fighting Indians made him a valuable asset to the Army, so he was transferred north in 1875. Shortly after Crook's departure, the Chiricahua band renewed its war against the Americans.

Overall, the Apache gradually were pacified and relocated on reservations. Indian Agent John P. Clum felt that all Apaches should be clustered together and self-governing. To that end, he supervised the closing of the Chiricahua Reservation and the accession of those Apaches into the San Carlos reservation in 1876. This move initiated the last hostile stand of the Apache under Geronimo. When the reservation was closed and all groups were forced to share the same land, splinter groups broke away to wage their own battles. In 1878, General Orlando B. Willcox unsuccessfully fought against Victorio's large band of Warm Springs Apache. Many smaller bands caused trouble throughout the region. By 1881 the ghost dance revitalization movement became popular among the White Mountain Apache, and in the following year, General Crook returned to Arizona and Sonora to subdue Geronimo's band. Crook briefly met with Geronimo, but Geronimo escaped again. In 1886, the new commander, General Nelson A. Miles, concluded Geronimo's final surrender in Skeleton Canyon.

Meanwhile, even though the Apache were causing problems, new settlement continued at an ever-increasing pace in southern Arizona. During the 1870s, many ranches, mines, and towns were started in southern Arizona. In addition, the American agricultural frontier spread into Arizona from Mormon country in Utah. After the last Mormon migration to Utah in the 1840s, the population had sharply increased. Various groups of Mormon colonists set out southward across the Colorado River at Lee's Ferry and began settlements along the Little Colorado, Mogollon, Salt, and Gila Rivers, and finally, the San Pedro River (Peterson 1973). Within the study area, the Mormon farm settlement, concentrated at two locations: along the Gila from Safford to Eden and Pomerene and St. David in the middle San Pedro Valley. Though ranchers and farmers competed for land, the grains and vegetables produced by farmers were in demand by the expanding population. The Mormons have remained in the same areas and, as a result of their efficient farming methods, continue to be an important segment of today's population.

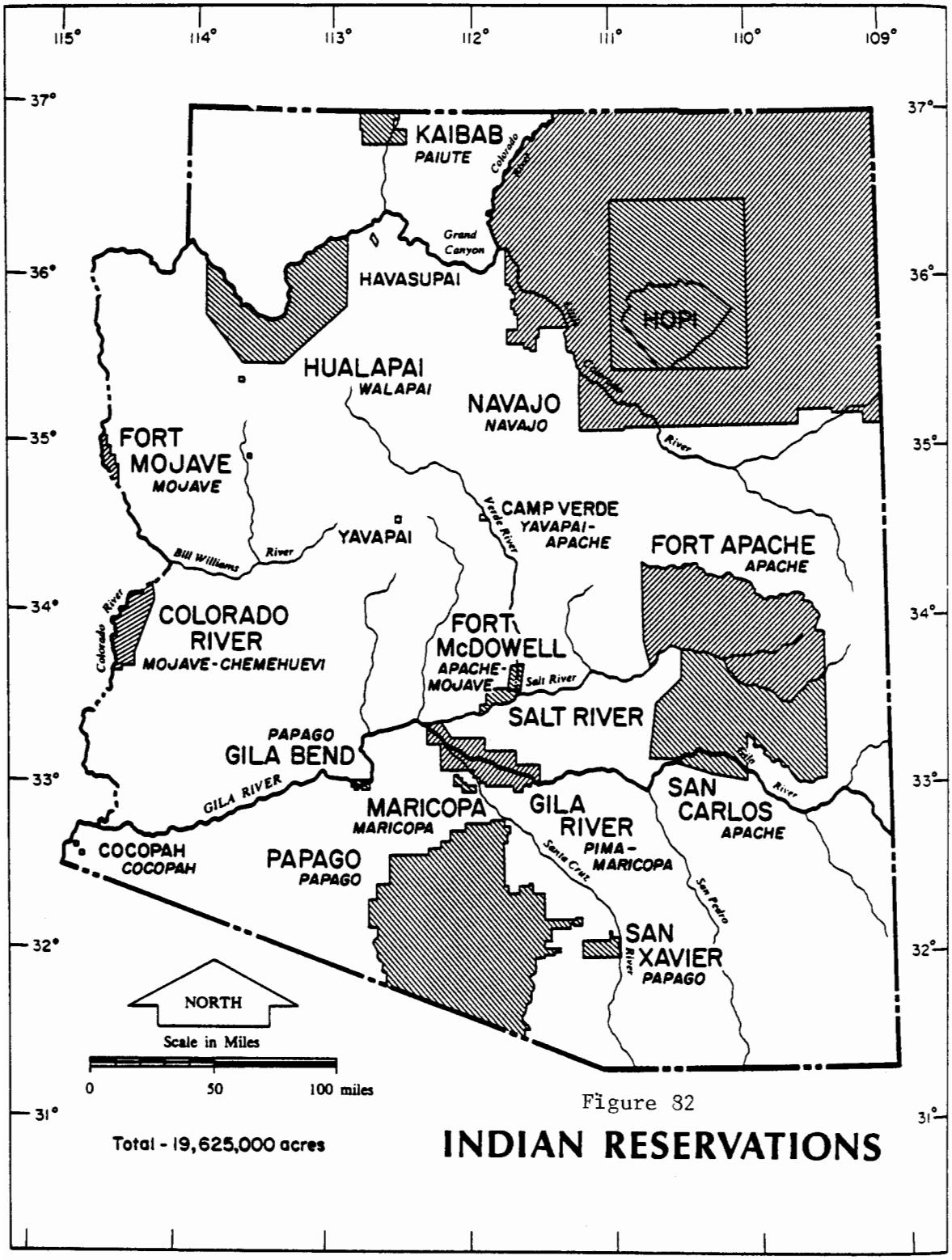
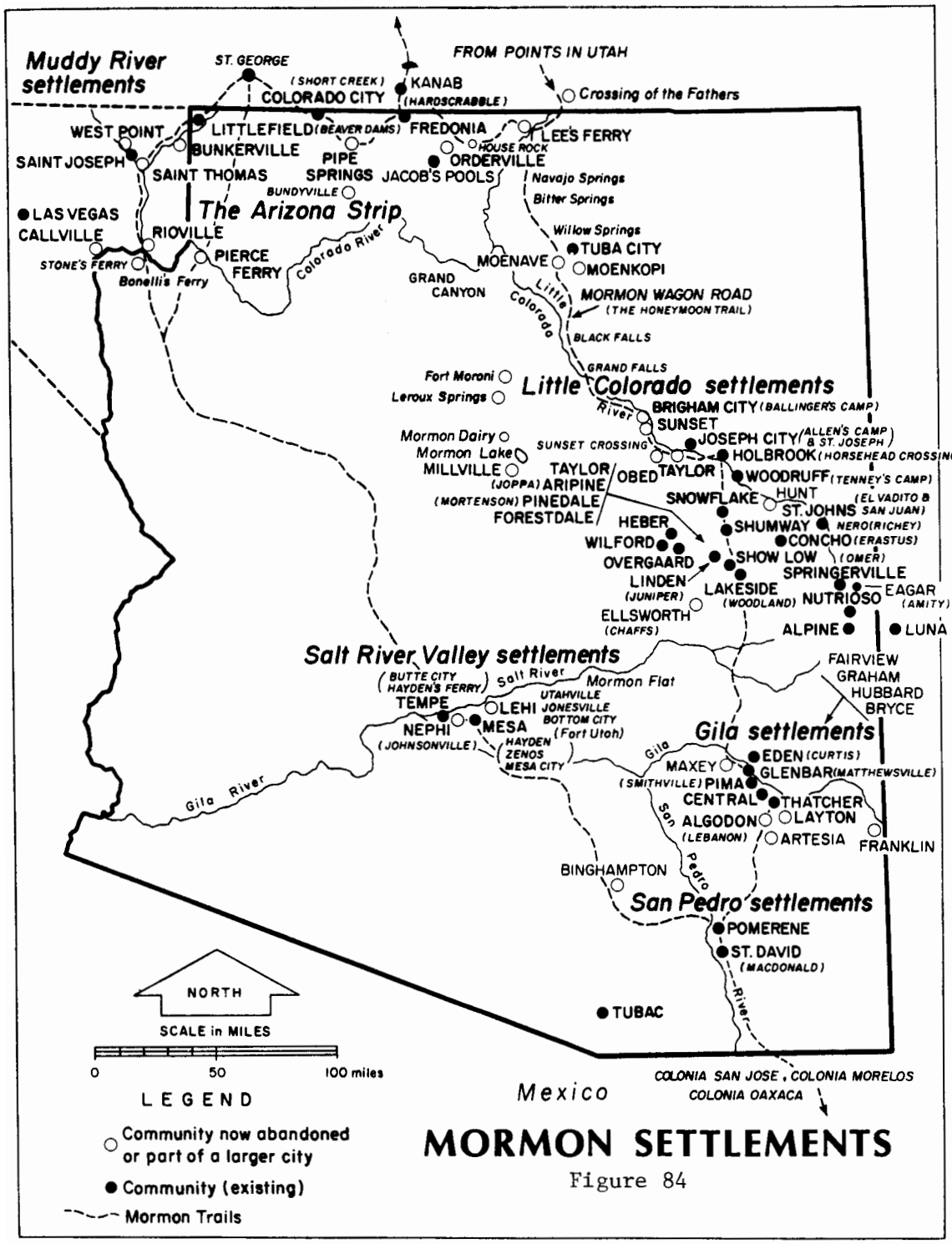


Figure 82

From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

Figure 83. Military Telegraph and Heliograph Systems. From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.



MORMON SETTLEMENTS

Figure 84

From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

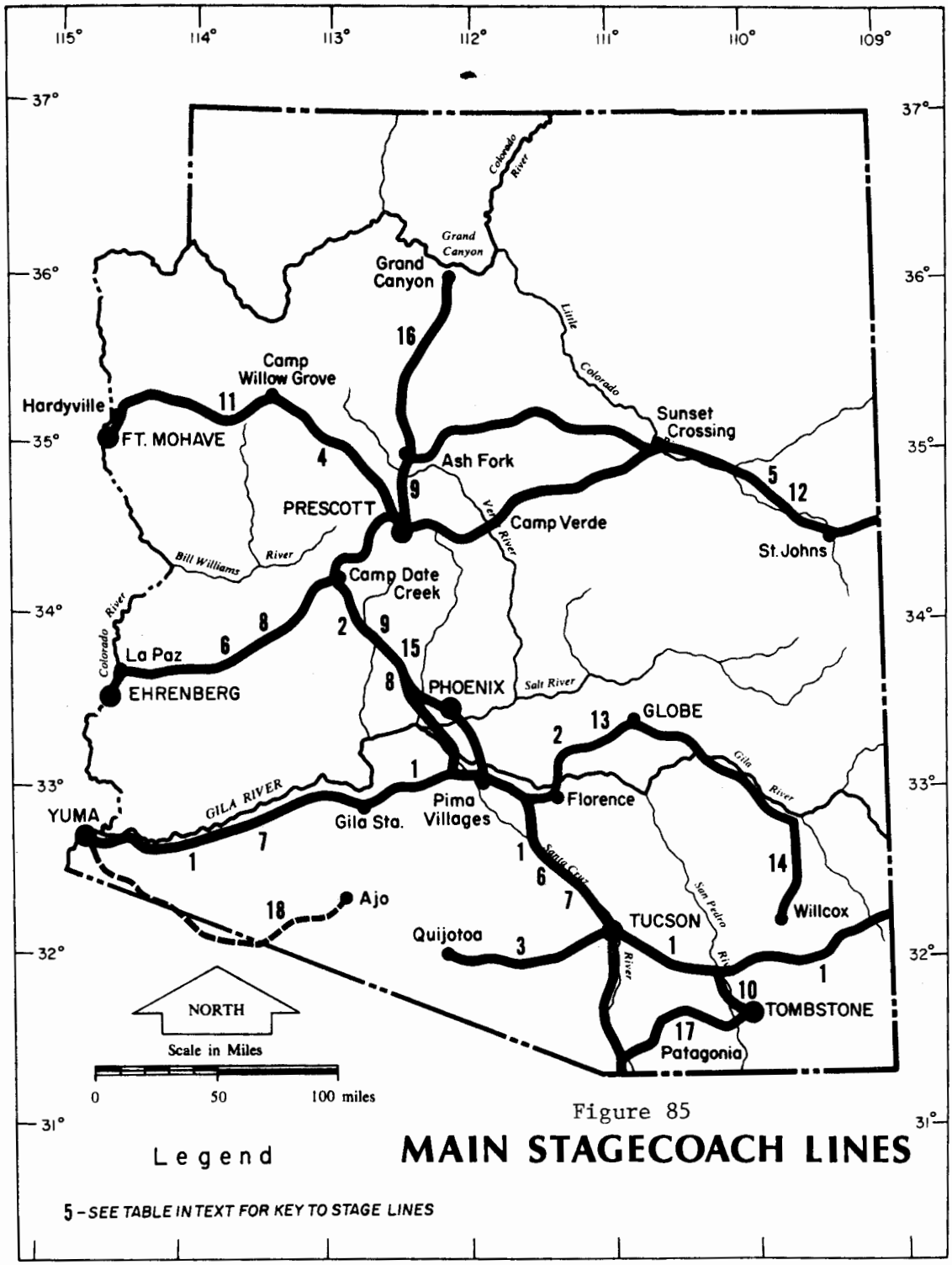


Figure 85

MAIN STAGECOACH LINES

From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

Figure 85. Legend

Number on Map	Major Stage Lines
1.	San Antonio and San Diego Mail Line, 1857–58 Butterfield Overland Mail, 1858–61 Texas and California Stage Line, 1878 Southern Pacific Mail Line, 1874–78 National Mail & Transportation Co., 1878
2.	Southern Pacific Mail
3.	Pedro Aguirre & Co.
4.	Duke's Express, 1864
5.	Santa Fe Stage Co., 1866
6.	Arizona Stage Co., 1868
7.	Tucson, Arizona City & San Diego Stage Co., 1870
8.	California & Arizona Stage Co., 1875
9.	Gilmer, Salisbury & Co. Stage Lines, 1878
10.	Tucson & Tombstone Stage Lines, 1879
11.	Hugh White & Co., 1879
12.	Prescott–Santa Fe Stage Line
13.	Arizona Stage Co., 1881
14.	Norton & Stewart, 1881
15.	Prescott & Phoenix, 1886
16.	Grand Canyon Stage Line, 1895
17.	Tombstone & Patagonia Express, 1880
18.	Jaeggers Pack Trail, 1854

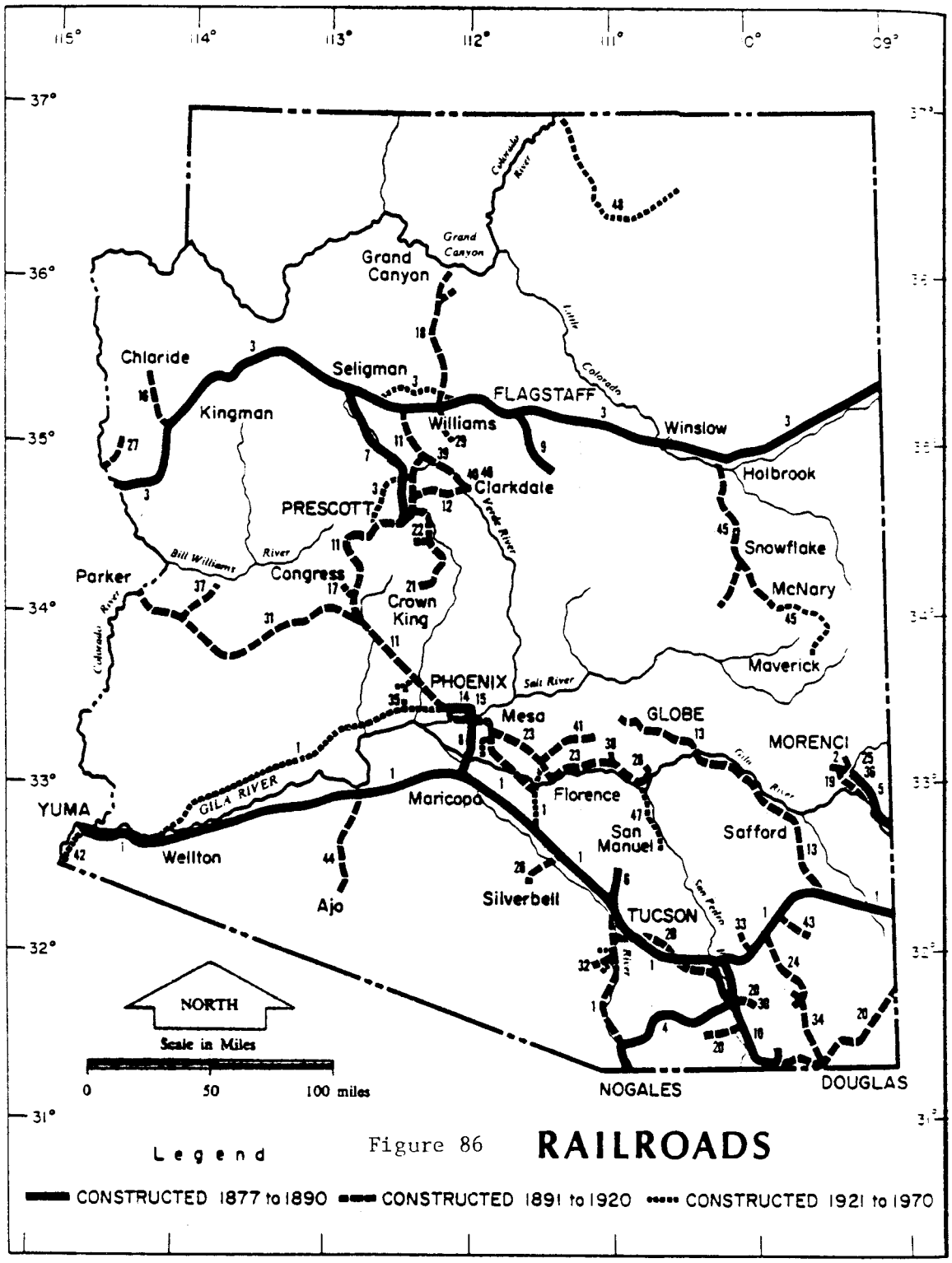


Figure 86 **RAILROADS**

From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

Figure 86. Legend

Number on Map	Company Name	Year of First Service to Any Part of Arizona
1	Southern Pacific	1877
2	Coronado	1879–80
3	Atlantic & Pacific	1881–83
	3a Santa Fe Pacific	1897
	3b Atchison, Topeka & Santa Fe	1902
4	New Mexico & Arizona	1881–82
5	Arizona and New Mexico	1883–84
	5a Clifton & Southern Pacific (New Mexico)	
	5b Clifton & Lordsburg (Arizona)	
6	Arizona Narrow Gauge	1886
	6a Tucson, Globe & Northern	
7	Prescott & Arizona Central	1886
8	Maricopa & Phoenix	1887
9	Arizona Mineral Belt	1887
	9a Central Arizona	
10	Arizona Southeastern	1888–89
11	Santa Fe, Prescott & Phoenix	1893
12	United Verde & Pacific	1894
13	Gila Valley, Globe & Northern	1894–98
14	Maricopa and Phoenix and Salt River Valley	1895
15	Phoenix, Tempe and Mesa	1895
16	Arizona and Utah	1899
17	Congress Consolidated	1899
18	Santa Fe & Grand Canyon	1901
	18a Grand Canyon Railway	
19	Morenci Southern	1901
20	El Paso & Southwestern	1901
21	Bradshaw Mountain	1902–1904
22	Prescott & Eastern	1898
23	Phoenix and Eastern	1903
24	Arizona & Colorado	1903–1909
25	Clifton & Northern Railroad	1903
26	Arizona Southern	1904
27	Mohave & Milltown	1904
28	Arizona Eastern	1910
29	Saginaw Southern	1904
30	Tombstone & Southern	1905
31	Arizona & California	1905
32	Twin Buttes	1906
33	Johnson, Dragoon & Northern	1908
34	Mexico & Colorado	1909
35	Phoenix and Buckeye	1910
36	Shannon-Arizona	1909
37	Arizona & Swansea	1910
38	Ray & Gila Valley	1900, 1910
39	Verde Valley	1913
40	Verde Tunnel & Smelter	1914
41	Magma Arizona	1915
42	Yuma Valley	1914
43	Mascot & Western	1915
44	Tucson Cornelia & Gila Bend	1916
45	Apache Railway	1918–1919
	45a Southwest Forest Industries	
	45b White Mountain Scenic (operated on lumber railroad connecting with the Apache Railway)	
46	Arizona Extension	1918
47	San Manuel & Arizona	1955
48	Black Mesa & Lake Powell	1971–72

NOTE: The complete story of railroads in Arizona is quite complex. The purpose of this listing is to provide a chronology of railroads based on their original corporate names. The date given is for the year of first service in Arizona. No attempt has been made to indicate acquisition and consolidation of the initial lines into the larger roads, nor has any attempt been made to provide dates of abandonment for those routes no longer in existence.

In the latter years of the 19th century American population grew so fast that the old Spanish Southwest was rapidly turning into a new American settlement. As Indian raiding steadily declined, the trappings of post-pioneer civilization developed. The formal political system had operated long enough to be well established. Schools and local law enforcement were growing to meet demands of the populace.

During this same period three other social groups were added to the already heterogeneous population: Black, Oriental, and European Slavs. Though Blacks were never widely used as slaves in the Southwest, some companies of Black troops were garrisoned in Arizona after the Civil War (Carroll 1971; Fowler 1971; Leckie 1967).

Orientals came to work on railroads, in mines, and to settle, but Arizona was not their first destination. Early Chinese immigration to Sonora began in the last quarter of the 19th century (Hu-Dehart 1980). With the Sino-Mexican Treaty of Annuity and Commerce of 1899, the numbers of Chinese in Sonora swelled from less than a 1,000 to over 13,000 by 1910 (Jacques 1976). Although the Mexicans originally desired more labor, many Chinese became merchants, whose success led to their harassment by the Mexican Government and people during the revolution of the 1910s. By the 1930s large numbers of Chinese were being expelled from Sonora. Some returned to China, others went north to Arizona (Jacques 1976).

The third group, the European Slavs came to work in the mines (Werling 1968) and concentrated near the mines at Bisbee and near other major mines.

At the turn of the century Arizonans fought the congressional battle to win statehood. By the time statehood was granted in 1912, the Mexican Revolution was under way just to the south. In the 1920s, skirmishes between rebel bands and the government's troops were fought at Nogales and Agua Prieta near the Arizona border. Though some American troops were stationed along the border during the Revolution, the influence of the military in Arizona would become greater when the United States became involved in World War I and Arizona's farmers and ranchers again supplied the Army with goods as they had done during the Indian wars.

Cultural resources of the Territorial period are vast in number and variety, reflecting the larger number of Anglo settlers and their extensive occupation, especially where the Spaniards did not live. Most histories of Arizona have concentrated on the Anglo period, and most historians have focused on military and political developments. The drama and excitement of the Indian wars has captured the most attention, even though the emphasis tends to bias historical perspective. One would thus expect that most cultural resource studies of the Territorial period concentrate on the military and the center of population--Tucson.

Military history has been a popular field of study for soldiers and civilians alike throughout American history. The Army encouraged its study by hiring staff historians. Civilian organizations also exist for such study. One of them, the Council on Abandoned Military Posts, has

special interest in Arizona because of its many posts. Their reports and publications are useful sources of information and include both general (Brandes 1960; Prucha 1964) and specific studies of military posts. In the southern part of the study area, Ft. Buchanan (Sacks 1965), Ft. Huachuca (Smith 1976), Camp Rucker (Chapel 1973), and others (Serven 1965) have been studied. In Tucson, Ft. Lowell has been studied by Johnson (1960), Peterson (1963), Weaver (1947), and others (Committee on Urban Planning 1976). But of all the forts, Ft. Bowie has received the most attention (Hoy 1976; Herskovitz 1978; Murray 1951; Utley 1958). Of interest beyond the battlefield is the heliographic communication system developed during General Miles' command to help compensate for Apache attacks on telegraph lines (Rolak 1975).

The city of Tucson has received a great deal of attention and has an active preservation program (Ayres 1968, 1970c; Adams 1929; City of Tucson 1971; Historic Areas Committee 1969; Mackie et al. 1969; Peterson 1970; Roubicek 1969).

The most notorious town of the region was Tombstone. The silver mines have long since played out, and the town has become a tourist center. Most of the town is preserved, and several properties are listed on the National Register of Historic Places. The town continues to be the focus of much historical interest (e.g. Devere 1978; Sonnichsen 1972; Walker 1979). Local historical societies contain the most unpublished information (besides government records) on other important towns.

Many of the cultural resources of southeast Arizona fall under the category of ghost towns. Like the cowboys and Indians of the Old West, ghost towns enjoy a great popularity (Sherman and Sherman 1969; James 1978). The term ghost town is generic, referring to many different types of sites, including ranches, farms, mining settlements, and just about any other site where human activity left enough ruins to be found by modern explorers and tourists. The ghost town idea shows the state of historical consciousness in our society. The ruins of any ghost town are old enough to attract some interest, but they remain generally unrecognized until some people or an organization takes an interest in them.

Like military posts and ghost towns, the old Butterfield Mail Route and its stations have attracted some study (Ahnert 1973; Sloane 1970; Peterson 1966). The route is now fairly well-known, and a few standing ruins are associated with it.

CONTEMPORARY CULTURE - 1912-1982

After statehood in 1912, Arizona rapidly developed along similar lines as other states. In general, American society and culture tend to become more homogeneous through time, and regional differentiation tends to become less obvious because of better communication and easier and quicker modes of transportation. Overland roads are improved and air transport services developed. The number of secondary rail lines to

older mines decreased, but the main Southern Pacific line continued to provide service. Technological advances provided improvements in the day-to-day lives of the gradually increasing population. Windmills, steam, and internal combustion engines were used to pump water from underground sources as rivers began to dry up.

Arizona's economic and social history during the 20th century reflected more and more the rhythm of all the American states. The large copper mines profitted greatly from high prices and low wages. In 1915, the miners in company towns in the Clifton-Morenci-Metcalf district went on strike. Two years later, this area had another major strike, as did the Bisbee Mines. Labor unions grew as a result. The demand for copper during World War I rejuvenated the mining industry, as did the demand for beef and cotton, which developed into important agricultural products. Labor associated problems arose again in the 1920s when the Ku Klux Klan campaigned against the Mexican Catholic miners in Bisbee (Abbey 1973).

During the Depression, industrial production almost ceased, but the modern tourist industry began to have a significant impact. The Veteran's Hospital in Tucson was built in 1927 to provide a healing environment for soldiers who suffered from the poison used in trench warfare. This hospital was a significant step in the early association between health and the arid climate.

Now that Arizona was a full-fledged state and Mexican border problems had waned, Americans from the East began to discover the variety of natural beauty unique to the Southwest. Resorts, guest ranches, and hotels were built to serve tourists. National Forests employed Civilian Conservation Corps (CCC) and Works Progress Administration (WPA) workers in the mountain forests. These groups also worked at lower elevations building numerous erosion-control features. World War II provided another much-needed economic boost for mining and food production. New mining districts opened at Silverbell and Pima, and the military established training bases in Arizona. Tourism boomed again after the war, and many of the soldiers who trained in Arizona returned to settle.

Scholarly interest in the aboriginal societies of southeastern Arizona began in the late nineteenth and early twentieth centuries (Gaillard 1894; Grossman 1973; Hrdlicka 1906; Kissell 1916; Russell 1908) but did not become commonplace until the 1930s. By these late dates, the Indians were living on reservations and in towns after experiencing several generations of acculturation to the modern social environment. The descriptive studies of the mid-century were primarily concerned with collecting baseline information on Indian lifeways (Goodwin 1942; Hill 1936; Hoover 1935; Opler 1941; Parsons 1928; Spicer 1941; Underhill 1939, 1940; Joseph, Spicer, and Chesky 1949), material culture (Beals 1934; Breazale 1923; Fontana et al. 1962; Ross 1941; Shreve 1943; Steen 1943, 1946), and history (Fontana 1958; Goodwin 1971; Kilcrease 1939; Wetzler 1949; Woodward 1949). The biggest problem was to understand both what preColumbian culture was like and how it changed as a result of domination first by

the Spaniards and then by the Americans. To this end, more recent studies have focused on the ethnohistorical processes of change in Indian life (Basso and Opler 1979; Cheek 1974; Cormack 1968; Hackenberg 1964; Kelly 1963; Mark 1960; Spicer 1962; Winter 1973).

Since the Indians of today are in many ways incorporated into the American society of the Southwest, some attention has been directed to the modern situation and its effects on both Indians and non-Indians (Weaver 1974). Indeed, the society of the Southwest is now a heterogeneous population of Anglo-Americans, Mexican-Americans, and Indians (Thompson and Spicer 1972). In addition to the Indians of southeast Arizona, a significant population of Yaquis from Mexico migrated to the Tucson area where they maintain some cultural identity (Spicer 1940, 1980).

Two important studies have concentrated on the domestic life of the historic period. Fontana and Greenleaf's (1962) study of Johnny Ward's Ranch is a seminal study in the historic archaeology of the region. More recently, McGuire (1979) reported on the excavation of the historic components at Rancho Punta de Agua south of Tucson. These studies and Herskovitz (1978) study of the material culture at Ft. Bowie provide an important baseline of data about historic period artifacts from sites in the study area.

HISTORICAL LIFEWAYS

The previous section outlined the relevant chronology of historical events of the study area. This section highlights the predominant historical themes. This examination is important because it delineates the general flow of history on the basis of the results of various cultural activities, perspectives, and life styles. The sequence of events, as discussed in the previous section, exemplifies a particular direction in the course of history that might not be readily apparent in an ideographic synthesis of the events. The events must be interpreted by the reasons behind the events and the results of the events. This approach satisfies the need to tell more than just what happened. Since the analysis specifies cultural processes and directions, it is useful for understanding the past, the present, and the future. Thus, this section has a use for planners and managers that is not found in ordinary descriptive texts.

The term lifeways denotes this interpretation, referring to the general way of life and activities of the different cultural groups who occupied the region. Their lifeways have had and still have significant effects on the land use of the region and are, therefore, extremely important.

Of the infinite number of themes that could be considered, three have been chosen as the most germane to the study area. The themes represent the major land use developments by the historic cultural groups. Other possible themes, such as military and government affairs and transportation/communication systems, were sporadic and dependent on the major developmental themes. The development of urban life, especially in Tucson, is contemporary and is only now beginning to have a significant impact on the region's history.

EURO-AMERICAN AND ABORIGINAL INTERACTION

The development of aboriginal lifeways in southeast Arizona through prehistory was a gradual process of human adaptation to the arid environment. During the historic period, however, aboriginal lifeways dramatically changed. The first major change was the movement of both the Athapaskan Apache and the Spaniards into the region in the 17th century. The second change was the expansion of the United States frontier into the region in the nineteenth century. Each of these two intrusions changed the course of history and land use in the area.

The primary cultural group of the region consisted of the Upper Pimans who belonged to the Uto-Aztecan language family. Their social and economic organization was reflected in the settlement type--the rancheria. This dispersed settlement was less permanent than a town but more

permanent than the portable tipis of the band level nomadic Apache. The relatively peaceful Piman existence in the desert greatly changed when the Apache and Spaniards moved into Piman territory.

Figure 87. Pima House. (Haury 1976) By permission from The Hohokam: Desert Farmers and Craftsmen, by E.W. Haury, Tucson: The University of Arizona Press, copyright 1976.

Spicer's Cycle of Conquest (1962) was the first major study describing the impact on the Spanish, Mexican, and American on the Indians of the area. This seminal ethnohistorical study comprehensively described the results of contact on the regional cultures, showing the changes occurring in the political, social, religious, and economic systems. These cultural systems experienced disintegration and re-orientation as a result of European dominance. Some of the more significant changes will be reviewed here.

The Pima-Papago-Sobaipuri groups adapted well to the desert environment. Of some 375-400 possible native food plants in the Sonoran Desert, about forty of them served as major staples (Felger, Nabhan, and Sheridan 1976; Castetter and Bell 1942; Castetter and Underhill 1935). Twenty-five plant species, including maize, beans, and squash, were cultivated in irrigated plots. Father Kino, the first Spanish missionary to serve in Arizona, introduced many European domestic plants and animals, including wheat, peas, melons, various spices, fruits, flowers, and cattle (Castetter and Underhill 1935). These new foods complemented the native crops and intensified the desire for new ones. Piman farmers became less dependent on wild foods and more dependent on the new plants and the increased irrigation they required.

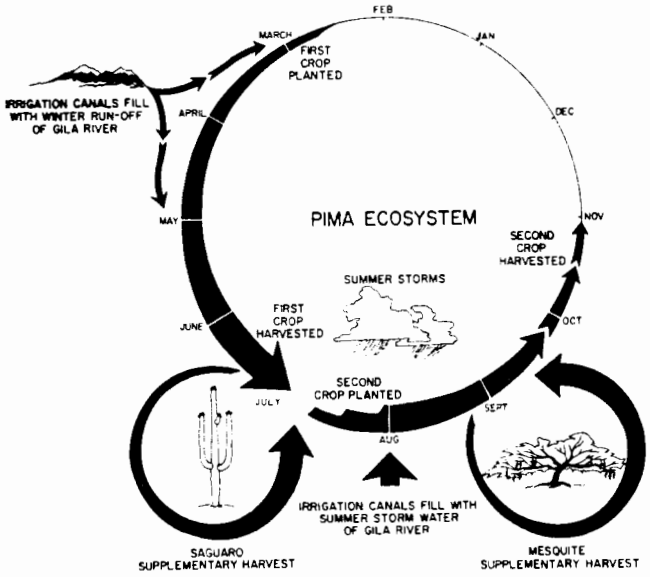


Figure 88. The Pima ecosystem. The Pima ecosystem was probably very similar to that of the Hohokam. Crops were planted not on the basis of local rainfall, but when rivers filled with summer and winter runoff. Saguaro and mesquite provided resources that backed up the domesticated crops. (Martin and Plog 1973). Illustration from The Archaeology of Arizona by Paul S. Martin and Fred Plog. Copyright 1973 by Paul S. Martin and Fred Plog. Reprinted by permission of Doubleday and Company, Inc. and Fred Plog.

The Spanish-introduced subsistence practices worked well in mission towns where more people were needed to work fields, which supported a greater population density. Concomitantly, the missionaries wanted their charges close to the mission where they could be converted and live a Christian, rather than a heathen, way of life. The Spanish policy of reduction was designed to replace native customs with Christian mores,

with priests supplanting the native religious specialist (shamans and hechiceros). This process itself had a disintegrating effect on native culture. The establishment of presidios changed Arizona life by bringing in military and civilian influences that directly competed with the missions.

Apache raiding of valley rancherias during the Spanish Period caused even greater social disintegration. The depopulating effects of Apache raiding and European diseases rearranged aboriginal populations. Because the Apache raided both Spaniard and Indian farmers, the latter two often were allied against the Apache. By the last two decades of the Spanish period, heterogeneous farmers clustered around the missions of the Santa Cruz Valley and the Gila Pima region northwest of the study area.

The 1790's and first two decades of the 1800's was a time of peace. All raiding Indians including the Apache were forced to live at Tucson. They were given gifts and alcohol under Spain and Mexico's pacification program. They lived in ghettos. The aboriginal lifeway had all but disappeared, being replaced by the Spanish-Mexican (mestizo) lifeway.

In the 1820's and 1830's the pacification program was replaced by Mexico with warfare. The Apache became hostile.

When the Americans arrived, they did not generally want to convert Indians to their faiths, nor did they particularly care to work or live with Indians. Basically, the Indian was an undesirable obstacle. Piman groups, again, offered little resistance. Apaches, however, opposed American settlement, and military force was thus needed to overcome Apache resistance.

The American solution to the Indian problem was to restrict native settlement to areas unappealing to American interests. The reservation system was used here as it had been in other parts of the American West. Reservations were given and then taken away (e.g. the Chiricahua Reservation). Traditional Indian enemies were forced to share the same land--away from their own homelands. Reservation boundaries were redrawn to suit the needs of settlers (e.g. the Christmas mine was originally on the San Carlos Reservation until an act of Congress changed the boundary). Distribution of the reservation land in Arizona today reflects this history. The study area contains only one reservation (San Xavier). If mining had been less productive in the region, the region may have had more reservations, as there are in other parts of Arizona.

APACHE LIFEWAY

Because of the much greater disruption and ultimate removal of the Chiricahua from the study area, most of our knowledge of Apache subsistence in the study area comes from studies of the Western Apache (cf. Goodwin 1935, 1942; Buskirk 1949).

Hunting, gathering, and raiding were the major subsistence bases of the pre-reservation Western Apache economy; Goodwin (1935:61) estimated that only 25 percent of Western Apache food was derived from agriculture, and the Chiricahua did not practice agriculture at all (Goodwin 1942:7). Western Apache farm sites lay in the transitional biotic zone, south of the Mogollon Rim (Griffen et al. 1971:70). The Western Apache raised maize and squash and, rarely, beans. They also consumed wheat, gathered in raids on the Pima and Mexicans (Opler 1973:44). Fields averaged one-half acre in extent and were prepared for planting by clearing away the brush. Crops were planted with digging sticks. Brush diversion dams were sometimes built to divert water onto fields. After spring planting, the people left for the summer gathering cycle, leaving only a few people to tend the fields. The group then returned in September for the harvest (Opler 1973:44-45). After the harvest, people moved to winter camps below the Gila and Salt Rivers in the Lower and Upper Sonoran biotic provinces (Griffen et al. 1971:69-70).

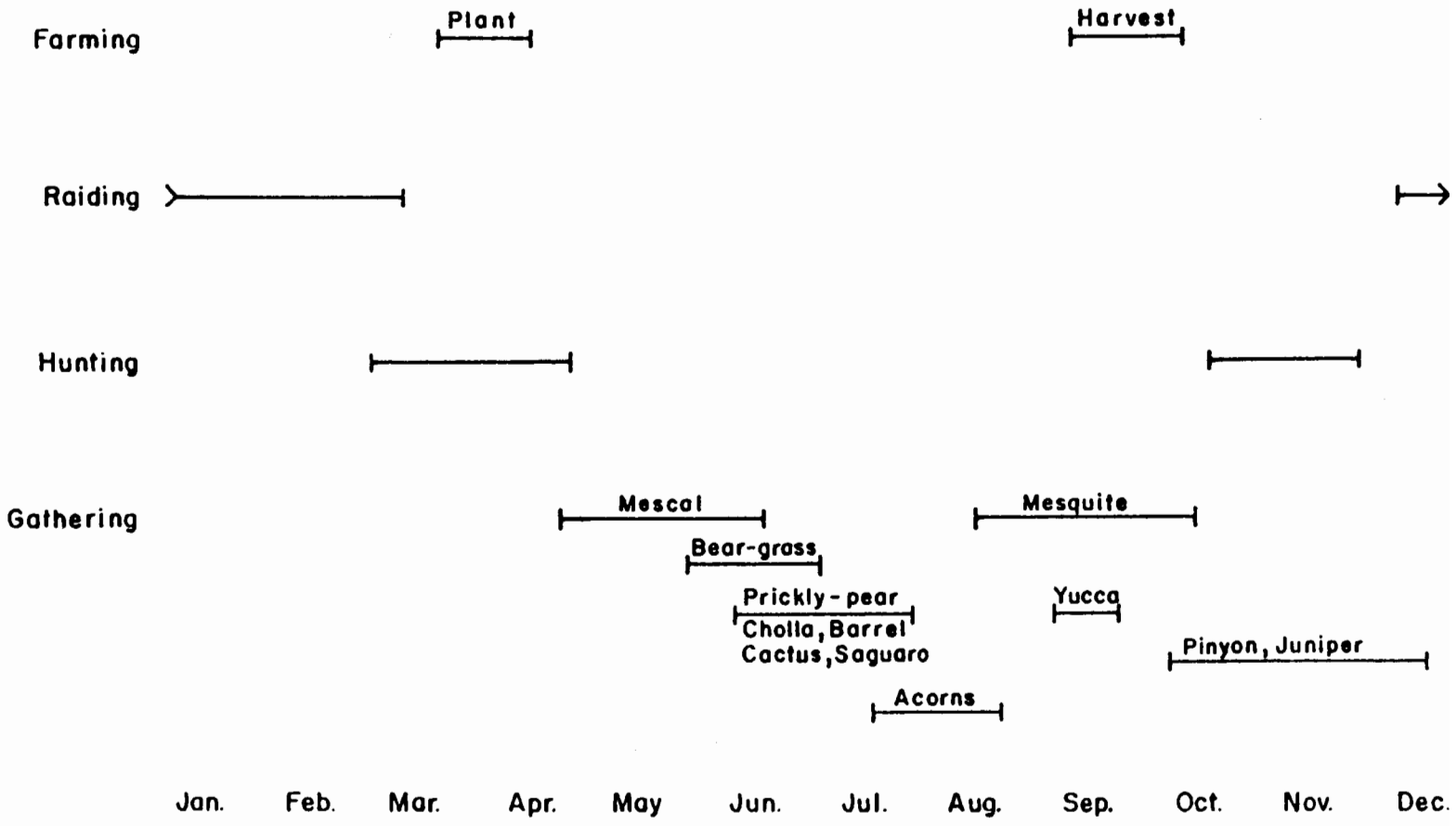
A variety of wild plants, and animals were consumed. Saguaro and prickly pear, grass seeds, and mescal (agave) were gathered in June and July in the San Pedro River Valley. Acorns and mesquite beans were gathered in the Oracle area in July and August. Before returning to the farm sites, people gathered yucca fruit, which ripened in September. After the harvest, pinyon nuts and Juniper berries were collected for winter. Wild plant foods were usually gathered by small groups of females from the same matrilocal family (Griffin et al. 1971:70; Basso 1970:3; Goodwin 1942:28).

Males hunted mule deer, white-tail deer, and javelina in late fall and winter, usually in small groups of from two to five. Young people hunted many kinds of small game, including jackrabbits, cottontail rabbits, squirrels, prairie dogs, woodrats, and birds. Adult males hunted small game only when unsuccessful in the quest for large animals (Griffen et al. 1971:70).

Fall and winter were the prime time for raids against Mexicans in Sonora and against the Pima and Papago. Raids were carried out as far south as Hermosillo and east to the Bavispe River (Goodwin 1942:93). The Western Apache clearly distinguished between raiding and warfare. The main goal of raids was to gain material goods, preferably livestock. War parties, in contrast, were organized to avenge the death of a relative who had died in battle (Basso 1971:16). Raiding parties were usually organized at the instigation of older women when the supply of foodstuffs grew low. Participants were recruited from among men in the local area under the leadership of a man with recognized prowess in battle and knowledge of the practical and ceremonial skills needed for a successful raid (Basso 1971:16-17; Griffen et al. 1971:70).

TABLE 13

WESTERN APACHE SEASONAL SUBSISTANCE ACTIVITIES



(McGuire 1980) Courtesy Arizona State Museum.

TABLE 14

ECONOMIC AND ORGANIZATIONAL CHARACTERISTICS OF MODERN POPULATIONS INHABITING THE DESERT AND TRANSITION ENVIRONMENTS

	% HUNTING-GATHERING	% AGRICULTURE	% FISHING	TYPE AGRICULTURE	AGRIC. LOCUS	PRIMARY HG LOCUS	SECONDARY HG LOCUS	SEDENTISM	SIZE MAX LOCAL AGGREGATE	SEASONALITY
Maricopa	50	30	20	II	V	V	U	S	50–99	All seasons in river valleys; gathering mainly in summer
Cocopa	40	40	20	FW	V	V	U	S	Hmstd.	All seasons in river valleys; gathering mainly in summer
Mohave	50	40	10	FW	V	V	U	S	Hmstd.	All seasons in river valleys; gathering mainly in summer
Yuma	30	50	20	FW	V	V	U	S	500+	All seasons in river valleys; gathering mainly in summer
Pima	41	50	9	II	V	V	U	S	100+	All seasons in river valleys; gathering mainly in summer
Papago	50	50		AI	V	U	V	SS	1-2 Fam.	Growing season: shifting camp; remainder of year: upland well villages
Walapai	100	P		C	V	U	V	SN	>50	Gathering-agriculture camps in valley bottoms in summer; permanent upland villages in fall, winter
Havasupai	40	60		II	V	U	V	SS	100–200	Spring-summer: agriculture-gathering in valleys; fall-winter: gathering in uplands
Yavapai	100	P		C	V	U	V	SN		Probably similar to Walapai
W. Yavapai	90	10		SF	V	U	V	SN	50–99	Probably similar to Walapai
S. E. Yavapai	90	10		C	V	U	V	SS		Probably similar to Havasupai
W. Apache	70	30		SF	V	U=V		SS	>50	Spring-fall: agriculture fields with permanent camps; fall-winter: shifting low-altitude camps
Chiricahua Apache	100	P		C		—U=V—		N		Shifting camps

KEY: AGRIC. TYPE—II = Intensive Irrigation, FW = Floodwater, SF = Shifting Fields, C = Casual
LOCI: U = Upland, V = Valley
SEDENTISM: S = Sedentary, SS = Semisedentary, SN = Seminomadic, N = Nomadic

Courtesy Fred Plog. Illustration from The Archaeology of Arizona by Paul S. Martin and Fred Plog. Copyright 1973. Reprinted by permission of Doubleday and Company, Inc.

Although almost nothing is known about Apache material culture from an archaeological perspective, much has been written about ethnographically known material culture. The primary dwelling was the wickiup, described for the Chiricahua as "a rude brush hut, circular or oval, with the earth scooped out to enlarge its capacity" (Hodge 1907(1):282; Schroeder 1974:145).

Goodwin described two main Western Apache dwelling types in enough detail to facilitate archaeological recognition. Both types ranged from 12-25 feet high, with a mean diameter of 15-18 feet. The first type was generally higher and made of poles placed in the ground with the bent side out and fastened at the top. This type sometimes had a covered entrance. The second type was usually smaller, from 7-9 feet high and built of poles set in the ground and bent so their tips met, running parallel to each other, and lashed together. This type generally lacked a covered entrance. Both types were then covered with several layers of grass thatch (Opler 1973:58-59).

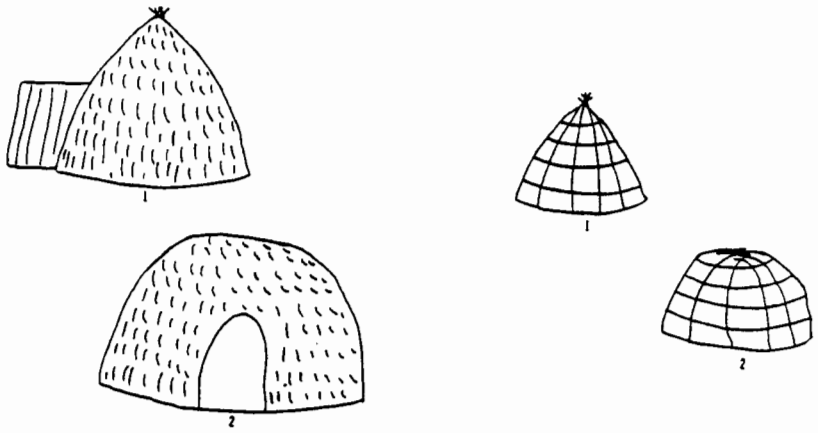


Figure 89. Western Apache House Types. (Opler 1973). By permission from Greenville Goodwin Among the Western Apache by M. Opler, Tucson: The University of Arizona Press, Copyright 1973.

Figure 90. Western Apache House and David Longstreet. (Basso, editor 1971) Courtesy Arizona State Museum.

Many other structures have been mentioned in the literature, although rarely with enough detail to permit use in site identification. Such structures include sweat houses; roasting pits for mescal, corn, and wheat; and water-control devices, such as the brush diversion dams discussed earlier (cf. Buskirk 1949; Reagan 1930; Goodwin 1942; Griffin et al. 1971).

A number of studies have been made of perishable Apache arts and crafts. Although such are unlikely to be preserved, accounts often mention tools used in preparing these items, tools that may be preserved archaeologically. Studies have been conducted on items associated with raiding (Opler 1973), subsistence (Buskirk 1949), baskets (Dodge 1900; Douglas 1935; Roberts 1929), dress and ornament (Lummis 1962), and games (Reagan 1904, 1905a, 1905b). More general accounts of Apache material culture include Beals (1934), Reagan (1930), and Palmer (1878).

Early historic photographs can also provide valuable clues to Apache material culture, but caution should be taken, since photographers often posed their subjects in costumes or with items of material culture not of their group (cf. Smithsonian Institution 1974 for an introduction to materials from that source).

Accounts of native material culture greatly vary in reliability. Although Gifford (1940) devised a culture element distribution study comparing Apache and Pueblo, he has been criticized for his short stay among the Apache, his ignorance of the language, and his deafness, which hindered his understanding of his interpreter (cf. Opler 1973:59, 85).

Ceramic evidence has often been used as a clue in identifying Apache sites. Aside from the studies discussed earlier, Western Apache ceramics have not been systematically analyzed either from an archaeological or an ethnographic perspective. Gunnerson (1979:169) stated that Western Apache ceramics differ from Jicarilla wares mainly in the absence of mica. Opler (1971) reviewed historic Jicarilla Apache ceramic techniques. Other important sources are the work of J. Gunnerson (1968; 1969) in northeast New Mexico. Work at Pecos yielded several features ascribed to the Jicarilla Apache, as well as ceramics (Gunnerson and Gunnerson 1970). Further east, excavations at San Saba uncovered a range of Lipan Apache material culture from the early historic period (Tunnell and Newcomb 1969). The use of materials from sites to the east of the study area, in conjunction with ceramics in the Arizona State Museum collection, can provide the basis for the direct historical approach advocated by Gunnerson (1979:169).

The Chiricahua tribe was divided by location into three bands that cooperated for emergency action (Opler 1937:179). The eastern Chiricahua band was known as tcíhénè, "red paint people". This band controlled the area of southwest New Mexico west of the Rio Grande (Opler 1937:178). The southern Chiricahua band was known as né'nà'í, "enemy people" and were located in northern Sonora (Opler 1937:178).

The central Chiricahua band is of most importance in the study area. Known as t'cókánénè, they controlled most of southeast Arizona from a core area in the Dragoon, Chiricahua and Dos Cabezas Mountains (Opler 1937:178). Further local divisions of the band are called local groups in the anthropological literature. These groups in turn were made up of matrilineal matrilocal extended family groups. The importance of the band is seen in the fact that the bands had names, although the Chiricahua tribal group as a whole had no name (Opler 1937:179).

The Western Apache are composed of loosely delineated named units; these in turn are divided into local groups. The larger units are called groups or subtribes, and the local groups are called bands (Goodwin 1942:7). Bands in turn are again composed of extended matrilocal family groups. Crosscutting band distinctions are clans, which are matrilineal descent groups whose function is marriage regulation rather than control of property as among the Hopi.

The two southern-most Apache subtribes, the White Mountain and San Carlos, occupied the northern sector of the study area and exploited the southern part for wild plant foods and as a base for staging raids into Mexico. The eastern White Mountain band of the White Mountain subtribe centered on a core farming area in the White River country to the north of the study area, but ranged south across the Gila River to the Pinaleno and Winchester Mountains (Goodwin 1942:12). The western White Mountain band also ranged south of the Gila to the Santa Teresa Mountains to gather mescal. They occasionally ranged as far south as the Galiuro Mountains in the territory of the Aravaipa band of the San Carlos subtribe (Goodwin 1942:16).

The Aravaipa farm sites lay at the mouth of Dick Spring Canyon on the Gila River (which they shared with the Pinal band of the San Carlos subtribe) and at the mouth and head of Aravaipa Canyon. The Aravaipa ranged east to the Santa Teresa Mountains and south to the Galiuro Mountains, which served as the northern boundary of the Chiricahua territory (Goodwin 1942:28).

MINING--THE EXTRACTION FRONTIER

Outside of the religious conversion of the aboriginal population, the desire for precious metals provided the greatest stimulation for settlement in southeast Arizona. The mining frontier of New Spain spread northward from the Valley of Mexico during the Spanish period. Spanish culture moved with the miners into northwest New Spain where several productive mining districts were established.

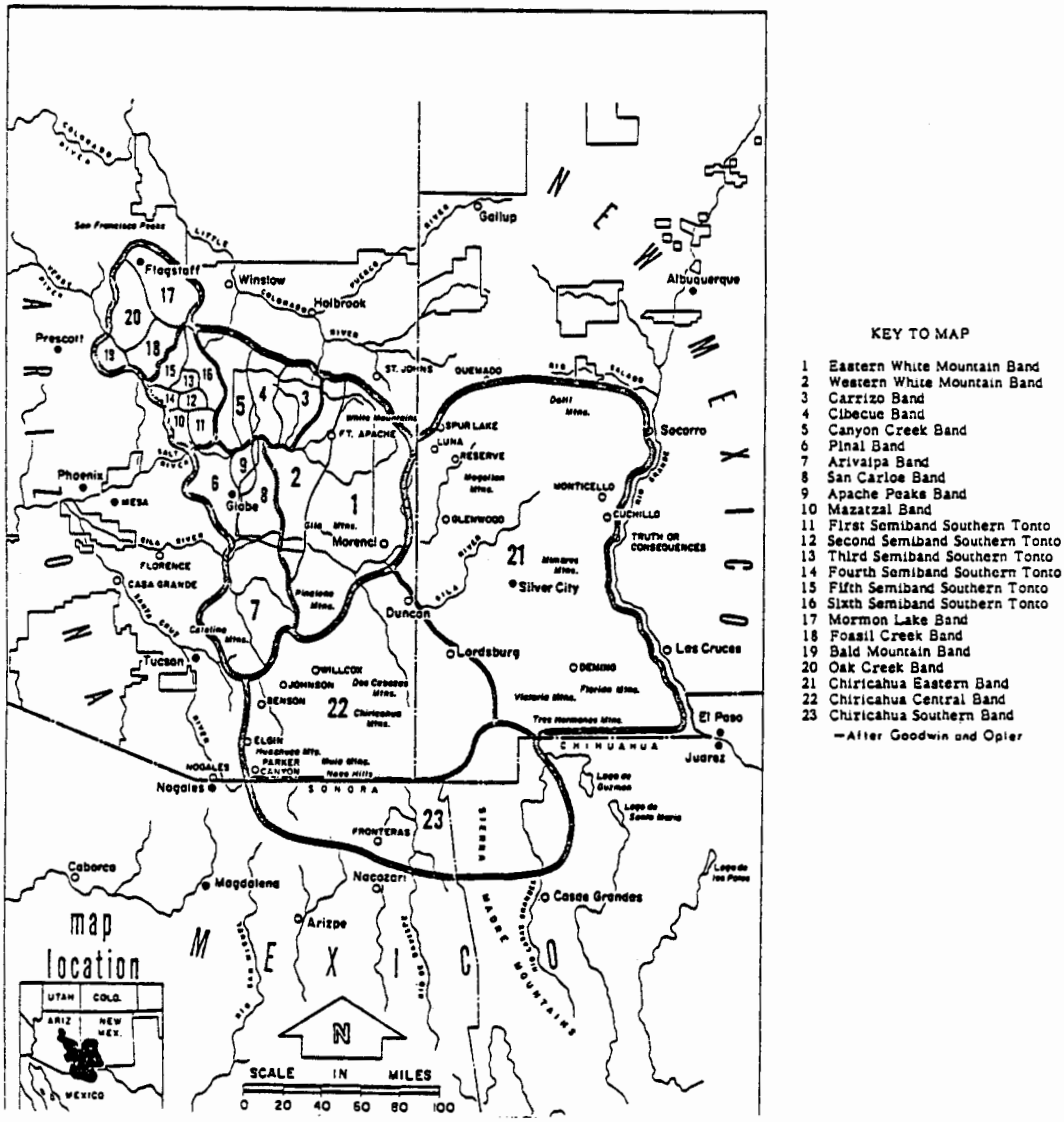


Figure 91. Chiricahua and Western Apache Territory about 1850.

Though no long-term mining operations existed in Arizona, Spanish prospectors continuously searched for deposits of silver and gold. Spanish mining focused in the Santa Rita Mountains next to the Santa Cruz Valley, where missionary activity was heaviest. The discovery of silver at the Real de Arizonac in the 1740s was the first report of precious metals in the region. The location of Arizonac is not exactly known, but it probably lay west of present day Nogales. The find lured mining interests and prospectors to the area, but more deposits were not found, and interest waned.

Not until the end of the Pima Uprising of 1751 did mining resume. The Salero Mine on Salero Hill in the Santa Rita Mountains is probably the oldest mine worked intermittently by the Spanish, Mexicans, and Americans. Apache raids made continuous operation difficult (Granger 1960: 324). Spanish mines were small operations, using human (often Indian) labor. Miners, like the military, were jealous of missionary control of Indian labor. Spanish mines, however, were not highly productive after Arizonac, and thus, Indian labor was not extensively used in Arizona.

American mining began in the 1850s when Charles Poston started the Tubac-based Sonoran Exploring and Mining Company. He re-opened the Spanish-Mexican Cerro Colorado Mine near Arivaca and named it Heintzelman. Frederick Brunckow, a German engineer in exile, established a mine south of Tombstone, but was soon murdered by Mexicans (Granger 1960:32). The other major pre-Civil War silver mine, the Patagonia or Mowry Mine, began working in the 1860s. Operations were curtailed during the war due to the lack of troops to resist Apache raids. The heyday of southern Arizona mining began after the war.

The California volunteers who secured Arizona during the Civil War stirred some interest in mining. General Carleton issued permits for prospecting in non-Apache areas of the state. Later, during the Apache Wars, many soldiers who pursued the Apache noted locations of prospecting sites throughout the countryside. In this way the military played an important role in opening the mining frontier in addition to controlling the Apache.

In the 1870s prospector Ed Schieffelin accompanied soldiers into the dangerous San Pedro Valley. While the soldiers scouted, Schieffelin prospected. After some searching, he found the mother lode. Several other veins were soon discovered nearby (Contention, Pearce, Lucky Cuss), and the town of Tombstone grew to service the extremely productive mines. These mines were rich enough to greatly improve Arizona's economy and to thus attract service business, more mines, and more prospectors. At the same time, strikes were made at the Harshaw (and Hardshell), Washington Camp, and Duquesne Mines south of Patagonia and Alta (Gold Tree or El Pomo) north of Patagonia. Other mines were opened or re-opened during the same period, including Total Wreck in the Empire Mountains, the Rosemont, Sahuarita Olive Camp, and Helvetia north of Sonoita, and the Oro Blanco west of the Santa Cruz River.

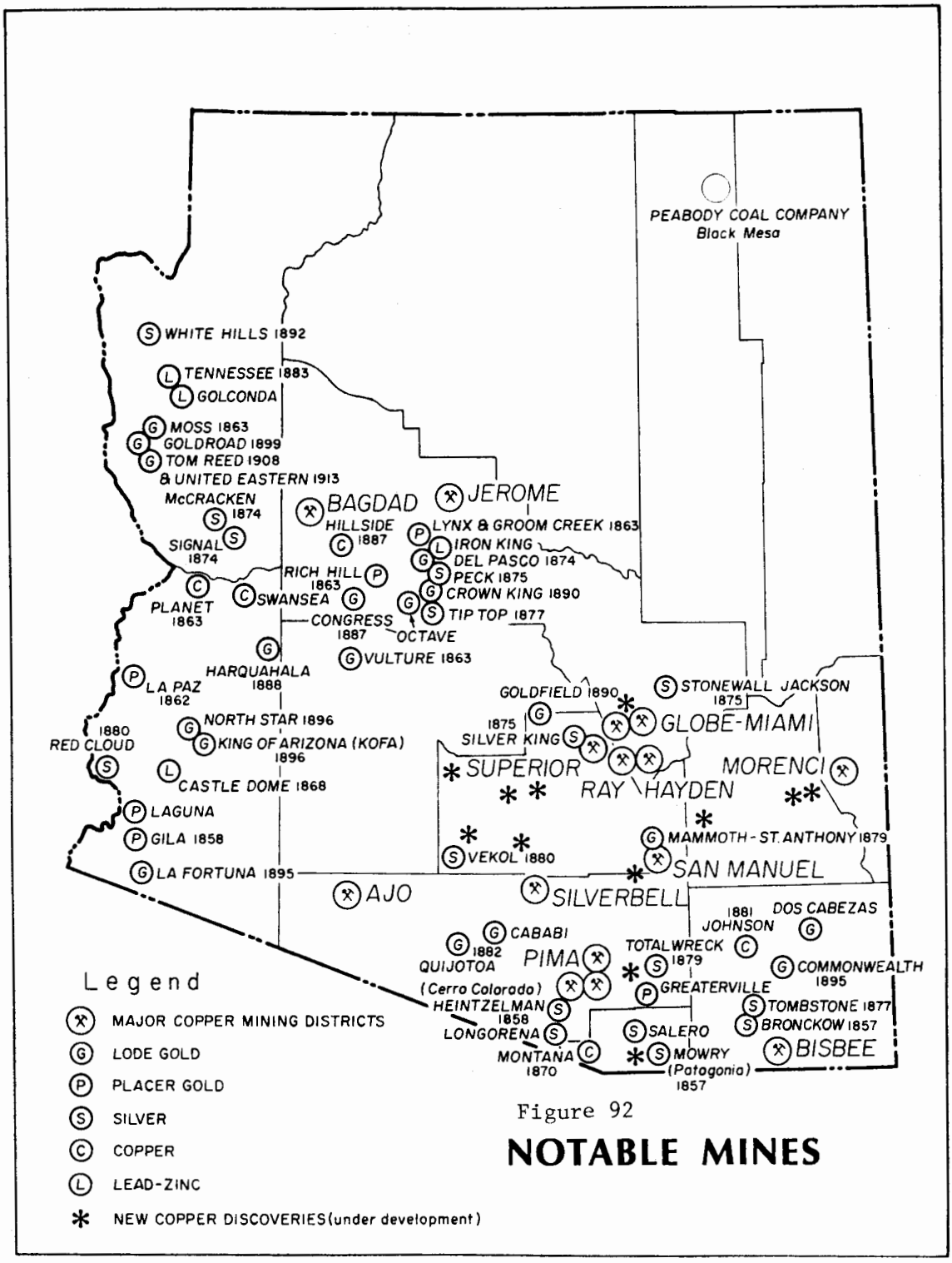


Figure 92

NOTABLE MINES

From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

Although American mining in southeast Arizona was first directed to silver and gold, copper became an important mineral in the last decades of the nineteenth century as copper prices dramatically increased with the demand for electrical conductors. The Longfellow and Metcalf Mines opened in the early 1870s. A smelter was built in the Clifton-Metcalf area, where ores were shipped and copper produced in quantity. Copper ore deposits at Bisbee were being mined at about the same time. Mines at Johnson and Middlemarch in the Dragoon Mountains were worked in the 1880s. To the north, Dr. James Douglas (Phelps-Dodge) found deposits on the San Carlos Reservation at Christmas, but could not develop them then. These early copper mines continued producing into the 20th century, but with falling output in recent years.

Mining became more extensive and efficient through the years. The historical trend has been one of total extraction. Mines repeatedly opened and closed as technology allowed the extraction process to continue. American technology of the last 100 years has made possible the removal of vast mineral resources, resulting in a steady decline of resources for future production, as well as enormous scars in the earth's crust. The deep mine shafts eventually will suffer subsidence problems as one already has in Tombstone at the Million Dollar Slope (Granger 1960:43). Open pit mines leave highly visible scars. The entire town of Bisbee was moved to expand the Lavendar Pit, and now the pit is a gaping hole as large as many natural land forms in the region.

Figure 93. Major Copper Mines. From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

RANCHING AND FARMING--THE EXPLOITIVE PROCESS

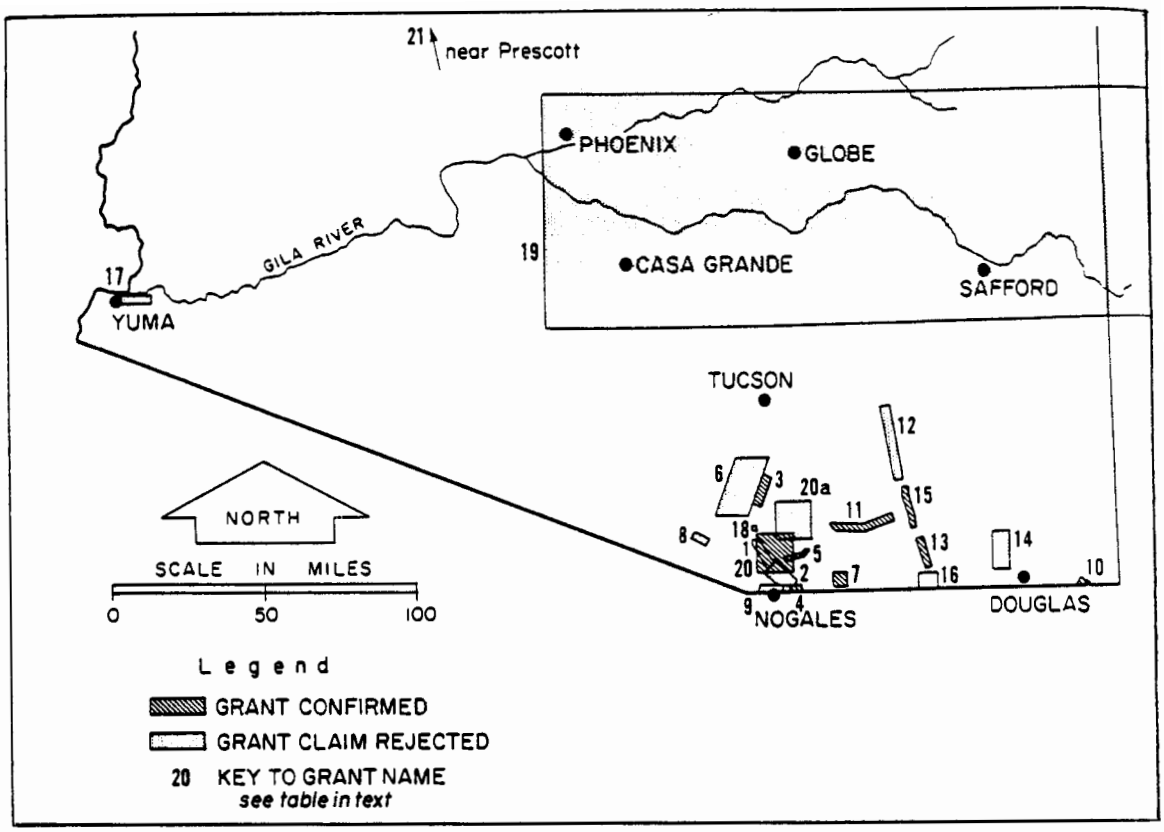
Although Pima farmers cultivated and irrigated their fields, the Spanish first introduced intensive agriculture and livestock grazing to the region. Father Kino's missions were the first settlements to use new methods, plants, and animals. Throughout the first two centuries of Spanish rule, missions were the primary loci of farms and ranches. Though some Spaniards set up ranchos and haciendas during this period, not until 1790-1830 did the Mexican style of ranching become common in southern Arizona (Mattison 1946).

Like the missions, ranches were located on the best lands, lands with access to water. From the first, the ranches exploited desert oases or cienagas along major rivers or at springs. By the time Americans began moving into the area, competition over water rights, springs, and meadows was intense, as evidenced by land grant disputes. After land grant questions were settled (1891-circa 1915), the new Mexican-Americans continued to live in the region, and newcomers competed for the remaining oases. The historic grasslands and meadows of the southern region were attractive to ranchers, and ranching became an important part of the economy. Moreover, the new settlers, miners, and the military required food and created a market for beef.

The cattle industry has been studied extensively (Haskett 1935; Morrisey 1950) because of its prominence and the effects of grazing on the environment. Aguirre (1975) related the story of Spanish-Mexican style ranching from the perspective of one of the older ranching families in the area. He mentioned the problems of acquiring livestock water and the methods used to overcome these problems. Steam engines were used to pump water as early as the 1890s.

The more abundant water flow in the Gila River attracted American farmers to the Gila Valley in the 1870s (McClintock 1921). Some of these farmers first settled at Gila Bend, here the irrigation ditches worked against, rather than for them. Instead of supplying the plants with water, the water washed the fields away. Dobyns (1978) lists several reasons that flooding in Arizona became uncontrollable, including Mormon ignorance of how to irrigate without wash-out. In reaction to the problem, Mormons moved upstream to the Safford Valley where floods would be less threatening. The cluster of Mormon towns in the area thrived, but their use of upstream water left less water for the Gila-Pimas downstream.

Any competition over land and water in early southern Arizona history seems slight today compared to the increasingly short supply of usable water. The modern and historic problems with flash-flooding and sheet erosion are symptomatic of the overpopulation and overexploitation of the desert environment. When the water supply in the mines dried up, the settlers dug wells. As technology allowed the use of steam, wind, and internal combustion engines to power pumps, the water in the underground aquifers was tapped. The resultant lowering of the water table has continued throughout the twentieth century at such ever increasing rates that it is the most serious problem facing the population today.



In the 1890's, the Court of Private Land Claims considered the following claims:

Number on Map	Name of Grant Claim	Acreage Claimed	Acreage Approved or Rejected	Successful Claimant
1. Tumacácori 2. Calabasas		81,350	rejected	
3. San Ignacio de la Canoa		46,696	17,204	Maish & Driscoll
4. Buenavista (María Santísima del Carmén)		17,354	5,733	Maish & Driscoll
5. San José de Sonoita		7,593	5,123	Santiago Ainsa
6. El Sopori		141,722	rejected	
7. San Rafael de la Zanja		152,890	17,352	Colin Cameron
8. Aribaca		8,677	rejected	
9. Los Nogales de Elías		32,763	rejected	
10. San Bernardino		13,746	2,383	John Slaughter
11. San Ignacio del Babocomari		123,069	33,792	Robert Perrin
12. Tres Alamos		43,385	rejected	
13. San Rafael del Valle		20,034	17,475	Juan Pedro Camou
14. Agua Prieta		68,530	rejected	
15. Ranchos de las Boquillas		30,728	17,354	William R. Hearst
16. San Pedro		38,622	rejected	
17. Algodones		21,692	rejected	
18. Otero (Tubac claim)		1,199	claim not filed	
		850,050	116,416	
19. Peralta-Reavis		11,280,000	rejected	fraudulent claim
20. Baca Float Number 3			94,289	Lieu Land selection
21. Baca Float Number 5			99,000	Lieu Land selection
		12,130,050	309,705	

Figure 94. Spanish and Mexican Land Grants. From Historical Atlas of Arizona, by Henry P. Walker and Don Bufkin. Copyright 1979 by the University of Oklahoma Press.

CHAPTER 8

CULTURAL CHRONOLOGY SUMMARY

A large variety of people have occupied the study area during the past 11,000 years during both prehistoric and historic times. This section summarizes the chronological sequence of cultures. The chronology table and historic period timeline that follow this discussion illustrate the history of occupation.

The earliest known inhabitants were the Clovis Paleo-Indians, who lived here between 9500-9000 BC. The study area contains more Clovis sites than any other region of comparable size in the United States. These sites (Naco, Lehner, Escapule, Liekum, Murray Springs) all lie on tributary arroyos of the San Pedro River between the Mexican border and Lewis Springs. This unparalleled concentration has made the area extremely important for the study of early man in the New World.

The study area also contains one of the longest and best-documented Archaic sequences in the country, the Cochise culture. The relationship of this hunting and gathering adaptation to the Clovis horizon is unclear, but the Clovis horizon somewhat overlaps the earliest stage of the Cochise, the Sulphur Springs. This earliest stage is known from sites in the Sulphur Springs Valley and Whitewater Draw. Here a variety of flat milling stones and small hand stones for processing wild plant foods have been found in association with a distinctive lithic assemblage. The presence of extinct fauna, such as the mammoth, with remains of this stage is one of the important features.

The introduction of ceramics marks the transition from the Cochise to Mogollon horticulturalists. In the study area, this transition seems especially clear in the San Simon Valley, but a major gap exists in our understanding of the transition in the San Pedro and Santa Cruz Valleys.

Enough Mogollon sites have been found in the eastern half of the study area to distinguish them from other prehistoric groups. But because the study area lies on the edge of the densest Mogollon region, the assemblages are mixed with non-Mogollon cultural elements. Though Mimbres branch components are present, the San Simon branch sites are predominant.

The absence of late remains of Cochise foragers in the San Pedro and Santa Cruz Valleys has led to the suggestion that the Hohokam people of these valleys entered an empty ecological niche as they expanded from the Gila-Salt Basin. The Hohokam were the major farmers in the San Pedro Valley until about AD 1200 and in the Santa Cruz Valley possibly until European contact. The Pioneer stage in the study area is almost indistinguishable from that of the Gila-Salt Basin, providing support for the contention of a migration from the Gila-Salt Basin. House styles, ceramics, and other items of material culture are almost identical.

The two sequences began to differ during the Colonial period as the Tucson Basin Hohokam developed a distinctive series of unslipped red-on-brown wares. The ceramics resemble those of the Mogollon area to the east in paste features. These and other differences have led some to classify the Tucson Basin inhabitants as part of the O'otam, a term for a group of related peoples in the study area to the east of the basin, having similar settlement and ceramic styles. The general similarities in material culture and development trends, however, have led most to group the Hohokam of the study area with the Hohokam of the Gila-Salt Basin. The main difference was the smaller role of irrigation agriculture in the study area.

Around AD 1200, the Hohokam culture changed in a number of ways. These changes include a shift to above ground architecture, a change to inhumation from the earlier style of cremation, and ceramic innovations. These traits have traditionally been ascribed to the Salado, a puebloan development possibly originating to the north of the study area in the Tonto-Globe area. Recent research has suggested that these developments probably resulted from indigenous changes in the large sedentary farming villages of the Sedentary period.

The Hohokam evidently abandoned the lower San Pedro River Valley around AD 1200 when the Mogollon or O'otam cultures of the San Simon Valley and upper San Pedro Valley also abandoned the region. The reasons for this abandonment are unclear, although DiPeso has linked it to changes resulting from expulsion of the Hohokam by the native inhabitants and changes occurring at Casas Grandes, a major trade center in northwest Mexico. DiPeso claims the O'otam survived into the Historic period as the ethnographic Upper Pima and Sobaipuri peoples found by the Spaniards.

Around the same time that the San Pedro Valley was abandoned, Salado people occupied most of the study area. Their large compound sites with a distinctive ceramic series occur widely over the study area. Evidently the study area supported a large Salado population for a century. The Salado used a wide range of agricultural techniques, and their sites are associated with large areas of cleared land, gridded gardens, canals, and other features. The conditions that made the area desirable to the Salado in AD 1200 and undesirable between AD 1400-1450 are unknown. The Salado evidently abandoned the area, although some may have become the historic Sobaipuri or merged with Apache groups expanding into the study area from the north and east.

When the Spaniards arrived, they found Piman-speaking peoples in the Santa Cruz and San Pedro Valleys. Among these groups Father Kino devoted his mission efforts. These Upper Pimans probably descended from the Hohokam and O'otam peoples of the prehistoric period, but the exact nature of the relationship is unclear. Several protohistoric sites, including some contacted by Europeans, have been excavated, but identification of specific sites with villages mentioned in Spanish accounts has been questioned.. Some of the larger sites, such as Paloparado and Quiburi, differ significantly from other sites that are known to be Upper Piman. These differences contribute to the problem of archaeological recognition of these people.

The Apache were the last Indian group to enter the study area. Members of the Athapaskan linguistic stock and related to groups in Canada and Alaska, the Apache represent a late southern expansion. Spanish accounts generally state that the Apache did not enter the study area until the 18th century. As they acquired horses, the Apache developed an economy based on raiding Spaniards and Pimans.

Passing through the study area during the 16th century were several Spanish explorers, including de Niza and Coronado. The Jesuit missionary, Father Kino, extended the Spanish missions for the Upper Pima from northern Sonora into southern Arizona in the 1690s. Over the next 20 years he established the missions at Guevavi and several vistas, including San Xavier del Bac. After Kino's death, the missions were less active for a few years until more priests were sent to the region. By 1753 the missions were large enough to need a garrison of soldiers to protect them from the Apache, and a presidio was built in Tubac. In 1767, the Jesuits were expelled from New Spain, and the Franciscans later took over the missions. Guevavi was abandoned in 1775, and the two primary missions in the area were San Xavier and Tumacacori. The next year, the garrison left Tubac, and the presidios at Tucson and Quiburi (Santa Cruz de Terrenate) on the San Pedro were built.

The great upsurge in Apache raids in the 18th century had major effects. The Sobaipuri abandoned the San Pedro Valley in 1762, leaving it empty of aboriginal peoples, for the first time in 10,000 years. Piman populations also were greatly affected by Apache raiding and Spanish-introduced diseases. By 1783, the area between Tucson and the Gila was depopulated. Moreover, native populations around Tucson declined drastically during the century, being increasingly replaced by a burgeoning mestizo population.

During the final years of the Spanish Colonial period from 1790-1830, the Spanish soldiers had pacified many of the raiding Apache who settled on the outskirts of Tucson. After Mexico won its independence in 1821, the military control of the Apache waned and raiding resumed. By this time southern Arizona belonged to Mexico, with which the United States went to war in 1846. After the war, the 1849 California gold rush brought many Americans through the region along the Gila Trail, which the United States acquired in 1853 as part of the Gadsden Purchase.

The Americans began settling and mining in the region before the Civil War. The Butterfield Overland Mail Route was also established. But the Civil War forced the military to leave the area, and Apache raiding vigorously continued. The Americans incited the wrath of the Chiricahua Apache leader, Cochise, in 1861. A reservation in the Chiricahua Mountains was established in 1872, but was closed two years later. Mining continued, and the famous mother lode was discovered at Tombstone. Another Chiricahua Apache, Geronimo, continued the final Apache resistance during the 1880s until forced to surrender in 1886. During this time, many forts were established to protect the growing civilian population. Mining and ranching were the primary industries of the region before statehood in 1912, and they have continued to be the primary industries to the present.

TABLE 15

PREHISTORIC PHASE CORRELATIONS IN SOUTHEASTERN ARIZONA

TIME PERIOD A.D.		PAPAGUERIA	TUCSON	GILA BASIN	SAN SIMON
1450	Classic	Sells	Tucson	Civano	(?)
1300			Tanque Verde		
1225				Soho	
1200		Topawa	Late Rincon (Cortaro)		
1150	Sedentary			San-tan	
1100			Early Rincon	Sacaton	Encinas
900		Vamori			
800	Colonial		Rillito	Santa Cruz	
700					Cerros
500			Canada del Oro	Gila Butte	
A.D. 1	Pioneer	(?)	Snaketown	Snaketown	Galiuro
			Sweetwater	Sweetwater	Pinaleño
				Estrella	Dos Cabezas
				Vahki	Penasco
300 B.C. (?)	Pre-Pottery	Amargosa II	San Pedro	San Pedro	San Pedro
		Amargosa I	Chiricahua		Chiricahua
		San Dieguito I & II	Sulphur Spring		Sulphur Spring

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TABLE 16

Historic Timeline

ca. 1534	Alvar Nunez Cabeza de Vaca returns to Sinaloa from northern frontier.
1539	Friar Marcos de Niza searches for the Seven Cities of Cibola.
1540	Francisco Vasquez de Coronado expedition down the San Pedro Valley.
1582	Antonia de Espejo expedition to silver deposits near Prescott.
1599	Juan de Onate explorations.
1691	Eusebio Francisco Kino visits rancherias at San Cayetano de Tumacacori and San Gabriel de Guevavi.
1692	Kino authorized to establish missions in Arizona.
1693	Kino visits San Pedro Valley Sobaipuris.
1696	Mission at Tumacacori founded.
1698	Pima and Sobaipuri skirmish with Apache and Jacome in San Pedro Valley.
1701	Juan de San Martin becomes first resident Jesuit at Guevavi and Francisco Gonzales is assigned to San Xavier del Bac.
1711	Kino dies.
1726	Augustin de Campos visits Tumacacori on his way to the Gila River and names the rancheria at Tubac.
1732	Mission at Guevavi is re-established. Sobaipuri abandoned Lower San Pedro Valley due to Apache attacks and merge with Gila Pima.
1736	Silver discovered at Captain Muxica's mining camp Arizonac.
1751	Church construction at Guevavi. Pima uprising.
1753	Presidio at Tubac established.
1756	Indian attack on San Xavier del Bac.

1757 Sobaipuri in Upper San Pedro Valley reject missionaries.

1759 Indian attack on Sonoita visita.

1760 Don Juan Bautista de Anza (the younger) becomes commander of Tubac.

1762 Sobaipuris from Upper San Pedro begin to settle at missions.

1766 Anza campaigning against Apaches to the east and north.

1767 Jesuit expulsion from New Spain.

1768 Franciscan priest takes over at Guevavi.

1770 Apache attacks at Sonoita and Calabazas; measles epidemic among Gila Pima.

1773 Lower Santa Cruz Valley abandoned due to Apache pressure.

1775 Guevavi is abandoned.

1776 Garrison at Tubac moved to Tucson. Presidio of Santa Cruz de Terrenate built.

1777 New presidio at Tucson.

1780 Santa Cruz de Terrenate abandoned.

1782 Apaches seize Tucson.

1787 Calabazas is abandoned and Tubac re-occupied.

1807 Tumacacori land grant.

1821 Mexico wins independence. Arizona becomes part of the territory of Mexico.

1838 Tubac officially becomes a civilian pueblo rather than a military post.

1846 U.S. war with Mexico. Kearny's troops and Mormon Battalion march across Arizona.

1848 Tumacacori and Tubac abandoned after attack by Apaches. Mexican War ends with Treaty of Guadalupe-Hidalgo.

1849 Gila Trail used in gold rush to California.

1853 Gadsden Purchase.

1856 Tucson occupied by U.S. for first time.

1858 Butterfield Overland Mail begins operations.

1860 Patagonia Mine rejuvenated and becomes the Mowry Mine.

1861 Bascom affair and beginning of Civil War.

1862 Battle of Picacho Pass. Ft. Bowie established.

1863 Territory of Arizona formed.

1864 Territorial capital established at Prescott.

1867 Territorial capital moved to Tucson.

1871 Camp Grant Massacre.

1872 Chiricahua Reservation established.

1874 Cochise dies in Stronghold Canyon.

1876 Chiricahua Reservation closed.

1877 Capital returned to Prescott. Camp Huachuca established.

1878 General Willcox conducts campaign against Warm Springs Apache.

1880 Tombstone newspaper, Epitaph, first published.

1881 Ghost Dance religion among Apache. Gunfight at O.K. Corral.

1882 General Crook returns to subdue Geronimo.

1884 Geronimo returns to San Carlos Reservation.

1885 Legislature creates University of Arizona.

1886 Geronimo surrenders to General Miles at Skeleton Canyon.

1890 Spotted fever epidemic in Gila Valley.

1901 Capital moved to Phoenix.

1909 Geronimo dies in captivity.

1910 Mexican Revolution begins.

1912 President Taft signs statehood proclamation.

CHAPTER 9

CULTURAL RESOURCE SYNTHESIS

This section synthesizes the existing data on the study area's past cultural processes, concentrating on the human use and occupation of the area, the changes in settlement pattern, land use, land tenure, and the changing nature of cultural systems.

The cultural resources of southeast Arizona represent a wide variety of aboriginal and historic period occupations. From archaeological and historical studies in the region we know the primary types of resources present but only a few of these resources have been studied. The uneven coverage of the studies restricts our ability to define specific settlement patterns for those periods that have received little attention. We can, however, point out some of the processional trends in occupation through time.

The Paleo-Indian occupation of southern Arizona is significant because of the number of sites and their importance in documenting the earliest prehistoric cultures in the New World. The sites of this period were occupied during the last great era of climatic and environmental change in the Southwest. The Paleo-Indian big-game hunters took advantage of the now extinct megafauna that lived on the plains-like grasslands common to the region at the time. The Paleo-Indians followed this game and lived in temporary camps. Willcox Playa is an example of a glacial lake that existed during these early years when the region experienced more effective moisture. As we understand more about the changes in the paleo-environment of this area, we can better define the settlement strategies and land use practices.

The changing environment of this time directly affected the people who lived in the region. The general environmental trend was one of dessication as the final glacier retreated northward. Increasing aridity in the region caused changes in the plant and animal life. The groups who occupied the area had to adjust to these gradual changes. Archaeologists have referred to these changes in human adaptation as the development of a desert tradition, which characterizes the Archaic stage throughout the western United States. Because of the more southerly location of the study area, these changes occurred later than they did elsewhere in the

West. The Archaic stage in southern Arizona has been fairly well documented by the Cochise sequence, which exhibits the transition from earlier big-game hunting to the later desert adaptation that exploited a broader range of indigenous food and natural resources. The strategy was to exploit specific resources on a seasonal basis. This lifestyle was a stable one which lasted a very long time.

The most significant change in aboriginal life occurred with the transition from the food-collecting desert tradition to the food producing southwestern tradition. In the study area, the transition is clearest in the shift from Cochise to Mogollon, where archaeological sites show a gradual increase in sedentism and population aggregation. Concomitant with this change is the introduction of ceramic technology and of domestic cultigens from Mesoamerica. Food production required a shift in settlement patterns. Food gatherers occupied sites close to natural food resources, whereas food producers had to locate where soil and water conditions allowed farming. Effectively, these changes meant that the primary focus of settlement shifted to the river valleys. In many areas there was a later expansion into neighboring areas where floodwater and dryland farming were intensified along with a probable increase in reliance on wild food sources.

During Mogollon and Hohokam times, the sedentary life caused a gradual refining of agricultural adaptation to the arid environment of the region. Though Mogollon appears to be a local development, the Hohokam probably moved into the Santa Cruz and lower San Pedro Valleys from the middle Salt region to the north and west. The Hohokam adaptation to the desert included irrigation techniques where they could obtain water. Floodwater agriculture was more common because permanent streams were rare.

The greater efficiency and dependability of food through agriculture allows societies to develop cultural traits that food gatherers cannot because of their need to expend more time and energy on basic subsistance and their need to move from place to place to harvest wild plants. The desert aridity of the western half of the study area, however, limited the cultural elaboration of the Hohokam.

The Salado groups who later occupied the study area brought some cultural traits from the northern Anasazi tradition during the Hohokam Classic period. This period experienced the most elaborate aboriginal developments in agriculture and architecture. The closing century of the Salado occupation was a time of disruption and migration throughout the Southwest. The Salado and others probably experienced a change in their settlement pattern, economy, and social organization.

By the protohistoric period, the Athapaskan Apache groups had immigrated into the eastern half of the study area. This society was nomadic rather than agricultural and conflicted with the Piman groups, much as the Navaho conflicted with the Pueblos to the north. This conflict resulted in drastic changes in Piman settlement pattern and social organization. Apache pressure, however, increased dramatically in the historic period when raiding became an important part of Apache economy.

The Pima were irrigation farmers living in shallow pithouses in a dispersed settlement pattern. The Spanish mission expansion north into the study area in the 17th century changed Pima life, and caused a depopulation from a European disease epidemic, which spread rapidly through aboriginal settlements. The Spaniards populated the fertile Santa Cruz and San Pedro River Valleys and introduced new cultigens which had significant long-term effects on Piman subsistance and the environment. The short-term changes on the environment, however, were gradual because the Spanish-Mexican population never grew large enough to drastically affect the environment. By the end of the Spanish period the Pimans were clustered around the missions of the Santa Cruz Valley and the Gila Pima area. Under Mexican control the Pima remained at the Missions while the Apache were forced into presidio ghettos.

With the arrival of the Americans, the Apache were moved to reservations. This completely changed Apache land use patterns and social organization.

Even though the Spaniards began the processes that were to radically change the natural environmental balance of the region, not until the Americans moved in were these changes dramatic. The American invasion brought a much larger population and more productive food production technologies. Early settlers moved into the river valleys and rich mining areas. The large number of cattle, greater use of irrigation, high population densities, and tree harvesting by the Americans have drastically degraded the environment.

Many ranches, mines and towns were started in the 1870's and farming moved into the area. The people became more homogeneous after statehood (1912), and regional variation decreased. Although prehistoric times experienced a gradual, natural dessication, the European-American occupants have induced the region's dessication at a rate exceeding any natural process--a process continuing today as population densities have increased the demand for water and other natural resources. In the late historic period, Americans have used up most of the natural water sources, greatly changed the surface vegetation in many areas, and extracted large amounts of the region's minerals. Better planning and management of the land use patterns in the future may prevent an era of depopulation due to environmental degradation and a lack of water.

CHAPTER 10

SUGGESTED MANAGEMENT OPTIONS

AND RESEARCH DIRECTIONS

The management of cultural resources by government agencies requires a management scheme as well as information about the resources and their context in the human history of the region. This chapter considers both these facets. The first section of this chapter describes management options open to managers and provides our management recommendations. The second section recommends research directions that identify the primary information categories needed by managers to make appropriate decisions about cultural resources.

SUGGESTED MANAGEMENT OPTIONS

Cultural resource management requires both a system of management and a method of making decisions about the managing of resources. The U.S. Forest Service and Bureau of Land Management have a specific set of management options to use in managing the resources under their jurisdiction. These options include a variety of protection measures, as well as a number of use allocations that specify how the resources can benefit the public.

The selection of the options requires a decision-making process. Many factors should be considered in making resource decisions, including the degree of need that a resource may exhibit due to internal or external conditions, feasibility, and expense. Moreover, since the conditions of the resources and other factors may change, new determinations or decisions may have to be made. The management of resources is an ongoing process that needs continual revision. Whenever possible, decisions should be made on an individual resource basis because of the new and changing conditions that affect each individual resource. Current information about the condition of each resource is needed before decisions are made.

When site-specific decisions cannot be made, decisions may be made for groups of resources. The groups should be defined by the nature of the need for the action and whether the affected resources are diverse or limited. Ultimately the managers will have to carefully consider each situation where decisions are needed. The recommended research directions discussed later in this chapter provide an initial information base for this process.

RESOURCE USE ALLOCATION

BLM has established the following use allocation categories for each cultural resource. The intent is to allocate each site or group of similar sites to one or more use categories. These categories define the context of the resources from which management decisions and recommendations can be made and should be viewed neither as mutually exclusive nor final. They serve mainly as guides to further consideration and direct attention to possible needs.

Socio Cultural Use - Socio-cultural use refers to the use of an object (including flora and fauna), structure, or place based on a social or cultural group's perception of the object's utility in maintaining the group's heritage or existence.

Current Scientific Use - Current scientific use refers to resources where a study or project is in progress at the time of evaluation. On these sites, scientists or historians use a cultural resource as a source of information that will further the understanding of human behavior.

Management Use - Management use refers to the use of a cultural resource by management agencies to obtain specific information needed to allocate cultural resources or to develop preservation measures. Such use includes identifying rates and processes of deterioration acting on cultural resources, studying the effectiveness of specific cultural resource protection measures, and the maintaining of stratigraphic profiles that serve as references for correlation of cultural sequences in a given area.

Conservation for Future Use - Conservation for future use refers to the management of cultural resources by segregating them from other forms of appropriation until specific conditions are met in the future. Such conditions can include developing new research techniques or exhausting all other resources similar to those represented in the protected sample. The category is intended to provide long-term, in-place preservation and protection of select cultural resources.

Potential Scientific Use - Potential scientific use refers to the potential use of a cultural resource, using existing research techniques, as a source of information to contribute to our understanding of human behavior.

RESOURCE PROTECTION OPTIONS

Because of the fragility and limited number of cultural remains, these resources need protection. Both human and natural agents damage cultural resources. Government agencies have several options to assist them in protecting these resources. Decisions about the most appropriate options are based on the nature of the resource, its use allocation, and its present or potential need for protection. The following are options for cultural resource management.

Physical Protection Options

1. Fencing, gating, building barriers to prevent access;
2. Posting or signing;
3. Surveillance or patrols;
4. Erosion control;
5. Fire control;
6. Stabilization of deterioration.

Options 1-3 offer protection mainly from human activity. Vandals, collectors, and curious citizens can all damage, destroy, or remove resources. The choice of options should depend on the location and access to the resource as well as the intensity of the destructive activity. Options 4-6 are designed to prevent destruction primarily from natural sources, although they would also provide protection from human visitation. The most appropriate option depends on the natural agents involved, the rate of deterioration, and the surrounding environmental context. Each option should be considered for its feasibility, costs, and desired results.

Administrative Protective Options

1. Public information/education;
2. Nomination to registers;
3. Land exchange, acquisition, or disposal;
4. Easements, withdrawals, or closure;
5. Clearances (inventories to identify sites to be affected by land uses and the evaluation and decisions on resource significance and potential impacts).

The Bureau of Land Management initiated a Cultural Resource Public Awareness Program in 1980 as a comprehensive plan to educate and inform the public about cultural resources. This program is an excellent means of reducing vandalism of cultural remains by prevention rather than

cure. With support from the U.S. Forest Service and other federal and state agencies, this program is a long-term effort and should be helpful, even though its effectiveness may not be immediate.

Nomination to the National Register of Historic Places is also a long-term program. Cultural resources discovered during surveys and those that are already well known are more likely to receive special protection once their significance is formally recognized.

Protection Through Data Recovery

Protection through data recovery assures a partial recovery of scientific values in the following cases:

1. The site has the potential to yield information on human history or prehistory;
2. Little or no information is known about the site;
3. More data is needed for a variety of reasons, even though some information is known;
4. The resource is endangered by physical or human activity, and less destructive measures are ineffective or otherwise inappropriate;
5. A resource is rare or unique among existing resources; or
6. Special studies are being conducted that need data from one or more resources.

The techniques for gathering such data include detailed recording, test or emergency excavations, relocations, and special studies. Each of these techniques requires competent data collection, proper reporting, and adequate curation of the data after it is collected.

MANAGEMENT RECOMMENDATIONS

1. Continue Cultural Resource Public Awareness Program;
2. Continue to evaluate resources for significance and eligibility for nomination to the to National Register of Historic Places;
3. Continue to base resource recommendations and decisions on use allocations and the need for protection. Factors used in evaluation should be as specific as possible;
4. Implement the appropriate protection options as needed; and
5. Use research recommendations in the following section to guide continued development of cultural resource programs.

RECOMMENDED RESEARCH DIRECTIONS

The following recommendations summarize the important data needs that became apparent after our synthesis of the culture history of the study area and the current research orientations, and after our compilation of information on the known sites. This section is divided into four parts. The first evaluates the status of the site inventory; the second section provides approaches to making it complete. The third part identifies research priorities; and the fourth section offers research recommendations. These suggestions provide substantive guidance for future inventory projects and special studies.

INVENTORY PROBLEMS AND DATA NEEDS

The resource inventory presented in this report reflects the generally cursory and unsystematic nature of past archaeological investigations in the study area. This data has been collected over a period of almost 90 years by a wide range of investigators, each with his own goals and methodologies. The current inventory cannot be regarded as complete. The general patterns discussed in this report need further expansion and archaeological testing.

Present information reveals that site density in the study area is high, but varies greatly. In part, this variability is a function of previous archaeological research, which has largely been concentrated along the major rivers. Along such rivers as the Gila, San Pedro, and Santa Cruz, site densities are high. Unfortunately, in most of these areas some of these sites have not been recorded, and many have been lost to vandalism, agricultural development, and urban expansion. Many areas outside the major valleys are virtually unknown.

Because of the disparity between our current knowledge of site density and site location and what is needed for effective resource management, the alternative strategies are discussed here.

The Bureau of Land Management has designed and uses a three-class system of conducting cultural resource inventories. Each of the classes specifies the general level of intensity and limitations for an inventory. The classification scheme recommends no particular area for an inventory. Rather, areal limits for any given inventory are determined by the present need. The scope and intensity of the inventory depends on a balance between project need, the timetable, and funds to carry out the study. The primary goal of each class of inventory is as follows:

Class I - an overview of the presently known cultural history using the literature and site records only.

Class II - a probabilistic (random or stratified) sample survey to discover new sites, update current knowledge, and make predictions on the nature and distribution of cultural resources within the study area. This strategy may be modified to include an additional judgemental or purposive survey as well.

Class III - an intensive discovery survey designed to locate all cultural resources within the study area and update current knowledge.

Although the overall goal of a cultural resource manager may be Class III level knowledge of the lands he/she manages, such knowledge is rarely possible. Pragmatically, managers must work with Class I and Class II level information on small areas within their region. Purposive inventories, such as the one recommended later in this chapter for locating small archaic sites, should be considered. In general, the greater the threat of adverse impact from development, the higher the level of information needed to make reasonable decisions concerning the allocation and management of the resources.

INVENTORY RECOMMENDATIONS

The purpose of this Class I study is to provide information for a large study area so that future studies and management can benefit from a broad assessment of the current knowledge of the resources. The following recommendations are designed to meet that need. Future inventories should integrate these recommendations into research designs that reflect the current research orientations (see Chapter 4) and priorities (discussed later in this chapter).

Inventory Recommendation No. 1 - Resource Discovery

The discovery of cultural resource sites seems simple enough, yet problems can impinge on discovery methods. All inventory studies should follow a systematic and well-reasoned research design to ensure comprehensive coverage and an analytically acceptable interpretation. Our review of the study area has revealed two situations that can bias the results of an inventory. Both represent a bias in observation or recordation that allows certain resources to be overlooked. In one situation sites containing few or sparsely scattered artifacts or small sites without (and sometimes with) diagnostic artifacts are not recorded. This bias often occurs when investigators either assume that the sites are not important or have not planned to collect that kind of data. The other bias occurs when a resource is deeply buried under alluvium. Many earlier sites probably have not been discovered in river valleys because they lie under an overburden of soil. Both of these situations have skewed the present data base.

The solution lies in planning. Inventory surveyors should expect to find small sites and sparse artifact scatters and have a plan to use them in analysis. Even if these sites cannot be interpreted with confidence, their location and character can be recorded easily and quickly if it is planned. In the Southwest, historic sites and rock art have previously suffered from prejudice because the researcher was not interested in them. This bias must be compensated for in the future. To help remedy this, predictive modeling and systematic core testing should be used to attempt discovery. Special studies could be used to develop and test systematic coring methods for the study area.

Inventory Recommendation No. 2 - Resource Classification

One of the basic steps in identifying and evaluating cultural resources is description and classification. Traditionally, the resources have been identified by a variable system using descriptions that show the presence of certain physical remains or inferred site functions. In Appendix 2 we provide a tally of the site type description used on the site records. (Summarized in Table 2, Chapter 1). This tally follows the system of site type choices used in the Arizona State Museum's SELGEM AZSITE data bank. (This system has recently been replaced with the PRIME AZSITE system in which the site type categories have been slightly modified). While these site descriptions generally indicate what a resource is, it is internally inconsistent and analytically undesirable. A research design depends on consistent and unambiguous classifications. Resource typologies are extremely important in increasing our knowledge of the resource base.

An important result of the current research orientations has been the increasing recognition of small sites and sparse artifact scatters that were previously not reported or observed. These cultural resources have been called variously subsites, nonsites, and isolated finds. Our interest in and need to understand the full range of material remains requires recognition and full treatment of these features--they reveal past human behavior. Just because we do not yet understand their function does not mean that we should disregard them. They may not be found to be significant, but until we understand their function, they provide an important source of data.

We cannot recommend one comprehensive system of site classification. Investigators must continue to design appropriate site classification schemes to increase our knowledge of the entire resource base and the cultural history it represents. Future inventories should have definite research designs with appropriate and well-defined site classification schemes.

Inventory Recommendation No. 3 - Resource Conditions

In addition to identifying the resource base, managers have a contiguous need to know the condition of the resources. Because the sites are continually being affected by natural processes and human actions, their condition is always relative to the intensity, duration and periodicity

of those factors acting upon them. Traditionally, site forms have defined site condition on a three to five point ordinal scale from excellent to destroyed. Though this classification gives the manager some information, it is insufficient.

Information on site condition and agents of deterioration were collected from some of the site records during our research. This data was included in a site summary table prepared for the study. This information is summarized in the following tables.

TABLE 17
Site Condition

	Number of Sites	Percent
Excellent	31	3
Good	222	18
Fair/Poor	285	23
Destroyed	19	2
Partially or completely excavated/ collected	79	6
No data	593	48
Total	1,229	100

TABLE 18
Agents of Deterioration

	Number of Occurrances*	Percent
Vandalism	122	8
Development	167	11
Deposition	61	4
Erosion	292	219
Animal Disturbance	128	9
Scientific Excavation	56	4
Other	42	3
No Data	637	42
Total	1,505	100

*Numbers are higher than the number of sites involved, for multiple impacts occur at many of the sites.

The tables indicate that at the time of the recording, only 21 percent of the sites in the sample were in excellent or good condition. If the sample had consisted only of habitation sites (prehistoric, protohistoric and historic), the figures would be even more discouraging. The tables also show that the most common causes of impact in the sample are erosion, development, animal disturbances and vandalism. The data also shows that information on site condition and sources of deterioration was not recorded for almost one-half the sites.

Site conditions need to be evaluated regularly and consistently. Specific information about each site is needed. If natural or human activities are affecting certain areas where several sites may be located, then specific information about the area is needed. This information should be collected during inventories and special visits to sites.

The data needed to evaluate resource condition includes

1. Extent of site remaining;
2. Areas where site has been disturbed;
3. Agents of deterioration;
4. Rate of deterioration for each agent; and
5. Observed or expected adverse impacts.

These data can then be used to recommend protective measures to decrease or stop deterioration. The poor existing data on the current site records makes it very difficult to make meaningful statements about the condition of the diverse resources within the study area. We recommend one or more special studies to examine this important problem. These studies should include investigations of the following:

1. A precise and usable system of recording site condition;
2. The identification of agents of deterioration;
3. Means of preventing natural processes that cause site degradation; and,
4. Effective measures for preventing human disturbance and vandalism.

BLM and the U.S. Forest Service have conducted a number of special studies to determine how specific agents of deterioration affect specific types of artifactual remains and cultural features. In most of the known studies, artifacts were either created (stone tools) or purchased (flower pots; bolt washers) by those conducting the experiment. These "artifacts" were then placed on the ground surface or buried. Their locations were mapped before and after the impacts occurred. In this way the amount of artifact movement and breakage could be measured (DeBloois et al n.d.; Gallagher 1977; Roney 1977; Wood 1979).

BLM and some regions of the Forest Service can allocate sites to Management Use (as opposed to making sites) and conduct impact studies on the sites. Both types of study should be continued and other types should be developed.

RESEARCH PRIORITIES

As we have shown in previous discussions, archaeological research in the Southwest has taken significant new directions. Because archaeological and historical research are a continual process, they will take more new directions in the future. The overall trend of research is to accomplish a better understanding of culture history and human behavior. During this process some concepts and analytical procedures lose their utility and other more useful ones are added. The flux of the process causes a certain amount of uncertainty and imprecision when viewed at any particular time. Using the previously discussed information on present research orientations, research designs, and present data gaps (see Chapter 4), we have identified three research priorities that we believe should be addressed by future researchers.

Research Priority No. 1 - Definition of Cultural Units

Defining cultural units is the most important priority because definition is the basis for all later analysis and interpretation. Historically, cultural units have been variously defined as ethnographic cultural areas, archaeological phases, artifact traditions, and ceramic types. In recent times there has been some confusion between pan-human behavioral systems and culture-bearing societies. But particular prehistoric and historic groups existed during limited time ranges and were organized in specific ways. The purpose of culture history studies is to chronicle the evolution of those groups through time, which requires precise and unambiguous definitions of cultural units.

The culture history of Arizona currently contains a mixture of cultural unit designations that often make analysis and comparability extremely difficult. Researchers use different definitions and therefore reach different interpretations. The problems of cultural unit definition is directly related to the research design as discussed above. A complete research design will clearly define the cultural unit of study, the classification of data (attributes of artifacts and sites), and the classification of data contexts (strata) in relation to the research problem. The most pressing concern in southwestern archaeology today is the need to clarify the conceptual base and the cultural unit definitions currently in use.

This need is exemplified by the lack of agreement among researchers on some of the central issues in cultural history. Chronology has been pointed to as the weakest and, ultimately, the most limiting factor in culture historical interpretation. This fallacy is functionally similar to the argument that more data always is the answer to interpretive problems. In fact, these arguments obscure the problem rather than offer a solution. Although chronological control and more data are always needed, the solution to many of the polemic issues is clarity in analytical definition and argumentation.

For example, there has been much debate over ethnographic continuity between the prehistoric Hohokam and the historic Piman groups in the western part of the study area. The differences between prehistoric remains and historic descriptions were seen as differences in cultures or societies. Grady (1976) has shown how a change in interpretive posture can explain this problem, which was perceived in the first place because of ambiguous, unrecognized assumptions about the relationship between cultures and their material remains. Here an objective approach clarifies problems that arise when a subjective approach is used to solve culture historical problems. Historic as well as prehistoric information must be used consistently. If not, such problems will always arise. Two approaches are recommended to help guide consistency in cultural unit definition. These approaches will be considered as the other two research priorities.

Research Priority No. 2 - Subsistence and Economic Classification

The ecological orientation of current research provides a practical and realistic guide to developing precise cultural unit definitions and can be applied to many of the current research directions. Archaeological and historical interpretations of cultural resources aim primarily at reconstructing past human social behavior. The ecological approach stresses the interaction between people and their natural and social environments.

Current researchers have concentrated on subsistence studies because the understanding of subsistence leads us to direct information about the human economic and technological systems that interact with the physical environment. Because the physical environment is assumed to limit human adaptation in certain ways, environmental zones can be used to group subsistence and economic systems. This assumption was used in developing some of the prevalent cultural unit designations in use in the Southwest. Mogollon, for example, is seen as adaptation of the general southwest sedentary culture to its mountainous zones (Martin 1979). Hohokam is less well-defined because its designation usually excludes the adjacent lower desert regions to the south and west (Gummerman and Haury 1979).

The regional approach suggested by Grady (1976) probably better defines the areal extent of cultural systems adaptation to the Sonoran region. Each of these approaches should, however, be considered as the broadest ecological classification.

Of more importance to certain kinds of research is a classification based on smaller scale adaptations. In the Sonoran region, the use and dependence upon either canal or flood water irrigation can be viewed as refinements within the general adaptive framework. In the Mogollon area, specialized adaptation to certain valleys can provide a small scale focus.

The primary purpose of classification by subsistence and economic systems is to provide a pragmatic and heuristic method of defining cultural units for study. Such a method requires analysis and interpretation based on the recognition and discovery of appropriate data classes (attributed to the artifacts, sites, and their contexts). Under such a method, however, some previously used analytical concepts will not be appropriate because they were designed for different purposes. Because this method shows how the cultural remains resulted from a social system, the ultimate goal of research is to discern the structure, organization, and dynamics of the system, rather than to create a simple space-time matrix of normative artifact types.

Research Priority No. 3 - Social and Cultural Dynamics

This final priority depends upon the execution of the two previous priorities. Once cultural units have been defined and classified by their subsistence and economic systems, the dynamics of the social and cultural systems can be viewed from a diachronoic perspective. In effect, this procedure will allow for the construction of a culture historical framework where changes in social systems are both understood and formally stated. This is the eventual goal of culture historical studies.

Certain elements of social organization are revealed by subsistence practices: the organization and scheduling of labor, production and task groups, and degrees of specialization or diversification. In most non-urban societies, families and groups of families cooperate as the basic productive units. Higher levels of social organization generally develop political systems to integrate social cooperation. To effectively study social organization and change, researchers must concentrate on and understand the lowest level of organization and then move to a higher level. This principle is important because inaccurate interpretations can result from analyses that confuse information from different levels.

At any given time social boundaries separate groups from one another. These boundaries serve various functions and change through time. The social boundaries operating between the various southwestern and Mexican societies at various times have been a subject of great interest. The questions about inter-group relationships, population expansion/contraction, and external trade and influence all figure prominently in the polemical literature but remain largely unsolved because of a lack of understanding of the basic social units and their changes through time. This situation results in intensive disagreements where one speculation (an inadequately supported explanation) is defended against another one. Where adequate support does not exist, emotional justification replaces reasoning. We can, however, still deal with controversial issues until we have all the data.

Social and political organization can be studied if the appropriate data is collected and interpretations are sound. But our analysis can use only the data that unambiguously relates to social organization. And in many cases the appropriate data for this purpose has not yet been determined. Until the nature of this data is determined by special studies

or by gifted insight, the most pragmatic approach is to concentrate efforts on the primary problems of defining useful cultural units of study and the classification of subsistence and economic systems.

RESEARCH RECOMMENDATIONS

Our overall research recommendation is that future research be conducted within the context of the current research priorities discussed above. Many of the issues in the region's culture history are highly controversial because of inadequately supported explanations (speculations), confusion in the necessarily hierarchial interpretation of social behavior through time (the structure and evolution of systems), and a lack of data due to chance of bias. The following recommendations are presented to help overcome some of these problems by isolating particular data needs. It is assumed that chronological control and cultural/social unit definition are prerequisites for each recommendation because both are fundamental to valid interpretations.

Research Recommendation No. 1 - Environmental Studies

The various hypotheses and explanations based on a lack of environmental data have been some of the most controversial of all issues in the prehistory of the Southwest. Although we can probably assume that the environment has changed little from historic time to the present, for four periods in early prehistory, new environmental data is crucial to help explain changes in regional evolution.

1. The earliest period of human occupation is unknown. Geological and faunal studies are needed for the period before and during the Clovis occupation to allow us to examine the relationship between early hunters and their environment. These studies should clarify the context of the human entrada into the study area.

2. During the Archaic occupation changes in the environment may have affected human adaptation and population. This period is long, and thus far archaeologists have only been able to make general, developmental statements. If environmental changes occurred, then systems would have responded, and these statements could help explain changes in cultural remains.

3. The introduction of sedentary societies (Hohokam, Mogollon) in the study area was a significant cultural difference from previous periods. Plant and animal (wild and domestic) data are needed from within and outside the study area to help interpret whether this development was indigenous or an expansion from the south.

4. Disagreement exists about the degree of aridity in the study area and human change of natural processes throughout the latter prehistoric periods, through the protohistoric, and into modern times. Special studies of dessication trends and population pressure could help clarify the unidirectional and mutual effects of human occupation in arid environments.

Research Recommendation No. 2 - Settlement Distributions

The study of settlement distributions is the most basic primary concern in cultural history. The goal is to define functional social units (both domestic and political) as well as to understand changes and interactions through time. Previous archaeological classification systems attempted to accomplish this goal by defining phases, traditions, and cultures (Willey and Phillips 1958). But these concepts assumed that the artifact types were identical to social groups. Current orientations emphasize the importance of discovering subsistence systems that are primarily cognitive and rational. We recommend the following suggestions for research that direct attention to the social systems rather than their material representations.

1. The locations and extent of the earliest occupants of the study area (Paleo-Indians and Archaic) need to be discovered and identified (e.g. Naco area and caves). This chapter of cultural history is so weak that we can now only use data from other regions plus the few investigations that have been conducted in the study area. Special studies should be conducted to both discover and interpret early sites.

2. The lack of information about the early societies and the lack of stratified sites hampered our understanding of the transition from hunting and gathering cultures to agricultural, sedentary populations. The sites should be sought using Inventory Recommendation No. 1 (Resource Discovery) and analyzed according to an appropriate research design.

3. Social units within the Hohokam and Mogollon regions should be defined by subsistence and economic systems adapted to specific ecological context in order to understand human relationships with the environment of the study area.

4. Social and cultural systems should be analyzed through time according to long-term changes in the human/environmental relationships. The evolution of development in both Hohokam and Mogollon reflect the periodicity of adaptations. Both short-term changes in balance and long-term trends must be viewed in their proper chronological contexts. Understanding these phenomena requires both creative research designs and better chronological control over material remains.

Research Recommendation No. 3 - Social Change and Interaction

Social change and interaction theories have been controversial because the evidence and argumentation supporting these have been weak. This weakness is due to two factors: the lack of well-defined social units and the mix of material culture types in assemblages of artifacts from sites. These problems can only be overcome through a change in the analytical perspective of researchers.

1. Researchers must realize that social and cultural change data are attributes of artifacts and sites rather than composite types. These attributes are directly related to certain social behaviors. Researchers should creatively search for those attributes and their social causes.

2. Social boundaries should be defined from subsistence and economic systems rather than from phase designations. Once the boundaries are specified, we can examine interaction between boundaries.

3. Both local and regional interaction spheres should be recognized. Each of these levels must be studied, both according to internal structure and evolution as well as interaction with external groups.

4. Once the micro- and macro-social changes have been identified, culture history can be summarized in a more satisfactory manner. Until then, the data gaps are many due to both a lack of information and our methods of understanding the data we have.

APPENDIX 1

PREVIOUS INVESTIGATIONS IN THE SOUTHEAST ARIZONA STUDY AREA
(Adapted and Expanded from Westfall 1979 and Simpson and Westfall 1978)

Date of Fieldwork	Personnel/ Institution	Project and Purpose of Investigation	Reference
1540	F. Coronado Empire of Spain	Conquest and missionization, description of Chichilticalli	Hammond and Rey 1940
1540	F. Castaneda	Conquest and missionization, description of Chichilticalli.	Hammond and Rey 1940
1775	Father Pedro Font	Mentions ruins near Picacho Peak.	Hackenberg 1964
1845	W.H. Emory U.S. Army	Middle Gila, including Pueblo Viejo area and Buena Vista	Emory 1848
1852	J.R. Bartlett U.S. Army	Description of ruin near western source of San Pedro	Bartlett 1854
1879	R.T. Burr, U.S. Army	Report of ruins in Chiricahua Mountains.	Sauer and Brand 1930
1880-85	A.F. Bandelier	Description of ruins in Tucson Basin, San Pedro River, Middle Gila	Bandelier 1892
1897	W.S. Devol	Description of ruins in Bonita Creek and Midnight Canyon.	Devol 1897
1897	J.W. Fewkes W. Hough	Brief reconnaissance in Pueblo Viejo.	Fewkes 1904 Hough 1907
1898	W.J. McGee Bureau of American Ethnology	Description of ruins in Tucson Basin	McGee 1898
1900	F. Russell	Collected artifacts in Pueblo Viejo area.	Sauer and Brand 1930 Russell 1908
Early 1900s	Ellsworth Huntington Carnegie Desert Lab.	Descriptions of ruins in the Tucson Basin.	Huntington 1914
Early 1900s	O Meinzer	Description of sites around Willcox Playa and in Sulphur Springs Valley.	Meinzer and Kelton 1913
1912	C. Lumholtz	Description of Black Mountain site, Tucson Basin.	Lumholtz 1912

1920-21	A.E. Douglass H.B. Leonard	Description of ruins between Bear and Sabino Canyon (map).	Douglass and Leonard 1920-21
1920-30	B. Cummings Univ. of AZ	Excavation at St. Mary's Hospital site.	Jacobs 1979
1926	B. Cummings Univ. of AZ	Description of artifacts lying below mammoth in alluvial deposits at Double Adobe.	Cummings 1927 Sayles and Antevs 1941
1927	E.J. Hands	Excavation of Tanque Verde ruin (BB:14:1).	Fraps 1935
1929	B. Cummings Univ. of AZ	Excavation (excavated or only examined) of ruins at base of Martinez Hill (BB:13:3).	
1929	C. Sauer D. Brand Univ. of CA	Survey of ruins in Middle Gila, Santa Cruz, San Pedro, and Sulphur Springs Valley.	Sauer and Brand 1930
1929	C. Trischka	Excavations in Middle Gila.	Trischka 1933
Late 1920s	B. Cummings Univ. of AZ	Excavations at Blackstone ruin.	Tanner 1936
1930	Norman Gabel Univ. of AZ	Excavation of Martinez ruin (BB:13:3) and partial restoration of ruin.	Gabel 1931
Early 1930s	L. Caywood	Survey and excavation in Sulphur Springs Valley.	Caywood 1933
1931	O. Tatman	Excavations at Buena Vista.	Tatman 1931 Brown 1973 Doelle 1975a
1932	F. Hawley	Excavations at Bead Mountain Pueblos.	Hawley 1932
1932	B. Cummings Univ. of AZ	Excavations at Mammoth ruin 2 on San Pedro River.	Teague 1974
1930-33	B. Cummings Univ. of AZ	Excavations at University Indian Ruin (BB:9:33).	Hayden 1957
1934	B. Cummings Univ. of AZ	Excavations at McEuen Cave and a surface village in Gila Mountains northwest of Safford.	ASM Archive Files
1934-38	W.S. Fulton Amerind	Excavation of sites in Texas Canyon.	Fulton 1934 a, b, 1938

1936-37	C. Miller, I. Kelly, James Officer Gila Pueblo, Univ. of AZ	Excavations at the Hodges site (AA:12:18); analysis of materials by Officer, but final report not completed until 1978.	Kelly 1978
1937	W. Duffen Univ. of AZ	Excavations near Bonita.	Duffen 1937
1937-39	Frank Mitalsky (Midvale) ASM	Reconnaissance survey of Tucson Basin.	ASM Site Survey Files
1938	W.S. Fulton C. Tuthill Amerind	Excavation of sites near Gleeson.	Fulton and Tuthill 1940
1939	Scantling ASM	Excavations at Jackrabbit ruin, Papago Indian Reservation. Defined Sells phase occupation of Papagueria (west of study area).	Scantling 1939
1939-40	Withers ASM	Excavations at Valshni Village, Papago Indian Reservation. Defined pre-Sells phase Vamori and Topawa occupation phases of Papagueria (west of study area).	Withers 1944, 1973
Late 1930s	E.W. Haury Univ. of AZ	Trenching at the Freeman site (BB:14:3).	
Late 1930s	E.W. Haury Univ. of AZ	Survey of Empire Valley, east of Tucson.	Swanson 1951
Late 1930s	E.B. Sayles Gila Pueblo	Survey and excavation of Cochise sites in San Simon, Sulphur Springs, and San Pedro Valleys.	Sayles and Antevs 1941
Late 1930s	E.B. Sayles Gila Pueblo	Excavation of San Simon Mogollon sites in San Simon Valley.	Sayles 1945
1939	Goodwin	Recorded 15 rockshelter sites in Aravaipa Canyon.	Gilamn and Richards 1975
Early 1940s	W. Fulton Amerind	Excavations at Double F and Westfall sites.	Fenner 1977 DiPeso 1981
1940	C. Tuthill Amerind	Excavation of Tres Alamos site.	C. Tuthill 1947
1940-49	Mills and Mills (amateurs)	Nine Mile ruin excavations. Salado-type compound south of Bowie, Arizona.	Unpublished MS on file at Amerind Foundation, Inc., Dragoon

1941	Danson Univ. of AZ	Survey of Upper Santa Cruz River from headwaters to Tubac, AZ.	Danson 1946
1941	A. Withers Amerind	Excavation of cave in Winchester Mountains.	Fulton 1941
1941-42	Haury and others ASM	Excavations at Ventana Cave, Papago Indian Reservation. Stratified deposits show evidence for occupation from Clovis times to historic Papago.	Haury 1950
1942	A. Carpenter	Discovery of possible Salado Burial (BB:7:5) by private citizen.	Carpenter 1977
1947	Danson and Woodbury Peabody Museum	Upper Gila Expedition. Several Mogollon sites recorded in Gila River Valley. Subject for Ph.D. thesis.	Danson 1957
1947	Wendorf SMU	Reported sites in the Black Hills Planning Unit of BLM Safford District.	Teague 1974
1948-49	C. DiPeso Amerind	Excavation of ball court at BB:15:3.	DiPeso 1951b
1948-49	C. DiPeso	Excavation of Babocomari Village.	DiPeso 1948, 1951a
1949	R. Romo	Discovery of cache of copper bells, stone and turquoise beads in west Santa Catalina Mountains north of Romero Canyon.	Haury and Gifford 1959
Late 1940s	E. Swanson Univ. of AZ	Survey of Empire Valley.	Swanson 1951
1948	B. Wright R. Gerald Univ. of AZ	Partial excavation of the Zanardelli site.	Wright and Gerald 1950
Early 1950s	Smiley, Wasley, and Olson ASM	Excavations at San Augustin Mission (BB:13:6). Testing at Old Presidio; discovery of prehistoric Hohokam pithouse beneath presidio walls.	Smiley et al. 1953 Wasley 1956 Wasley (editor) 1956a, b Wasley n.d.
1950s	Sayles and others Gila Pueblo	Revisited sites in the San Simon and Sulphur Springs Valley. Recorded a few new sites. Purpose was to update the Cochise culture sequence.	Sayles et al 1958

1950-51	C. DiPeso Amerind	Excavations at Quiburi near Benson.	DiPeso 1953a
1951	M. and F. Navarrete private citizens	Discovery of Naco mammoth site; excavated 1952 under direction of E. Haury.	Haury 1953
1953	C. DiPeso Amerind	Excavations at Paloparado (San Cayetano Del Tumacacori), Ramanote Cave.	DiPeso 1956
1953	C. DiPeso Amerind	Report of finds of Clovis points in southeast AZ.	DiPeso 1953b
1953-55	E. Hill	Reported prehistoric villages on San Pedro River near Aravaipa Creek.	Teague 1974
1953-66	E. Haury Univ. of AZ	Seminar field trips throughout the Safford District. Reconnaissance surveys.	Quinn and Roney 1973 Teague 1974
1955	McConville and Holzkamper ASM	Survey of gas pipeline ROW for Southern Pacific Railroad recorded a number of sites in Tucson Basin.	McConville and Holzkamper 1955
1956	C. DiPeso Amerind	Excavations at Reeve ruin, Bidegain site, Davis site.	DiPeso 1958a, b
1956	B. Fontana ASM	Partial excavation of the Joe Ben site (BB:13:11).	Fontana 1956
1957	S. Claridge private citizen	Discovery of W:14:1, cave site on Bonita Creek.	Wasley 1962
1957	G. Hopper and Mrs. G. Trowbridge	Shell caches in Tucson Basin.	Stanislawski 1961
1958	F. Eddy Univ. of AZ	Survey of Cienega Creek Basin and excavation of DD:2:30.	Eddy 1958
1958	Robinson and others ASM	Excavations begun at historic San Xavier del Bac Mission (AA:16:10)	Robinson 1963
1958	M.J. Rogers San Diego Museum	Survey of Pantano-Rillito drainages; first investigation concerned with pre-Hohokam occupation of Tucson Basin.	Rogers 1958
1958	D. Tuohy ASM	Survey of upper Gila River between Safford and Florence	ASM files Doelle 1975a Tuohy 1960a Vivian 1970a

1959	Fontana and others ASM	Reported existence of trincheras features at southern end of San Xavier Reservation; also reported petroglyphs and circular stone enclosures.	Fontana et al. 1959
Late 1950s	Wasley and Tuohy	Recorded 12 sites on Gila River near Winkelman and on lower San Pedro River.	Teague 1974
Early 1960s	J. and V. Mills private citizens	Excavation of Glass Ranch site	Mills and Mills 1966
1960	Johnson ASM	Excavation of historic structures at Fort Lowell (BB:9:40)	Johnson 1960
1962	A. Johnson R. Thompson Univ. of AZ	Excavation of Ringo site.	Johnson and Thompson 1963a, b
1963	W. Wasley G. Vivian	Checked some of sites recorded by Tuohy in 1958 in upper and middle Gila. Collected ceramics of the Buena Vista site.	Vivian 1970a
1964	G. Cattanach ASM	Excavation of Cochise site near Fairbank.	Cattanach 1966
1964	J.N. Young Univ. of AZ	Excavation at Garden Canyon site on Fort Huachuca Army Base, Sierra Vista.	Young 1972b
1964-66	J.L. Zahniser Univ. of AZ	Survey of the Rincon Valley and Saguaro National Monument (1970) excavation of BB:14:24, near Tanque Verde ruin. Focus of work on late Hohokam occupation of Tucson Basin.	Zahniser 1965a, b, c 1966, 1970
1965	J. Brown P. Grebinger ASM	Highway Salvage excavation at Paloparado.	Brown and Grebinger 1969
1965	Cheryl White Univ. of AZ	Description of the rock art at Saguaro National Monument.	White 1965
1965-66	Sciscenti and Greenleaf ASM	Excavations at the historic Punta de Agua Ranch and four nearby prehistoric sites, San Xavier Indian Reservation.	Greenleaf 1975
1966	E. Hemmings C.V. Haynes	Excavation of Escapule mammoth EE:8:28.	Hemmings and Haynes 1969

1966-67	L. Agenbroad	Survey for dissertation research.	Agenbroad 1967a
1966-70	N. Whalen Univ. of AZ	Survey of Cochise sites on the west side of San Pedro River Valley.	Whalen 1971
1966-71	Bradley and Grebinger AZ Archaeological and Historical Society	Partial excavation of Whiptail ruin (BB:10:3). Work continued in 1968-70 by AAHS; 1971 by PCC. Fifty houses excavated, 50 more possibly present.	Final report forthcoming
1967	Agenbroad Univ. of AZ	Discovery and description of Clovis points in Tucson area.	Agenbroad 1967b
1967	James. E. Ayres ASM	Salvage of historic sites slated for demolition by Tucson Urban Renewal project.	
1968	Wasley, Fiero and Kayser ASM	Survey of proposed Charleston Dam Reservoir. One-hundred and twenty-six sites discovered in in 51-square mile area.	Kayser n.d.
1968	Hemmings and others Univ. of AZ	Data recovery at the Pantano site (EE:2:50), San Pedro stage Cochise occupation defined.	Hemmings et al. 1968
1968	P. Grebinger ASM Hgwy Salvage	Excavation at Portero Creek including EE:9:68 and EE:9:53.	Reinhard 1978 Grebinger 1971b
1969	Kayser and Fiero ASM	Survey of ROW of Tucson Aqueducts for CAP, from the proposed Charleston Dam to the Gila River (185 mi.). Twenty-five sites recorded.	Kayser and Fiero n.d. (ASM project files)
1969	W. Wasley, D. Kayser, and D. Fiero ASM	Excavation of San Simon site (CC:10:1) near Willcox.	Kayser and Fiero 1970
Late 1960s	L. Agenbroad Univ. of AZ	Excavation of Lone Hill site BB:10:1.	Agenbroad 1970
Late 1960s	J. Brown Univ. of AZ	Survey and excavation in Pueblo Viejo Valley (Safford Valley) for dissertation on Salado origin.	Brown 1973, 1974
Late 1960s	F. Hemmings Univ. of AZ	Excavations at Murray Springs Clovis site.	Hemmings 1970

Late 1960s	A. Herring L. Escapule private citizens	Discovery of Clovis points at AA:16:34 west of Tucson and EE:8:30 northeast of Sierra Vista.	Ayres 1970a
Late 1960s	J. and V. Mills private citizens	Excavation of Kuykendall site.	Mills and Mills 1969
1970s-81	T. Scott B. Lee EAC	Salvage excavation in Safford Valley by Eastern Arizona College relating to local construction and farming activities.	
1970	Amerind	Recorded six rockshelter sites near San Simon reported by an amateur.	Quinn and Roney 1973
1970	James E. Ayres ASM	Salvage excavation of historic burial in village of Bac (AA:16:35), San Xavier Indian Reservation.	Ayres 1970b
1970	H. Franklin H. Clements Univ. of AZ	Excavation of possible Hohokam burial BB:11:24 in Soza Wash.	Franklin and Clements 1972
1970	Windmiller ASM	The Fairchild site near Double Adobe, Sulphur Springs Valley. Excavation of extinct mammoth remains and a Cochise culture site.	Windmiller 1970, 1971a, 1973a
1970-71	L. Hammack, B. Masse, and H. Franklin ASM	Excavation of Second Canyon Ruin BB:11:20, Alder Wash BB:6:9, Dos Bisnagas BB:6:6, Una Cholla BB:6:18. Test excavations of other sites followed inventory.	Hammack 1971 Franklin 1978, 1980 Masse 1985
1971-73	Goodyear and Dittert ASM	Hecla I, Hecla II, and III. Survey and data recovery in proposed Hecla Mine area, southern slopes of Slate Mountains, Papago Indian Reservation (west of study area).	Goodyear and Dittert 1973 Goodyear 1975
Ca. 1971	P. Grebinger ASM	Research on Hohokam cultural devopment in the middle Santa Cruz Valley.	Grebinger 1971a, 1976b; Grebinger and Adams 1974
1972	S. Fuller and others MNA	Arizona Survey of Tucson Gas and Electric (TG&E) San Juanto Vail 345KV line ROW from northwest New Mexico to Clifton, AZ.	Kane 1972

1972	Doyel and others ASM	Clearance survey of the TG&E San Juan to Vail 345KV line ROW, from Clifton to near Tucson. Recorded three sites, one a possible San Simon site northeast of Willcox.	Doyel 1972b
1972	P. Goree, R. Larkin, and J. Mead ASM	Records search for Cholla-Saguaro Transmission Line.	Goree, Larkin, and Mead 1972
1972	B. Huckell ASM	Excavation of Gold Gulch Cochise site near Bowie, AZ.	Huckell 1973
1972	Larson	Mapping of prehistoric features Tumamoc Hill, east of Tucson.	Larson 1972
1972	N. Walker A. Polk	Survey of Apache-Twin Buttes and Pantano-Whetsone Transmission Lines. Twenty-three sites recorded.	Walker and Polk 1973
Ca. 1973	R. Vivian and others ASM	Records search inventory and Overview - APS Cholla-Saguaro 345 KV Transmission Line, Phase II.	Vivian and others 1973
1973	Clonts WAC-NPS	Test excavations at Guachi and Pisinimo, Papago Indian Reservation. Discovery of Snaketown phase Hohokam occupation in the Papagueria (west of study area).	Masse 1980
1973	Fritz ASM	Tucson Sewage project; records inventory. Thirty-one linear miles within Pima County and Tucson. Fifteen sites found to be directly affected by proposed sewer route.	Fritz 1973
1973	Grady and others ASM	Survey of ROW of Salt-Gila Aqueduct, CAP. Located 21 (24?) sites most of which appear to be late Hohokam temporary activity sites. Seven of these occur within proposed Tucson Division project area.	Grady 1973
1973	Lindsay and Metcalf Museum of Northern AZ	Evaluation of impacts to cultural resources on Tumamoc Hill by proposed construction of a service facility.	Lindsay and Metcalf 1973

1973	Metcalf and Trott Museum of Northern AZ	Survey of proposed ROW for AZ Nuclear Power Project transmission lines.	MNA Site Survey files
1973	K. Quinn J. Roney ASM	Records search and overview of San Simon and Vulture Units of the BLM.	Quinn and Roney 1973
1973	O. Roubicek and others ASM	Survey of proposed Rancho Romero community north and west of Santa Catalina Mtns. Five previously recorded sites were visited, six new sites found.	Roubicek et al. 1973
1973-74	M. Raab ASM	Santa Rosa Wash. Survey and data recovery in proposed Tat Momolikot Dam-Lake St. Clair in Santa Rosa Wash drainage, Papago Indian Reservation (west of study area).	Raab 1974
1973-75	Rosenthal and others NPS	Survey and data recovery of sites within proposed road ROW, Quijotoa Valley Papago Indian Reservation. Documented use of Papagueria by Paleo-Indian, Amargosa, and Piman.	Rosenthal et al. 1978
1974	Debowski and Fritz ASM	Records search on Middle Gila Unit of BLM (northwest of study area).	Debowski and Fritz 1974
1974	Ferguson and Beezley ASM	Records check, APS San Manuel to Red Rock proposed transmission line. Archaeologically sensitive areas defined in the San Pedro Valley, Santa Catalina Mts., Falcon Valley, and Tortolita Mts.	Ferguson and Beezley 1974
1974	Fritz ASM	Tucson Sewage project, inventory and assessment of impact to cultural resources.	Fritz 1974a, b
1974	Fritz and Grady ASM	Tucson Sewage project, additional survey of 5 mi. not previously surveyed along interceptor route (Santa Cruz River section).	Fritz and Grady 1974
1974	Fuller ASM	Survey of the BLM Silverbell Planning Unit northwest of Tucson. Assessment of cultural resources and recommendations.	Fuller 1974

1974	Kinkade and Gilman ASM	Arizona Public Service Cholla-Saguaro proposed transmission line; Winkelman to Redrock section. Survey located five Hohokam-Salado sites and one historic mine.	Kinkade and Gilman 1974 Teague and Mayro 1979
1974	McDonald and others ASM	Tucson Gas and Electric Co., survey of proposed El Sol-Vail transmission line. Only one site (AA:16:43) found in Tucson Basin portion of survey.	McDonald et al. 1974
1974	N. Smiley and McCarthy ASM	Survey of Graham Curtis Project, Phase I north of Pima, AZ. No sites recorded.	Smiley 1974
1974	Steward and Teague ASM	Survey in the Vekol copper mining district, northern Papago Indian Reservation. Ethnoarchaeological survey of archaeological sites (west of study area).	Stewart and Teague 1974
1974	Teague ASM	Records search and overview on Winkelman and Black Hills Unit of the BLM, Safford District.	Teague 1974
Ca. 1974	M. Grady ASM	Survey of the Tucson Sewage Project SW interceptor realignment. One new site recorded.	Grady 1975
1975	Brew ASM	Canada del Oro site records check and synthesis. Field survey of proposed sewer route and treatment facilities. Relocation of four sites and three "non-sites" in the area.	Brew 1975, 1976
1975	Doelle ASM	Records search and overview on Geronimo Unit of the BLM, Safford District.	Doelle 1975a
1975	Gilman and Richards ASM	Survey of Aravaipa Canyon. Four sites discovered.	Gilman and Richards 1975
1975	Gilman and Sherman ASM	Survey of Graham-Curtis Project, Phase II north of Pima, AZ. Five sites recorded.	Gilman and Sherman 1975
1975	Hard and Doelle ASM	Tucson Sewage Project. Summary of history of San Augustin Mission; development of mitigation program.	Hard and Doelle 1978

1975	Kinkade and Fritz ASM	Tucson Sewage Project, mitigation program. Investigations at BB:9:72 (Ft. Lowell kitchen site); and at AA:12:90 (prehistoric irrigation ditches and historic Anglo dwellings).	Kinkade and Fritz 1975
1975	Kinkade and Witter ASM	Clearance survey of Foote Wash - No Name Wash. Thirteen sites recorded, all limited activity Mogollon sites.	Kinkade 1975a
1975	McGuire	Survey of proposed Silverbell Park and golf course; three sites recorded (AA:12:93, 95, 96).	McGuire 1975
1975	Scott EAC	Field school, Eastern AZ College, Thatcher, AZ. Partial excavation of the Fisher site, a Salado village south of Safford, Arizona	U.S. Dept. of Interior, Bureau of Land Management 1978
1975	Stacy and Hayden NPS	Overview of cultural resources in Saguaro National Monument east and west of Tucson.	Stacy and Hayden 1975
1975	Vivian and Reinhard	Records check of sites along Santa Cruz River near Tucson.	Vivian and Reinhard 1975
1975	Beckett and others NMSU	Records search and sample inventory in southeastern AZ and southeastern New Mexico for BLM.	Beckett et al. 1975
1975	G. Kinkade ASM	Reconnaissance inventory of Gila Box area east of Safford. Five prehistoric and five historic sites recorded.	Kinkade 1975b
1975	NPS - Fort Bowie	Numerous reconnaissance surveys and stabilization studies in Fort Bowie National Historic Site since site designated.	U.S. Dept of Interior, Bureau of Land Management 1978
1975	P. Shaafsma and P. Vivian ASM	Reproduction and interpretation of the Malapais Hill Pictographs south of Winkelman, AZ.	Shaafsma and Vivian 1975
1975	P. Beckett NMSU	Survey of a proposed Public Service Co. of NM 345 KV powerline from Deming, NM to Greenlee County, AZ. One prehistoric and one historic site were discovered.	Bussey and Beckett 1975

Mid 1970s	J. and V. Mills private citizens	Excavations at Buena Vista site.	Mills and Mills 1978
1975-76	Kinkade BLM	Reconnaissance survey of ca. one million acres in Safford District. Recorded ca. 60 prehistoric and 40 historic sites.	U.S. Dept. of Interior, Bureau of Land Management 1978
1975-77	N. Whalen SW Texas State Univ.	Survey of 180 sq. miles on east side of San Pedro Valley, 293 sites recorded.	Whalen 1981
1976	Ackerly and Rieger ASM	Archaeological overview of southwest Pinal County.	Ackerly and Rieger 1976
1976	Ciolek-Torrello and Brew ASM	San Xavier Indian Reservation; San Xavier Bicentennial Plaza test excavations, yielded artifacts dating from prehistoric to present.	Ciolek-Torrello and Brew 1976
1976	W. Doelle ASM	Records inventory, synthesis, and proposed management plan for Santa Cruz Riverpark.	Doelle 1976
1976	Ferg ASM	Collection and testing of Poor Canyon site BB:11:25 north of Redington recorded by Lensick (1976a). Chiricahua Cochise and historic remains recorded.	Ferg 1977b (see Lensick 1976a)
1976	Fitting Commonwealth Associates	Foote-Wash - No Name Wash Project. Mitigation. Surface collection and test excavation at limited activity sites recorded by Kinkade (1975a).	Fitting 1977
1976	Gregonis ASM	Tucson Sewage project. Further considerations of additional interceptor route. Determined that no additonal survey needed.	Gregonis 1976c
1976	Kinkade ASM	Conducted project inventories and performed resource protection work. Provided recommendations on establishing a CRM program for BLM Safford District.	Kinkade 1976
Ca. 1976	S. Lensink ASM	Inventory of nine proposed pumping stations, SOHIO West Coast-Mid-continent Pipeline Project across southern AZ. Located two sites.	Lensick 1976a, (see Ferg 1977b)

Ca. 1976	L. Teague and M. Brewer ASM	Test Excavation of AZ. EE:5:11.	Teague and Brewer 1976
1976	Lensick ASM	Survey of proposed Diablo Village Estates housing development, Avra Valley.	Lensick 1976b
1976	Scott EAC	Field school, Eastern AZ College, Thatcher. Partial excavation of a Salado village near Safford, AZ.	U.S. Dept of Interior, Bureau of Land Management 1978
1976	Scheick ASM	Proposed River Road bikeway survey. Assessment of impact to three sites (BB:9:27, 43, 54) along Rillito Creek.	Scheick 1976
1976	Simpson and others	AZ Electric Power Coop., Inc. Clearance survey for 56 mi. ROW for 230 KV line, from near Morenci to south of Safford, AZ. Seventy-two sites recorded.	Simpson and Westfall 1978
1976	Simpson and others ASM	AZ Electric Power Coop., Inc. Clearance survey of access roads to 230 KV line ROW. Seventeen sites recorded.	Simpson and Westfall 1978
1976-78	Doyel ASM	Excavations at three Hohokam sites and one historic Pima site, south of Tucson, Middle Santa Cruz River Valley.	Doyel 1977b
1976-78	Gregonis and others ASM	Excavations at the Hardy site, a Hohokam pithouse village at Ft. Lowell, Tucson (AZ:BB:9:14?).	Gregonis 1977
1976-79	Westfall ASM	Archaeological overview of Middle and Lower Santa Cruz Basin.	Westfall 1979
1977	C. Breternitz ASM	Survey of Continental Copper Co. transmission lines in the Lower San Pedro Valley. Seven prehistoric sites discovered.	Breternitz 1978
1977	Buttigieg-Berman NM State Univ.	Survey of proposed powerline ROW in Graham County, including Buena Vista site.	Buttigieg-Berman 1977
1977	Czaplicki ASM	Santa Cruz Riverpark research proposal; recommends overview and intensive survey of proposed Riverpark.	ASM project files

1977	Hewitt Pima College	Survey of the Tucson Airport Authority study area.	Hewitt 1977
1977	Johnson and Hewitt Pima College	Excavation at Four Saguaros Rockshelter, Saguaro National Monument.	Johnson and Hewitt 1977
1977	Simpson and others ASM	AZ Elec. Power Coop., Inc. Mitigative activities on 30 sites in 230 KV line ROW from Morenci to Apache Plant.	Simpson and Westfall 1978
1977	Westfall, Rozen Davidson	Survey of AZ Elec. Power Coop., Inc. Dos Condados to Apache ROW. Twenty-seven Mogollon and Cochise sites discovered; mitigation, data recovery on 11 sites.	Westfall, Rozen and Davidson 1979
1977	A. Gomolak NMSU	Survey of proposed powerline changes and access road locations for the Public Service Co. of NM Greenlee-Hidalgo (Deming) 345 KV powerline. One early Mogollon site - the Mesa Top Site -was found.	Gomolak 1977 Berman 1978
1977	M. Berman NMSU	Mesa Top Site - excavation (by Mary Jane Berman of NMSU) of an early Mogollon site on the Upper Gila River.	Berman 1978
1977-78	T. Scott EAC	Field school, Eastern Arizona College, Thatcher. Excavation of a site in the upper Aravaipa Valley near Bonita, Arizona.	
Ca. 1978	B. Huckell ASM	Test excavations at AZ.BB:9:58. The Vista del Rio Site, a Hohokam site north of Tucson.	Huckell 1978
1978	Betancourt ASM	Synthesis of Tucson Basin prehistory and history, focusing on the Santa Cruz River; inventory of sites within Tucson Basin.	Betancourt 1978a
1978	Betancourt and others ASM	Survey of Santa Cruz River within boundaries of proposed riverpark; recommendation for site protection and data recovery. Thirty-three new sites found, including Archaic, Hohokam, and historic.	Betancourt 1978b
1978	Bremer AZ State AFB	Overview of Davis-Monthan Air Force Base.	Bremer 1978

1978	Czaplicki ASM	Overview for Transportation Corridor project. Five sites were located.	Czaplicki 1978
1978	Rozen and Baldwin ASM	Survey of 40 miles of powerline ROW, TG&E, northern Tucson and and lower Santa Cruz River Valley, AZ. Four sites and four artifact scatters recorded.	Rozen 1979
1978	Stein Museum of Northern AZ	Resurvey of proposed Salt-Gila Aqueduct, CAP; nine sites found within project area.	Stein 1979
1978	Stone ARS	Survey of aggregate materials source 16 mi. southeast of Tucson.	Stone 1978
1979	Doyel ASM	Excavations at BB:13:14.	Doyel 1979a
1979	Kinkade, Bromley, and Selle BLM	Survey and mitigative data recovery of 30 Mogollon sites at the Barrier Dam site on the lower San Simon River.	No report
1979	Gregonis ASM	Survey of seismological survey lines in Graham and Cochise Counties.	Gregonis, L.M. 1979
1979	Rozen ASM	Survey of northern Tucson 138 KV transmission line in northern Tucson Basin and lower Santa Cruz Valley. Six prehistoric and two historic sites located.	Rozen 1979a
1979	Rozen ASM	Survey of Transportation Corridor Project, Tucson. One small sherd and lithic scatter and isolated artifacts discovered.	Rozen 1979b
1979	Westfall ASM	Class I overview of Middle and Lower Santa Cruz Basin for Tucson Division of Central AZ Project.	Westfall 1979
Late 1970s	AZ Archaeological and Historical Society	Survey of Tumamoc Hill.	Masse 1979
Late 1970s	Debowski ASM	Survey and testing of 25 sq. mi. section of Santa Rita Mtns.	Debowski 1980
Late 1970s	Masse Univ. of AZ	Excavation at Big Ditch site.	Huckell 1980 Masse et al. (in preparation)

Late 1970s	Mead Central AZ College	Excavation at Twin Hawks site near Oracle.	Franklin and Masse 1976
1980	ARS	Survey of Del Bac Heights proposed housing development.	AZ Clearinghouse Project No. 80-85-0067
1980	Fortier and Stone ARS	Survey of Salida del Sol proposed housing development.	Fortier and Stone 1980
1980	Bromley BLM	Survey and test excavation of the Tanque and Slick Rock dam sites in the Lower San Simon River Valley.	Draft report, BLM Safford District files
Ca. 1980	Gregonis and Huckell ASM	Records search and reconnaissance of 8 drainages in and near Tucson for Tucson Urban Study.	Gregonis and Huckell 1980
Ca 1980	Nickerson and others ASM	Excavation of AZ.AA:16:57 in Avra Valley southwest of Tucson to obtain pollen and flotation samples.	Nickerson and others 1980
Ca. 1980	Huckell ASM	Survey and records search of the proposed Catalina State Park north of Tucson. Nine prehistoric sites, 2 historic sites, 2 artifact scatters, and 1 historic complex present.	Huckell 1980

Current Research

C. McCarthy ASM	Class II sample survey for Tucson Division of Central AZ Project.	
P. Fish Archaeological Sec., ASM	Excavations at Los Morteros (AA:12:57).	Downum et al. 1981
D. Stephen J. Hewitt Pima College	Field school excavation at Indian town site, Tortolita Mountains.	Stephen and Hewitt 1981
L. Teague ASM	Mitigative data recovery on Salt-Gila Aqueduct, Central AZ Project.	
C. Bromley, S. Dooley BLM, Safford District	Class III intensive inventory and premitigation testing on the San Simon Restoration Project, Timber Draw Detention Dam, southeast of Safford, AZ. Thirty-five Cochise and Mogollon sites and 2 historic sites recorded.	Dooley et al.

D. Goddard Fenster School Tucson	Limited excavation at Tanque Verde Ruin.
B. Lee EAC	Field school, Eastern Arizona College, Thatcher. Partial excavation of the Layton site south of Safford.

APPENDIX 2

SITE TYPES

Site Types	Numbers
Agricultural terrace	2
Artifact (isolated)	29
Artifact scatter	130
Artifact concentration	2
Ball court	10
Barn	2
Battlefield	7
Bedrock metates	1
Bedrock mortars	21
Building (specified)	
Store	3
Courthouse	2
Railway Station	3
Schoolhouse	2
City Hall	1
Blacksmith Shop	1
Jail	3
Theatre	1
Post Office	1
Toll House	1
Hot Springs Desert	1
Mine House	1
Sawmill	3
Flour Mill	3
Building (unspecified)	26
Burial	44
Cache	4
Campsite	76
Canal	8
Cave	86
Cemetery	9
Check dam	1
Chipping Station	57
Church	6
Cliff Dwelling	11
Compound	51
Cremation	13
Dam	3
Enclosure	1

Field	8
Field House	3
Firepit	1
Fortification	7
Fort	17
Garden	6
Gridded Fields	1
Hearth (unspecified)	139
Hotel	4
House	83
House Mound	4
House Ring	3
House Floor	9
Lithic Concentration	9
Lithic Scatter	1,153
Mescal Pit	2
Midden	3
Mine	20
Mining Camp	8
Mining Town	5
Mission	10
Mound	46
Petroglyph	76
Pictograph	42
Pit	11
Pit House	108
Platform Mound	2
Plaza	2
Pueblo (general)	40
Presidio	2
Quarry	30
Ramada	1
Ranch	62
Roasting Pit	12
Rock Art	3
Rockpile	65
Rockshelter	128
Road	5
Rooms	92
Sheet Trash	1
Sherd Concentration	19
Sherd Scatter	1,104
Shrine	4
Stage Station	12
Stone alignment	56

Stone Circle	48
Stone Concentration	21
Storage Area	1
Storage Room	7
Structure (unspecified)	46
Terrace	14
Trail	15
Trash (general	85
Trash Mound	47
Tower (round)	3
Town	17
Village	306
Wall	15
Water Control Devices	8
Water Tank	3
Workshop	29

OTHER

Bedrock	3
Bone Fragments	1
Buildings (specified)	
Bullring	1
Civil Conservation Corp. Camp	4
Contact Site	1
Corral	7
Extinct Fauna	3
Fire-cracked Rock Concentration	4
Forest Service Office Ruins	1
Foundation	10
Habitation	28
Hideout	1
Hill	1
Historic Marker	1
Hunting Shelter	3
International Boundary	1
Killsite	1
Lake	1
Line Kiln	6
Lumber Flume and Trestle	1
Mammoth Remains	2
Mining Component	8
Mortars	13
Mountain	1

Multiple Units	1
Puddled Adobe	1
Reservation	1
Robbery Site	1
Ruins	19
Shelters	2
Steam Pump	1
Subterrano	1
Trincheras	1
Water Wheel	1
Windmill	2

APPENDIX 3

FLORA OF THE STUDY AREA

LOWER SONORAN LIFE ZONE

Chihuahuan Desert

Tarbush	Flourensis cernus
Creosotebush	Larrea divaricata
Sandpaperbush	Moronia scrabrella
Chuhuahuan white thorn	Acacia constricta vernicosa
Ocotillo	Fouquieria splendens
Mesquite	Prosopis juliflora
Cholla cactus	Opuntia
Prickly pear cactus	Opuntia
Barrel cactus	Echinocactus
Pincushion cactus	Mammillaria

Sonoran Desert

Paloverde	Cercidium
Saguaro	Cereus
Mesquite	Prosopis
Smoketree	Dalea spinosa
Cholla cactus	Opuntia
Creosotebush	Larrea
White bursage	Franseria dumosa
Desert saltbush	Atriplex polycarra
Jojoba	Simmondsia chinesis
Barrel cactus	Echinocactus
Prickly pear cactus	Opuntia
Hedgehogs and rainbows	Echinocereus
Pincushion cactus and fishhooks	Mammillaria

UPPER SONORAN LIFE ZONE

Grassland

Perennial grama grasses	Bouteloua
Prickly pear cactus	Opuntia
Cholla cactus	Opuntia
Yucca	
Ocotillo	Fouquieria
Agaves	
Dropseed	Sporobolus
Needlegrass	Stipa
Mesquite	Prosopis
Catclaw	Acacia greggii

Chaparral

Scrub oak	Quercus turbinella
Manzanita	Arctostaphylos pungens
Mountain mahogany	Cercocarpus breviflorus

Woodland

Evergreen oaks	Quercus
Juniper	Juniperus
Pine	Pinus
Mesquite	Prosopis
Saguaro	Cereus
Cholla cactus	Opuntia
Pincushion cactus	Mammillaria
Blue gramma	Bouteloua gracilis

TRANSITION LIFE ZONE

Oak	Quercus
Madrona	Arbutus arizonica
Douglas fir	Pseudotsuga menziesii
Buckbrush	Ceanothus fendleri
Aspen	Populus tremuloides
Mountain muhlys	Muhlenbergia

References

Lowe 1964a
Nichol 1952

APPENDIX 4

COLLECTIONS AND RECORDS FROM THE STUDY AREA

To identify the study area's artifacts and archival material in regional and national collections, an extensive search of museum, historical societies, and private collections was undertaken. Project personnel sent questionaires to the following institutions and organizations. (An asterisk marks those institutions that responded.)

- Amerind Foundation*
- Field Museum of Natural History*
- The Heard Museum*
- Museum of the American Indian, Heye Foundation*
- Museum of New Mexico*
- National Museum of Natural History, Smithsonian Institutions*
- Arizona Historical Society
- Pima Community College*
- Arizona College of Technology*
- Cochise College
- New Mexico State University Anthropology Museum*
- Maxwell Museum of Anthropology, University of New Mexico*
- University of Colorado Museum*
- Logan Museum of Anthropology, Beloit, Wisconsin*
- Anthropology Museum, Eastern Arizona College*
- Southwest Museum, Los Angeles*
- Northern Arizona University*
- Museum of Northern Arizona*
- Western New Mexico University*
- University of Texas at El Paso*
- J. and V. Mills, Elfrida, Arizona*
- Arizona State Museum, University of Arizona*
- Bisbee Memorial Museum
- Cochise Stronghold Indian Museum
- Eastern Arizona Museum*
- Ft. Huachuca Historical Museum
- Ft. Lowell Museum
- Graham County Historical Society Museum
- Pete Kitchen Museum
- Pimeria Alta Historical Society Museum*
- Pinal County Historical Society Museum
- Pioneer Home Museum
- Wells Fargo Museum
- Cochise County Historical Society
- Greenlee County Historical Society
- Gila County Historical Society
- San Pedro Valley Historical Society

- Tubac Historical Society
- Tombstone Restoration Commission
- Documentary Relations of the Southwest, Arizona State Museum*

Following is an analysis of the materials held by each institution that responded.

Maxwell Museum of Anthropology, University of New Mexico - The museum has little archaeological material from the study area. It has less than 50 ceramic vessels, but does have a good collection of historic Apache, Papago, and Pima baskets.

Logan Museum of Anthropology, Beloit, Wisconsin - The museum has no prehistoric materials from the study area. It does have a small collection of historic Apache, Papago, Pima, and Mexican materials, including pottery, baskets, and textiles.

National Museum of Natural History, Smithsonian Institution - The museum has a fairly extensive collection of archaeological materials, some collected as early as 1813. The collection is especially strong in materials from the Safford area. The museum also has a collection of 400-500 historic Pima items, and an extensive Apache collection. The Apache materials, however, have not been identified as to different subgroups, although some Chiricahua artifacts are probably included.

Anthropology Museum, Eastern Arizona College - The museum has a small collection of prehistoric materials excavated in conjunction with a salvage project in 1980. It also has a number of historic Anglo-American items recovered from the cornerstone of the Mormon School in Thatcher, including textiles, clothing and costumes, musical instruments, religious materials, and prints of 1908 photographs.

Arizona College of Technology - All of the school's site records from the excavations at the Big Ditch site, directed by Bruce Masse, are on file with the Arizona State Museum.

Northern Arizona University - The university has no materials from the study area, although it does have survey materials from the Point of Pines area to the north.

Western New Mexico University - The university has never conducted archaeological work in southeast Arizona.

New Mexico State University Anthropology Museum - All sites recorded on survey in the study area are on file with the Arizona State Museum. The university has no materials from southeast Arizona.

University of Texas at El Paso - Records of all the surveys conducted by Rex Gerald are on file with the Amerind Foundation, including those of the Marijilda site southwest of Safford.

Museum of the American Indian, Heye Foundation - The museum has one of the largest holdings of American Indian materials in the world, both prehistoric and historic. The records of collections are being computerized and are unavailable, but the ethnographic collections of Apache, Pima, and Papago materials are extensive, as are the archaeological collections from Arizona.

J. and V. Mills, Elfrida, Arizona - The Mills have the most extensive private collection of materials from the study area. Much of it comes from their excavations and is completely catalogued as to provenience. In addition, they have copies of their privately printed research reports.

Amerind Foundation - The Amerind Foundation has extensive materials from prehistoric and historic excavations by Fulton, Tuthill, and DiPeso. In addition, it also has its own survey files for the area.

Arizona State Museum, University of Arizona - The Arizona State Museum has the most extensive collection of materials from the region. It is especially strong in the area of the Lower and Middle Santa Cruz River and the Tucson Basin. In addition, the Arizona State Museum Library has an unparalleled collection of published and unpublished materials dealing with the area.

Documentary Relations of the Southwest, Arizona State Museum - The DRSW is an interdisciplinary research center dedicated to collecting documents and maps relating to the Spanish Period in the Spanish occupied states of the U.S. and northwestern Mexico. The center maintains a document file and maps, but no artifacts.

Arizona Historical Society - The AHS houses in its new building in Tucson, a large collection of documents, maps, and artifacts relating to Arizona's history. The emphasis of the collections is in the territorial and statehood years.

The Heard Museum - The Heard Museum maintains the collections from the La Ciudad Hohokam site from the excavations on Heard property in 1929. Other artifacts were randomly collected as donations from individuals.

Museum of New Mexico - The Museum of New Mexico has some collections from southeast Arizona. Many of these are ethnographic Pima, Papago, and Apache specimens. Archaeological materials date from surveys and studies conducted from 1931-38, including collections made by Herbert W. Yeo, Grenville Goodwin, and E.T. Hall.

Southwest Museum, Los Angeles - The Southwest Museum maintains ethnographic and historic specimens, but no archaeological collections.

University of Colorado Museum - The UC Museum maintains many ethnographic and historic specimens. Archaeological collections include surface collections made by Joe Ben Wheat in Pima and Pinal Counties and collections by Earl H. Morris from Solomonville in Graham County.

Field Museum of Natural History - The Field Museum maintains some ethnographic and historic specimens.

The various historical societies and museums in southeast Arizona maintain a variety of historical specimens and documents. Most of these organizations, like the Arizona Historical Society, concentrate on the territorial and statehood years. They reflect the local popular historical interests of the subregions within the study area.

APPENDIX 5

SITE RECORD COMPILATION

BACKGROUND

During the compilation and analysis of the site records for this study, the variety and quantity of the site records was enormous. Each institution and agency had a different system and each system had its own intricacies. While this inventory has made a significant step in compiling all current records, it is limited to a specific point in time; it was out of date as soon as it was finished. There is a desperate need for one central repository of resource data. This records compilation may serve as a step towards developing such a collection of records.

The following sources were utilized in order to prepare the known cultural resource site record compilation. An asterisk denotes those institutions that responded to questionnaires requesting information on site records. The crosses are the institutions that provided site records and survey data.

- Bureau of Land Management, Safford+
- Bureau of Land Management, Phoenix+
- Arizona State Museum, University of Arizona*+
- Archaeological Research Services, Phoenix*+
- Museum of Northern Arizona*+
- Amerind Foundation*+
- U.S. Forest Service, Coronado+
- Field Museum of Natural History
- The Heard Museum
- Museum of the American Indian, Heye Foundation*
- Museum of New Mexico
- National Museum of Natural History, Smithsonian Institution*
- Arizona Historical Society
- Pima Community College*
- Arizona College of Technology*
- Cochise College
- New Mexico State University Museum*
- Maxwell Museum of Anthropology, University of New Mexico*
- University of Colorado
- Logan Museum of Anthropology, Beloit*
- Anthropology Museum, Eastern Arizona College*
- Southwest Museum, Los Angeles
- Northern Arizona University
- Western New Mexico University*
- University of Texas at El Paso*
- J. and V. Mills, Elfrida, Arizona*
- Bisbee Memorial Museum
- Cochise Stronghold Indian Museum

- Eastern Arizona Museum*
- Ft. Huachuca Historical Museum
- Ft. Lowell Museum
- Graham County Historical Society Museum
- Pete Kitchen Museum
- Pimeria Alta Historical Society Museum*
- Pinal County Historical Society Museum
- Pioneer Home Museum
- Wells Fargo Museum
- Cochise County Historical Society
- Greenlee County Historical Society
- Gila County Historical Society
- San Pedro Valley Historical Society
- Tubac Historical Society
- Tombstone Restoration Commission
- Documentary Relations of the Southwest, Arizona State Museum*

While the questionnaire was distributed to all these institutions, a major problem was lack of response. Sites were plotted on USGS maps and summarized in the Site Summary Table. The specific properties within the study area which have been archaeologically surveyed are also plotted on the maps.

CULTURAL RESOURCE SITE RECORD SYSTEMS

The most widely used cultural resource site numbering system in use in the study area is that of the Arizona State Museum. Unless otherwise noted all site numbers referenced in this report are Arizona State Museum numbers. The following discussion is adapted from Vogler (1980), which in turn was a revision of Wasley (1964).

The Arizona State Museum system for designation of sites is based on the system devised by Gila Pueblo in the late 1920s. A four-part site designation is used, e.g. AZ:U:15:2.

1. A standard political division (state, territory, small country) is the basic unit of area for the survey; the name of the standard political division forms the first component of the site designation. It can be abbreviated but never omitted (e.g. "AZ").

2. The standard political division is further divided into quadrangles based on standard meridians and parallels, each quadrangle measuring one degree of longitude and one degree of latitude. These quadrangles are designated by alphabetical letters, beginning in the northwest corner of the political division and ending in the southeast corner. Should there be more than 26 quadrangles in the political division, additional ones are identified by double letters; if more than 52 quadrangles are present, triple letters are used (e.g. "U"). The Gila Pueblo system used names rather than letters at this level e.g. Chiricahua, Benson, Pearce.

3. The rectangle is the third component of the site designation, a subdivision of the quadrangle. In every quadrangle there are 16 rectangles, each measuring 15 minutes of longitude and 15 minutes of latitude. Within a quadrangle, rectangles are numbered from one to sixteen, beginning in the northwest corner and ending in the southeast quadrangle. The relative position of a given rectangle number is always the third component of site designation (e.g. "15").

4. The final component of the site designation is a number identifying the site within the rectangle. Sites within a rectangle are numbered serially as they are found and recorded. Accordingly, there is no implication of geographic position in site numbers (e.g. "2").

The Arizona State Museum has the largest repository for site information, although it has not attempted to incorporate most of the data which has been collected as a result of cultural resources studies conducted by federal agencies. The Arizona State Museum maintains files on each site and survey it has records for. The areas which have been surveyed are drawn and coded on USGS topo maps. The surveys are coded by indicating whether the survey was judgemental, sample, or intensive. The SELGEM AZSITE system was developed to provide computer access to site data, but it only summarizes the data available in the files. As of now, the AZSITE data is incomplete, but print-outs are available for a fee. Intensive research requires direct reference to the files, cards, maps, and reports.

Data about sites on Bureau of Land Management and U.S. Forest Service lands are coded and organized by internal agency systems. These include site numbering codes, master topo maps showing sites and survey boundaries, and inventory reports. In structure they are similar to the Arizona State Museum system. The numbering codes and site forms have occasionally changed. Reference to the agency's code handbooks is necessary to clarify changes and current codes and forms. Access to this data is limited by current policies concerning use of data.

Other institutions use a system similar to Arizona State Museum including site designation codes. To avoid confusion, site numbers should always include a code for the institution, e.g. AZ EE:9:15 (ASM). Some agency site numbers follow a different form, for example AR-02-04-001. All site number codes may or may not include AZ for Arizona. Because of the confusion caused by the different numbering codes in use, it is helpful to mention site names and/or general locations to fully identify sites.

Several attempts have been made to duplicate and consolidate the site records from the various institutions. We found that the site forms compiled for this overview contained many duplicated records, but it was not possible to clarify all duplications for the site records inventory or the Site Summary Table due to a lack of complete information on the records. Some records showed cross-referencing, but many did not. This

condition lead to an inflation in the total number of sites in the Site Summary Table. In order to provide an estimate of the total number of sites, we counted all the records from each institution, excluding those where there was enough information to determine duplication. The following table is a summary of those counts. Future research based on these site records will find the records complete, but duplication may occur within specific geographical limits.

SITE FREQUENCY BY ORGANIZATION

	All Sites	Hist./Prehist. and Historic	Prehistoric
Arizona State Museum	2,152	359	1,793
Bureau of Land Management	812	106	706
U.S. Forest Service	106	23	83
Museum of Northern AZ	25	4	21
Amerind Foundation	222	28	194
Arch. Research Services	11	—	11
Total	3,328	520	2,808

SITE CLASSIFICATION

Classification of sites in the study area should be regarded with some caution. Although sites are defined in the Site Summary Table by cultural affiliation, it should be noted that there is no consistent definition for many cultural manifestations, most notably late "Western Pueblo/Salado" sites. Given the problems extant in current chronology, which is based on cross-dating of sherds from the Gila Basin, which are in turn cross-dated with materials from northern Arizona, attempts at chronological placement should also be regarded with some caution.

For the purposes of this overview, a site is defined as a locus of prehistory or historic activities in which cultural remains are present and which are distinct by virtue of distance and/or geomorphic features from other loci of prehistoric or historic activities. The cultural materials which constitute a site basically are artifacts and/or cultural features. Artifacts are objects which humans have manufactured or modified, such as projectile points, manos, metates, bone awls, etc. Cultural features are specific clusters of artifacts and/or other material humans have used or assembled that exhibit structural association and which consist of non-recoverable or composite matrices. Examples of cultural features are burials, talus depressions, bedrock mortars, walls, lithic and/or sherd scatters and so on. Generally, a single artifact by itself, occurring with no other cultural material, does not constitute a site.

Although no consistent definition of site type has been employed by the numerous researchers who have worked in the study area over the years, there are several recurring types of sites in survey files. These are:

- Sherd and/or Lithic Concentration - generally used to cover small areas of ceramic or lithic debris, generally with no associated structural manifestations;

- Village - an area of debris with associated structures; if pithouses are present, the village may be described as Hohokam or Mogollon on the basis of ceramics. When surface structures are present, the village may be defined as Hohokam/Salado, Salado, or Western Pueblo;

- Compound - term generally used for late prehistoric sites with clusters of above-ground masonry rooms delimited by a compound wall and generally associated with Salado ceramics. Compound and Salado villages are often used interchangeably;

- Pictographs - rock art site with painted decorations;

- Petroglyphs - rock art site with decorations cut into the rock face;

- Rockshelter - cultural materials located within a natural stone overhang;

- Campsite - term generally used to refer to concentrations of lithic and/or ceramic debris associated with remains of a firehearth (or firehearths).

See Appendix 2 for a complete list of site types in the study area.

APPENDIX 6

FORMAL RECOGNITION

NATIONAL REGISTER OF HISTORIC PLACES SITES

COCHISE COUNTY

FT. BOWIE NATIONAL HISTORIC SITE - T15S/R28E/S12
1862, Federal
Ruins of fort established in 1862; the focal point of military operations against Geronimo and his band of Apaches.

COCHISE HOTEL - Cochise
1882, Private
The hotel was built to accommodate travelers at the junction of the Arizona Eastern and the Southern Pacific Railroads. One room was used for the Wells Fargo office. The hotel is one-story adobe and frame and retains most of the original furniture and fixtures. The building is in excellent condition and is still in use as a hotel.

QUIBURI - Fairbank vicinity
ca. 1200 - ca. 1780, Private
Prehistoric jacal structures have been found at this site, as well as remains from the Sobaipuri village of the 17th century and ruins of the 18th century Spanish presidio. By the late 17th century, the village was under repeated Apache attack which continued until both villagers and Spaniards were forced to abandon the area.

ST. PAUL'S EPISCOPAL CHURCH - Safford and 3rd Streets, Tombstone
1882, Private
The rectangular plastered adobe church has a bell tower, stained glass windows, and exposed wooden truss system. The original pews and ceiling lamps are still in place. A driving force in the early years of the church was Endicott Peabody, founder of Groton School.

TOMBSTONE CITY HALL - 315 East Fremont, Tombstone
1882, Municipal
The two-story red brick building is still in use by the city. The interior has been remodeled. The ground floor is a fire station with three arches over recessed doors. Exterior decoration includes entablature and frieze, a roof pediment, and urns. Building trim is white woodwork.

TOMBSTONE COURTHOUSE - Third and Toughnut Streets, Tombstone
1882, Municipal
The building was the county courthouse until the county seat was moved to Bisbee in 1929. The two-story, red brick, cruciform building has white stone quoins, a cupola, and pedimented gable ends. The front porch has two pillars and two pilasters. It is a State Historic Park.

TOMBSTONE HISTORIC DISTRICT - Tombstone
1870s, Multiple Public and Private
Tombstone silver made this the major community of the county for several years. The town boomed after Ed Schieffelin's strike in 1877 and its heyday is recalled in the mixture of fact and legend surrounding the gunfight at OK Corral. The town declined sharply when the mines filled with water. Some of the buildings have been restored.

BUFORD HOUSE - Tombstone
1880, Private
Built in an early transitional Sonoran style. Owned by George Buford, a prominent mine owner and businessman. Noted sheriff also occupied the house from 1919-1931.

DRAGOON SPRING STAGE STATION - Dragoon vicinity
1858-1862, 1872, Federal (U.S. Forest Service)
A Butterfield stage station operated here for four years. Portions of some walls and a small graveyard remain. In 1872 General Howard met with Apache leaders here to establish the boundaries of the new Chiricahua reservation.

PEARCE GENERAL STORE - Pearce
1893-, Private
The old adobe general store has an embossed metal ceiling and store front. Most of the original fixtures are still in use. There is a wagon yard on one side of the store and a warehouse in the rear. In front is an old gravity feed gas pump.

STAFFORD CANYON - Chiricahua National Monument
1879, Federal (National Park Service)
The simple log structure received some frame additions after 1930. The original cabin is chinked with adobe and has a stone fireplace and chimney at one end. Stafford had a truck garden in the clearing around the cabin and sold produce to Fort Bowie.

FARAWAY RANCH HISTORIC DISTRICT - Chiricahua National Monument.
ca. 1879-1977, Federal
This district includes elements of archaeology, architecture, and history. Its significance is based on those elements and its associations with events and persons important in history.

DOUGLAS MUNICIPAL AIRPORT - Douglas
1938, Municipal
Douglas was important to early aviation in Arizona. The first landing was in 1911, and military aircraft flew out of Douglas for several years after 1916. The airport was one of the stops on the first transcontinental airmail route in 1930. The runway extended into Mexico until erosion made the Mexican portion of the runway unusable.

SAN BERNARDINO RANCH - Douglas vicinity
ca. 1884, Private
Famed Arizona lawman John Slaughter established his ranch on the site of an early short-lived Mexican hacienda. Two stone buildings of the Slaughter period remain and traces of the adobe hacienda structures.

GADSDEN HOTEL - 1046 G Avenue, Douglas
1929-, Private

The five-story concrete and steel building was designed by prominent southwestern architects, Trost and Trost. The hotel is particularly noted for its ornate lobby which has a marble staircase and pillars, a carved plaster ceiling decorated with gold leaf, and a Tiffany stained glass window with a desert scene. Like the original Gadsden Hotel on the same site, it has been the social and economic center of the area and has witnessed millions of dollars worth of mining and cattle transactions. The hotel derives its name from James Gadsden, who negotiated the 1853 treaty bringing this portion of Arizona into the Union.

GRAND THEATRE - 1139-1149 G Avenue, Douglas
1919-, Private

This classical revival building has a marble-walled lobby and an elaborately decorated interior. The theater played an important role in the cultural life of the town until it was closed in 1962. Local groups are working to restore it for community use.

DOUBLE ADOBE SITE - Douglas vicinity
ca. 7000 BC, Private

The people of the Cochise Culture, who inhabited much of the southwestern United States and northern Mexico, fashioned stone weapons with which they killed now-extinct varieties of mammoth, bison, and horse. Human artifacts in conjunction with bones of these extinct animals were found at this site.

BISBEE HISTORIC DISTRICT - Bisbee
1877-, Multiple Public and Private

Until recently, Bisbee was the hub of one of the most productive copper districts in the state. Most of the buildings in the historic section of Bisbee were built between 1895 and 1915, but the mining camp began in 1877. The town is strung along a winding steepsided canyon and its side gulches. The most important concentrations of brick commercial buildings are in Brewery Gulch and Tombstone Canyon.

MUHEIM HOUSE - 207 Youngblood Hill, Bisbee
1898-, Municipal

Joseph M. Muheim, prominent Bisbee merchant, banker, builder, and investor, built this unusual house for his bride. A semi-circular porch and circular parlor are topped by a cone-shaped tower.

PHELPS-DODGE GENERAL OFFICE BUILDING - Main Street and Brewery Gulch, Bisbee
1890s, Municipal

The two-story, red brick building has two three-sided bays and a gable roof. The main entry and the windows are arched in white brick. Ceilings and walls are narrow tongue and groove. The building housed the general offices of the Phelps-Dodge copper interests. The mines have closed and the building is being rehabilitated as a mining museum.

NACO MAMMOTH-KILL SITE - Naco vicinity
ca. 8000 BC, Private
The site is of great importance in establishing the range and date (10,000-11,000 years ago) of prehistoric peoples in Arizona who belonged to the Big Game Hunting tradition. Eight Clovis points were found among the remains of the Naco mammoth. The climate was then more humid than at present. What is now dry wash was then a marsh or bog and a thick clay gradually settled over the bones and preserved them.

LEHNER MAMMOTH-KILL SITE - Hereford vicinity
ca. 9000 BC, Private
Human artifacts were found in conjunction with the remains of nine Columbian mammoths, as well as extinct horse, bison, and tapir. The artifacts include thirteen Clovis points and eight cutting and scraping tools. Radiocarbon dating gives a time of 11,000-12,000 years ago. The culture was characterized by big game hunting.

CORONADO NATIONAL MONUMENT - International boundary
1540-1542, Federal (National Park Service)
This memorial commemorates the entrance of the Coronado expedition into what is now the United States. The exact location of the entrance was probably farther east along the San Pedro River.

GARDEN CANYON ARCHAEOLOGICAL SITE - Sierra Vista vicinity
Prehistoric, Federal (Department of the Army)
This undated and largely unexcavated site includes a village with both pithouses and above-ground masonry dwellings, as well as bedrock mortars and burials.

GARDEN CANYON PETROGLYPHS - Sierra Vista vicinity
Prehistoric, Federal (Department of the Army)
The petroglyphs are carved in the roof of a shallow limestone cave in a bluff several hundred feet above the floor of the canyon.

OLD FORT HUACHUCA - Sierra Vista vicinity
1877-, Federal (Department of the Army)
Fort Huachuca was established in 1877 near the end of the period of Indian wars. The post was intended to protect local settlers and was important in the final Apache campaigns of the 1880s. Troops from Fort Huachuca participated in the pursuit of Pancho Villa into Mexico in 1916. The old post area includes several late 19th century adobe family quarters, frame barracks, and other buildings. The interiors have been remodeled.

GRAHAM COUNTY

KEARNY CAMPSITE AND TRAIL - Safford vicinity
1846, Federal (U.S. Bureau of Land Management)
General Stephen Watts Kearny and 100 dragoons from the Army of the West camped at the junction of Bonita Creek and the Gila River during the march from Fort Leavenworth to California in the Mexican War. Their guide on this portion of the journey was Kit Carson. A monument has been erected at the site.

SIERRA BONITA RANCH - Bonita vicinity
ca. 1872, Private
Adobe ranch buildings constructed on the site of an earlier hacienda were headquarters for one of the largest and most successful ranches of the Territorial period. The interior of the large adobe residence has been remodeled. The ranch was established by Henry C. Hooker, who made a fortune supplying beef to the numerous military posts in Arizona during the Apache wars.

POWER'S CABIN - Galiuro Mountains
1918, Private (within U.S. Forest Service land)
Draft evasion and other disputes led to a gunfight at this remote cabin. Three lawmen and Tom Power were killed in the shootout. The one-room cabin with chimney is badly deteriorated.

GREENLEE COUNTY

CLIFTON-CASA GRANDE BUILDING - Park Avenue, Clifton
1870s, Private
The white-stuccoed, one-story adobe was one of the first buildings in Clifton. It was built by Henry Lesinsky, who established the first successful mining operations in the area and was largely responsible for the early development of the town. The building has been flooded several times by the San Francisco River and has been somewhat altered. It is now partially restored and is in use as a museum.

DELL POTTER RANCH HOUSE - Clifton vicinity
ca. 1900, Private
This well built, southern style house with Mission parapet was once a showplace surrounded by orchards. Repeated floods have destroyed the fruit trees and the elaborate watering system. Potter was an imaginative and rather flamboyant entrepreneur with a wide variety of financial interests.

PIMA COUNTY

EMPIRE RANCH (English Boys' Ranch) - Greaterville vicinity
1870s, Private
Walter L. Vail (1852-1906) began a vast land and cattle empire here in partnership with two young Englishmen. The original adobe ranch house remains in use. It is single-story, four-room zaguan type with some additions.

RINCON MOUNTAINS FOOTHILLS ARCHAEOLOGICAL DISTRICT - Saguaro National Monument
ca. 3000 BC-1450 AD and 1800 AD-present, Federal
The approximate 110 sites in the District represent a wide variety of site types and time phases, including historic periods which have yielded basic data at a local level of significance.

MANNING CABIN - Saguaro National Monument
1905, Federal (National Park Service)
The two-room, dog-trot log cabin was privately built but has been used by rangers since 1907. Rock pillars have been added to the main entrance. Cement floors have also been added.

FORT LOWELL - Craycroft and Fort Lowell Road, Tucson
1874-1891, Municipal and Private
The fort, which was moved from its original site in downtown Tucson, consisted of several large adobe buildings and attractive grounds and was a base for Apache campaigns. Some buildings and ruins remain. One of the officers' quarters has been reconstructed.

OLD MAIN, UNIVERSITY OF ARIZONA - Tucson
1887, State
Phoenix architect, James Creighton, designed this two-story brick building with four towers, Mansard roof, and surrounding porch. It was the original building of the University and is still in use.

ARMORY PARK HISTORIC DISTRICT - Bounded by Stone, 3rd Avenue, 12th Street, and 18th Street, Tucson
1880s, Multiple Public and Private
The district is characterized by late Territorial architecture and shows residential development on a grid pattern after the coming of the railroad.

BARRIO LIBRE HISTORIC DISTRICT - Bounded by Stone, Main Street, 14th Street, and 18th Street, Tucson
1850s, Multiple Public and Private
The district features Mexican town architecture of the early Territorial period. Tucson was part of the Gadsden Purchase of 1853, and this old portion of the city reflects the building styles of that period.

FREMONT HOUSE (Carillo House) - 145-153 South Main Street, Tucson
ca. 1860, State
The zaguan type adobe townhouse was reputedly occupied by John C. Fremont at one time while he was governor of the Arizona Territory. It has been completely restored and is now a museum.

PIMA COUNTY COURTHOUSE - 115 North Church Street, Tucson
1929, County
The three-story, Spanish Colonial Revival building has a blue tiled dome and was designed by noted Tucson architect, Roy Place.

EL PRESIDIO HISTORIC DISTRICT - Bounded by Alameda, Church Street, 6th Street, and Granada, Tucson
ca. 900 AD, Multiple Public and Private
The district includes a prehistoric pithouse and the site of a Spanish pueblo and presidio of 1776. The present architecture is early Territorial and mainly residential.

SOLOMON WARNER HOUSE AND MILL - 350 South Grande, Tucson,
1875, Private
The mill was important in the industrial development of Tucson, and Warner was involved in both the commercial and political life of the area. Only foundations of the mill remain, but the major part of the adobe house is still in use.

DESERT LABORATORY - Tucson vicinity
1903, State
The Carnegie Institution established the center for the study of North American desert ecology and made significant contributions to the scientific understanding of arid climate influence on flora and fauna. In 1940 the site became a U.S. Forest Service experiment station. Since 1958 the center has been used for desert research by the University of Arizona.

LEVI H. MANNING HOUSE - 9 Paseo Redondo, Tucson
1907-1908, Municipal
This was the home of Levi H. Manning, prominent Tucson civic leader and entrepreneur. The house functioned as a showplace during his lifetime. The Elks Club purchased the house in 1950 and made several modifications. In 1979 it was sold to the City of Tucson.

CITIZEN BUILDING - 82 South Stone, Tucson
1914, Private
The two-story, stuccoed, brick building housed the Tucson Citizen until 1940. It is now an office building. The three-bay facade has arched openings on the ground floor. The flat roof has a low parapet. The building has been extensively altered.

WEST UNIVERSITY HISTORIC DISTRICT - Tucson
1890-1930, Multiple Private
The district exemplifies the pattern of middle and upper class residential development in Tucson as the city evolved from the 1890s-1930s. The area became the first major Tucson suburb north of the railroad and it retains the scale and density of an early 20th century neighborhood.

SAN XAVIER DEL BAC - Tucson vicinity
ca. 1797, Private
The building combines all Spanish ecclesiastical styles except Gothic and includes some Byzantine and Moorish features. It has a Churrigueresque facade and an ornate interior which includes large frescoes. This is the only Spanish mission church still in use in Arizona.

SANTA ANA DEL CHIQUIBURITAC, MISSION - Tucson vicinity
1811-1840s, Federal (U.S. Bureau of Land Management)
The last mission constructed in Pimeria Alta and the farthest north was built at this site. Only portions of the rock footings are still visible. It has not been excavated.

PINAL COUNTY

AMERICAN FLAG POST OFFICE AND RANCH HEADQUARTERS - Oracle vicinity
1870s, Private Building/Federal Land (U.S. Forest Service)
The one-story, stuccoed adobe is still in use as a residence. In the 1880s it was also a post office, serving ranchers and miners of the area.

SANTA CRUZ COUNTY

RUBY (Montana Camp) - Ruby
1870s, Private
Ruby was a mining and cattle ranching center which reached a peak population of about 1,000 people in the 1930s. Water for ore processing was pumped from fifteen miles away. About a dozen deserted buildings remain.

TUMACACORI NATIONAL MONUMENT - Tumacacori
1691, Federal (National Park Service)
A Jesuit visita was established at this site. The Franciscan church was built about 1800 and abandoned in 1840. It is this building ruin which remains and has been stabilized.

TUBAC PRESIDIO - Tubac
1750s-1850s, State
The presidio was the earliest Spanish military outpost in Arizona and was established immediately after the Pima Rebellion of 1751. From this post the famous Anza expeditions departed for California in 1774 and 1775. The buildings were used in the 1850s as headquarters for an Anglo mining company. The ruins were excavated by Arizona State Museum in 1975. The site is now a State Historic Park.

OLD TUBAC SCHOOLHOUSE - Tubac
1880s, State
The 1885 schoolhouse is incorporated into the present building. It is now part of a State Historic Park.

CALABASAS - Tumacacori vicinity
Prehistoric, State
The Sobaipuri village site became a Spanish visita in the 18th century and was a Mexican hacienda briefly before the Gadsden Purchase of 1853. The major obstacle to permanent settlement throughout this period was Apache attacks. The adobe ruins of the church, later used as a ranch house, remain.

GUEVAVI MISSION RUINS - Nogales vicinity
Prehistoric-1775, Private
A Pima village became the site of a Spanish mission in 1701. A new plastered adobe church, of which some ruins remain, was built in 1751. The mission suffered from the Pima Rebellion that year but briefly revived. The community was abandoned by 1775 under pressure of Apache attacks.

JAMES FINLEY HOUSE - Harshaw
ca. 1880, Private House on Federal Land (U.S. Forest Service)
The red brick house with stone lintels and hand hewn redwood beams is one of a few remaining buildings in this former mining town. The house was originally an office for the mining company.

SANTA CRUZ COUNTY COURTHOUSE - Morley Avenue and Court Street, Nogales
1903, County

This Neo-Classic building has a central dome and stands on a hillside overlooking the city. The portico has four simple columns and a pediment with an elaborate bas relief.

PETE KITCHEN RANCH - Nogales vicinity
1860s, Private

This large prosperous establishment was probably the first permanent Anglo ranch in Arizona and was noted for its successful defense against Apache raids. Two old adobe buildings remain, one deteriorated and the other much altered.

STATE AND LOCAL RECOGNITION

The following sites are formally recognized at the state and local level. They are listed on the Arizona state inventory maintained by the State Historic Preservation Officer (SHPO). Sites marked with "NR" are listed on the National Register of Historic Places. Sites marked with "NHL" are National Historical Landmarks. The other sites are recognized as important enough to be on the state inventory, even though complete documentation may be lacking. Ownership, approximate dates of occupation, location, and a short description of each site is noted. The list is organized by counties within the study area. The numbers shown for some sites are keyed to numbers on inventory maps in the possession of the SHPO.

COCHISE COUNTY

1. FT. BOWIE NATIONAL HISTORIC SITE

   T. 15 S., R. 28 E., Sec. 12
   1862
   Ruins of fort established in 1862; the focal point of military operations against Geronimo and his band of Apaches.
   Federal

2. FT. BOWIE WATER SUPPLY SYSTEM

   T. 15 S., R. 29 E., Sec. 7
   circa 1860
   Exemplify water supply system used by U.S. military in the southwest during second half of 19th century. At Bear Spring there was an underground, rock lined reservoir which stored water before it was lifted to the fort by a hydraulic ram.
   Federal

3. BOWIE PEAK HELIOGRAPH SITE

   Fort Bowie National Historic Site vicinity
   1886, 1890
   The army heliograph system was used in Arizona during the final weeks of the Geronimo campaign of 1886. The station at Bowie Peak was necessary to relay messages to nearby Fort Bowie, which lacked the elevation to communicate with the other stations in the system. The line was abandoned in September 1886 but was occasionally reactivated against raiders. In 1890 an elaborate heliograph practice maneuver was staged using many of the original station sites.
   Federal (Bureau of Land Management)

4. COCHISE HOTEL

NR Cochise
1882 -
The hotel was built to accommodate travelers at the junction of the Arizona Eastern and the Southern Pacific Railroads. One room was used for the Wells Fargo office. The hotel is one-story adobe and frame and retains most of the original furniture and fixtures. The building is in excellent condition and is still in use as a hotel.
Private

5. DOS CABEZAS

Dos Cabezas
1878 -
The small community served a gold and silver mining area and once had three stamp mills and about 300 people. It declined gradually in the 20th century but still has a number of residents, mostly retirees and commuters. There are numerous adobe ruins.
Multiple private

6. EWELL SPRINGS

Dos Cabezas vicinity
Prehistoric, 1850s
The springs were used by the Bartlett boundary survey in 1851 and were the site of a station on Birch's overland stage route in 1857. Remains include numerous bedrock mortars, a stone corral, and an arrastra. The springs have been dry since the 1880's earthquake.
Unknown

7. SAN SIMON VILLAGE SITE

Bowie vicinity
500 - 300 BC
The site helped to define the San Simon branch of the Cochise Culture and is considered transitional between the Desert Tradition and the Mogollon Culture. The site included pithouses, storage pits, and metates. Excavated. Site only.
Private

8. GILLMAN HEADQUARTERS

Willcox vicinity
1880's
The ranch was first established in 1884 by G. H. Judd and later acquired by Gillman, a Graham County Supervisor. The house is of cut native stone with mud-chinked 18-inch walls. The site includes a rock stable.
Federal (Forest Service)

9. AEPCO 220

Willcox vicinity
Undated, prehistoric
Large dense lithic scatter site was apparently a chipping station, possibly used by a pre-ceramic culture.
State

10. AZ CC:13:6 (ASM)

Willcox vicinity
Undated, prehistoric
Sherd and lithic scatter site is located on a large sand dune. May have been an activity site of late Cochise people.
Private

11. JOHNSON

Benson vicinity
1882 - late 1920's
The town was founded to serve the Cochise Copper Company's Peabody Mine and was named after the general manager. Growth was fairly steady, reaching about 1,000 people by 1925. It died in the copper slump of the late 1920's. There are some ruins and foundations.
Private

12. RUSSELVILLE

Willcox vicinity
circa 1881 - 1883
The camp served the Peabody Mine belonging to the Russell Gold and Silver Mining Company and had a population of about 100 people. It was abandoned in 1883 when the town of Johnson was founded closer to the mine. Site only.
Private

13. TRES ALAMOS ARCHAEOLOGICAL DISTRICT

Benson vicinity
8th to 14th century
This agricultural village, which was abandoned in the 10th century and later reoccupied, was located on the frontier between the Mogollon and Hohokam cultures. Excavation by the Amerind Foundation in 1940-1942 revealed irrigation ditches, a ball court, pithouse compounds, burials, and granaries. The village was on a terrace above the San Pedro River floodplain.
Federal (Bureau of Land Management)

14. SOZA RANCH

Redington vicinity
1875 -
The ranch was established by a family which had been in Arizona since 1775. The site includes a mesquite bosque, adobe ruins, and an old corral.
Private

15. STEELE'S STAGE STATION SITE

Willcox vicinity
1874 - 1880's
The station was established by Thomas Steele to accommodate traffic to Fort Grant, Globe, Tres Alamos, and Tucson. It had the advantage of a permanent water supply. The station was abandoned when the railroad came. Site only.
Private

16. CONTENTION CITY

Fairbank vicinity
1879 - 1888
Three mills here served the Tombstone mines and were closed when the mines flooded and became unworkable. The population was about 200 at its peak. There are some adobe walls and a small cemetery.
Private

17. QUIBURI

NR Fairbank vicinity
circa 1200 - circa 1780
Prehistoric jacal structures have been found at this site, as well as remains from the Sobaipuri village of the 17th century and ruins of the 18th century Spanish presidio. By the late 17th century, the village was under repeated Apache attack which continued until both villagers and Spaniards were forced to abandon the area.
Private

18. FAIRBANK

Fairbank
1882 -
The town was established as a railroad supply station and stage terminal and was named for a businessman and mine owner.
Unknown.

19. TOMBSTONE AND VICINITY

LUCKY CUSS MINE

Tombstone vicinity
circa 1880 - 1930's
The Lucky Cuss was one of Ed Schieffelin's early profitable mining claims in the Tombstone area. His strikes started a silver rush and created the boomtown of Tombstone. The mine was purchased by Eastern capital and continued in production until 1911 when the cost of pumping water became prohibitive.
Private

SACRED HEART CHURCH

6th and Safford Streets, Tombstone
1881, 1882, 1947
The 1881 adobe church and the 1882 frame church are still in use but have been supplanted for worship use by the 1947 cement block building.
Private

ST. PAUL'S EPISCOPAL CHURCH

NR Safford and Third Streets, Tombstone
1882 -
The rectangular plastered adobe church has a bell tower, stained glass windows, and an exposed wooden truss system. The original pews and ceiling lamps are still in place. A driving force in the early years of the church was Endicott Peabody, founder of Groton School.
Private

TOMBSTONE CITY HALL

NR 315 East Fremont, Tombstone
1882 -
The two-story red brick building is still in use by the city. The interior has been remodeled. The ground floor is a fire station with three arches over recessed doors. Exterior decorations include entablature and frieze, a roof pediment, and urns. Building trim is white woodwork.
Municipal

TOMBSTONE COURTHOUSE

NR Third and Toughnut Streets, Tombstone
1882 -
The building was the county courthouse until the county seat was moved to Bisbee in 1929. The two-story, red brick, cruciform building has white stone quoins, a cupola, and pedimented gable ends. The front porch has two pillars and two pilasters. It is a state historic park.
State

TOMBSTONE HISTORIC DISTRICT

NR Tombstone
NHL 1870's
Tombstone silver made this the major community of the county for several years. The town boomed after Ed Schieffelin's strike in 1877 and its heyday is recalled in the mixture of fact and legend surrounding the gunfight at the OK Corral. The town declined sharply when the mines filled with water. Some of the buildings have been restored.
Multiple public and private

TOUGHNUT MINE

Tombstone vicinity
1880 - 1930's
The mine was one of Ed Schieffelin's early claims which led to the Tombstone silver boom.
Private

BUFORD HOUSE

NR (Part of Tombstone NHL)
1880
Built in an early transitional Sonoran style. Owned by George Buford, a prominent mine owner and businessman. Noted sheriff also occupied the house from 1919-1931.
Private

20. COCHISE WEST STRONGHOLD

Dragoon Mountains
1860's - 1870's
The Chiricahua Apache stronghold was an easily defended, fortress-like, natural setting characterized by huge boulders and was a favorite base of Cochise. In the 1870's it became part of the shortlived Chiricahua reservation.
Federal (Forest Service)

21. COUNCIL ROCKS

Dragoon vicinity
1872
President Grant's "Peace Policy" led to a meeting here between General O. O. Howard and Cochise at which a treaty was arranged with the Chiricahua Apache. A reservation was established with Tom Jeffords, personal friend of Cochise, as Indian agent.
Federal (Forest Service)

22. DRAGOON SPRING STAGE STATION

Dragoon vicinity
1858 - 1862, 1872
A Butterfield stage station operated here for four years. Portions of some walls and a small graveyard remain. In 1872 General Howard met with Apache leaders here to establish the boundaries of the new Chiricahua reservation.
Federal (Forest Service)

23. ROCKFELLOW-SHAW HOUSE

Cochise Stronghold
1890's
The original one-room adobe is incorporated into this stone and cement house which stands on the favored campsite of Cochise and his Chiricahua.
Federal (Forest Service)

24. MIDDLEMARCH

Pearce vicinity
circa 1898 - 1919
This copper mining camp of approximately 100 people was apparently named for its location midway between Fort Bowie and Fort Huachuca. There are some ruins.
Federal (Forest Service)

25. GLEESON

Gleeson
1900 -
The mining camp was named for John Gleeson of the nearby Leonard Copper Mine. By 1909 there were about 500 people here. Much of the town burned in 1912 and was rebuilt. It declined gradually after World War I. There are several adobe ruins. Some residents live in the remaining buildings.
Multiple private

TURQUOISE

Tombstone vicinity
1870's - 1890's
The mines in this area yielded copper, lead, and silver, as well as turquoise. Some mining of turquoise had been done by Indians previously. The town died about 1894 and was briefly reoccupied in 1896. Site only.
Private

26. COURTLAND

Pearce vicinity
1909 - 1940's
A copper camp was established here and boomed for about ten years, reaching a population of 2,000 before it gradually declined and died in the 1940's. Some ruins remain.
Private

27. COMMONWEALTH MINE

Pearce vicinity
1894 -
Over one million tons of ore were produced here before the mine closed in 1930. The strike was made by John Pearce, a local rancher.
Private

PEARCE

Pearce
1896 -
Gold and silver deposits discovered by James Pearce led to the opening of the Commonwealth Mine and Mill. The town grew to a population of 1500. When the mine closed in the 1930's, the town dwindled, but several houses remain and the general store is still in business.
Multiple private

PEARCE GENERAL STORE

NR Pearce
1893 -
The old adobe general store has an embossed metal ceiling and store front. Most of the original fixtures are still in use. There is a wagon yard on one side of the store and a warehouse in the rear. In front is an old gravity feed gas pump.
Private

28. CAMP JOHN A. RUCKER

Rucker Canyon
1878 - 1880
Rucker died while trying to rescue a fellow lieutenant in a flooded stream. The camp served as one of the main supply points during the Apache campaigns. Geronimo, Juh, and 119 Apache surrendered here in December of 1879. Several companies of Indian scouts used the camp until late 1880. It was reopened during the summer of 1886 for the final Geronimo campaign. The adobe bakery still stands and several foundations remain.
Federal (Forest Service)

29. CIMA CABIN

Chiricahua Peak vicinity
1930's
The Forest Service built this cabin for administrative use. All materials had to be made on the site or brought in by pack horse. It is constructed of pine logs and is approximately 26 feet by 33 feet.
Federal (Forest Service)

30. PARADISE

Paradise
1901 -
The mining camp diminished after the mines closed in 1907 but still has some residents.
Multiple private

31. GALEYVILLE

Portal vicinity
1880 - circa 1900
This Chiricahua Mountain silver town was established by John Galey and had a population of 400 but lasted only two years. It was notorious as a hangout for cattle rustlers. The buildings were dismantled about 1900 and used in the town of Paradise.
Private

32. HILLTOP

San Simon vicinity
1913 - circa 1926
This shortlived mining camp had two locations: the northwest side of Shaw Peak (1913) and the northeast side (1917). The Hilltop Mine opened in the 1880's and gradually declined in the 1920's. There are some ruins.
Federal (Forest Service)

33. STAFFORD CABIN

NR Chiricahua National Monument
1879 -
The simple log structure received some frame additions after 1930. The original cabin is chinked with adobe and has a stone fireplace and chimney at one end. Stafford had a truck garden in the clearing around the cabin and sold produce to Fort Bowie.
Federal (National Park Service)

34. FARAWAY RANCH HISTORIC DISTRICT

NR Chiricahua National Monument
circa 1879 - 1977
This district includes elements of archaeology, architecture, and history. Its significance is based on those elements and its associations with events and persons important in history.
Federal

35. DOUGLAS MUNICIPAL AIRPORT

NR Douglas
1938 -
Douglas was important to early aviation in Arizona. The first landing was in 1911, and military aircraft flew out of Douglas for several years after 1916. The airport was one of the stops on the first transcontinental airmail route in 1930. The runway extended into Mexico until erosion made the Mexican portion of the runway unusable.
Municipal

36. SAN BERNARDINO RANCH

NR Douglas vicinity
NHL circa 1884
Famed Arizona lawman John Slaughter established his ranch on the site of an early shortlived Mexican hacienda. Two stone buildings of the Slaughter period remain and traces of the adobe hacienda structures.
Private

37. GERONIMO SURRENDER SITE

Skeleton Canyon
1886
This flat area on the east bank of Skeleton Canyon was the site of the final surrender of Geronimo, an event which also signaled the end of serious Indian depredations in Arizona.
Federal (Forest Service)

38. EL PASO & SOUTHWESTERN RAILROAD DEPOT

Douglas
1913 -
The depot is significant both architecturally and historically. It was built in the Beaux-Arts design. The building served as a "flagship" depot and was the largest and most magnificent depot owned by the El Paso & Southwestern Railroad.
Private

EL PASO & SOUTHWESTERN RAILROAD Y.M.C.A.

Douglas
1905
This building is significant in its representation of the Mission Revival style, in its construction by the El Paso & Southwestern Railroad for the benefit of the public, and in its role as a local landmark in Douglas for over 77 years.
Private

GADSDEN HOTEL

NR 1046 G Avenue, Douglas
1929 -
The five-story concrete and steel building was designed by prominent Southwestern architects, Trost and Trost. The hotel is particularly noted for its ornate lobby which has a marble staircase and pillars, a carved plaster ceiling decorated with gold leaf, and a Tiffany stained glass window with a desert scene. Like the original Gadsden Hotel on the same site, it has been the social and economic center of the area and has witnessed millions of dollars worth of mining and cattle transactions. The hotel derives its name from James Gadsden, who negotiated the 1853 treaty bringing this portion of Arizona into the Union.
Private

GRAND THEATRE

NR 1139-1149 G Avenue, Douglas
1919 -
This classical revival building has a marble-walled lobby and an elaborately decorated interior. The theater played an important role in the cultural life of the town until it was closed in 1962. Local groups are working to restore it for community use.
Private

DOUGLAS JEWISH CEMETERY

Douglas
1904 -
This small cemetery contains about 30 graves and is now abandoned. There has been some vandalism. It is one of the earliest Jewish cemeteries in the state.
Private

39. DOUBLE ADOBE SITE

NR Douglas vicinity
NHL circa 7000 BC
The people of the Cochise Culture, who inhabited much of the Southwestern United States and Northern Mexico, fashioned stone weapons with which they killed now-extinct varieties of mammoth, bison, and horse. Human artifacts in conjunction with bones of these extinct animals were found at this site.
Private

40. LAVENDER PIT MINE

Bisbee
1951 - 1975
Harrison Lavender of Phelps-Dodge conceived the plans and techniques for this mine which was named for him after his death in 1952. The pit covers 213 acres and is 1000 feet deep. In its first year of production, it produced nearly 60 million pounds of copper.
Private

41. BISBEE HISTORIC DISTRICT

Bisbee
1877 -
Until recently, Bisbee was the hub of one of the most productive copper districts in the state. Most of the buildings in the historic section of Bisbee were built between 1895 and 1915, but the mining camp began in 1877. The town is strung along a winding steepsided canyon and its side gulches. The most important concentrations of brick commercial buildings are in Brewery Gulch and Tombstone Canyon.
Multiple public and private

BISBEE WOMAN'S CLUB CLUBHOUSE

74 Quality Hill, Bisbee
1902
This building has been associated with the Bisbee Woman's Club since its construction in 1902. The Club has been instrumental in civic improvements in the area. This clubhouse is the oldest continually used clubhouse in Arizona.

MUHEIM HOUSE

207 Youngblood Hill, Bisbee
1898 -
Joseph M. Muheim, prominent Bisbee merchant, banker, builder, and investor, built this unusual house for his bride. A semi-circular porch and circular parlor are topped by a cone-shaped tower.
Municipal

PHELPS-DODGE GENERAL OFFICE BUILDING

NR Main Street and Brewery Gulch, Bisbee
1890's
The two-story, red brick building has two 3-sided bays and a gable roof. The main entry and the windows are arched in white brick. Ceilings and walls are narrow tongue and groove. The building housed the general offices of the Phelps-Dodge copper interests. The mines have closed and the building is being rehabilitated as a mining museum.
Municipal

42. NACO MAMMOTH-KILL SITE

NR Naco vicinity
circa 8000 BC
The site is of great importance in establishing the range and date (10,000-11,000 years ago) of prehistoric peoples in Arizona who belonged to the Big Game Hunting tradition. Eight Clovis points were found among the remains of the Naco mammoth. The climate was then more humid than at present. What is now dry wash was then a marsh or bog and a thick clay gradually settled over the bones and preserved them.
Private

43. LEHNER MAMMOTH-KILL SITE

NR Hereford vicinity
circa 9000 BC
Human artifacts were found in conjunction with the remains of nine Columbian mammoth, as well as extinct horses, bison, and tapir. The artifacts include thirteen Clovis points and eight cutting and scraping tools. Radiocarbon dating gives a time of 11,000 to 12,000 years ago. The culture was characterized by big game hunting.
Private

44. GARCES

Sierra Vista vicinity
1901 - 1926
This small mining camp changed its name several times but not its fortunes, for it never had more than 100-200 people and finally expired in 1926. Site only.
Private

45. MONTEZUMA SCHOOL HOUSE

Hereford vicinity
1914 - 1922
This shortlived school served a small rural community. Ruins of the adobe and brick walls remain.
Private

46. CORONADO NATIONAL MONUMENT

NR — International boundary
1540 - 1542
This memorial commemorates the entrance of the Coronado expedition into what is now the United States. The exact location of the entrance was probably farther east along the San Pedro River.
Federal (National Park Service)

47. CORONADO NATIONAL MONUMENT COCHISE CULTURE ARCHAEOLOGICAL DISTRICT

Coronado National Monument and vicinity
Prehistoric
The district consists of scattered Cochise Culture sites, none of which has been excavated.
Federal (National Park Service and Forest Service)

48. GARDEN CANYON ARCHAEOLOGICAL SITE

NR — Sierra Vista vicinity
Prehistoric
This undated and largely unexcavated site includes a village with both pithouses and above-ground masonry dwellings, as well as bedrock mortars and burials.
Federal (Department of the Army)

49. GARDEN CANYON PETROGLYPHS

NR — Sierra Vista vicinity
Prehistoric
The petroglyphs are carved in the roof of a shallow limestone cave in a bluff several hundred feet above the floor of the canyon.
Federal (Department of the Army)

50. FRY HOMESTEAD

Sierra Vista
circa 1900
This structure is associated with the Fry family of Sierra Vista. This family influenced the early history of both Sierra Vista and Ft. Huachuca.
Private

51. FT. HUACHUCA WORLD WAR II MOBILIZATION BUILDINGS

Ft. Huachuca
circa late 1930's
These buildings served as barracks for more than eight million soldiers in the early 1940's. One of the contractors hired to build these barracks was Del Webb. This complex served as an early training program for troops before overseas assignments.
Federal (U.S. Army)

52. OLD FORT HUACHUCA

NR Sierra Vista vicinity
1877 -
Fort Huachuca was established in 1877 near the end of the period of Indian wars. The post was intended to protect local settlers and was important in the final Apache campaigns of the 1880's. Troops from Fort Huachuca participated in the pursuit of Pancho Villa into Mexico in 1916. The old post area includes several late 19th century adobe family quarters, frame barracks, and other buildings. The interiors have been remodeled.
Federal (Department of the Army)

53. BATTLE OF THE BULLS

Charleston vicinity
11 December 1846
This site in the narrows of the San Pedro River was the scene of the only "engagement" during the long trek of the Mormon Battalion in 1846. The troops were scouting for a wagon trail between Santa Fe and California during the Mexican War and were charged by several wild bulls from herds abandoned by Mexican ranchers some years before.
Private

54. CHARLESTON-MILLVILLE

Tombstone vicinity
1870's - 1880's
Mills were established here by the San Pedro River to process ore from the mines at Tombstone. The community was noted for its lawlessness. There are some adobe ruins and a small cemetery.
Private

55. BABOCOMARI SITE

Fairbank vicinity
17th century
The earliest known settlers here were Sobaipuri. Sometime before 1811, the Spanish began mining and cattle raising in the area. After Mexican independence, it became part of a huge ranch with 40,000 head of cattle. Anglo settlement before the Civil War was discouraged by Apache attacks, but by 1880 it was again devoted to cattle ranching.
Private

56. SUNNYSIDE

Fort Huachuca vicinity
circa 1887 - 1890's
The town served the Copper Glance Mine in the Huachuca Mountains and was inhabited by a small religious colony under Samuel Donnelly. Money from the mine was held by the community in common, and the members ate in a community dining hall. The camp continued after Donnelly's death but disbanded when the mine had to close.
Private

57. HAMBURG

Sierra Vista vicinity
circa 1906 - 1920
The town was named for its founder, Henry Hamburg. The population of approximately 150 people served the local mines. Site only.
Private

58. ARNOLD HOTEL

216 Third Street, Benson
1880 -
The sixteen-room, one-story, frame hotel has been somewhat altered but still retains many of the original fixtures and some of the birdseye maple furniture. Walls and ceilings are 2-inch tongue and groove. A veranda nearly surrounds the building.
Private

OLD BENSON CEMETERY

7th Street near Gila Street, Benson
circa 1880
Benson's first cemetery remained in use until 1948. Pioneer Billy Fourr is buried here along with most of Benson's early settlers. There are numerous stone markers and wrought-iron fences.
Municipal

BENSON DEPOT

Between 3rd and 4th Streets, San Pedro and Huachuca Streets, Benson
circa 1880 -
The town was created by the coming of the east-west railroad to Southern Arizona. This small frame building is one of the few original depots remaining in the state. The hipped-roof structure is painted the usual Southern Pacific gold with brown trim. The building has been moved and is now being restored as a museum.
Private

BENSON SCHOOL BUS

Benson High School, Benson
1914 -
The black horse-drawn carriage with pull-down shades and 8-10 student capacity was in use until about 1920. It occupies a display shelter on the high school grounds.
Municipal

BENSON SMELTER RUINS

Highway 86, Benson
1904 -
The unexpected closing of the Tombstone mines caused the abandonment of the new smelter, of which only the foundation ruins remain.
Private

OHNESORGEN STAGE STATION SITE

Benson vicinity
circa 1871 - 1883
In 1871 William Ohnesorgen took over a previous stage station situated on the south bank of the San Pedro River. In 1878 he built a toll bridge which washed away in a flood in 1883. Site only.
Private

REFORM SCHOOL GYMNASIUM AT BENSON

Benson High School, Benson
circa 1900 -
This brick building, which has been stuccoed, was part of Arizona's first reform school. In 1913 the school was transferred to Fort Grant and the building has since been used by the public high school.
Municipal

59. RAILROAD AVENUE DISTRICT

Willcox
1877 -
A camp for men working on the railroad was established at the present site of Willcox in 1877. In 1880 the camp was named for General O. B. Willcox, then commanding officer at nearby Fort Grant. That same year, adobe and frame houses were constructed, and in the spring of 1881, the townsite was surveyed. The first train from San Francisco came through on March 20th of that year. Townsite lots were sold in 1883. Most of the buildings in the district date from the 1880's and 1890's and are constructed of a variety of materials, including adobe, frame, and brick.
Multiple private

GRAHAM COUNTY

1. TURKEY CREEK CLIFF DWELLING AND STORAGE STRUCTURE

Klondyke vicinity
1200 - 1400 AD
The one-room mud and stone dwelling is under a cliff overhang and has an unusual A-type roof. The storage structure is some distance away. Both were probably Salado culture.
Federal (Bureau of Land Management)

2. ARAVAIPA ARCHAEOLOGICAL DISTRICT

Klondyke vicinity
Prehistoric
The beautiful canyon contains numerous cliff dwellings, caves, and village sites. No thorough archaeological survey has been made here.
Multiple public and private

3. BLACK ROCK SHELTER

Fort Thomas vicinity
circa 1100 - 1400 AD
The small adobe-walled shelter in a cave is unusual for this area. Cultural affiliation may be Hohokam and/or Salado.
Federal (Bureau of Land Management)

4. BLACK ROCK ADOBE SITE

Fort Thomas vicinity
circa 1100 - 1450 AD
Adobe wall ruins mark this Hohokam-Mogollon dwelling under a cliff overhang.
Federal (Bureau of Land Management)

5. FORT THOMAS

Fort Thomas vicinity
1876 - 1892
A neglected cemetery and some adobe ruins remain of this frontier fort which served as a base for campaigns against the Apache. The area is dry and desolate and the post was plagued by malaria and typhoid, making it one of the West's least pleasant duty stations.
Private

6. REDLAND SCHOOLHOUSE

Fort Thomas vicinity
1916
The school was built to serve an increased population due to expanded irrigation. The one-story building was constructed of El Paso brick and has a truncated hip roof and two arched windows in front. It has not been used for several years.
Private

7. INDIAN HOT SPRINGS AND INDIAN HOT SPRINGS HOTEL

Fort Thomas vicinity
1903
The hot springs here had evidently been used since prehistoric times. The spot was popular with the military personnel at nearby Fort Thomas in the 1870's and 1880's. Various proprietors constructed small buildings to accommodate health seekers before the imposing three-story brick hotel was built in 1903. The generally Victorian style building has double verandas, third floor dormers, and an imposing square tower. It is no longer open to the public.
Private

8. AZ CC:1:19 (ASM)

Eden vicinity
circa 900 - 1375 AD
The pueblo ruin consists of a large mound and several satellite mounds covering from 50 to 100 rooms. The walls were of coursed river rock and the village stands about one-half mile from the Gila River. The culture was probably Salado.
Federal (Bureau of Land Management)

9. MAMMOTH TUNNEL

Pima vicinity
1899 - 1908
Thomas McEniry of Texas had this tunnel opening dug as part of a stock fraud scheme. Supposedly, the tunnel would be ten miles long and would connect the Sulphur Springs Valley and the Safford area and carry water from a fictitious underground reservoir for irrigation. The site consists of a large opening tapering to a point within a few hundred yards.
Federal (Forest Service)

10. BRYCE HOUSE

Bryce
1897
This simple brick house was built by the discoverer of Bryce Canyon. There are four rooms above ground and a full, stone-lined basement with an outside entrance. The roof is shingled. The house has fallen into disrepair but is basically sound. It is not occupied.
Private

11. AZ CC:1:2 (ASM)

Bryce vicinity
Prehistoric
This large prehistoric agricultural area includes twelve waffle gardens on high rocky ground. The undated site may be Salado.
Federal (Bureau of Land Management)

12. FOOTE WASH - NO NAME WASH ARCHAEOLOGICAL DISTRICT

Solomon vicinity
Possibly 5000 - 500 BC, but mostly circa 900 - 1250 AD
The district consists of several small temporary camps, cobble hearths, check dams, and chipping stations. There are indications of use during the Archaic period.
Multiple public and private

13. SOLOMON DISTRICT

Solomon
1873
I. E. Solomon settled here to provide charcoal for the smelters at Clifton and eventually acquired land and commercial enterprises, including what became the Valley National Bank. The town served as county seat from 1883 to 1915. Solomon was the first treasurer of Graham County.
Multiple public and private

14. AEPCO 79

Sanchez vicinity
900 - 1100 AD
This large habitation site was apparently based on flood plain agriculture. Artifacts indicate a cultural mix, possibly late San Simon branches of Mogollon.
Private

15. PUEBLO VIEJO

San Jose vicinity
14th century
The ruins of this large compound with ballcourt, reservoir, and canals are thought to have been seen by the Spanish in 1540. There is speculation that this is the Chichilticalli ruin referred to by Coronado's expedition. The site includes several burials.
Private

16. AEPCO 56

Buena Vista vicinity
? - 1300 AD
The large village site was probably a late Salado agricultural community, possibly a satellite of a larger Buena Vista site nearby.
Private

17. KEARNY CAMPSITE AND TRAIL

NR Safford vicinity
1846
General Stephen Watts Kearny and 100 dragoons from the Army of the West camped at the junction of Bonita Creek and the Gila River during the march from Fort Leavenworth to California in the Mexican War. Their guide on this portion of the journey was Kit Carson. A monument has been erected at the site.
Federal (Bureau of Land Management)

18. BONITA CREEK CLIFF DWELLING

Safford vicinity
circa 1000 - 1300 AD
The one-room stone masonry dwelling is of unknown cultural origin.
Federal (Bureau of Land Management)

19. EASTERN ARIZONA COLLEGE OLD ADMINISTRATION BUILDING

616 Church Street, Thatcher,
1908
The College was founded by early Mormon pioneers who arrived in Thatcher in the late 1880's. This building was the first major building built on the campus and was the sole educational facility of the college until 1918. The original building was severely damaged by fire and recently replaced with an entirely new structure.
State

BRINKERHOFF HOTEL

206 College, Thatcher
circa 1898
The two-story, brick building has a symmetrical plan and was built by pioneer, Hyrum Brinkerhoff, who settled in Thatcher in 1883. It is now a residence.
Private

20. LOWER MARIJILDA CANYON RUIN

Safford vicinity
circa 1100 AD
The inhabitants were apparently members of the San Pedro branch of the Mogollon culture. The site stands on a cobble flood plain and is not defensive. There are several groups of cobble-walled pueblos, some plazas, and a kiva.
Federal (Forest Service)

21. AEPCO 206

Safford vicinity
Undated Prehistoric
Multiple activity area appears to have been intensively used by the Chiricahua Cochise people approximately 4000 years B.P.
Federal (Bureau of Land Management)

22. AEPCO 207

Safford vicinity
Undated Prehistoric
Bedrock mortars and dense sherd and lithic scatter mark this activity site apparently used by Chiricahua Cochise peoples approximately 2000 B.P.
Federal (Bureau of Land Management) and State

23. AEPCO 208

Safford vicinity
Undated Prehistoric
This small lithic scatter site has yielded unidentified projectile points. The site may be associated with other sites in the area which have been tentatively identified as Chiricahua Cochise.
State

24. FORT GRANT

Bonita vicinity
1872
The fort was a base for Apache campaigns in the 1870's and 1880's and became a state industrial school in 1913. It is now a minimum security facility for adult prisoners. During the Indian wars, three troops of cavalry and two companies of infantry were stationed here. Most of the buildings were adobe. The two-story residence of the commanding officer, with mansard roof and veranda, is still standing. The military post was abandoned in 1895.
State

25. SIERRA BONITA RANCH

NR
NHL
Bonita vicinity
circa 1872
Adobe ranch buildings constructed on the site of an earlier hacienda were headquarters for one of the largest and most successful ranches of the territorial period. The interior of the large adobe residence has been remodeled. The ranch was established by Henry C. Hooker, who made a fortune supplying beef to the numerous military posts in Arizona during the Apache wars.
Private

26. POWER'S CABIN

NR
Galiuro Mountains
1918
Draft evasion and other disputes led to a gunfight at this remote cabin. Three lawmen and Tom Power were killed in the shootout. The one-room cabin with stone chimney is badly deteriorated.
Private (within Forest Service land)

27. GRAHAM COUNTY COURTHOUSE

Main Street and 8th Avenue, Safford
1916
This two-story, buff, brick building is the fifth courthouse for Graham County. It is built on a symmetrical plan in Neo-classical style with columned portico and dentiled pediment and cornice.
County

CLIFFORD HOUSE

Relation Street between 12th and 14th, Safford
1897
The two-story, rectangular, brick house has a front porch, gabled roof, and frame additions. It was the home of W. H. Clifford, who was a prominent local rancher and businessman.
Private

JACOBSON BUILDING

8th Street and 8th Avenue, Safford
1895
The two-story, brick building originally had a general store on the first floor. The second floor, which had an outside entrance, was used for dances, meetings, and church services. The first and second floor porches have been removed and the building is badly deteriorated. Jacobson and his sons were active in many local business ventures. This building has been razed and the rubble removed.
Private

MORRIS HOUSE

Second Street and 8th Avenue, Safford
1882
This one-story, adobe home is probably the oldest remaining building in the Safford area. It was built in 1882 as a residence by a family from Missouri. In 1885 it was sold to the Chiricahua Cattle Company, which used it to house cowboys. Since 1911 it has been a private residence.
Private

OLNEY HOUSE

1104 Central, Safford
1900
George Olney, prominent Graham County businessman and politician, built this handsome two-story, brick house with verandas and paired columns. The house now occupies a city lot but originally had large rose gardens, corrals, and outbuildings.
Private

PACKER HOUSE

1203 Central, Safford
1909
The one-story, brick house with gable hip roof has been painted white. It was built by early Safford resident, Alonzo Packer.
Private

PORTER HOUSE

126 19th Street, Safford
circa 1886
The six-room, one-story, brick house has had few alterations since it was built for the James Henry Porter family. Porter had a small cattle ranch and a freighting business between Willcox and Globe. The house was set back from the road to allow room for the freight wagons.
Private

RIDGWAY HOUSE

928 Central, Safford
circa 1906
The one-story, grey stone house with cross gable roof originally had only three rooms but was added onto shortly after Ridgway purchased it in 1907. Ridgway was a partner in a local mercantile company.
Private

ROLLINS HOUSE

Bowie Highway, Safford
1880's
The two-story, white brick house with veranda and covered balcony is constructed on a square plan and has a hipped roof. The house is badly deteriorated. Rollins' daughter, Maggie, married famed lawman, Tom Rynning.
Private

SAFFORD CITY HALL

717 Main, Safford
1898
The building was originally a two-story, red brick school with a belfry. The city acquired the symmetrical plan building in 1945, narrowed the windows, stuccoed the exterior, and began its present use as a city hall. The belfry has been removed.
Municipal

WELKER HOUSE

1127 Central, Safford
1910
The two-story, grey brick house has a high hipped roof, front porch, side bay window, and dormers. It was apparently the first Safford house to have electricity. Welker had many business interests, including a 1906 flume to carry lumber from the Pinaleno Mountains.
Private

KIMBALL HOUSE

1400 Eighth Avenue, Safford
1935
This was the home of Spencer W. Kimball, recently deceased president of the Church of Jesus Christ of Latter-Day Saints.
Private

GREENLEE COUNTY

1. APACHE GROVE

York vicinity
1880's
Apache war parties frequented this cottonwood grove by the Gila River and occasionally attacked settlers and travelers during the 1880's. The site is now occupied by a trailer court.
Private

2. GILA RIVER CONCRETE ARCH BRIDGE

Clifton vicinity
1918-1919
This bridge is significant in its thematic standing in the Arizona Concrete Arch Bridge study. It represents (as a group) the highway engineering of an era.
County

3. CLIFTON-CASA GRANDE BUILDING

NR Park Avenue, Clifton
1870's
The white-stuccoed, one-story adobe was one of the first buildings in Clifton. It was built by Henry Lesinsky, who established the first successful mining operations in the area and was largely responsible for the early development of the town. The building has been flooded several times by the San Francisco River and has been somewhat altered. It is now partially restored and in use as a museum.
Private

CHASE CREEK DISTRICT

Clifton
1890's
This commercial district boomed just after the turn of the century. Some of it was destroyed by fire in 1913 and was immediately rebuilt. Many of the buildings are vacant, but the narrow winding street still retains much of its original character.
Multiple public and private.

CLIFTON JAIL

Route 666, Clifton
1870's
The unusual cliff-face cave jail was dug out circa 1878. It contains two cells and was in use until the disastrous flood of 1906. In 1929 it was cleaned out and a stone entryway was added. It now serves as a tourist attraction.
Municipal

EASTSIDE DISTRICT

East Clifton
1870's
Eastside was the original business and residential district of Clifton. The oldest remaining building is the "Casa Grande Building" built by mine owner Henry Lesinsky in 1873 and is now a museum. The district was frequently flooded because of its position on the East bank of the San Francisco River, but several turn-of-the-century business buildings and some frame hillside residences remain.
Multiple public and private

NORTH CLIFTON DISTRICT

Clifton
1880's
This early Clifton residential district retains much of its original character and its modest single family homes. The district stretches along the winding west bank of the San Francisco River.
Multiple public and private

PHELPS-DODGE GUEST HOUSE

Route 666, Clifton
1912
The English-style, two-story house with English garden serves the company's guests. The light stucco house has a truncated hip roof and dark timber trim.
Private

SHANNON HILL DISTRICT

Clifton
1901
The district derives its name from the Shannon Copper Company smelter constructed there in 1901. A cluster of houses for company employees grew up around the smelter which is now in ruins. Some of the original houses remain but most have been altered or torn down.
Multiple private and public

SOUTH CLIFTON DISTRICT

Clifton
1890's
The district, which is primarily residential, lies in a relatively level area of a bend on the San Francisco River and is divided by the railroad and the main highway. The land was subdivided about 1898 and has retained most of its original residences, many of which are brick.
Multiple public and private

PATTERSON ROAD THROUGH TRUSS WAGON BRIDGE

Clifton
Built 1905, moved 1917
This is perhaps the oldest surviving highway bridge in Arizona. Originally designed for horse and carriage traffic, the bridge was subsequently relocated when increasing numbers of automobiles threatened it. It is a rare style of bridge in Arizona. Originally it stood at Park Avenue in Clifton.
Municipal

PARK AVENUE THROUGH TRUSS HIGHWAY BRIDGE

Clifton
1918
As the only connection between east and west Clifton, this bridge is a vital link in the economic and social life of the city. Also this is the first bridge built in Clifton that accommodated two-way automobile traffic.
Municipal

4. DELL POTTER RANCH HOUSE

NR Clifton vicinity
circa 1900
This well built, Southern style house with Mission parapet was once a showplace surrounded by orchards. Repeated floods have destroyed the fruit trees and the elaborate watering system. Potter was an imaginative and rather flamboyant entrepreneur with a wide variety of financial interests.
Private

5. OROVILLE SITE

Clifton vicinity
1880's
Chinese laborers imported to work in the copper mines settled on this fertile flat in a curve of the San Francisco River and began a truck farm. Eventually almost all of the Chinese in the area were harassed out of the district. A small farm now occupies the site.
Private

6. METCALF LOCOMOTIVES

Metcalf vicinity
1879
The baby gauge locomotives were installed as an economy measure. Indian thefts of burros and mules made pack trains too expensive. Eventually five of the little engines were employed in the Clifton-Morenci area. Three of these have been abandoned on a mountain near the old Coronado Incline.
State

7. BILLINGSLEY HOME

202 Main Street, Duncan
1898 - 1901
This house was built and owned by B. F. Billingsley, a leading citizen and merchant in Duncan. It was the first house in Duncan to have electric lights and stove.
Private

AZ CC:8:3 (ASM)

Duncan vicinity
circa 400 - 1000 AD
This site is significant for its integrity and for the important information it might yield on the mixture of Mogollan, Salado, and Hohokam cultural traits that appear in the southeastern area of Arizona.
State

AZ CC:8:4 (ASM)

Duncan vicinity
circa 100 - 400 AD
This site is significant for its integrity and for the information it could yield on an understanding of prehistoric cultural dynamics operating throughout this portion of southeastern Arizona.
State

PIMA COUNTY

1. LA OSA RANCH

Sasabe vicinity
1885
This early Anglo ranch may have been a Spanish land grant. It was later a guest ranch. There are conflicting stories about the origin of the name.
Private

2. ARIVACA

Arivaca
Prehistoric
Pima, Spanish, and Anglo settlements here were based on agriculture, stock raising, and mining. Several buildings from the early Anglo period remain.
Multiple private

3. CERRO COLORADO DISTRICT

Arivaca vicinity
18th and 19th centuries
The district was the scene of mining activity by Spanish, Mexican, and Anglo pioneers. The silver deposits were first noted in 1750 and were worked on a small scale during the Spanish and Mexican periods. An Anglo mining company took over in 1857 but had to abandon operations when the protection of federal troops was withdrawn during the Civil War.
Private

4. THEODORE WELISH HOUSE

Lower Madera Canyon
circa 1880
A family graveyard is associated with the adobe ruins of this early pioneer house.
Federal (Forest Service)

5. GREATERVILLE

Greaterville
1874
The placer gold mining town is now a rural village. It reached a population peak of 500 people before the ores diminished in the 1880's.
Private

6. EMPIRE RANCH (English Boys' Ranch)

NR Greaterville vicinity
1870's
Walter L. Vail (1852-1906) began a vast land and cattle empire here in partnership with two young Englishmen. The original adobe ranch house remains in use. It is a single-story, four-room zaguan type with some additions.
Private

7. MATTY CANYON ARCHAEOLOGICAL DISTRICT

Cienega Creek vicinity
circa 1 AD
The site includes a Cochise culture pithouse. Partial excavation of the arroyo banks has revealed a late preceramic stage of that culture.
Private

8. ROSEMONT

Sonoita vicinity
1870's - circa 1910
The copper mine was located by L. J. Rose and William McCleary, who established the Rosemont Smelting and Mining Company. Debts forced them to sell out to the Lewisohn's of New York. The town had approximately 150 people. Site only.
Federal (Forest Service)

9. HELVETIA

Continental vicinity
1880 - 1911
The copper mines in this district have been worked intermittently. They were purchased by a New Jersey firm in the 1890's but had to close in 1911 when copper prices fell too low.
Federal (Forest Service)

10. TOTAL WRECK

Pantano vicinity
circa 1879 - 1884
John Dillon located this silver/lead mine in 1879 and named it for the appearance of the ledge. In 1881 it was acquired by the Empire Mining and Development Company, which built a 70-ton mill and established a town of about 200 people. The mine and mill closed in 1884 and the town folded.
Private

11. CIENEGA SPRINGS STATION

Pantano Wash vicinity
1858 - 1862
The Butterfield Overland stage station at this site was abandoned during the Civil War and reactivated afterwards. The buildings were destroyed by Apache in 1870. It has not been excavated.
Private

12. CIENEGA CREEK CONCRETE ARCH HIGHWAY BRIDGE

Tucson vicinity (rural)
1920 - 1921
This bridge is significant in its contribution to the Arizona Concrete Arch Highway Bridge Thematic Study. When completed, it was a major link in the Tucson-Benson-Bisbee Highway.
County

13. COLOSSAL CAVE

Vail vicinity
1884
The cave is possibly the longest dry cave in the world and was the scene of a hideout by four robbers in 1884. It is now a park. The cave was created about 40 million years ago by seepage of a river. About 700 years ago the river dried up.
State

14. RINCON MTS. FOOTHILLS ARCHAEOLOGICAL DISTRICT

NR Saguaro National Monument
circa 3000 BC - 1450 AD and 1800 AD - Present
The approximate 110 sites in the District represent a wide variety of site types and time phases, including historic periods which have yielded basic data at a local level of significance.
Federal

15. FREEMAN HOMESTEAD

Saguaro National Monument
1929
The last homestead in this area is marked by adobe ruins of a small house.
Federal (National Park Service)

16. SAGUARO NATIONAL MONUMENT LIME KILNS

Saguaro National Monument
1870's, 1914 - 1917
Several adobe kilns were used in the construction of Fort Lowell in the 1870's and in 1914-1917 for construction in Tucson. The two remaining kilns are in ruinous condition.
Federal (National Park Service)

17. MANNING CABIN

NR Saguaro National Monument
1905
The two-room, dog-trot log cabin was privately built but has been used by rangers since 1907. Rock pillars have been added to the main entrance. Cement floors have also been added.
Federal (National Park Service)

18. REEVE RUIN

Redington vicinity
13th and 14th centuries
The stone-walled pueblo includes three plazas and was excavated by the Amerind Foundation in 1956. The community overlooking the San Pedro River was a Pueblo intrusion into Sobaipuri territory. The coursed sandstone masonry was quarried nearby. There are five groups of continguous one-story rooms.
Private

19. DAVIS RUIN

Redington vicinity
13th and 14th centuries
The river terrace compound of adobe and stone reveals Pueblo intrusion into southern Arizona and was excavated by the University of Texas at El Paso and the Amerind Foundation in the 1950's. The site includes a rectangular kiva and a burial ground.
Private

20. REDINGTON

Redington
circa 1875
The area was much used as a hideout by rustlers and outlaws and is now a ranching community.
Private

21. BELLOTA

Redington vicinity
1890
The original ranch house was a two-room adobe rectangle. Later it became a four-room, L-shape and the flat dirt roof was replaced by a pitched roof.
Private

22. TANQUE VERDE

Tucson vicinity
1870
A cattle ranch was started here by Sonoran Emilio Carrillo. The original L-shaped adobe was built for defense due to problems with Indians and rustlers. The building has been altered and enlarged but still retains some of its original features.
Private

23. VALLEY OF THE MOON

2544 East Allen Road, Tucson
1916
The fantasy park was built primarily for children by George Phar Legler and was opened, free to the public, in 1932. There are numerous miniature structures and scenes.
Private

FORT LOWELL

Craycroft and Fort Lowell Road, Tucson
1874 - 1891
The fort, which was moved from its original site in downtown Tucson, consisted of several large adobe buildings and attractive grounds and was a base for Apache campaigns. Some buildings and ruins remain. One of the officers' quarters has been reconstructed.
Municipal and private

MATHER HOUSE

50 Calle Clara Vista, Tucson
Late 1920's
The one-story, pueblo style residence is representative of the homes in this early Tucson subdivision. The flatroofed house has eleven-foot ceilings, three fireplaces, casement windows, and French doors.
Private

PATTERSON HOUSE

1844 East Elm, Tucson
1920's
Tucson architect, Henry Jaastad, designed this one-story adobe residence with arched porch and tile roof.
Private

OLD MAIN, UNIVERSITY OF ARIZONA
NR Tucson
1887
Phoenix architect, James Creighton, designed this two-story brick building with four towers, Mansard roof, and surrounding porch. It was the original building of the University and is still in use.
State

RONSTADT HOUSE

607 North 6th Avenue, Tucson
1905
The two-story, white-painted, brick house was designed by noted southwest architect, Henry Trost, and is distinguished by its Sullivanesque ornamentation.
Private

ARMORY PARK HISTORIC DISTRICT

NR Bounded by Stone, 3rd Avenue, 12th Street, and 18th Street, Tucson
1880's
The district is characterized by late territorial architecture and shows residential development on a grid pattern after the coming of the railroad.
Multiple public and private

BARRIO LIBRE HISTORIC DISTRICT

NR Bounded by Stone, Main, 14th Street, and 18th Street, Tucson
1850's
The district features Mexican town architecture of the early territorial period. Tucson was part of the Gadsden Purchase of 1854, and this old portion of the city reflects the building styles of that period.
Multiple public and private

TEMPLE EMANUEL

560 South Stone, Tucson
1910
The Jewish temple, built in the territorial period, was the first synagogue in Arizona. The congregation had been organized in the 1880's. In 1949 a new sanctuary was built and this one is now used by other religious groups. It is built of stone on a symmetrical plan with two domed towers and entryways flanking a pedimented wall with three arched windows.
Private

FREMONT HOUSE (Carillo House)

NR 145-154 South Main Street, Tucson
circa 1860
The zaguan type adobe townhouse was reputedly occupied by John C. Fremont at one time while he was governor of the Arizona Territory. It has been completely restored and is now a museum.
State

EL PASO & SOUTHWESTERN RAILROAD DEPOT & PARK

400 West Congress, Tucson
1912 - 1913
This depot was built by Phelps-Dodge Company, owner of the railroad. The depot was closed in 1924 after the railroad was sold to Southern Pacific. Architecturally, the depot is a good example of an opulent classical Palladian design which is unusual in a southwestern depot. The building is a symbol of the great wealth that the copper industry generated in Arizona.
Private

PIMA COUNTY COURTHOUSE

NR 115 North Church Street, Tucson
1929
The three-story, Spanish Colonial Revival building has a blue tiled dome and was designed by noted Tucson architect, Roy Place.
County

EL PRESIDIO HISTORIC DISTRICT

NR Bounded by Alameda, Church, 6th, and Granada, Tucson
circa 900 AD
The district includes a prehistoric pithouse and the site of a Spanish pueblo and presidio of 1776. The present architecture is early territorial and mainly residential.
Multiple public and private

SOLOMON WARNER HOUSE AND MILL

NR 350 South Grande, Tucson
1875
The mill was important in the industrial development of Tucson, and Warner was involved in both the commercial and the political life of the area. Only foundations of the mill remain, but the major part of the adobe house is still in use.
Private

PASQUA VILLAGE

Tucson
circa 1900
Yaqui Indian refugees from Mexican oppression settled here and created a distinctive community with an interesting blend of social and religious customs.
Multiple private

DESERT LABORATORY (Tumamoc Hill)

NR Tucson vicinity
NHL 1903
The Carnegie Institution established the center for the study of North American desert ecology and made significant contributions to the scientific understanding of arid climate influence on flora and fauna. In 1940 the site became a U.S. Forest Service experiment station. Since 1958 the center has been used for desert research by the University of Arizona.
State

ST. MARY'S HOSPITAL

1601 West St. Mary's Road, Tucson
1880
None of the original structure remains, but the site has been in continuous use as a hospital and is the oldest such site in Arizona.
Private

LEVI H. MANNING HOUSE

NR 9 Paseo Redondo, Tucson
1907 - 1908
This was the home of Levi H. Manning, a prominent Tucson civic leader and entrepreneur. The house functioned as a show place during his lifetime. The Elks Club purchased the house in 1950 and made several modifications. In 1979 it was sold to the City of Tucson.
Municipal

POZO NUEVO

Organ Pipe Cactus National Monument
Early 20th century
The well was dug by a Papago rancher. In 1951 a new well and a line camp were constructed by an Anglo rancher.
Federal (National Park Service)

SOIL CONSERVATION SERVICE PLANT MATERIALS CENTER

3241 Romero Road, Tucson
circa 1934
The group of adobe structures was built by WPA labor and is still in use by the Soil Conservation Service.
Federal (Soil Conservation Service)

WRIGHTSTOWN RANCH

1690 North Harrison Road, Tucson
1912
When the Wright's homesteaded the ranch site, it was twelve miles from Tucson. The family thought it necessary to create a small town at the ranch, Wrightstown. The area continued to develop with the family playing an important role in the community.
Private

EL ENCANTO HISTORIC DISTRICT

Tucson
1929 - 1977
The area has been the residence of many prominent Tucsonians. The area remains intact as an example of an earlier era, a vital neighborhood on a grand scale.
Multiple private

PROFESSOR GEORGE E. P. SMITH HOUSE

1195 East Speedway, Tucson
1904
This house, designed and built by Professor George E. P. Smith, is the largest and most architecturally unique of the professors' homes built around the University of Arizona campus.
Private

CITIZEN BUILDING

NR 82 South Stone, Tucson
1914
The two-story, stuccoed, brick building housed the Tucson Citizen until 1940. It is now an office building. The three-bay facade has arched openings on the ground floor. The flat roof has a low parapet. The building has been extensively altered.
Private

UNIVERSITY OF ARIZONA OLD LIBRARY BUILDING

University of Arizona Campus, Tucson
1924 - 1927
This was the first building constructed for the specific use as a library on this campus. The original three-story building has been modified over the years. It was designed by Ms. E. Lutrell, University Librarian, who studied the most modern library designs in the country. Architects were Lyman and Place of Tucson.
State

PROFESSOR A. E. DOUGLAS HOUSE

1189 East Speedway, Tucson
1906 - 1907
The residents of this house, Dr. W. A. Cannon and Professor A. E. Douglas, were prominent men in Tucson and gained recognition at national and international levels. The house itself is one of two residences in the area that date to this period and still show a tremendous amount of integrity.
Private

WEST UNIVERSITY HISTORIC DISTRICT

NR Tucson
1890 - 1930
The district exemplifies the pattern of middle and upper class residential development in Tucson as the city evolved from the 1890's to the 1930's. The area became the first major Tucson suburb north of the railroad and it retains the scale and density of an early 20th century neighborhood.
Multiple private

SOUTHERN PACIFIC OIL HOUSE NO. 3

South 3rd Avenue and East 13th Street, Tucson
1908
This building was one of the storage areas for fuels and lubricants needed for steam engines. It represents an era of steam transportation which was important in the early settling, development, and expansion of the west.
Private

MIDVALE HISTORIC PARK

Valencia and Mission Roads, Tucson
1870 - 1920
This area has scientific, historic, and ethnic archaeological significance. It contains features likely to yield information on important cultural adaptations to semi-arid environments and lifeways of average Mexican families in the Tucson area in the late 19th century.
Private

BOUDREAUX HOUSE

101 North Bella Vista Drive, Tucson
1908
Built of native volcanic stone, the house is of unique design, is multi-level, and has arched windows and doorway and a flat roof.
Private

V.A. MEDICAL CENTER

Tucson
1928 - 1930
This is one of three Veterans' Administration Hospitals that exemplify the use of regional stylistic adaptation; in this case, the use of the Mission Revival style.
Federal (Veterans' Administration)

CORONADO HOTEL

410 East 9th Street, Tucson
1928
This is one of the few remaining major hotels built out of the downtown area during a period of intensive hotel development in Tucson. When built, the hotel was the only one on the north side of the railroad tracks.
Private

24. CATALINA FOOTHILLS ESTATE BUILDING

Campbell Avenue and River Road, Tucson
1940
Part of a complex at this intersection to serve as a gateway to the newly developing foothills area on Tucson's north side.
Private

25. OLD STEAM PUMP RANCH

10500 Oracle Road, Tucson
1874 - 1935
Built in the 1870's, the ranch is representative of the type of architecture characteristic of early Anglo expansion and settlement in southern Arizona.
Private

26. CANADA DEL ORO

Tucson vicinity
1860's - 1870's
The site saw frequent Apache ambushes on the trail from Tucson to old Camp Grant, including the 1872 attack on a Tully and Ochoa wagon train. The canyon lies between the Catalina and Tortolita Mountains.
Multiple federal and private

27. CANADO DEL ORO ARCHAEOLOGICAL DISTRICT

Tucson vicinity
circa 300 BC - 1300 AD
The location was apparently occupied by Cochise Culture people and later used as a plant processing area and multiple habitation site by Hohokam people.
Multiple

28. LOS MORTEROS SITE

Tucson vicinity
900 - 1300 AD
This is probably the last major relatively undisturbed Hohokam site in the Tucson area.
Multiple

29. PICTURE ROCKS

Cortaro vicinity
Prehistoric
The petroglyph and rock shelter have been damaged by vandalism. Time and cultural affiliation are not known.
Private

30. COCORAQUE BUTTE ARCHAEOLOGICAL SITE

NR — Tucson vicinity
Prehistoric
The Hohokam site is undated and unexcavated. It includes extensive petroglyphs, wall ruins, and a trail system.
Federal (Bureau of Land Management)

31. GACHADO WELL AND LINE CAMP

NR — Organ Pipe Cactus National Monument
circa 1916
The adobe line camp serves a desert area. There are three structures and a well.
Federal (National Park Service)

32. SAN XAVIER DEL BAC

NR
NHL — Tucson vicinity
circa 1797
The building combines all Spanish ecclesiastical styles except Gothic and includes some Byzantine and Moorish features. It has a Churrigueresque facade and an ornate interior which includes large frescoes. This is the only Spanish mission church still in use in Arizona.
Private

33. MINERAL HILL (Azurite)

Tucson vicinity
1880's - 1920's
The name was changed to Azurite in 1897, but the town of approximately 125 people moved away when the mine closed in 1900. The site has been worked intermittently since that time.
Private

34. OLIVE

Tucson vicinity
1880's - 1890's
The silver mine town was named for the wife of one of the owners of the Olive Mine. The ore was shipped away to be processed.
Private

35. TWIN BUTTES

Tucson vicinity
1903 - circa 1930
The Twin Buttes Mining and Smelting Company acquired the property in 1903 and established a town of approximately 300 people. Operations ceased in 1914 and the town gradually expired. Some buildings remain.
Private

36. CANOA RANCH

Continental vicinity
Prehistoric
Pima, Spanish, Mexican, and American ranch activities occurred here but no original buildings remain. It was an 1812 Spanish land grant.
Private

37. SANTA ANA DEL CHIQUIBURITAC, MISSION

NR Tucson vicinity
1811 - 1840's
The last mission constructed in Pimeria Alta and the farthest north was built at this site. Only portions of the rock footings are still visible. It has not been excavated.
Federal (Bureau of Land Management)

PINAL COUNTY

1. SASCO

Red Rock vicinity
circa 1901 - 1921
The town derived its name from the Southern Arizona Smelting Company and was a smelter town for the Silver Bell and Picacho mines. The population was approximately 600. There are several foundations and ruins of stone buildings.
Private

2. PICACHO PASS AND PICACHO PEAK

Picacho vicinity
1846, 1862
The Mormon Battalion camped here in 1846 on its way to California during the Mexican War. In 1862 the second and last military skirmish of the Civil War to take place in Arizona occurred at Picacho Pass. The peak has long been a landmark for travelers and lies on the route between Tucson and Phoenix. The area is now a state park.
State

3. PICACHO PETROGLYPH SITE

Eloy vicinity
Prehistoric
These petroglyph covered boulders have been vandalized.
State

4. CAMP GRANT (original site), (Fort Aravaipa, Camp Breckinridge, Camp Stanford)

Mouth of Aravaipa Creek
1860 - 1872
The abandonment of this camp with the outbreak of the Civil War was a factor in turning the Tucson settlers toward the Confederate States. It was re-established in 1862 but was always an undesirable and unhealthy post.
Multiple private

5. FLIEGER SITE

Oracle vicinity
900 - 1400 AD
This Hohokam community was apparently on a trade route and includes a cache of marine shells. There are also two ballcourts.
Private

6. COPPER CREEK

Mammoth vicinity
1880's - 1942
The small copper mining camp had a population of about 200 people. It was located on a steepsided canyon.
Federal (Bureau of Land Management)

7. AMERICAN FLAG POST OFFICE AND RANCH HEADQUARTERS

Oracle vicinity
1870's
The one-story, stuccoed adobe is still in use as a residence. In the 1880's it was also a post office, serving ranchers and miners of the area.
Private building, Federal land (Forest Service)

8. MOUNTAIN VIEW HOTEL

Oracle
1895
The two-story, brick hotel and sanitorium with pedimented gable was built by William Neal, a local cattleman and friend of Buffalo Bill Cody. Neal, a Negro, was a successful Tucson businessman before moving to Oracle.
Private

ORACLE MULTIPLE RESOURCE AREA

Oracle
Late 19th - early 20th century
This is a variety of buildings representing the evolution of early architecture in Oracle.
Multiple

SANTA CRUZ COUNTY

1. OLD GLORY (Oldglory)

Nogales vicinity
1895 - 1915
The name was originally one word but was changed in 1909. This small mining camp had about 50 people. Site only.
Private

2. ORO BLANCO

Nogales vicinity
18th - 19th centuries
In 1873 Anglos reopened a mine worked in the Spanish and Mexican period. Two mills were added and the town had approximately 225 people.
Private

3. RUBY (Montana Camp)

NR Ruby
1870's
Ruby was a mining and cattle ranching center which reached a peak population of about 1,000 people in the 1930's. Water for ore processing was pumped from 15 miles away. About a dozen deserted buildings remain.
Private

4. HANK AND YANK RUINS AND SPRING

Oro Blanco vicinity
1880's
The pioneer ranch site is marked by adobe ruins. Hank and Yank were packers with General George Crook in the Apache campaigns of the 1870's. The ranch was attacked by Apache in 1886. The spring is still active.
Federal (Forest Service)

5. BEAR VALLEY FIGHT SITE

Ruby vicinity
1918
The last cavalry-Indian fight in the United States was an engagement between about 30 Mexican Yaqui Indians and Troop E of the 10th Cavalry. Ten Yaqui were captured but one died. The site is on one of the main smugglers' routes.
Federal (Forest Service)

6. NOONVILLE

Pena Blanca Lake vicinity
1879 - circa 1890
The town and Noon Mine were named for and by John Noon. The rock foundation of a house remains.
Federal (Forest Service)

7. PECK CANYON

Tumacacori vicinity
1880's
In 1886 some of the settlers were killed by Apache raiders from Mexico.
Federal (Forest Service)

8. TUMACACORI NATIONAL MONUMENT

NR Tumacacori
1691
A Jesuit visita was established at this site. The Franciscan church was built about 1800 and abandoned in 1840. It is this building ruin which remains and has been stabilized.
Federal (National Park Service)

9. ST. ANN'S CHURCH

Tubac
18th century
The present 1920's church is the third to be built on this site. A Spanish visita was constructed here in the 1770's.
Private

SALERO MINE

Tubac vicinity
1820 - 1860's
The silver mine was operated during the Mexican period and reopened in the 1850's by the Sonora Exploring and Mining Company. The mine was abandoned during the Civil War.
Private

OTERO SCHOOLHOUSE

Tubac
1916
There was a house on this site in the Spanish colonial period. It was destroyed sometime after 1880. The present building was originally a dance hall and saloon and became a school in 1938.
Municipal

OLD MILL (Site)

Tubac
1859
An early grist mill of the Anglo period occupied this site on Sonoita Creek. Tubac was then the headquarters for the Sonora Mining and Exploring Company. Stone foundation ruins remain.
Private

GARRETT RANCH HOUSE

Tubac
1915
The building is primarily of interest due to its association with an unusual solution to a property line dispute. The house has been much remodeled.
Private

TUBAC PRESIDIO

NR Tubac
1750's - 1850's
The presidio was the earliest Spanish military outpost in Arizona and was established immediately after the Pima Rebellion of 1751. From this post the famous Anza expeditions departed for California in 1774 and 1775. The buildings were used in the 1850's as headquarters for an Anglo mining company. The ruins were excavated by Arizona State Museum in 1975. The site is now a state historic park.
State

OLD TUBAC SCHOOLHOUSE

NR Tubac
1880's
The 1885 school house is incorporated into the present building. It is now part of a state historic park.
State

YOAS HOUSE

Tubac
circa 1900
The house was built of salvaged timber from Old Tubac. An outbuilding is believed to be the oldest intact structure in Tubac.
Private

TUBAC PRESIDIO HISTORIC DISTRICT

Tubac
Prehistoric
The prehistoric site was colonized by the Spanish and was the starting point of Juan Bautista de Anza's expeditions to California in the 1770's. In the 1850's it was an American mining center.
Multiple public and private

10. SOPORI RANCH

Amado vicinity
Prehistoric
The old Pima rancheria was later a Spanish land grant. In the Anglo period, mining and ranching were continued with a brief interruption during the Civil War.
Private

11. CALABASAS

NR Tumacacori vicinity
Prehistoric
The Sobaipuri village site became a Spanish visita in the 18th century and was a Mexican hacienda briefly before the Gadsden Purchase of 1854. The major obstacle to permanent settlement throughout this period was Apache attacks. The adobe ruins of the church, later used as a ranch house, remain.
State

12. GUEVAVI MISSION RUINS

NR Nogales vicinity
Prehistoric - 1775
A Pima village became the site of a Spanish mission in 1701. A new plastered adobe church, of which some ruins remain, was built in 1751. The mission suffered from the Pima Rebellion that year but briefly revived. The community was abandoned by 1775 under pressure of Apache attacks.
Private

13. NOGALES INTERNATIONAL AIRPORT

Northeast of Nogales
1929
The airport became a temporary Port of Entry in 1929 and achieved permanent status in 1933. The airport includes 3,000 acres of grassland and 50,000 feet of paved runway.
County

14. SANFORD RANCH

Patagonia vicinity
18th century
The site was a visita established by Father Kino sometime before 1762. In 1821 it became part of the San Jose de Sonoita land grant to Leon Herreras of Tubac. Denton Sanford settled there in 1874. In 1925 it became the Circle Z dude ranch. Some adobes from the Sanford period remain.
Private

15. JOHNNY WARD RANCH

Patagonia vicinity
1859 - 1903
Apache attacks at this site led to the notorious Bascom Affair in 1861 which broke the uneasy truce with the Chiricahua. The site was excavated by the Arizona Archaeological and Historical Society in 1959-1960.
State

16. PATAGONIA HOTEL

Duquesne Avenue, Patagonia
1901
The one-story, plastered-adobe building has been added to frequently and is now a clubhouse.
Private

PATAGONIA RAILROAD DEPOT

Patagonia
1900
This typical wood frame depot has been unused since 1961. Patagonia, which is on the line from Nogales to Benson, was established in 1900 and the depot in 1904. In 1931 the line to Nogales was washed out and Patagonia became the end of the line.
Private

17. HARSHAW

Harshaw
circa 1878
The town was named for a local cattleman and prospector, David Harshaw. The Hermosa Mining Company built a twenty-stamp mill here and employed about 150 men. A few houses (still inhabited) and the foundation of the stamp mill remain.
Federal (Forest Service)

JAMES FINLEY HOUSE

NR Harshaw
circa 1880
The red brick house with stone lintels and hand hewn redwood beams is one of the few remaining buildings in this former mining town. The house was originally an office for the mining company.
Private house on Federal land (Forest Service)

18. MOWRY MINE

Harshaw vicinity
? - 1904
The lead-silver mine was worked during the Spanish, Mexican, and American periods. Lt. Sylvester Mowry purchased it in 1857 and installed reduction works. Mowry was accused and convicted of pro-Confederate activities and served some time in prison.
Private

19. SAN RAFAEL RANCH HOUSE

Lochiel vicinity
1900
The 600,000 acre 1825 Mexican land grant was acquired by Colin Cameron in 1884. The house is built of brick in a Southern Raised Cottage style with hip roof and wrap-around veranda. It is still used as a residence.
Private

20. LOCHIEL

Lochiel
circa 1880
Approximately 400 people lived in this smelter town. It is said to have been frequented by Pancho Villa. It is now a small community on the Mexican border.
Multiple private

21. CANELO HILLS CIENEGA (Knipe Ranch)

Canelo
1870's
Some early adobe buildings remain on this pioneer cattle ranch. The present house was built in 1882 after an earlier one burned.
Private

22. RAIL X

Sonoita vicinity
circa 1880
This much altered, one-story adobe is still a ranch headquarters.
Private

23. FORT BUCHANAN (Camp Moore)

Patagonia vicinity
1856 - 1861
The base for Apache campaigns was abandoned and burned at the outbreak of the Civil War. There are no ruins. The men lived in huts and the few buildings were of adobe.
Private

24. CAMP CRITTENDEN

Sonoita vicinity
1867 - 1873
The post was established near the site of old Fort Buchanan to protect the local ranchers. There are some remains of the adobe buildings. The garrison was almost constantly in the field against the Apache until the peace agreement with Cochise in 1872. That fact plus an increase in malaria caused the abandonment of the post the following year. It is now a cattle range.
Private

25. SALERO MINE

Tumacacori vicinity
1600's - 1800's
This is one of the oldest mines in the Santa Rita Mountains. The silver and copper deposits were first discovered by Jesuit missionaries. It was worked intermittently until the 1890's.
Unknown

26. ALTO TOWNSITE

Patagonia vicinity
1885 - 1930's
This Anglo mining town was established in an area that had previously been prospected and mined by the Spanish and the Mexicans. The only remains are the adobe walls of the post office.
Federal (Forest Service)

27. SANTA RITA HACIENDA

Tubac vicinity
1804 - circa 1900
Mining activity was conducted here during the Spanish, Mexican, and American periods. Foundation ruins of the smelter and several houses remain.
Private

28. MADERA CANYON SAWMILL SITE

Santa Rita Mountains
1857
The first sawmill in Arizona was established here by a Captain Tarbox from Maine. Site only.
Federal (Forest Service)

29. SANTA CRUZ COUNTY COURTHOUSE

NR Morley Avenue and Court Street, Nogales
1903
This Neo-classic building has a central dome and stands on a hillside overlooking the city. The portico has four simple columns and a pediment with an elaborate bas relief.
County

WASHINGTON CAMP (Duquesne)

Nogales vicinity
1870's
The Duquesne Mining and Reduction Company of Pittsburgh set up its headquarters a mile south of Washington Camp in 1890. The twin mining towns are now partially in ruins.
Private

PETE KITCHEN RANCH

NR Nogales vicinity
1860's
This large prosperous establishment was probably the first permanent Anglo ranch in Arizona and was noted for its successful defense against Apache raids. Two old adobe buildings remain, one deteriorated and the other much altered.
Private

CAMP STEPHEN D. LITTLE

Nogales
1910
The camp was named for a soldier killed during a skirmish between rival bands of Mexican revolutionaries. The post was abandoned in 1931, but several officers' houses remain and are occupied.
Multiple private

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