ARCHAEOLOGICAL RESOURCES

IN SOUTHWESTERN COLORADO

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ARCHAEOLOGICAL RESOURCES OF SOUTHWESTERN COLORADO:

SAN JUAN RESOURCE AREA

by

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with

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UNCOMPAHGRE AND GUNNISON RESOURCE AREAS

by

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SAN MIGUEL RESOURCE AREA

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DESIGNED BY Leigh Wellborn

FOREWORD

This document represents the newest Class I (Pre-History) to be prepared for the western slope of Colorado. This study is one of four baseline overviews of the cultural resources of the Montrose, Colorado, District. The first published Class I overview was Paul O'Rourke's 1980 study of the history of southwestern Colorado. This present volume is a combination of three overviews of pre-history in southwest Colorado.

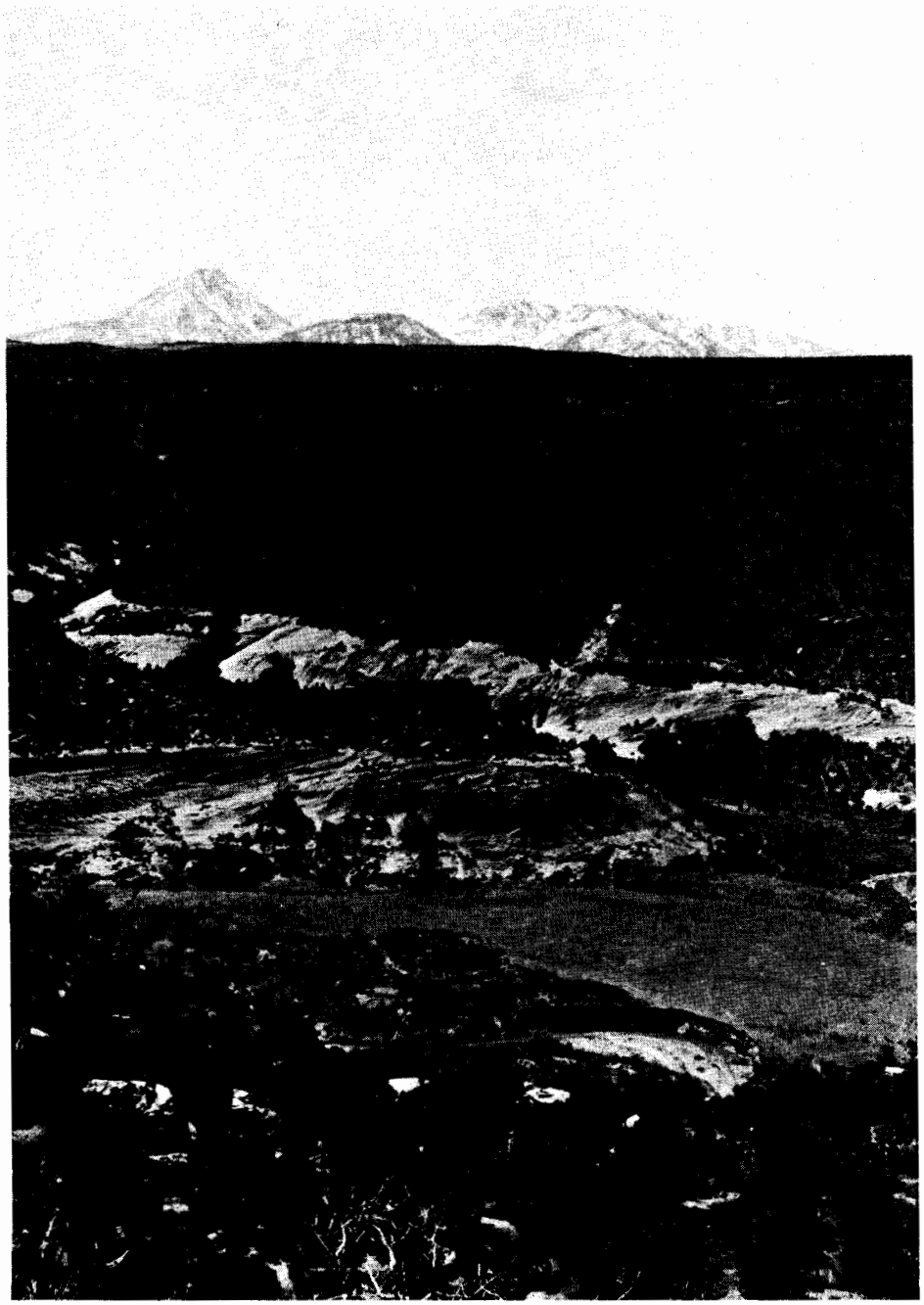
Such works provide a valuable and needed synthesis of literature and history for this region and gives our land managers data that are used on a daily basis for land-use decisionmaking. Multiple land use is a Bureau mission that is being met. Oil and gas, coal, and other energy minerals, not to mention rights-of-way, grazing programs, recreation projects, and land-use planning, are all supported by overviews such as this.

Resource Management Plans and subsequent Environmental Impact Statements produced for the Bureau's Area Offices are the foundations for long-term land management. The San Juan Resource Area Resource Management Plan/Environmental Impact Statement is an example of a management tool that is dependent upon critical baseline information. This Class I overview is being used in the San Juan Resource Management Plan, and for daily management of the vast cultural resource base located in the Montrose District. These Class I documents are multiple use in scope and help provide basic understanding for land-use decisions.

This overview provides both the Bureau and the general public with a synthesis of previous archaeological work in the region, and it discusses types of prehistoric sites to be found here. The study presents some research approaches to future work that will hopefully aid in better identification and evaluation of these valuable resources.

The southwestern Colorado overview is a contribution to the study and evaluation of our precious heritage. This document is valuable for both professionals and the general public. Such works are used by schools, libraries, universities, and those interested in our past. It is, therefore, my pleasure to present this latest volume of the Cultural Resources Series to all interested readers.

George Francis
State Director
Bureau of Land Management, Colorado
September 1982



FRONTISPIECE. The general character of the land in southwestern Colorado is reflected in this view across Yellow Jacket Canyon to a pinyon-juniper covered area. The laccolithic Sleeping Ute Mountain can be seen in the distance.

ARCHAEOLOGICAL RESOURCES OF SOUTHWESTERN COLORADO:

AN OVERVIEW OF THE BUREAU OF LAND MANAGEMENT'S

SAN JUAN RESOURCE AREA

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ARCHAEOLOGICAL RESOURCES OF SOUTHWESTERN COLORADO: AN OVERVIEW OF THE BUREAU OF LAND MANAGEMENT'S SAN JUAN RESOURCE AREA

By

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With

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PREFACE

This report has been prepared in partial fulfillment of Bureau of Land Management Contract YA-512-CT9-205 entitled "A Study of Access and Other Factors Affecting Vandalism to Archaeological Sites in Southwestern Colorado." Task 1 of the contract called for completion of a background document, or a BLM Class I overview, of the San Juan Resource Area. This resource area includes two planning units, Sacred Mountain and Durango-Chromo, and covers portions of Archuleta, Dolores, La Plata, and Montezuma Counties in the southwest portion of Colorado. The resource area itself is part of the Montrose District. The vandalism aspect of the contract requires a separate effort, and will be reported in another later volume.

A partial draft of Chapter III, written by Deborah A. Hull, then of the Montrose District Office, was supplied by the Bureau. This draft has been edited and expanded by the author (Nickens) and incorporated herein. Douglas D. Scott, Archaeologist for the Montrose District, furnished continuous aid and reference material for the preparation of this volume. Considerable gratitude is due Dr. Scott for his assistance. Many of the photographic illustrations included throughout the report were also provided by Dr. Scott's office.

The maps and artifact renderings are the work of Johanna Winship of Bison Illustrations, Montrose, Colorado. Certainly the quality of her work appreciably increases the overall impact of the overview. Bernadene Calhoun undertook the onerous tasks of organizing the bibliographies and typing the manuscript. The efforts of these persons are greatly appreciated.

The primary goal guiding the preparation of this overview has been to provide both the interested nonprofessional and the professional archaeologist with an introduction to the history of archaeological inquiry and a summation of the results of that work. The result is not intended to be the final word on the archaeology of this area, nor is it

necessarily a complete documentation. Indeed, to write an exhaustive discussion of the prehistoric cultural resources of southwestern Colorado would require a much more extensive effort.

Thus, the overview is intended to serve as an introduction to the cultural resources of southwestern Colorado in general and, more specifically, the BLM San Juan Resource Area. For more detailed or additional information, readers are encouraged to consult the primary sources cited herein, or those included in the 1978 "Bibliography of Archaeology of Southwestern Colorado," by Deborah A. Hull and Douglas D. Scott, published as Cultural Resource Series No. 5 by the BLM-Colorado. An appendix to the overview updates and expands the earlier bibliography to the issue date of this report.

Finally, appreciation is extended to several reviewers and colleagues who spent time reading the report and making important editorial and technical comments on an earlier draft. Clearly, the comments received, nearly all of which led to minor corrections in the text, have been important in presenting the information in a precise format. These reviewers include: David A. Breternitz, Susan M. Chandler, Steven L. Fuller, Gary Matlock, Alan D. Reed, and Janet Sprouse.

I.

INTRODUCTION

General

One of the more important effects that cultural resource management is having on the study and management of prehistoric and historic cultural resources on federal lands in the American Southwest is the preparation of overview documents on a regional basis. These reports commonly cover bounded areas such as Bureau of Land Management Districts or Resource Areas, U.S.D.A. Forests, National Parks or Monuments, or perhaps even single large-scale project impact areas such as a Water and Power Resources Service dam and irrigation project. Once funded and completed, these volumes serve a myriad of functions for management programs and archaeological professionals alike, both of which require adequate, current information of the nature, distribution, and significance of cultural resources in a given study area. Although these documents are designed primarily for the use of the agency contracting for the effort, overviews often find interagency utilization as well since it is not unusual for several agencies, including state as well as federal, to have land management responsibilities in a given region. In at least one case, two agencies (Bureau of Land Management and Forest Service) have combined to write a series of joint overviews covering the states of Arizona and New Mexico.

The data presented in this report ostensibly cover the San Juan Resource Area of the BLM-Colorado's Montrose District. As we shall see, however, the coverage will undoubtedly have wider applicability beyond just the BLM lands in southwestern Colorado. Indeed, when discussing past cultural variation and distribution, it is all but impossible to draw finite boundaries around a study area or particular acreage and discuss the previous cultural patterns and extant vestiges without reference to adjoining areas.

The Project

The work called for in the scope of work guiding the ensuing data compilation and summarization (BLM Contract No. YA-512-CT9-205) requires preparation of an overview document to serve as a guide for understanding the cultural resource base in the San Juan Resource Area of southwestern Colorado (Figs. 1 and 9). This general area covers some 5000 square miles, about 256,360 acres of which are managed by the BLM in two planning units. The Sacred Mountain Planning Unit includes Montezuma and Dolores Counties and the Durango-Chromo Planning Unit comprises parts of La Plata and Archuleta Counties. Defined in general terms such as these, the area contains an immensely broad cultural resource base, one characterized by a quantity and quality of resources which can scarcely be accorded justice in a single document. The breadth of this resource base is evidenced in the previously published bibliography of archaeological source materials (Hull and Scott 1978), a compilation which lists over 1000 references to previous archaeological work in southwestern Colorado. Furthermore, the pace of archaeological management and scientific studies in the area continues to accelerate at a tremendous rate as witnessed by the expanded and revised supplemental bibliography appended to this overview.

Within this overall context, the overview may be said to be oriented toward several goals specific to BLM management needs. As one of the nation's primary land managing agencies, the BLM is required to identify, evaluate, and protect cultural resources in public lands under its jurisdiction and to ensure that Bureau initiated or authorized actions do not inadvertently harm or destroy cultural resources. These requirements are mandated by the following legislation:

1. The Antiquities Act, 1906 (34 Stat. 224, amended; 16 U.S.C. 431-433).
2. The Historic Sites Act, 1935 (49 Stat. 666).
3. The Historic Preservation Act, 1966 (80 Stat. 915) as amended in 1976.

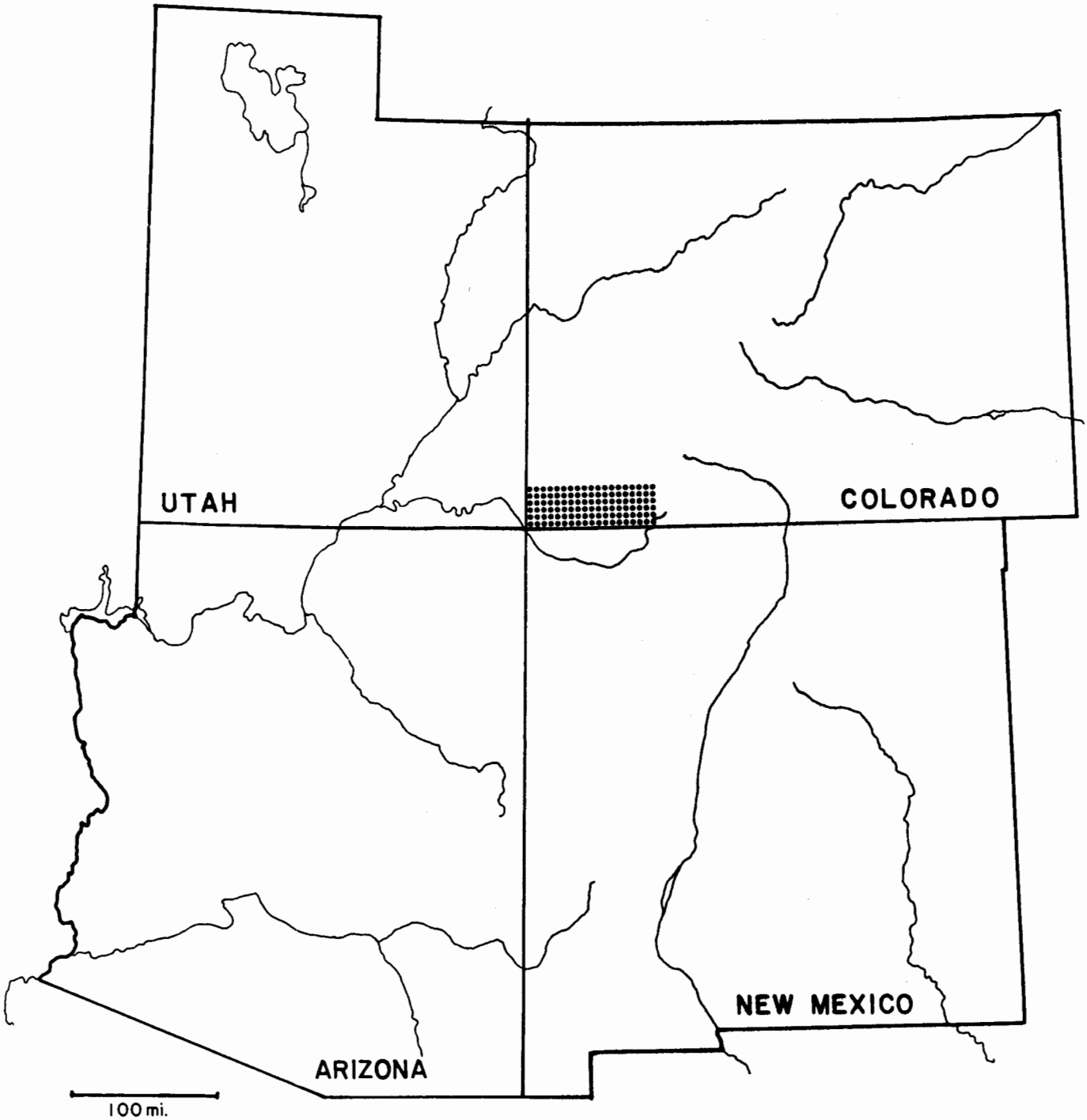


Figure 1. General location of the study area, which includes the Bureau of Land Management's San Juan Resource Area. More detailed map coverage of the area can be found in Figure 9 on page 38.

4. The National Environmental Policy Act 1969 (83 Stat. 852).
5. Federal Land Policy and Management Act of 1976.
6. Federal Executive Order 11593.
7. Archaeological and Historic Data Preservation Act of 1976.
8. Archaeological Resources Protection Act of 1979.

The overview document, designated by the BLM as a Class I inventory of cultural resources, initiates the first step of the BLM's formal compliance with Executive Order 11593 which required all federal agencies: (1) to conduct inventories of all historic properties that might qualify for the National Register of Historic Places; (2) to "exercise caution" until all such properties were placed on the Register to see to it that unnecessary loss or destruction did not occur; and (3) to adopt policies that would contribute to the protection of historic properties on non-federal lands. Further, the document provides the major source for background data needed for Unit Resources Analyses, Management Framework Plans and environmental assessments and statements. In a similar vein, the overview provides a context for making cultural resources evaluations and interpretations and for undertaking Class II (sample-oriented) and Class III (intensive) field inventories of cultural resource properties.

To adequately meet these various needs, the overview document should include the following components: (1) The modern and paleo-environmental conditions must be described, including those factors important to the understanding of prehistoric human use and occupation of the area; (2) A summary of past and present archaeological investigations must be presented to provide a baseline for current knowledge concerning cultural resources in the study area; (3) The culture history and past lifeways must be identified from the archaeological record; and (4) A synthesis of previous and current work is necessary which details current directions, identifies inadequacies in current knowledge, and offers suggestions for future research orientation and cultural resource management in the area.

To this end the ensuing report is subdivided into three parts. Part I reviews the environmental characteristics of the study area, including comments pertaining to the paleoclimatic conditions which have been defined for southwestern Colorado. Next, an extended recapitulation of previous investigations is presented to give the reader a picture of the tremendous amount of attention which has been given to the prehistoric resources. To complete Part I, the historic period, including Euro-American settlement and aboriginal patterns, is briefly outlined with specific attention devoted to two topics of interest to our discussion: historic vandalism of prehistoric sites and the archaeological study of historic cultural resources. In Part II we undertake examination of our current perceptions of prehistoric culture history and adaptive patterns which result from the many individual studies listed in Part I. Finally, in Part III a synthetic approach is adopted, one which summarizes the present extent of our archaeological knowledge in southwestern Colorado and identifies current and future research orientations.

PART I

ENVIRONMENTAL AND RESEARCH BACKGROUND

II.

ENVIRONMENTAL BACKGROUND

Physiography

The project area lies in the major physiographic province known as the Colorado Plateau, as originally defined by Fenneman (1928). This province covers about 150,000 square miles of Utah, Colorado, Arizona, and New Mexico. Hunt (1967:267) has listed the outstanding physiographic features of the province as follows:

1. The structural geology consisting of extensive areas of nearly horizontal sedimentary formations, structural upwarps resulting in striking topographic features, and numerous igneous structures.
2. Great altitude, with the general plateau surface exceeding 5000 feet (1524 m) and some plateaus and peaks reaching 11,000 feet (3353 m).
3. A drainage system which has resulted in deeply incised and steep-walled canyons.
4. A marked aridity and shortage of water.
5. Extensive areas of bare, exposed rock.
6. Sparse vegetation and sparse human population.
7. Brightly colored and highly varied desert scenery.

Located in the Four Corners Region, the San Juan area includes much of the extreme eastern end of the Colorado Plateau Canyon lands which are an extensive area of flat-lying sandstone and shale sediments in Colorado, New Mexico, Arizona and Utah. The Colorado and San Juan Rivers, along with their tributaries, have been the primary agents of extreme dissection of the Plateau in the San Juan area. In the northeast section, the Plateau abuts against the much higher San Juan Mountains, a complex sedimentary, igneous and metamorphic mountain chain, and the La Plata and San Miguel Mountains, smaller intrusive mountain extensions.

Elevations within the area decrease from northeast to southwest due to the sediments of the Mesa Verde section of the Colorado Plateau

dipping toward the southwest away from the San Juan Mountains. Elevations are Durango, Colorado, 6505 feet (1983 m); Cortez, Colorado, 6198 feet (1889 m); Bluff, Utah, 4400 feet (1341 m). All of the area has a regional elevation of 4000 feet (1219 m) or more with the San Juans at the northeast boundary reaching an average elevation of 10,000 to 11,000 feet (3048-3353 m). Most of the streams of the Mesa Verde area are from the northern portion of the San Juan drainage system. In general, these flow south or southwest down the slope of the Colorado Plateau to the San Juan River. In order from east to west the major streams of the area are the Piedra, Pine, Animas, La Plata and Mancos Rivers and McElmo and Montezuma Creeks. On the west and north of the area, numerous dry washes and the Dolores and San Miguel Rivers flow northwest to empty into the Colorado River. Many streams, particularly in the western part, flow only after thundershowers or in the spring when the mountain snows melt. In the eastern section permanent streams, including the rivers named above, are relatively numerous. More water is relatively available even during the drought periods.

Forces of erosion are made very effective by the torrential nature of the precipitation, the nature of underlying rock, the slope of the land, and the relative lack of vegetation. Streams are often eroded one or two thousand feet into the Plateau, leaving the characteristic mesa / canyon topography. Permanent streams generally have relatively gentle gradients and flat valley floors, about a half mile or more wide, while tributary and ephemeral streams are characterized by steep gradients, often averaging several hundred feet or more per mile, and "V"-shaped valleys, or canyons. Arroyo cutting and headward growth of canyons is actively occurring at the present.

The physiographic appearance of the San Juan area is, in general, somewhat intermediate between the appearance of the high rugged mountains to the immediate northeast and that of the completely dissected desert to the southeast. The northeast section of the area resembles

mountain topography more than would be expected of the Colorado Plateau, for in this section a more humid climate has produced a rounded landscape of rolling hills covered with vegetation. The extreme western and southern sections, on the other hand, appear quite desert-like.

Several physiographic subdivisions of the San Juan area have been determined by variations in slope, erosion, and igneous activity. First, the Animas River has formed an extensive drainage basin around the vicinity of Durango. The Animas River Basin is deeply eroded into sandstone and shale deposits. The topography is typically mature rolling hills with the relief on the order of less than one thousand feet. Much of the original horizontal character of the underlying rocks has been lost with the exception of the spectacular Hermosa cliffs extending about 10 miles north of Durango. The river valley itself is about a mile wide in most places with several terraces. East of the Animas River Basin and separated by Yellow Jacket Pass lies the much smaller and physiographically younger basin of the Piedra River. Because of its intrusive igneous activity in the geologic past, nearness to the complex San Juan Mountains, and dense vegetation, the landscape here takes on an almost mountainous appearance. Chimney Rock, a prominent erosional remnant reaching an elevation of 8457 feet (2578 m) overlooks the Piedra River Basin. The Animas River and Piedra River Basins extend south to form the northeastern portion of the San Juan Basin, a much larger and more completely developed drainage area.

Other tributaries of the San Juan Basin, the Mancos River and McElmo Creek, lie to the west of the Animas River Basin and are separated from it by the fairly extensive divide between the La Plata and Mancos Rivers. Above this broad relatively flat area of rolling hills rise two prominent features, the Mesa Verde to the south and Ute Mountain to the southwest.

The Mesa Verde, a bold flat-topped cuesta, stands 1500 feet above the McElmo Valley and dips steeply to the south and southwest, joining the San Juan Basin. The Mancos River has cut through the mesa, giving rise to

tributary canyons, which run in a general north-south direction to empty into the Mancos River. Mesa Verde has thus been dissected into smaller finger-like parts known as particular mesas of the Mesa Verde, e.g., Chapin Mesa and Wetherill Mesa. The dividing canyons possess nearly vertical walls due to the composition of the cuesta.

Ute Mountain faces the western escarpment of the Mesa Verde across the valley of Spring or Aztec Creek. This isolated igneous lacolith rises to an elevation of 9884 feet (3013 m), forming one of several similar landmarks distributed throughout the Four Corners Region.

North of the Mancos are the Dolores and San Miguel Plateaus, drained by the rivers of the same names. The San Miguel Mountains, which lie between these plateaus, are geologically a spur of the San Juan Mountains isolated by erosion. The La Sal Mountains and the southwestern escarpment of the Uncompahgre Plateau also overlook the valley of the San Miguel. The landscape of these northern plateau and valley lands tends to be broad and mature with fewer of the steep mesas and canyons so characteristic of the southern and western parts of the Mesa Verde area.

Geologic Stratigraphy

The project area is dominated by sedimentary rocks, primarily sandstones and shales. Throughout much of the area, the exposed strata date to the Cretaceous Period (ca. 65-130 million years ago) of the Mesozoic Era being deposited in marine, brackish, or fresh water. Locally, these rocks are intruded by small, irregular igneous bodies and by dikes. Extensive volcanic outcrops are found mostly in two areas: Ute Mountain, southwest of Cortez, and in the West Needle Mountains, located northeast of Durango. The area's formations contain a wide variety of economic commodities including oil and gas, carbon dioxide, coal, uranium, geothermal springs, sand and gravel, and other minerals in lesser amounts. The stratigraphic sequence for southwestern Colorado is given in Table 1.

Table 1. Geologic formations of Southwestern Colorado (after Haynes et al. 1972).

ERA	PERIOD	FORMATION	CHARACTER
CENOZOIC	QUATERNARY		Alluvium
		Wisconsin Durango Cerro Florida	Glacial tills, gravels, and outwash
	TERTIARY		Volcanic intrusives
		San Jose Formation Nacimiento Formation Animas Formation	Sandstones
MESOZOIC	CRETACEOUS	McDermott Formation Kirtland Shale Fruitland Formation Pictured Cliffs Sandstone Lewis Shale Mesa Verde Group Mancos Shale Dakota Sandstone Burro Canyon Formation	Generally shales and sandstones with some coal
	JURASSIC	Morrison Formation	Sandstone and shale
		Junction Creek Formation	
		Wanakah Formation	Sandstone and limestone
		Entrada Sandstone	
	TRIASSIC	Dolores Formation	Mudstone and sandstone
PALEOZOIC	PERMIAN	Cutler Formation Rico Formation	Sandstone and conglomerate and shale
	PENNSYLVANIAN	Hermosa Formation	Sandstone, shale, limestone, and gypsum
		Molas Formation	Red limy shale
	MISSISSIPPIAN	Leadville Limestone	Fossiliferous limestone
	DEVONIAN	Ouray Limestone	Fossiliferous limestone
		Elbert Formation	Shale, limestone and sandstone
	CAMBRIAN	Ignacio Quartzite	
	PRE-CAMBRIAN		Granite and related volcanics

Soils

There is a close relationship between the distribution of soil units and the ecological history of the locale, and upon the geologic formations from which they are derived. The soils found in the project area have not as a whole been intensively studied. It is, therefore, appropriate to discuss the soils in general terms such as the regional classification adopted by the Upper Colorado Region Comprehensive Framework Study (1971). Soil units which occur in southwestern Colorado include:

1. Cool, usually moist, light-surface soils (dominantly Cryoboralfs with Cryorthods or Cryochrepts). These soils are distributed throughout the higher elevations such as the San Juan and La Plata Mountains. They extend over steep, coniferous-timbered upper mountain slopes, moderately-sloping open grassland parks, and narrow mountain valleys. A significant component is very steep, windswept, rocky alpine slopes and peaks above timberline. Elevations are mainly between 8000 and 13,500 feet (2438-4115 m). Mean annual soil temperatures are lower than 47°F (8°C) and precipitation is high, ranging from 20 to 60 inches (508-1524 mm). About half of the soils are moderately deep or deep and have effective depths of 20 to over 60 inches (508-1524 mm). The remainder are shallow or less than 20 inches (508 mm) over bedrock. Shallow soils and rock outcrop are common on ridges and south or west-facing slopes. Deep alluvial soils constitute less than two percent of this unit. Dominant soils have light-colored, loamy surface layers that are somewhat acidic. Subsoils are permeable and sandy to clayey in texture. Both surface soils and subsoils are often gravelly or stony. Other components are dark, loamy, upland soils and dark, poorly-drained alluvial soils.

Principal uses of these soils today are for timber, grazing, wildlife, recreation, and water production. Short growing seasons are a major limitation to growing crops in this zone.

2. Warm or cool, usually dry, dominantly shallow soils without distinct horizons (dominantly Torriothents or Ustorthents). This soil unit is widespread throughout the project area and its distribution includes a majority of BLM lands in southwestern Colorado. Associated vegetation is chiefly grasses, pinyon-juniper and sagebrush except at higher elevations where there is oakbrush and scattered conifers. Elevations range from 4000 to about 10,000 feet (1219-3048 m) and mean annual soil temperatures cover a wide range. Mean annual precipitation extends from 6 to 15 inches (152-381 mm).

This unit contains a high proportion of shallow soils less than 20 inches (508 mm) to bedrock. Rock outcrops or rock lands are conspicuous in areas. At lower elevations the shallow soils have light-colored surface layers and are limy while at higher elevations the surface layers are darker colored. Within the unit are some deep soils of agricultural significance. They consist of mixed alluvial soils in the valleys and loamy upland soils formed by windblown (eolian) deposits.

The steep slopes, shallow soils, and sparse cover cause rapid runoff at lower elevations. Water erosion is severe in narrow alluvial valleys where gullying and bank cutting is widespread. There is also a significant amount of geological erosion in the canyons. Sediment yield is moderate for the entire unit but ranges from low to high.

3. Warm, intermittently dry, dark-surface soils (dominantly Origiustolls and Haplustolls). This unit is small in the project area, being restricted to a southeast-northwest trending zone between Cortez and the Dove Creek area. It extends over gently to steeply sloping mesas and plateaus, dominated by a sagebrush-grass vegetation community. Elevations range from 6200 to 6700 feet (1890-2042 m) and mean annual precipitation is about 15 inches (381 mm).

Dominant upland soils within the map unit have dark-colored, friable, surface layers that are rich in organic matter and have a neutral to alkaline reaction. Loamy surface textures are typical but sandy and clayey textures are included. About half of the dominant well-drained, moderately permeable soils have subsoils that are more clayey than the surface soils. Depth to underlying bedrock ranges from 20 to over 60 inches (508-1524 mm). Other components are shallow soils over sandstone and shale, rock outcrop, and alluvial soils. The alluvial soils are important agriculturally but are minor in areal extent. Much of the presently utilized cropland of the area is on the deep soils of this unit where a long growing season (about 140 days) and high available water-holding capacities of these soils make them well-suited for cultivation.

4. Warm, usually dry, dominantly deep soils without distinct horizons (dominantly Torriorthents and Torrifluvents). This soil unit is restricted to the extreme southwestern portion of the project area, primarily lands on the Ute Mountain Ute Reservation. The soils occupy gently sloping valley floodplains, benches, mesas, and steep foothills. In lower parts of the valleys the vegetation is shadscale with some greasewood along the streams. On the mesas sagebrush and grasses predominate with scattered juniper at some locations. Elevations are chiefly between 4500 and 6000 feet (1372-1829 m) and annual precipitation ranges from 8 to 12 inches (203-305 mm).

Climate

Seasonal Movement of Air Masses

The San Juan project area has the variable climate characteristic of the Southwestern United States west of the Rocky Mountains. More specifically, in Koppen's classification of world climates based on annual and monthly means of temperature and precipitation, southwestern Colorado has a cold, middle latitude, semiarid climate (BSK) (Trewartha 1954).

The following statements by Trewartha (1954) outline this type of climate:

> Dry climates in the middle latitudes usually are found in deep interiors of the great continents, far from the oceans, which are the principal sources of the atmosphere's water vapor. Further intensifying the aridity of the deep continental interiors is the fact that in both Eurasia and North America these locations are commonly surrounded by highlands that block the entrance of humid maritime air masses and of rain-producing storms (p. 280).
>
> The essential feature of a dry climate is that potential evaporation from the soil surface and from vegetation shall exceed the average annual precipitation. In other words, during a normal year the capacity of the atmosphere to acquire water evaporated from the soil surface and transpired from plants is greater than the water added to the soil through precipitation. In such a climate there is a prevailing water deficiency and a constant groundwater supply is not maintained, so that permanent streams cannot originate within such areas. It may be possible, however, for permanent streams to cross areas with dry climates... provided they have their sources in more humid regions (p. 267).

Dorrah (1946:2-9) has described the characteristics of seasonal air mass movements which affect the climate of the project area. In winter, high pressure zones, resulting from a faster rate of cooling over continental masses than over oceans, move to the southeast, drawing in moist Polar Pacific air from the northwest. Orographic uplift storms result from the Polar Pacific air being raised in elevation by topographic features and cooled, thus producing condensation and precipitation. Unfortunately for much of the Intermountain West, Pacific storms, before reaching the region, must first cross the Sierra or Cascade Mountain ranges. As the moist air is forced to rise over these high mountains, a large portion of the original moisture falls as precipitation. Thus, the prevailing westerly air currents reaching southwestern Colorado are comparatively dry, resulting in light precipitation. Another type of winter storm is produced when dry, cold Polar Continental air is drawn into the Southwest and displaces moist air masses upward with subsequent expansion and cooling, producing condensation and precipitation in frontal activity convergence-type storms.

In summer, low pressure systems result from continents heating at a faster rate than oceans and pulling systems of moist oceanic air in from the Pacific and Gulf of California, or the Gulf of Mexico. While the frequency of Tropical Pacific air masses entering the area is not as great as that of air masses from the Gulf of Mexico, the movement of very moist Tropical Pacific storms has caused some of the heaviest precipitation recorded. Storms caused by these invasions of moist air from the south are of several types: the orographic uplift and convergence storms, as described above; and convective storms. Convective storms tend to be local phenomena of short duration resulting from the rise of hot, moist, ground-level air to altitudes of less pressure where expansion and cooling result in condensation and precipitation. To persist, convective storms need continuous moisture replacement, an infrequent occurrence in the arid Southwest.

Precipitation

Moisture in the San Juan project area is heavy in the late winter months, primarily February, and again in the late summer months. Most of the winter moisture occurs as snow which has a determining effect on the vegetational aspect of the landscape in late spring and early summer, typically the driest period of the growing season. Rainfall reaches its peak in the region in August and decreases gradually into the autumn. During the late summer months the days begin with cloudless skies, but by noon, because of intensive air turbulence, clouds develop and thunderstorms are common. This precipitation is usually localized and intensive for a short period of time. In southwestern Colorado, it is not uncommon for muddy flash floods, several feet deep, to fill the channels of intermittent stream beds and flow for several hours.

Average annual precipitation in the study area ranges from 8 inches (203 mm) in the southwest corner to over 20 inches (>508 mm); most of the area, including the BLM lands, receives between 12 and 20 inches (305-508 mm) (Berry 1968). The most critical factor determining precipitation within the project area is elevation.

Temperature and Frost-free Days

Altitude also affects the distribution of temperature variation in southwestern Colorado, but in an inverse situation to that of precipitation. As elevations increase, from southwest to northeast, average temperatures decrease and, correspondingly, the frost-free period or growing season also decreases. An exception to this general pattern is the Mesa Verde where more mesic conditions result in higher temperatures and a longer growing season. Average annual temperatures and frost-free periods at selected weather stations include:

Weather Station	Annual Temperature	Frost-Free Period
Cortez	48.9°F	126
Mesa Verde National Park	50.5°F	158
Mancos	--	110
Fort Lewis	42.8°F	96
Durango	46.2°F	121
Ignacio	46.2°F	106

Climate and Water Supply

Because of the variability and irregularity of precipitation occurring in southwestern Colorado, a continuous supply of water, surface or underground, is not possible. In actuality, the effective moisture in the area is even less than the average precipitation figures suggest, since, according to Hunt (1967:289-290), probably 95 percent of the precipitation is lost by evaporation transpiration and seepage into the ground.

Nonetheless, several sources of water supply are found in the area for use by fauna and prehistoric and historic human occupants. Surface water is available in the San Juan and Dolores Rivers, both of which have their headwaters in the Colorado Rockies. Tributaries to these rivers originate where winter snowfall and higher average rainfall produce water supplies. Many of these drainages, however, are ephemeral, flowing only in the spring and early summer.

Another important source of surface water for livestock, wildlife and probably human groups in the past is an erosional feature commonly referred to as a "pothole" or "water tank." These holes occur in slickrock areas, primarily in the Mesa Verde Group sandstones, where weaknesses in the strata allow scouring and decomposition of the cemented sandstone grains to form a depression. Rainfall periodically fills these potholes, providing short-term water supplies.

Groundwater supplies become available as springs, appearing along the deeply incised canyon walls of the region. In general, precipitation seeps into porous sandstone aquifers and percolates downward until it meets an impervious stratum such as shale or limestone. At this junction, the water flows laterally until it emerges where the sedimentary strata have been exposed. Again, these water sources are often ephemeral since the permanency of a spring depends upon recharging of the sandstone aquifers.

Vegetation Communities

Vegetation communities in southwestern Colorado vary widely in response to geographic and climatic conditions. Much of the project area is dominated by either pinyon-juniper woodlands or sagebrush zones. A generalized distribution of vegetation communities, based on the work of Kuchler (1964) and Iorns and associates (1965), is shown in Figure 2 and each community is briefly defined below. These plant communities are thought to represent potential natural vegetation communities which existed prior to Euro-American settlement of the region. Representative photographic illustrations are included for the vegetation zones most germane to our discussion of BLM lands.

Subalpine Forests, 7500-11,500 feet (2286-3505 m) (Fig. 3)

At higher elevations in the subalpine forest, which is sometimes called the spruce-fir forest, the dominant trees are Engelmann spruce and subalpine fir. At lower elevations in the subalpine forest are three species that occupy large areas. They are lodgepole pine, Douglas fir, and quaking aspen.

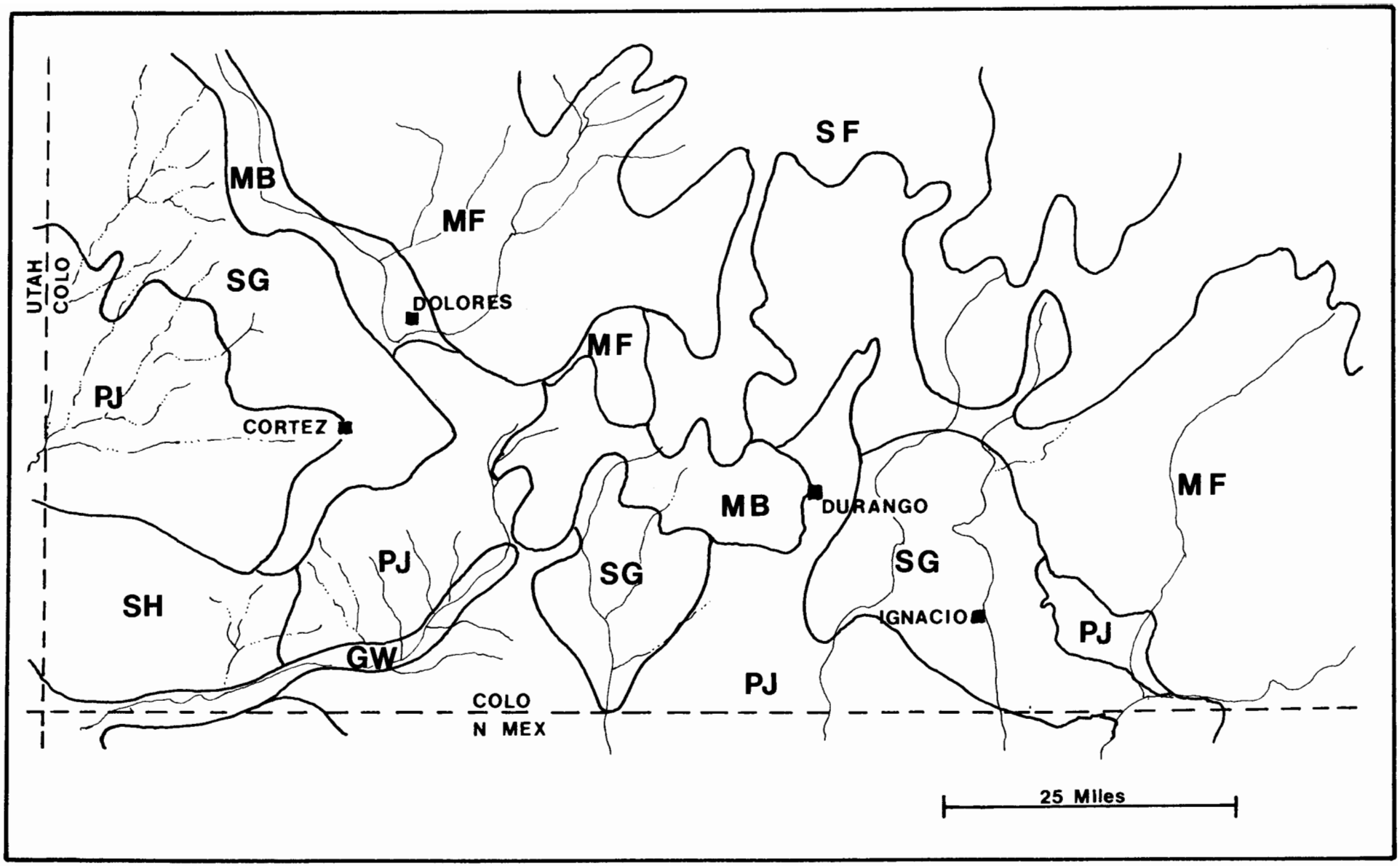


Figure 2. Distribution of vegetation communities in southwestern Colorado (after Iorns et al. 1965). Symbols: SF-Subalpine Forests; MF-Montane Forests; MB-Mountain Brush; PJ-Pinyon-Juniper Woodland; SG-Big Sagebrush; SH-Shadscale; GW-Greasewood.

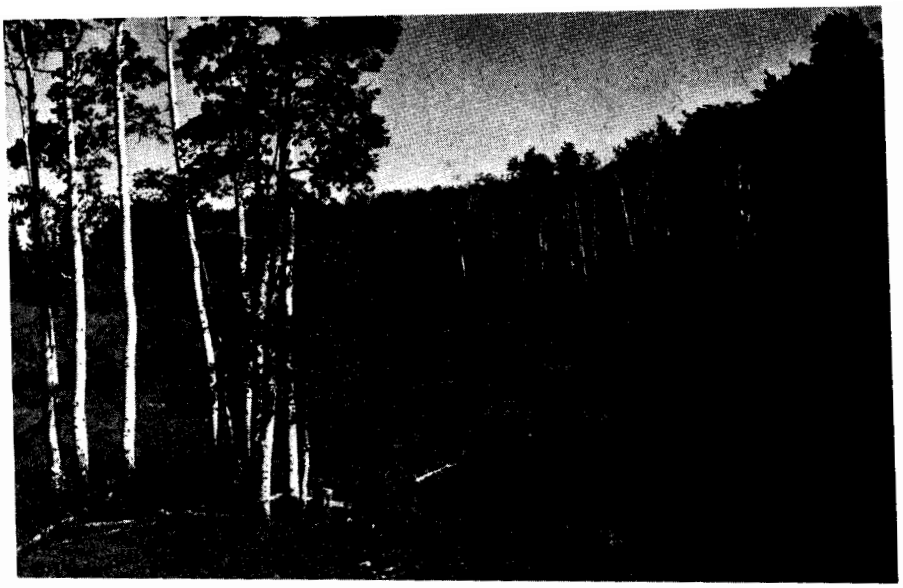


Figure 3. This view is typical of the subalpine forest community in the San Juan and La Plata Mountains.

Figure 4. Montane forest setting, in this case dominated by ponderosa pine.

Understory plants commonly found in the subalpine forest are pinegrass, elk sedge, arnica, and huckleberry. Much of the subalpine forest has dense stands of trees and little undergrowth. Streambank and meadow communities in the subalpine forest consist of woody plants such as willows, cottonwoods, aspen, birches, and dogwood. Some of the important herbaceous species are tufted hairgrass, blue joint, sedges, and rushes.

Highly productive forage is found in grazeable aspen woodlands within the subalpine forest. Here wheatgrasses, bromes, wild rye, and an array of desirable forbs furnish excellent forage for livestock and game animals.

Montane Forest, 6700-9000 feet (2042-2743 m) (Fig. 4)

Typical montane forests are characterized by the presence of ponderosa pine, intermixed with extensive areas of quaking aspen. Ponderosa pine forms open stands and usually has an abundance of understory plants. Some of the important plants are mountain muhly, Arizona fescue, Idaho fescue, slender wheatgrass, and oat grasses. Common shrubs are big sagebrush, serviceberry, snowberries, mountain mahogany, and bitterbrush. Streambank and meadow communities in the montane forest are similar to those in the subalpine forest. In some areas, the zonation between the subalpine and montane forests is not well defined.

Mountain Brush, 6500-8000 feet (1981-2438 m) (Fig. 5)

At lower elevations mountain brush includes shrub types that commonly occur as a transition between forest and other vegetation types. Common shrubs of this type are oaks, mountain mahogany, serviceberry, ceanothus, bitterbrush, cliffrose, chokecherry, snowberry, and rose. In the project area, sparse ponderosa pines are found extending into the mountain brush zone. Other plants commonly found in this zone are big sagebrush, bluebunch wheatgrass, needle-and-thread, junegrass, and annual bromes.

Figure 5. A mixture of ponderosa pine and Gambel oak can be seen in this view of the mountain brush vegetation community.

Figure 6. The pinyon-juniper woodland occupies much of the southwestern sector of the study area.

Pinyon-Juniper Woodland, 5000-7000 feet (1524-2134 m) (Fig. 6)

Occurring in foothill and low mountain areas, pinyon-juniper types are not usually abundant at elevations higher than 7000 feet (2134 m) or lower than 4000 feet (1219 m). The most common junipers are Utah, Rocky Mountain, and one-seed. Colorado pinyon is the most common pine in this zone. Understory species include bitterbrush, big sagebrush, mountain mahogany, and cliffrose. Some herbaceous species present are blue grama, galleta, bluebunch wheatgrass, western wheatgrass, Indian ricegrass, Russian thistle, and cheatgrass.

Big Sagebrush, below 9000 feet (2743 m) (Fig. 7)

This type is identified by the presence of big sagebrush. Occurring in extensive zones, big sagebrush is not as restricted by elevations as are the other communities and is found at elevations of up to 10,000 feet (3048 m). Sagebrush is found on well-drained, commonly loamy soils that are not usually saline. Many woody and herbaceous species are associated with big sagebrush. Some of these shrubs are black sagebrush, little rabbitbrush, horsebrush, winterfat, and snakeweed. Understory grasses are galleta, blue grama, western wheatgrass, bluebunch wheatgrass, and squirreltail.

Shadscale, below 5000 feet (1524 m) (Fig. 8)

Limited to soils that are slightly saline and that have relatively rapid surface runoff, shadscale grows in some places in nearly pure stands, but is commonly mixed with other shrubs such as sagebrush, horsebrush, and spiny hopsage. Nuttall saltbush commonly occurs locally as pure stands within this zone.

Greasewood

This community is restricted to the Mancos River floodplain and along intermittent stream channels at lower altitudes in the study area. It usually grows as nearly pure stands, but is associated in some places with shadscale, sagebrush, and rabbitbrush. Herbaceous phreatophytes commonly found with greasewood are saltgrass and alkali sacaton.

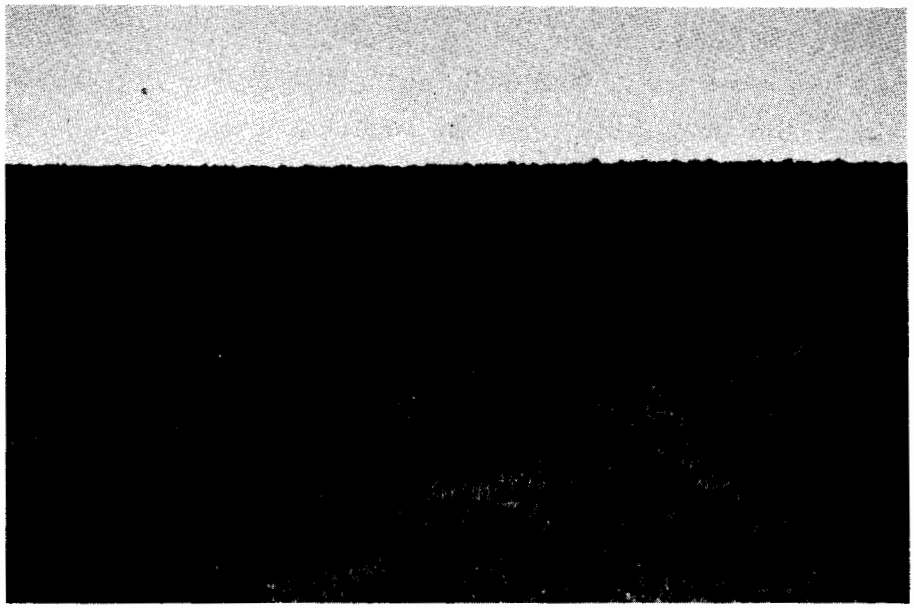


Figure 7. Sagebrush vegetation community, dominated by big sagebrush and a wide variety of grasses.

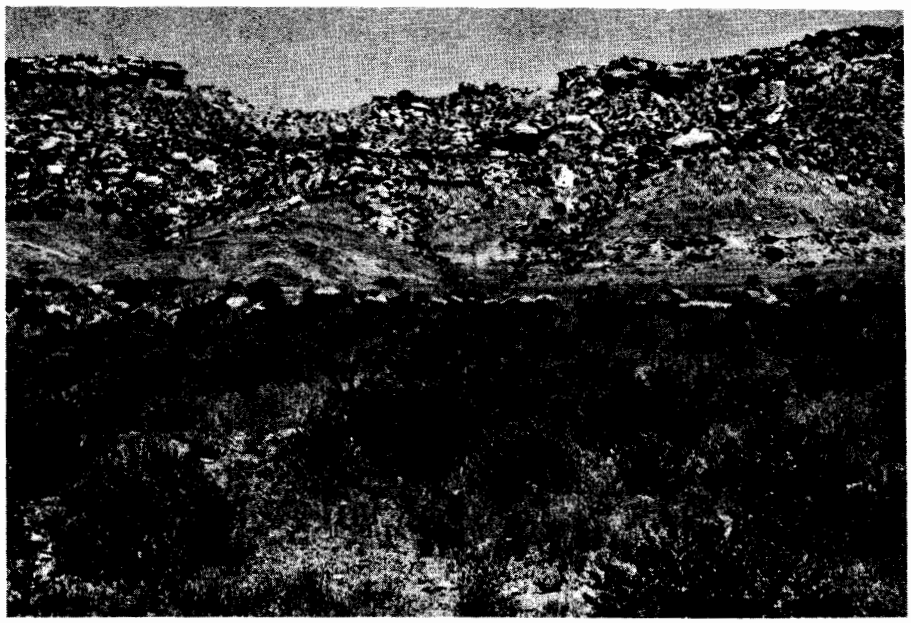


Figure 8. The shadscale zone is found in southwestern Montezuma County and extends into southeastern Utah.

Fauna in the Study Area

A broad variety of animal life is found in southwestern Colorado. Current BLM checklists found in the 1972 Unit Resource Analysis for the Sacred Mountain Planning Unit include the following breakdown: mammals - 85 species; birds - 252 species; amphibians - 18 species; reptiles - 25 species; and fish - 28 species. A majority of these animals are native to the region and would have been available for exploitation by prehistoric aboriginal groups utilizing the area. As we shall see in a later section, the economic emphasis was on the larger and smaller mammals, along with the turkey, for food animals. Table 4 in Chapter VI presents a listing of scientific and common names of the faunal species which have been recovered from archaeological sites in the project area.

Past Environmental Conditions in the Study Area

It is of interest to devote some attention to past environmental patterns recognizable for the San Juan Resource Area since in later chapters we will be examining the interaction between prehistoric and historic human groups and the natural environment. The following discussion of paleoenvironments is generalized and is limited to the time period extending back to about 12,000 B.P., a span which includes the full range of known possibilities for human occupation and use of the region by prehistoric cultures. In actuality, the majority of the evidence for such occupation in southwest Colorado occurs between A.D. 1 and the present. Thus, climatic patterns extant during the past two millennia are most important for later discussions.

In geological terminology, the past 12,000 years encompass the Holocene Epoch of the Quaternary Period and represent a postglacial time following the Wisconsin glaciation, the final glacial advance of the Pleistocene Epoch in North America. The published literature concerning Quaternary climatic reconstruction for southwestern Colorado

is not extensive; however, both regional and local data are accruing from a variety of sources. Primary among these studies are pollen analyses and dendroclimatology with lesser contributions being derived from cycles of arroyo-cutting and alluviation and analyses of sub-fossil molluscan fauna (malacology). Also important to this subject are recent approaches viewing past climatic fluctuations in the American Southwest as part of macro-climatic episodes occurring worldwide or as multi-regional climatic patterns. The data from these studies are presented below; a discussion of the effects of earlier climatic conditions upon the culture history and past lifeways of human populations in the project area is reserved for later sections of the report.

General Models

There has long been an interest in discovering and explaining the changing environmental conditions that resulted from the switch from glacial to postglacial and modern climatic conditions in the Southwest. Until recently, the most prevalent generalized model was that of Antevs (1955) who utilized evidence from alluvial deposition and erosion to posit a three-phase sequence of postglacial climatic fluctuations. This sequence, known as the Neothermal, postulates the following climatic stages or periods: an Anathermal period, ca. 8000-5000 B.C., with climatic conditions wetter and cooler than the present; an Altithermal, ca. 5500-2500 B.C., with climatic conditions drier and warmer than the present; and a Medithermal, ca. 2500 B.C. to the present, with climatic conditions gradually reaching present conditions.

In the Southwest, the Altithermal was seen as a climax of aridity and warmer temperatures after the Pleistocene. The phase was marked by arroyo cutting, lowered water tables, accumulation of caliche in soils, wind erosion, and dune formation. The succeeding Medithermal phase saw moderately warm and more humid conditions, but still arid or semiarid conditions in the Southwest. Many of the arroyos began to fill with alluvium, dry lakes in the northern Great Basin were flooded, sand dunes were overgrown with vegetation, and new glaciers formed in the Sierras and Rockies (Malde 1964). To many investigators, the tempo of

prehistoric aboriginal life accelerated along with the Medithermal Phase. The archaeological record shows the first signs of agriculture in the Southwest, and as time continued, increased dependence on plant foods and a progressive adoption of a more sedentary way of life, culminating in villages with farming located nearby.

When viewed on a sophisticated level, the Antevs' model of the postglacial sequence has proven to be much too generalized (cf. Bryson et al. 1970; Bryan and Gruhn 1964) and some of the patterns were challenged based on other lines of evidence (Martin 1963). Another recent approach to climatic reconstruction is to view past fluctuations on a much larger scale. These episodes appear to be the result of changes in major atmospheric circulation patterns and are derived from a number of lines of evidence and from many parts of the world (Baerreis and Bryson 1965; Bryson et al. 1970; Wendland and Bryson 1974; Wendland 1978). Researches on this sequence are not yet complete, but promise to provide a much clearer picture of Holocene environmental conditions and human occupation of North America. One point that is clear is that climatic fluctuation during the Holocene Epoch is far more complex than is indicated by Antevs' tripartite division. The major climatic episodes, which have been identified, are presented in Table 2 along with suggested chronological placements. Brief comments on the geologic and climatic expressions of these episodes in the Southwest are included in the table.

In a recent synthetic treatment of the paleo-climatic record for the Colorado Plateau, Euler and others (1979) have combined geological, archaeological, pollen, and tree-ring data to form a "comprehensive regional reconstruction of both long- and short-term paleoenvironmental trends." The primary goal of this project was to compare the paleoclimatic sequence for the Plateau with observable changes in prehistoric population movements; this evaluation can best be examined in later discussions after we have examined the archaeological record for southwestern Colorado. For the time being, it is sufficient to

TABLE 2.

MAJOR CLIMATIC EPISODES OF THE HOLOCENE EPOCH

(After Baerreis and Bryson, 1965; Wendland and Bryson 1974; Wendland 1978)

Dates: B.P. (Years Before Present)	Major Climatic Episodes	Geologic/Climatic Expression
	"Recent"	Climatic amelioration beginning with drought conditions about A.D. 1880.
100		
	Neo-Boreal	Cooler--glaciers reappear in Rockies as far south as New Mexico, known as the "Little Ice Age." Growing seasons were probably significantly shortened.
400		
	Pacific	Summer rains diminish, winter rains increase on the Colorado Plateau, probably cooler.
850		
	Neo-Atlantic	Warmer--gullying begins in the valleys of the Colorado Plateau and the Rio Grande area of the Southwest, probably as a result of increased summer rainfall.
1260		
	Scandic	Accelerated erosion in Southwestern mountains--warming trend.
1680		
	Sub-Atlantic	Warmer in the Southwest.
2760		
	Sub-Boreal	
5060		
	Atlantic	Drier and/or warmer--perhaps the warmest period of the Holocene.
8490		
	Boreal	
9300		
	Pre-Boreal	
10,030 B.P.		
	Late Glacial	Colder temperatures.

note that the resultant regional sequence suggests major drought culminations at about A.D. 50, 350, 600, 875, and 1450. The period A.D. 950-1150 was documented as an interval of increased effective moisture with general aggradation of alluvial deposits and high water tables on the Colorado Plateau. Correspondingly, there was an expansion and diversification of human populations throughout the region during this period. In southwestern Colorado, however, droughts expressed in the tree-ring records during the last half of both the twelfth and thirteenth centuries signalled population changes which, again, will be reviewed in subsequent chapters.

One document upon which this reconstruction is based is that of Dean and Robinson (1977), who present a dendroclimatic analysis from a 25-station network throughout the Southwest. Utilizing archaeological and historic tree-ring samples, a climatic chronology was developed for each of these stations, which include the Mesa Verde and Durango locales in southwestern Colorado. By combining the local chronologies, contour maps were constructed for the entire Southwest which portray diachronic fluctuations of tree growth and therefore certain climatic variables, primarily precipitation and temperature. These maps, constructed for 10-year intervals covering the period A.D. 680-1970, provide excellent documentation of short-term climatic fluctuations.

Paleoclimate Studies in Southwestern Colorado

Generally speaking, paleoclimatic studies undertaken in the study area have been one of two types. The first category includes a series of studies carried out in the higher elevations of the La Plata or San Juan Mountains, which are oriented toward defining long-term environmental changes occurring during Holocene Epoch, or the past 12,000 years. The data for such reconstructions come, in the main, from pollen analysis of peat bog core samples which have been stratigraphically dated by the radiocarbon method. A second grouping of paleoclimatic investigations includes those which have appeared as ancillary studies to archaeological work in the form of dendrochronological,

palynological, or geologic records. For the most part the archaeologically-related climatic evidence dates to the period of Anasazi cultural dominance in the study area between about A.D. 400 and 1300. Both categories of paleoclimatic results are briefly reviewed below; readers are encouraged to consult the original sources for more detailed information. A caveat is in order, however, as much work on this topic remains to be done in the project area to fill gaps in the existing data and to provide correlations between areas and forms of evidence. At the time of this writing (1980), a major effort is currently underway by the University of Colorado Dolores Archaeological Project, one focus of which is to provide a detailed climatic reconstruction for the interval A.D. 800 to the present in southwestern Colorado.

Foremost among investigations inquiring into Holocene environmental changes in southwest Colorado are the results produced by Andrews et al. (1975) and Peterson and Mehringer (1976). Andrews et al. (1975) employed bog stratigraphy and pollen evidence to posit that certain northeast-facing cirque basins in the San Juan Mountains were deglaciated by about 9000 B.P.; south-facing basins may have been ice-free about 2000 years earlier. For the Holocene, these authors use pollen ratios to indicate fluctuations in timberline. An upward advance of the timberline occurred about 8500 B.P., indicating warmer temperatures, followed by a brief climatic reversal, after which the treeline moved up again about 8300 B.P. and remained until sometime after 3500 B.P. This lengthy period coincides generally with Antevs' Altithermal; however, Andrews et al. (1975:194) see the interval as being at least partly warm and wet rather than warm and dry. Prior to 1300 B.P., the timberline again retreated to lower elevations and remained there until about 300 years ago when it advanced upward for a third time, after which it has depressed once again.

The work of Peterson and Mehringer (1976) took place near Twin Lakes in the La Plata Mountains and once again analyzed a radiocarbon-dated peat core to arrive at a sequence of past timberline fluctuations.

Their work indicated that the treeline was lower than that of the present about 9800 B.P., after which it advanced upward at least twice prior to 6000 B.P. Shortly after 4000 B.P., the timberline retreated to lower elevations only to be followed by a significant upward advance about 2500 B.P. Peterson and Mehringer also note a major lowering of the treeline within the past 300 years which may be attributable to either a climatic change or the effects of human disturbance (e.g. mining, logging, or grazing).

These studies of high altitude timberline fluctuation will undoubtedly become more important as further archaeological and paleoclimatic dates are developed for the periods preceding the time of Christ. The information from southwestern Colorado peat bogs has also been observed to correlate with other Holocene studies throughout the Middle Rocky Mountains (e.g. Madsen and Currey 1979), although local differences may be expected to occur due to specific minor climatic events in a given area and locally-occurring environmental conditions.

The overall sequence seen in these studies has the final Pleistocene deglaciation of the higher altitudes occurring sometime around 10,000 to 12,000 B.P., followed by a period of relatively cool temperatures to about 8000 B.P. when warmer/dry conditions became prevalent. About this time in the San Juan area, there was a minor reversal indicated by slightly lower treelines and perhaps some renewed glaciation (Andrews et al. 1975; Peterson and Mehringer 1976). However, from around 7500 to about 5000 B.P., the warm and dry climate regime continued, followed by an interval of warm/wet conditions prevailing until around 2500 B.P. when cooler temperatures depressed the treeline.

For the time period covering approximately the last 2000 years, which coincides with the primary cultural developments in southwestern Colorado, fairly detailed information on climatic patterns is available. One important point to note is that significant climatic changes or reversals which would initiate gross changes in biotic components have

not occurred during this period. Even in the preceding millenia, the macroclimatic changes discussed above probably did not result in large-scale environmental changes on the landscape. According to Bryson and Wendland (1967:279), the overall impact of fluctuations in Holocene climates likely resulted in shifting of the boundaries of major biotic zones, but not in changes to the interior of the biotic region.

In southwestern Colorado, it has been well documented that the prehistoric cultural groups were adapted to an environment comprised of similar biotic constituents as those found in the area today (c.f. Erdman et al. 1969; Nickens 1977a, n.d.). Nonetheless, there are definite indications of minor changes in weather patterns, many of which were significant enough to have had an effect on human and other biotic communities. The most important such changes were the recurrent periods of drought, often lasting for several decades, which have been documented for the Mesa Verde area. Fritts et al. (1965), for example, note several periods of drought in the tree-ring records centered on the years A.D. 517, 565, 614, 844, 884, 1170, 1280, 1402, 1525, 1585, and 1670. The extent and distribution of these prolonged drought periods have been graphically portrayed by Dean and Robinson (1977). The effects of these dry intervals and the concomitant cultural responses will be reviewed in a later section.

Several specific studies dealing with paleoclimate in the study area deserve brief mention. This information is listed by project area as follows:

1. Hovenweep area--As part of a multi-year archaeological project, San Jose State University, under the direction of Joseph Winter, examined pollen evidence for environmental change during the period A.D. 700 to 1300. Weir (1977:274-278) has observed that the fossil pollen record indicates two minor alterations in the past vegetation in this area. An early period, A.D. 700-900, reflects a relatively wet period during which more mesic plant environments existed. In contrast, a later period from A.D. 1000 to 1300, shows more environmental stress with lower levels of tree pollen. By comparison, the modern pollen rain indicates an environmental situation which falls between the earlier wet and dry periods.

2. Mesa Verde area--Paleoclimatic inferences from the detailed Mesa Verde tree-ring chronology have already been discussed. The record for environmental fluctuations for this area is well documented from around A.D. 450 onward. Pollen analyses from archaeological sediments have often shown an increase in tree pollen (primarily pinyon and juniper) around A.D. 1300, or shortly after prehistoric groups abandoned the area. This "woodland expansion" could be attributed to one of two factors, a climatic change favoring growth of trees or the natural reforestation of areas cleared for cultivation by the prehistoric human communities. The data appear to support the latter cause (cf. Martin and Byers 1965; L. Scott, various; Wyckoff 1977) since evidence for climatic change is generally absent. A similar situation was noted in pollen profiles from southeastern Utah and attributed to secondary forest succession following aboriginal abandonment (West 1978).

Very little has been done to correlate alluvial sequences in the Mesa Verde area. Reed (1958) suggested that the present day terraces in the Mesa Verde were the alluvial floors of the canyons in prehistoric times since all prehistoric sites are found on the earlier terrace. He offered a guess that the Mancos River and its intermittent tributaries started cutting the older terrace about A.D. 1300. The arroyo-cutting, which produced the most recent terrace, probably started around A.D. 1880. Although the evidence is scant and in need of further refinement, this sequence bears similarity to better documented fluvial sequences in other parts of the northern Southwest.

3. Chimney Rock area--East of the Mesa Verde, excavations at Chimney Rock Mesa (Eddy 1977) have yielded paleoclimatic information for a brief period extending from A.D. 925 to 1125. These data, primarily from pollen analyses, indicate a somewhat mesic climate early in the period trending toward more xeric conditions by the end. Eddy (1977:66) posited that overall this period was characterized by lower annual precipitation than found in the area today (454.4 mm) and by a winter-dominant seasonal precipitation pattern.

4. Navajo Reservoir District--In the southeastern extent of the San Juan Resource Area lies the modern Navajo Reservoir on the upper San Juan River. Extensive paleoclimatic and archaeological studies were completed in conjunction with the reservoir construction and flooding. Information from alluvial sediments, pollen from archaeological and floodplain sediments, and animal bones recovered from archaeological sites combined to allow reconstruction of the paleoenvironment. After Eddy (1972:6-14), the following summary of events applies to this area.

A.D. 300 or 400 to 800: The alluvial sequence indicates a moderate moving San Juan River and deposition of alluvium, indicative of a winter-dominant moisture regime. The pollen record reveals an increase in tree pollen and there is a concomitant faunal response.

A.D. 800-1000: Termination of the floodplain alluviation occurred around A.D. 800. Flow of the San Juan increased as a result of a change to a summer dominant moisture characterized by intense summer thunderstorms. Headward cutting of the river system proceeded upstream into Colorado. Decreased winter moisture reduced woodland cover and general vegetation cover.

A.D. 1000-1550: Little is known for this interval mainly due to the abandonment of the area around A.D. 1050 which resulted in no archaeological remains for study. An apparent absence of alluvial events suggests stability of the entrenched river channel.

A.D. 1550 to 1700: During this time sediments indicate a moderately swift river flow with active filling of the channel prior to downcutting stage. This situation, along with an associated high relative percentage of tree pollen, reflects a winter-dominant storm pattern.

A.D. 1700 to present: Intensive downcutting of the channel has prevailed since A.D. 1700 under the influence of summer-dominant thundershowers and rapid, upland slope runoff.

It can be seen from the foregoing discussion that a certain amount of discord exists between paleoclimatic data in southwestern Colorado depending upon the baseline data in use and locality. Additionally, many gaps in the evidence are apparent and there are other factors which have only received superficial study. These factors include both naturally occurring and human-related disturbances which may have affected the data base. One example of this is the question of fire which repeatedly occurs as a result of natural causes in the woodlands of San Juan area and may even have been deliberately used to clear lands by prehistoric groups. Although corroborative evidence for a cultural use of fire in the study area is lacking, this method was commonly used throughout North America as a means of clearing woodlands for cultivation and promoting growth of economic wild plant species. The point is that the effects of past fires, whether natural or human in origin, could greatly skew pollen results from a particular locale and time period. Erdman (1970), for example, has observed that following a burn, a pinyon-juniper forest takes up to 300 years to reach a climax situation. Without doubt, a stratigraphic pollen sequence from such a location would reflect a period of low tree pollen not at all related to climatic conditions.

III.

A HISTORY OF ARCHAEOLOGICAL INVESTIGATIONS IN SOUTHWESTERN COLORADO

An interest in investigating prehistoric ruins has a long and varied history in southwestern Colorado. Explorers first began to notice their presence around the middle of the eighteenth century, although most of this interest has been expressed during the past 100 years. In more than one case, some of the pioneering efforts in North American archaeology took place in this part of the northern Southwest, and it is the purpose of this section to review those developments. Also, this chapter will provide a basis for understanding the origin of the data base and concepts to be utilized in subsequent discussions of past cultural patterns in the project area.

Several authors have written histories of the archaeology of this area, most notably Brew (1946), Tobin (1947), and Herold (1961). These reviews were current at the time they were written, but since Herold's work no general synthesis has been offered to describe the latest endeavors. A cultural resources overview has recently been produced for southeastern Utah (Nickens 1980), which discusses contemporaneous and often related investigations taking place west of the present project area. A combination of the information in that document and that found in the following paragraphs will provide interested readers with a complete history of archaeological investigations in the Southwest north of the San Juan River.

As past reviews have noted, the archaeology of southwestern Colorado has followed an evolutionary trend that very much mirrors the path followed by general American archaeology. Brew (1946) and Herold (1961) have best expressed the stages of development that the archaeology of southwestern Colorado has followed. They have divided the work in the area into five stages: Early Exploration and Discovery (up to 1885); Early Excavation and Surveys (1885-1914); Stratigraphic

Excavation (1915-1927); Analytical Studies (1927-1946); and Research since 1946. Herold's analysis took the history up to 1959, and this work brings it up to December 1979. This history follows the stages set up by previous authors, but adds a sixth stage: Interpretive Archaeology, Research Designs, and Cultural Resource Management (1950-1979).

The purpose of this section of the overview is to review the developments in archaeology in southwestern Colorado. The approach taken is almost completely chronological in nature. No real attempt has been made to describe and evaluate the various theories and concepts which have arisen and evolved since the earliest investigations. A review of current theory and concepts will be presented in a later chapter, as well as detailed definitions of what elements and changes comprise each cultural phase present in this area. But prior to discussing what is now accepted, it is necessary to understand what has gone before. Readers will probably find it useful to refer to Figure 9 while perusing this chapter as this illustration gives locations of well known archaeological sites and areas in southwestern Colorado, all of which are discussed below. Also, persons interested in additional or more detailed information on these matters are encouraged to consult the previously published bibliography on archaeological sources for southwestern Colorado (Hull and Scott 1978) as well as the expanded and updated bibliographic sources appended to this report.

Early Exploration and Discovery
(up to 1885)

Apparently the honor for first mentioning the presence of prehistoric ruins in southwestern Colorado belongs to Juan Maria Antonio Rivera who in 1765 led a small party of silver-seekers from Abiquiu in New Mexico to the present project area. Rivera's diary (located in Madrid, Spain) mentions ancient ruins along several of the rivers in the eastern portion of the area (Cutter 1977). Rivera also noted the presence of Ute encampments along the Animas River.

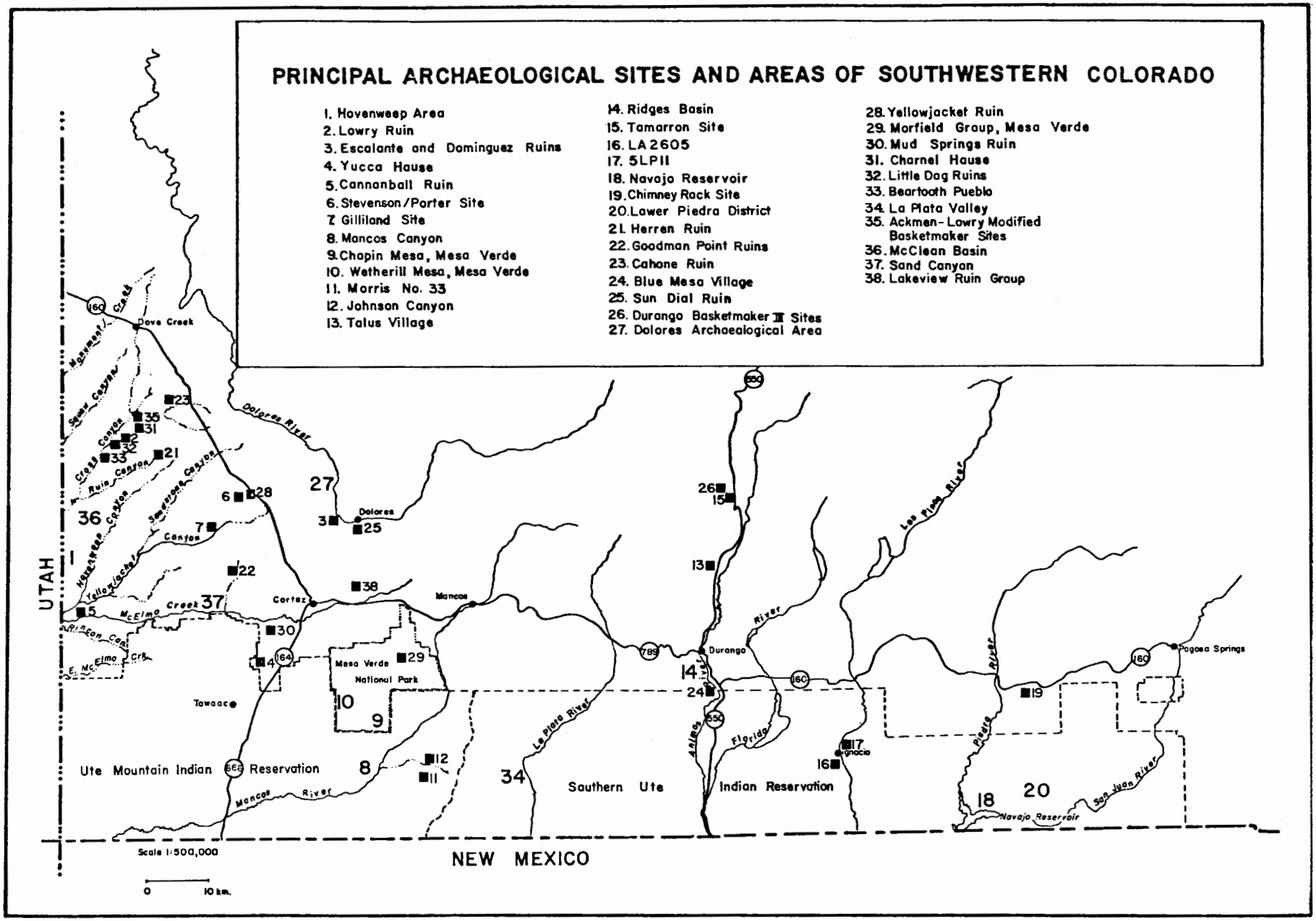


Figure 9. Principal archaeological sites and areas of southwestern Colorado.

The initial documentation of specific archaeological ruins, however, occurred 11 years later during an exploring expedition to the Spanish missions in California by two Franciscan friars. Fray Antanasio Dominguez and Fray Silvestre Velez de Escalante, accompanied by a party of eight men, set out on July 29, 1776 from Santa Fe to discover a direct route from the New Mexican capital to Monterey, a Spanish settlement in California. The expedition advanced up the Rio Grande and Chama Rivers, crossed the San Juan River and went down the Dolores before finally turning up over the Uncompahgre Plateau to the Gunnison River.

During their journey many ruins were recorded by Dominguez and Escalante; one in particular mentioned is located near a big bend in the Dolores River west of the modern town of Dolores. On August 13, 1776, while the expedition stopped and took polar bearings, Father Escalante found and examined a ruin located at the top of a low hill and the following passage from his journal describes the ruin: "Upon an elevation on the river's south side, there was in ancient times a small settlement of the same type as those of the Indians of New Mexico, as ruins which were purposely inspected show" (Bolton 1972). Because the region is so liberally dotted with ruins, there is some doubt as to the one Escalante mentioned, but Fewkes believes the ruin described, which he called the Escalante Ruin, was "situated about 3 miles from Dolores (town) on the top of a low hill to the right of the Monticello (Dove Creek) Road, just beyond where it diverges from the road to Cortez. The outline of the pile of stones suggested a D shaped or semi-circular house with a central depression surrounded by rooms separated by radiating partitions" (Fewkes 1919:36). The site, now known as the Escalante Ruin (5MT2149), is on the National Register of Historic Places and has been partially excavated and stabilized for interpretative purposes.

During the next 100 years trappers, traders, Mormon explorers, prospectors, and a few cattlemen passed through the Mesa Verde region but little attention was paid to the ruins. Brew (1946:17) lists three important historical events which he believes brought archaeological ruins to the attention of the scientific world. The first event was the discovery of gold in California. The rush of the 49ers to California drew people in great numbers from the Middle West and the East Coast. The "Old Spanish Trail" through the San Juan area was one route used to reach the West Coast. The gold rush also produced railroad surveys which arose from the need to have better communications with rapidly growing districts on the West Coast.

Mormon exploration was the second historical event that brought the Mesa Verde ruins into the light. The Mormons were surveying the area for new places to settle. The explorations began in the 1850s and one of the most noteworthy was led by William D. Huntington. Huntington is credited with the earliest published report on prehistoric houses of southwestern Colorado and the San Juan region. His account was published in the Desert News of Salt Lake City on December 22, 1854.

Huntington's party followed the Gunnison Trail from Salt Lake City to within 25 miles of the Colorado River. The expedition came south through the present Moab region, down Montezuma or Recapture Creek to the San Juans, turned east, and ascended the McElmo Creek. There they explored ruined houses and towers which possibly are part of the Square Tower Group at Hovenweep National Monument. Huntington's description of the area included large standing buildings, "with the ends of the red cedar joists yet in place, store buildings reduced to 'mere heaps' and dwellings within caves." The descriptions of the ruins are quite detailed including even measurements of the buildings, walls and windows.

According to Brew (1946:17), even though these early explorations of the nineteenth century provided little scientific information, they were useful because they drew attention to the fact there there were ruins

in the region. "Because of them, the expeditions...organized for other purposes, expected to find prehistoric sites and in some cases made staff preparations to study and describe them."

The third event was the war between the United States and Mexico which brought into the hands of the United States much of the Southwest. This event produced official governmental exploration under the War Department and the United States Geological and Geographic Survey. Governmental exploration, as well as the railroad surveys, brought into the Mesa Verde Region "trained observers with equipment for making accurate records" (Brew 1946:17).

Eighteen fifty-nine witnessed the first official exploration of the Mesa Verde region by an expedition under Captain J. N. Macomb of the Corps of Topographical Engineers (Macomb 1876). Many ruins within the area were described in a report by the party's geologist J. S. Newberry (1876). Although the report was written in 1860, the publication was delayed until 1876 because of the Civil War. The expedition's route was up the Chama River from the Rio Grande, through Pagosa Springs across the Pine,Piedra and Animas Rivers, around the south base of the La Plata Mountains to the Dolores River, and across the Great Sage Section to the junction of the Grand (Colorado) and Green Rivers. On the return trip they proceeded southwest from the La Sal Mountains, passed the site of Monticello, continued south close to Alkali Ridge to the San Juan River, and then up the San Juan to Canyon Large and across to Jemez, Santo Domingo, and Santa Fe.

In his section of the report, Macomb (1876:6) noted that the architectural remains and the pottery suggested that the "San Juan Valley" was once occupied by a race probably of the same origin and character of the Pueblo Indians extant in New Mexico. Up to this time it was thought that Chaco Canyon marked the northernmost extension of the Pueblo cultures.

Newberry's (1876) report noted that large numbers of ruins lie between the Mancos and Dolores Rivers. He earned distinction as the first white man, so far as is known, to climb to the top of Mesa Verde. He did this near Point Lookout, the northern promontory in 1859, but he did not discover any of the cliff houses located in

the canyons of the Mesa. He does describe what may be Escalante Ruin and also mentioned some ruins in the cliffs of the Dolores River Canyon.

Moving west from the Dolores, Newberry's party passed Surouaro Ruin (5MT5) which is near the Yellow Jacket Post Office. He also mentioned some traces of irrigation ditches which he had observed. According to Newberry (1876:89), "There is every evidence that a large population resided here for many years, perhaps centuries, and that they deserted it several hundred years ago, that they were Pueblo Indians, and hence peaceful, industrious, and agricultural."

In 1873 a prospector named John Moss, who was a geologist of sorts, entered the San Juan country in search of gold or silver. He searched the foothills of the La Platas but finding nothing turned southward through Mancos Valley into the deep gorges of Mancos Canyon. Here he noted, without much interest, a few small cliff houses clinging to the canyon walls far above. Moss's discovery of the cliff dwellings must have become known because in 1874 he was asked to guide William Henry Jackson's party down Mancos Canyon to the cliff houses.

For the majority of people, the Mesa Verde area was still relatively unknown during the 1860s. It was left to the F. V. Hayden survey to bring the ruins of the Mesa Verde to the attention of the general public. Two members of that party produced invaluable archaeological reports. They were W. H. Holmes, the official geologist, and W. H. Jackson, the party's photographer.

One of the Hayden survey's main objectives was the exploration of a large tract of land in the "San Juan country" that had been purchased from the Ute Indians in 1873 and which was supposed to contain extensive silver and gold sources. The expedition began at the headquarters in Denver and worked its way down from the headwaters in the mountains toward the Colorado River in 1874, 1875 and 1876.

The 1874 expedition was led by W. H. Jackson, whose party was comprised of two packers, Ernest Ingersoll (a correspondent for Horace Greeley's New York Tribune), and an acquaintance from Omaha named E. H. Cooper. Jackson located John Moss at his camp on the Rio La Plata in September 1874, and Moss guided the Jackson party down the Mancos Canyon to the cliff houses. Jackson climbed to and photographed a small ruin high on the west wall. Two Story House, named by Jackson, was the first in Mesa Verde to be identified (Fig. 10). Also during 1874, the Aztec Spring Ruin (Yucca House National Monument), which is located between the Mesa Verde and Ute Mountain, and sites in the McElmo and Yellow Jacket Canyon were visited and photographed by Jackson (Fig. 11).

In 1875 W. H. Holmes, a geologist who later became chief of the Smithsonian Institution's Bureau of American Ethnology, reversed Jackson's route by moving north through Mancos Canyon from a point on the San Juan. Holmes revisited the mounds and small cliff dwellings reported by Jackson in 1874 and emerged in Mancos Valley. Here he turned west around the northern face of the Mesa Verde and in McElmo Canyon discovered a number of large ruins. One of these was a "triple-walled tower...situated on a low bench within a mile of the main McElmo, and a dry wash that enters that stream from the south..." (Holmes 1878a:398). Holmes, like Jackson, believed that all prehistoric ruins in Mancos Canyon lay west of the river and that none were to be found in branch canyons to the east. Holmes made some fairly accurate maps of the ruins he had visited. He also described and illustrated several types of pottery and artifacts, and a few years later published the first study of Southwestern pottery (Holmes 1886).

Jackson's Photographic and Naturalists' Division continued work in the Yellow Jacket area in 1875 and 1876. His party recorded ruins in the San Juan Canyon below the mouth of the McElmo, in Montezuma Canyon, in the vicinity of Alkali Ridge, in Epson Creek and the Chinle in Utah. Jackson (1878) also prepared a map of a large part of the Southwest which accompanied the report.

Figure 10. Two Story House, photographed by William H. Jackson in 1874. John Moss (standing), guide for the Hayden Survey, and Ernest Ingersoll (sitting) are shown in the photo (photo courtesy of the Smithsonian Institution National Anthropological Archives).

Holmes (1878b) returned to the region in 1876 and searched for ruins on the La Plata and San Juan Rivers. The following year Jackson returned for his third and final survey of the area. The result of the Hayden Survey was the launching of Mesa Verde archaeology. As of yet, however, there had been only observation and collection; no organized excavation had taken place.

European interest was generated in the Mesa Verde region after Alfred Morgan (1876-1877) reported on the archaeological aspects of the Hayden survey. This report was presented to the Literary and Philosophical Society of Liverpool and was accompanied by a fairly detailed map.

For American readers, two papers by E. A. Barber published in the Naturalist in 1876 and 1877 were of more importance. Barber had been a member of the Hayden party and his work "constituted the first serious attempts to describe, analyze and classify the minor artifacts of the Mesa Verde" (Brew 1946:19). One paper (1876) dealt with the classification of pottery designs and shapes and even included some speculations about technique. The second paper was concerned with stone implements and ornaments. In this report, Barber (1877) lists the materials out of which stone objects are made, gives a classification of implements and a classification of arrow points on the basis of form.

Another early traveler into the Mesa Verde region was Lewis Henry Morgan. On a trip from Cañon City to Taos, New Mexico, Morgan recorded all he saw into a journal. He recorded and made measurements of the Aztec Ruin on the Animas River and visited cliff houses along the Mancos River, the La Plata Valley, and at the head of the McElmo Canyon. Morgan's journal is accompanied by two maps of the sites he viewed. The exact locations of the sites that Morgan mentions are difficult to determine, for the ruins in the region are numerous and Morgan's landmarks are not easy to recognize. He does, however, produce vivid descriptions of the sites accompanied by detailed measurements (Morgan 1881).

Figure 11. Aztec Springs Ruin (now known as Yucca House) as photographed by William H. Jackson in the 1870s. The western edge of the Mesa Verde can be seen in the background (photo courtesy of the Smithsonian Institution National Anthropological Archives).

In 1879, W. F. Morgan presented a paper to the A.A.A.S. which is worth noting. It was the first published report of a cliff house at the head of the Mancos Canyon which was beyond the points that Jackson and Holmes had reached and is in what is now Mesa Verde National Park. Along with a description of the ruin, Morgan presented a ground plan (Morgan 1879). Whatever digging that Morgan might have done at this time was not reported.

Early Excavations and Surveys
(1885 - 1914)

During this period an important series of events in Southwestern archaeology was brought about by a group of nonprofessionals--the Wetherill family. The homestead of B. K. Wetherill and his family was located beneath the escarpment of Mesa Verde at Mancos, Colorado. The five boys in the family--Richard, Alfred, John, Clayton and Win--discovered many ruins as they were tending their cattle in the Mancos Canyon and its tributaries. By the time they were finished exploring they had undertaken an archaeological survey of the whole region from east of Mesa Verde to the Colorado River (McNitt 1957).

The most exciting of the Wetherills' finds, one which precipitated a concentrated search for antiquities, occurred in the northern reaches of the Mesa Verde in 1888 when Richard Wetherill and his brother-in-law, Charlie Mason, while searching for stray cattle, encountered several of the larger cliff dwellings of the Mesa Verde which they named Cliff Palace, Spruce Tree House, and Square Tower House. The next few seasons were spent exploring the ruins and gathering artifacts. In 1888 and 1889, the first Wetherill collection was shown in Denver and was bought by the Denver Historical Society for $3000 in 1890. Their second collection was bought in 1892 by C. D. Hazzard of the H. Jay Smith Exploring Company of Jackson Park, Illinois, and exhibited the following year at the Chicago World's Fair. A third collection was gathered for Gustaf Nordenskiold and found its way to the National Museum in Helsinki, Finland. The fourth and final collection was made in 1892 for the State of Colorado and placed in the Colorado State Museum in Denver.

By 1890, Richard Wetherill, either alone or with his brothers and Mason, had located and examined all the major cliff dwellings in Mesa Verde (by his count: 182). He had named many of them, roughly mapped the entire area explored, and inspected 150 miles of the Mesa's cliffs (McNitt 1957:32). A notation by A. V. Kidder (McNitt 1957:3) provides an understanding of how extensive Richard Wetherill's excavations were: "A number of years ago, Jesse Nusbaum and I were exploring cliff dwellings on the west side of Mesa Verde. We saw one that was high upon the canyon wall opposite us, and decided to look into it. But it was a terribly hard climb--up a sheer wall and across a narrow ledge, with a long drop below. But we finally made it. With great elation over our discovery and the successful climb, we peered down through an opening in the rocks at our ruin. And right there before our eyes was an up-ended slab of rock. On it we read these words: 'What fools these mortals be. R. Wetherill'."

The Wetherills have been accused by some of being pothunters and vandals, and by modern-day standards such a case could be made, but to their credit they did observe facets of the culture and did keep records of the source of the articles found. A great debt is also owed to Richard Wetherill who, in 1893 while working at Butler Wash, Utah, noticed the diversity of his finds (Morris 1939:11). Some were identical to the cliff dweller but others, which occurred often in isolated positions and sometimes underneath the cliff dweller remains, were quite different in many ways. He called the latter "Basketmaker." T. Mitchell Prudden was the first to treat the Basketmakers seriously in an article titled "An Elder Brother to the Cliff Dweller" which was based entirely upon information supplied by Richard (Prudden 1897). Wetherill first introduced the term "basketmaker" to the professional literature in a letter printed in the Antiquarian in September 1897. He stated "...I refer here only to the sandal of the cliff and mesa dwellers, as the basketmaker made a round and a square toed sandal with the same material, but without the offset at the little toe" (Wetherill 1897).

The Wetherills were also active in attacking the supposition that the cliff dwellers were a different people from the inhabitants of the large open sites on mesa tops and valley floors. They based their conclusion on the similarity observed not only in artifacts and architecture but also on skeletal types.

The Wetherills entertained many visitors at their ranch, leading several of them on tours of the cliff dwellings. Some of the visitors were responsible for spreading knowledge of the Mesa Verde across two continents. After a trip with the Wetherills in 1889, F. H. Chapin (1890) published an article in the American Antiquarian entitled "Cliff Dwellings of the Mancos Canyon." Two years later he published The Land of the Cliff Dwellers (Chapin 1892) which described at length his explorations in the Mesa Verde area.

One of the Wetherills' most important visitors was Gustaf Nordenskiold, who was passing through Denver in 1891 when he saw the Wetherill collection owned by the Denver Historical Society. He contacted the Wetherills and asked them to show him the Mesa Verde cliff dwellings. Instead of remaining only a week or two and doing some sightseeing as planned, Nordenskiold ended up staying the entire summer and excavating in numerous ruins.

On the advice of Richard Wetherill, he "began these works in a ruin in Cliff Canyon where until then the earth had been barely scratched" (Nordenskiold 1893). The trial excavation cleared two kivas and a few rooms. After this, Nordenskiold moved on to Wetherill Mesa--which he named for the brothers--where more intensive excavations were carried on. Nordenskiold began at Long House, where he spent a month with John Wetherill and two laborers. Next he spent two weeks at Kodak House, for which he engaged another laborer. One more digger was added for a few days' excavation at Mug House and Spruce Tree House. At Step House he was rewarded by finding a large quantity of pottery and a number of burials (Nordenskiold 1893).

As the digging proceeded, Nordenskiold measured the ruins, photographed them, diagrammed the floor plans, and took careful notes on the details of architecture as well as the relics. He also found some time to uncover the mound of a partially buried surface ruin on a point of the mesa overlooking Cliff Palace. This ruin was later excavated by Fewkes and named Sun Temple (McNitt 1957). At Spruce Tree House, Nordenskiold anticipated the tree-ring dating method of A. E. Douglass by counting 162 annual growth rings on a spruce tree growing through a masonry wall. From this he concluded that Spruce Tree House was at least 200 years old.

When Nordenskiold had concluded his excavations, he departed for Durango along with his collection of relics of the cliff dwellers. On his arrival, however, he was served with a warrant by the county sheriff. News of his summer's work had spread. A committee of Durango's townspeople, incensed that a foreigner should be taking a wagonload of antiquities out of the country, had protested. Nordenskiold's boxes were seized, and two weeks later he appeared before a district court. Because there was no law prohibiting the removal of ancient relics from either the state of Colorado or from the United States, the complaint was dismissed and Nordenskiold left for Helsinki with his boxes.

Nordenskiold's greatest contribution was not the collection of cliff dweller relics, which is now in the National Museum of Helsinki, Finland, but his report of his summer's work, The Cliff Dwellers of Mesa Verde (1893). The report is magnificently illustrated and describes sites, associated artifacts, kiva paintings, and reservoirs of the Mesa Verde proper. Since the publication of this report in 1893, it has been difficult to obtain; however, the recent issuance of a reprint edition by Rio Grande Press has made this classic monograph available to researchers once again.

Nordenskiold entertained occasional visitors at his camp on the mesa between Rock and Long Canyons. One of these visitors was an eastern tourist named Dr. W. R. Birdsall, brought by Richard Wetherill. Dr. Birdsall remained several days after expressing interest in the excavations. A few months after his departure, the American Geographic Society published a paper written by Birdsall (1891) which Nordenskiold (1893) admitted was "The best description yet published of the ruins of Mesa Verde." Birdsall's article, entitled "The Cliff Dwellings of the Canons of the Mesa Verde," appeared in 1891.

During the 1890s other papers were written that dealt with cultural resources in the Mesa Verde area. L. W. Gunkel wrote on sites and pictographs in the canyons of the McElmo and Hovenweep (Gunkel 1897). The following year S. D. Peet published an account on the Mesa Verde cliff houses (Peet 1898). Finally, in 1900, C. N. Crotensburg wrote a short description of the ruins in Montezuma and McElmo Valleys (Crotensburg 1900).

With the turn of the century came the appearance of a series of articles on the Mesa Verde area by Dr. T. Mitchell Prudden. A pathologist and professor from Columbia University, Prudden arrived in Colorado on a vacation trip. His arrival was the beginning of a close friendship with the Wetherills. Over the years, with Clayton as his guide, Prudden explored nearly every corner of the 120,000 square miles of Indian country and came to know it as intimately as he knew Manhattan Island or his native New Haven (McNitt 1957:86).

Prudden did much to bring the Anasazi to the attention of the public. "His enormous vitality found an outlet, first in solving some of the mysteries of the Anasazi, and then in writing about his trips and discoveries" (McNitt 1957:86). One of his greatest accomplishments was the most complete archaeological map published up to that time of the entire San Juan drainage (Prudden 1903:10). Prudden had obtained all the available maps of the region and found that all were

inaccurate or lacking in some detail that he desired. Consequently, he made a map of his own which shows the courses of rivers and their tributaries, mountain ranges and the more important trading posts and towns of the Four Corners Region, as well as the approximate location of numerous ancient ruins throughout the area. Unfortunately, the map is today of little practical use except to show large concentrations of sites. Prudden had located sites by placing dots on the map he had constructed. Moreover, the map is not entirely correct with regard to watercourses and the scale is small. As a result, any given site cannot be located from it. But despite the inaccuracies, it was the best archaeological map of the country at that time.

A major achievement of Dr. Prudden was his special research into the small, unit-type pueblos which occur throughout the northern southwest. The unit-type pueblo, which Prudden defined, was a communal dwelling consisting usually of one story and from three to four rooms to 15 or slightly more. In the smallest of these dwellings the rooms were laid out in a single straight row; as they became larger, perpendicular wings were added at both ends to form an open rectangle. In each case, the pueblo almost invariably faced south overlooking a detached kiva, and generally farther to the south was a refuse area. Prudden undertook excavation of seven of these unit-type ruins beginning in 1913.

Accounts of Prudden's excavations are found in two of his reports: Sites 1 through 4 in "Circular Kivas of Small Ruins in the San Juan Watershed" (1914), and Sites 5 through 7 in "A Further Study of Prehistoric Small House Ruins in the San Juan Watershed" (1918). Site 1 is in Montezuma Valley about three miles from Cortez "a few rods west of the highway which runs southward from Cortez and crosses the McElmo Wash near Mitchell Spring." Eight rooms and a kiva were dug and a ground plan was given. Site 2, merely trenched, and Site 3, slightly excavated, are near Site 1. Site 4 is approximately 35 miles west of Cortez and is located on Cahone Mesa "near the head of a small eastern tributary

of Cross Canyon" near the Pleasant View-Bluff Road. The site is a small unit with a double row of rooms and a kiva. Prudden dug only the kiva and that only partially. All the above sites were investigated in 1913.

Excavated in 1915 were the following three sites: Site 5, also located on Cahone Mesa, was about three-fourths of a mile east of Site 4, between Ruin and Hovenweep Canyons. A six-room house and kiva were excavated completely. Site 6 is on Squaw Point between Cross Canyon and Dove Creek on the east and Squaw Canyon on the west, near the south end of the mesa. This is a group of ruins including a large pueblo and an artificial reservoir. A six-room unit and kiva were dug completely. Ruin 7 is on the next point west of Bug Mesa, between Squaw and Monument Canyons in Utah. Five rooms and a part of a kiva were dug here in a double kiva unit. Additional units were excavated here by Leh (1937, 1940) in 1937 and 1938.

In all, Prudden uncovered 25 rooms and four kivas. Although only a small amount of excavation work was done, his work is significant because it was the first to focus attention upon the small, transitional period of Pueblo life and architecture rather than on the more spectacular dwellings of the Classic Period.

A man who was most influential in forcing a shift from past antiquarianism to the scientific study of the Southwest's prehistoric inhabitants was Edgar L. Hewett, who, in 1907, had established the Archaeological Institute of America with its School of American Research in Santa Fe. He also began the first Southwestern archaeological field school of Puye where Earl Morris and Jesse Nusbaum received their early field training. Hewett, more than any other individual, was responsible for stirring up interest in high-level government circles to bring about the Lacey Law, which was passed in 1906, for the preservation of American antiquities. Through Hewett's efforts, many of the national monuments in the Southwest were born,including Mesa Verde in 1906 and Chaco Canyon in 1907.

Hewett also sponsored and directed much archaeological work in southwestern Colorado and southeastern Utah during the years 1906-1909. A.V. Kidder, the dean of Southwestern archaeologists, recounted an event which took place in 1907, quoting from the journal he kept at the time:

> Thursday, July 4th. Up, as usual in this country at four, to take advantage of the delicious hours of the early morning and forenoon. At ten or eleven the heat of the day comes on and lasts till after four. We pitched our tent, as this is to be our headquarters for some time, unpacked our duffle-bags and with Mr. Hewett started up the mesa that separates the canyons of the McElmo and the Yellow Jacket. It is usual, he told us, to find ruins on mesas that overlook the junctions of important drainages, so we walked out along its flat sage-brush covered top. Near the tip we found a partly fallen zig-zag wall set with a tower. It extended clear across the mesa, defending the end. Mr. Hewett predicted a pueblo on the protected tip and, sure enough, this lay a bit farther out. It was entirely gone except for the butts of a few walls.
>
> My diary says very little of what we looked out upon. I think I was dazed by that view, my first of such a vast desolation; naked red rock below and all about, mesas, pinnacles, ragged canyon walls, sheer cliffs. I must, too, have been a bit overcome by what Mr. Hewett so casually told us we were to do. He waved an arm, taking in it seemed, about half the world, "I want you boys to make an archaeological survey of this country. I'll be back in three weeks" (Kidder 1960:12).

Some years later in 1917, Kidder and Sylvannus Morley jointly produced a paper on the archaeology of McElmo Canyon, Colorado, which gave further information about the numerous Pueblo III settlements in the McElmo-Yellow Jacket drainage (Morley and Kidder 1917). This study was based upon a number of unusual sites on Cannonball Mesa and in the Hamilton Mesa area. This area has received no serious study since that date, except for an inventory done by the University of Colorado for the BLM in the 1960s.

Also as a result of Hewett's sponsorship, Sylvannus Morley, in 1908, produced the first competent report on an excavation outside of Mesa Verde proper when he dug at Cannonball Ruin. This ruin is

situated at the head of Cannonball Canyon (Fig. 12) and, according to Morley, was composed of "two pueblos on the opposite rims of the canon from each other, and a square tower built upon the very edges of the mesa" (Morley 1908:10). The southern and smaller pueblo of the two was chosen for excavation by the Colorado Branch of the Archaeological Institute of America during the field season of 1908. Morley excavated or at least uncovered a series of rooms, kivas and towers. His report contains a plan of the main house, and a description of architecture and artifacts sufficient for placing the site as Pueblo III in the developmental sequence as it is now known.

J. Walter Fewkes of the Bureau of American Ethnology began his work in Mesa Verde during the first decade of the twentieth century. After passage of the Antiquities Act of 1906, Fewkes' official duties in the government bureau gave him a responsibility to work among the ruins on public domain and prompted his active entry into archaeology. In 1908, he arrived at Cliff Palace (Fig. 13) and Spruce Tree House to clear away the debris left from both the prehistoric occupation and the work of the Wetherills and other explorers, and to convert those ruins into exhibits of America's Indian inheritance. During the next 12 years he supervised excavations at Far View House, Square Tower House, Earth Lodge A, New Fire Temple, Painted Kiva House, Pipe Shrine House, One Clan House, and Sun Temple. From 1909 to 1926, Fewkes produced at least four reports annually. "The number of these reports probably accounts for the quite erroneous belief that we know all we need to know of the large sites of the Mesa Verde" (Brew 1946:24).

Fewkes performed a certain service in the clearing and preservation of ruins, and his efforts greatly contributed to the popularization of Mesa Verde National Park; however, his reports leave much to be desired. Notes of his excavations were inadequate so that little knowledge can be ascertained from a study of specimens recovered. Conditions noted during the process of digging were not recorded, maps were not accurately drawn, terminology was needlessly complex and unstandardized, and many felt that data was hopelessly scrambled

Figure 12. Cannonball Ruin, located at the head of Cannonball Canyon (BLM photo files).

Figure 13. Cliff Palace Mesa Verde National Park (BLM photo files).

(Lister and Lister 1968:12). His main interests seem to have been restoration of the ruins and interpretation of the religious symbolism of the prehistoric peoples. Fewkes' approach was often not based on scientific method in this regard, however, as evidenced by his assertions that Sun Temple "...had a specific use and was, in fact, a temple for sun-fire worship to be used by the inhabitants of Cliff Palace..." (cited by Brew 1946:24 without specific reference). Concerning this statement, Brew (1946:24) comments: "The specific description of the religion of the prehistoric peoples and the coupling of Sun Temple with Cliff Palace in dogmatic statements are alike unjustified and, unfortunately, are characteristic of much of his work."

Fewkes' "Prehistoric Villages, Castles and Towers of Southwestern Colorado" (1919) is one of his most useful reports. In this study, Fewkes describes sites in the country west of Mesa Verde proper, not covering the ground as thoroughly as Prudden had done, but giving more information about some of the ruins. The area covered includes the vicinity of the towns of Dolores, Cortez, Yellow Jacket, Pleasant View, and Dove Creek, and the canyon country of Goodman Point, Bug Point, McElmo, Cannonball, Hovenweep, Hackberry Ruin, Sand and Wickiup Canyons and the McLean Basin.

Stratigraphic Excavations
(1915 - 1927)

Although Fewkes continued his work in southwestern Colorado well into the 1920s, the quality did not increase. It was up to men like Earl Morris, Sylvannus Morley, and A. V. Kidder to change the look of southwestern Colorado archaeology.

In 1913, Earl H. Morris began his work in the Mesa Verde area working as a field assistant for the School of American Research. Morris proposed to explore the La Plata country which lay some miles north and west of Farmington, New Mexico, with the escarpments of the

Mesa Verde to the west and the La Plata Mountains to the north. Morris had planned a thorough survey of all the mesas in the area and had a government permit to include Montezuma and La Plata Counties, Colorado, and San Juan County, in New Mexico. A year later, Morris again returned to the La Plata drainage, this time working solely for the University of Colorado. His route took him north along the La Plata River to Red Mesa. He then turned westward to Mancos Springs; then south across Red Horse Gulch, along a crest which marked the boundary between La Plata and Montezuma Counties and onto a dividing spur of land between Salt Canyon in New Mexico and Grass Canyon in Colorado. The 15 sites examined in the two seasons formed the basis of a report later published by the Bureau of American Ethnology (Morris 1919). According to the Listers (1968:63): "Earl became the first to excavate and publish upon a pit house type of architecture in the northern San Juan, the first to describe the regional variance of the plain and poorly decorated pottery, the first to put forth the idea of the germ of Pueblo culture being localized in the San Juan Basin, and later distributed from there." Morris (1919:204) observed: "The discovery in the northern part of their domain of a more ancient culture than that of the cliff dwellers should be of special interest, since it appears that the region north of the San Juan River is the center from which migration carried the true Pueblo culture south, southeast, and perhaps to the west."

Morris continued his archaeological exploration of the La Plata drainage in 1916. The site he selected for investigation was a community of mounds, domiciles, and trash scattered over the surface of an isolated triangular mesa thrust high above the arroyo. Selecting the largest mound, which was unpotted, Morris discovered three distinct periods of occupancy of the site. The first occupancy consisted of a sizeable settlement of houses, sunken into the subsoil, which were roundish in form and had their sides plastered with mud. The second

tenancy was represented by irregular shaped dwellings of cobblestones and adobe. Kivas were present and the pottery had more variety than was found at the earlier levels. The final occupancy had a house of dressed sandstone. "At the time of excavation all pottery from the structure was classed as Mesa Verde type, but in the experience gained through a number of further digs on the La Plata and at Aztec 23 years later, Earl made a distinction between a Chaco complex which underlay a Mesa Verde complex" (Lister and Lister 1968:66). Morris' report in 1919 described excavations in 23 sites, but full presentation of the information then obtained did not appear until his La Plata report, published in 1939.

In August and September of 1922, Morris returned to the La Plata area to study post-Basketmaker material in more detail. He excavated Site 18, located on a plateau between Red Horse Gulch and Maverick Gulch, but architecture, pottery and cranial types identified it as pre-Pueblo. Moving to ruins on Red Mesa, Morris discovered 15 low mounds. An excavation was carried out near one and a subterranean house, or protokiva as Morris called it, was cleared. Morris had found what he believed to be pre-Pueblo. "The investigation by Morris of late Basketmaker and early Pueblo sites came at a most opportune moment. During this time stratigraphic excavation was developing in other parts of the Southwest and he was first to apply it in the Mesa Verde area.... This technique revolutionized field method and provided the chronological control so sorely needed" (Brew 1946:25).

Work in the Piedra-Pagosa district in the eastern portion of the San Juan Resource Area was begun in 1921 by the State Historical and Natural History Society of Colorado under the directorship of J. A. Jeancon. The Chimney Rock vicinity was visited and some sites excavated during the summer field season (Jeancon 1922). Here, along the Piedra River, various types of dwellings were unearthed, and what appeared to be the complete evolution of a culture group established. During the summer of 1921, about 25 percent of the pueblo located on

top of Chimney Rock Mesa was excavated, and portions of a small pueblo at the Harlan Ranch site and several pithouses at the Pargin Ranch site were investigated. These excavations, located in the Piedra River Valley, were done in what Dittert et al. (1961:9) later defined as the Chimney Rock District.

In 1922, F. H. H. Roberts, Jr., in association with J. A. Jeancon, began his investigations of the northeastern basin of the San Juan including the region around Pagosa Springs and the Piedra Parada which eventually resulted in his Piedra District report (Roberts 1930). The 1922 excavation was devoted to four sites, three of which were pithouses and the fourth "the large pueblo located on the top of Chimney Rock or Piedra Parada Mesa where considerable work was also done during the season of 1921" (Roberts 1922:29).

Although most of his work was concerned with the eastern headwaters of the San Juan River, in 1923 Roberts carried his reconnaissance as far west as the Montezuma Valley. "The feeling that a knowledge of the extent of the ruins in this portion of the state was as important as further excavations, and the desire to determine, as far as possible, the place of this group in the culture of the Southwest led to the reconnaissance of 1923" (Roberts 1925:4). The party departed from Pagosa Springs and moved down the San Juan River in order to explore the river area and its tributary canyons. The tributaries of the San Juan as far west as and including the Animas River were thoroughly covered. The Mesa Verde, La Plata Valley, Johnson Canyon, Montezuma Valley, and McElmo Canyon areas were not as carefully checked as other areas "because of the excellent and extensive work which had already been done there by other institutions." The larger and more interesting ruins were noted by the expedition and first-hand knowledge of the house types was secured.

While Roberts was conducting his work in the Piedra-Pagosa area, other workers were concentrating on the Mesa Verde in the post Fewkes era. Kidder (1923) published a brief note in El Palacio which pointed out the presence of Basketmaker material in the Mesa Verde caves.

Jesse Nusbaum, who had replaced Fewkes as Park Superintendent in 1921, conducted sporadic repair and excavation in several of the cliff ruins between 1924 and 1929. Probably his most significant work of this interval occurred in 1926 when Nusbaum excavated three early seventh-century pithouses in the south end of Step House. All of these pithouses were found beneath a sterile layer of cave debris upon which the later Pueblo cliff dwellers' trash had accumulated. Unfortunately, Nusbaum's work was not published, although field notes are on file at the Park as is a manuscript on the Step House work (Nusbaum 1949).

One of the most important and lasting events in Southwestern archaeology was the tree-ring work of A. E. Douglass, an astronomer with the University of Arizona. Beginning in 1923, Douglass made a number of visits to the Mesa Verde ruins, drilling core samples of wood to add to the library of specimens obtained throughout the Southwest. By 1929, the various floating chronologies had been tied down with cross-dated specimens (Douglass 1929), making it possible to accurately measure construction and abandonment dates for the cliff dwellings. The work started by Douglass in the 1920s continues today as wood specimens are sent to the Laboratory of Tree-Ring Research at the University of Arizona on an annual basis from excavated sites in southwestern Colorado. A summary of tree-ring dates through the early 1970s for the Mesa Verde area is found in Robinson and Harrill (1974), and Dean (1975) has summarized the dates from the Durango area. Mention should also be made of the additional early collection of tree-ring samples from the Mesa Verde by Harold Gladwin of Gila Pueblo, Globe, Arizona. In 1929 Gladwin visited 103 mesa-top and canyon-head sites in search of tree-ring samples (Smith n.d.).

Analytical Research (1927-1950)

Beginning in 1927 and carrying through into the 1950s, a new, or at least evolving, approach was taken in archaeological work in

southwestern Colorado. Investigators changed their emphasis from simple data gathering to attempts at analysis and synthesis of data in a meaningful culture historical reconstruction framework. Paul Martin's work for the Colorado Historical Society and later the Field Museum of Natural History in Chicago was, in many respects, the beginning of this phase of the area of analytical archaeology.

In 1928 the State Historical Society of Colorado, under the directorship of Paul S. Martin, chose for its field of work a region 32 miles north and west of Cortez, Colorado. To be specific, this area is contained in Townships 38 and 39 North, Ranges 18 and 19 West, Montezuma County, Colorado. Ackmen (Pleasant View) was the nearest post office to the site of operations. Both mesa-top and canyon ruins were found in the project area, which also included several large ruin groups. Excavations the first year were limited to the Herren ruins which consisted of 13 house units and to investigation of a round tower at a nearby site called Charnel House. All the above sites were of Pueblo III classification. Two units were dug at Herren ruins which developed into four round towers, two kivas and 26 rooms (Martin 1929).

The 1929 season of the State Historical Society was devised so as to provide one-half of the field season to be devoted to a continuance of the work of 1928 and the rest of the time spent cleaning out a rim rock site. Martin had a great interest in unit-type ruins and felt more work should be done on them to determine if "this kiva-tower-passage arrangement was confined only to the ruins excavated or whether other smaller ruins might possess this same curious feature" (Martin 1930). The season began with Martin digging a Pueblo III site named Beartooth Pueblo which consisted of 22 rooms and two kivas and was located on the north rim of Ruin Canyon. He also excavated at Little Dog Ruins where three house types were found in stratigraphic relationship. The lowest of these were three Basketmaker III or Pueblo I pithouses. The highest was a unit classified at that time as Pueblo II but of a type now usually

placed at Pueblo III. The significance of this site was much greater than was generally realized at the time particularly because the large amount of work in sites of similar age by Morris was still unpublished.

In 1931, C. T. Hurst and V. F. Lotrich of Western State College, Colorado, carried out fairly extensive excavations on a site about 20 miles west of Dolores, Colorado. The ruin is located on private property and is about 400 feet south of where Highway 666 crosses Yellow Jacket Creek. According to Hurst and Lotrich (1932:195), "This ruin is the same one that Kidder (1924:65) refers to as Yellow Jacket Spring Ruin (5MT5). In their report, the writers renamed the site "Square Mug House." In all 11 kivas and 10 rooms were excavated. The writers placed the site during the Pueblo III time period. Complete records of the sites excavated by Hurst and Lotrich have, unfortunately, not appeared. Hurst and Lotrich also contributed a survey of pottery from the Mancos and Yellow Jacket localities which is in the Gunnison collection at Western State College. Many vessels and designs are illustrated and described; however, the provenience of the objects is not given.

The decade of the 1930s saw several significant additions to the overall understanding of prehistoric cultures in the Mesa Verde region. In the Park, archaeological work was somewhat curtailed, perhaps a consequence of the depression years. Many articles appeared in the Occasional Papers of Mesa Verde National Park and Mesa Verde Notes series which were primarily contributed by members of the Park staff. Much valuable information can be found in these publications, but they do not represent additional excavation, being based, in the main, on library and laboratory research. In 1934, Earl Morris, then working at Aztec Ruin in New Mexico for the Carnegie Institution, was loaned to the Park Service to repair and stabilize several of the larger cliff dwellings, including Cliff Palace.

Beginning in 1919, the Mesa Verde National Park started an experimental corn field which was to last 17 years. The results were

presented at a symposium on prehistoric agriculture held at Flagstaff, Arizona, in 1936 by Paul Franke, Assistant Superintendent and Park Naturalist, and Don Watson, Ranger Historian. The purpose of this field was to show to skeptical visitors that the Anasazi were farmers. According to Franke and Watson (1936) "Most of the visitors come in the summer when the air is dry, the sky is without cloud, and running water does not exist. As a result, the average visitor refuses to believe that crops will grow without irrigation...working on the theory that seeing is believing, a small field of corn has been planted each spring for the past 17 years, and the question of food supply of the Indians has been answered merely by pointing a finger."

Finally, in 1939, members of the Mesa Verde Park staff excavated a Pueblo I pithouse dated by tree-rings to the eighth century A.D. (Watson 1939; Smiley 1949). This site was accidentally discovered when workmen were digging a trench for a new water pipe. Also during 1939, a program of organized research was initiated to survey the archaeological sites in the Park. It was begun in order to achieve a maximum interpretive development for the Park, as well as to contribute further to the scientific knowledge of man in the area. It was hoped that such a survey would help locate many of the earlier sites so they could be excavated. Specialists from Gila Pueblo, an archaeological organization in Arizona, were contracted to help the small Park staff undertake the survey, which continued on and off until 1941.

Meanwhile, archaeologcial research at the Lowry Ruin was carried out by Paul S. Martin of the Field Museum Archaeological Expedition to the Southwest during the years 1930-31 and 1933-34. The ruin is located nine miles west of Pleasant View Post Office. Investigation of Lowry Ruin was prompted by the existence of a site with apparent Chacoan features in the Mesa Verde cultural area. Evident at the Lowry site were Chaco-like potsherds and a large depression which looked as if it might be a great kiva, a structure then known to be associated only with Chaco architecture. Yet when work was started on this ruin (1930), the

known range of Chaco culture traits was limited to Chaco Canyon, Aztec Ruin, Gallup, New Mexico, and to the region near Pagosa Springs, Colorado. Thirty-seven rooms and eight kivas were dug, including a Chaco-type great kiva 47 feet in diameter. Martin's report (1936) was of particular value because Lowry Ruin then suggested a transition between Chacoan and Mesa Verde styles of pottery decoration. Martin dates the large house to Pueblo II - Pueblo III. This was the first indication that the concept of Pueblo II as a period of only small "unit type" houses was not entirely correct.

After Martin finished his report on Lowry in 1936, he turned his attention to four small sites located in Township 38 North, Range 18 West in Montezuma County, southwestern Colorado. The expedition was again funded by the Field Museum Archaeological Expedition to the Southwest. Martin chose these small sites because no similar work had ever been done in that area. Also, "small ruins rarely yield anything spectacular but they are, none the less, the important links in a historical chain. Without fully understanding them, it is impossible to understand the later, more beautiful and glamorous ruins" (Martin 1938:230). While the digging proceeded, an intensive archaeological survey of the Ackmen-Lowry area was conducted and a total of 180 sites was recorded within an area of 16½ square miles (Lloyd 1938). Martin conducted two more excavations in Township 39 North, Range 18 West, in 1938. Lowry Ruin is located six miles southwest of these two sites and the sites excavated in 1937 lie about four miles south. The 1938 sites were selected in order to fill in the gap in the Basketmaker period.

During the 1937 and 1938 seasons, six sites were dug in which 85 rooms, 13 pithouses, three kivas and two very large circular structures of unknown use were cleared. According to Martin (1939:322), with the publication of his 1938 report, "Our work in that area is finished, for we have investigated and reported on all the manifestations of cultures from Basketmaker period to Great Pueblo period or roughly from A.D. 700 to A.D. 1150."

In the summer of 1935, Deric O'Bryan, working for the Carnegie Institution under the supervision of Earl Morris, conducted a large-scale inventory of the La Plata River Valley (O'Bryan 1950:19). The work was undertaken to supplement Morris' earlier work in the area. Nearly 1000 sites were located in the region located between the mouth of the La Plata, at the San Juan River in New Mexico, north to the Cherry Creek-La Plata junction, and west to the ridges on both sides of Johnson Canyon. Ruins from Basketmaker III through Pueblo III were identified, plus one historic Zuni camping area. The survey results were never published, but the site forms, artifact collections, and a diary describing the work are on file at the Museum of New Mexico in Santa Fe.

During the 1930s a considerable amount of work was being conducted in the Durango vicinity under the leadership of two amateurs, I. F. "Zeke" Flora and Helen Sloan Daniels. Flora collected a large number of tree-ring specimens throughout the area for Gila Pueblo (Dean 1975) and assisted Harold Gladwin in fairly extensive excavations on Blue Mesa south of Durango in 1936. The Blue Mesa village consisted of several parallel rows of contiguous surface rooms and associated pithouses dating to the period A.D. 540 to 688. Unfortunately, the Blue Mesa work was never formally reported, being described in a few paragraphs in Gladwin's A History of the Ancient Southwest (1957).

Daniels, working through the Durango Public Library, directed excavation of several sites with laborers from the New York Youth Administration program. Daniels (1940) compiled the results of this work in a single volume, and she and Flora published a weekly column in the Durango News called "Sherds and Points," which touched upon a variety of subjects dealing with the prehistoric occupants of the area.

The work of Flora and Daniels in the Durango area was brought to the attention of Earl Morris in 1934 when he was asked to examine a large collection of pottery that Flora had exhumed. Morris states "the collection proved to consist almost wholly of unmistakable Basket-

maker III vessels, but the designs on most of the decorated specimens differed sufficiently from those characteristic of neighboring localities to put the stamp of local individuality upon the Durango product" (Morris and Burgh 1954:1). Morris had another chance to observe a collection dug by Flora in 1937. This collection, obtained from North Shelter, was representative of Basketmaker II. At that time no sites of this age had been recorded for any part of the upper San Juan drainage. Upon the recommendation of A. V. Kidder, Carnegie Institution applied for a permit to excavate, which was granted in 1938. From 1938 to 1940, Morris carried out excavation for the Carnegie Institution in the Durango area. The 1938-1939 seasons saw excavations in the north and south rock shelters part way up the western wall of Hidden Valley beneath a massive ledge of whitish sandstone.

The 1940 excavation was at Talus Village which is situated on a timbered hillside that flanks the west margin of the Animas Valley about 13 kilometers north of Durango. The report by Morris and Burgh on these excavations appeared in 1954. Tree-ring dates ranging from A.D. 46 to 330 showed the sites to be the oldest found in the Mesa Verde area at that time. Excavation included houses and refuse areas of the north and south shelters and the Talus Village. In addition to defining the floor surfaces of houses, the authors were able to discover the method of wall and roof construction, thus making possible the first authoritative description of Basketmaker II houses. The excavation also revealed the location of pre-pottery sites in the open in addition to their location in caves. Numerous mummies and perishable artifacts found in the burial crevice and other refuse areas supplied further information. The reports of the earlier excavations have been published (Morris and Burgh 1954), but a group of Basketmaker III sites excavated in 1939 were not published until after Morris' death (Carlson 1963).

Carlson (1963) states that the 1939 excavations were carried out at six sites at which a pithouse and surface room were present. All of these sites were assignable to the Basketmaker III phase for the Durango area. Dendrodates indicate that the pithouses were occupied simultaneously about A.D. 760. In addition, notes were made at six other locations.

The location of this Basketmaker occupation is Hidden Valley, a narrow shelf formed during the Pleistocene above the west side of the valley of the Animas River just to the north of the city of Durango in southwest Colorado. The immediate area of the sites is known as Falls Creek Flats. The sites consist of individual or occasionally paired pithouses in an area of fields and low knolls about one and one-half miles long by one-half mile wide.

The six excavated sites all occupy similar positions on low ridges above the valley floor. All were marked by the presence of potsherds and other habitation debris and of a circular depression which, when excavated, proved to be the remains of a pithouse. The remains of surface structures, an encircling ring of cobblestones, and trash areas with burials were encountered at some sites.

Carlson has done an excellent job of describing the architectural features of the pithouses and surface rooms. His report also covers sections on the artifacts found at the sites, on the faunal and floral remains (section on maize by Hugh Cutler and on beans by Lawrence Kaplan). It also contains a section on the dating, chronology and culture change at the site and also makes some comments on the settlement pattern and inferences on social organization. Finally, Carlson concludes his report with a summary on the Durango Basketmaker III culture.

The year 1939 also saw the completion of Earl Morris' paper describing his work in the La Plata district of southwestern Colorado and northwestern New Mexico (Morris 1939). A study on the technology of La Plata pottery by Anna O. Shephard was included within the report. In extensive fieldwork from 1915-1930, Morris uncovered remains of all

periods from Basketmaker III to Pueblo III. Ten large sites are reported in detail, and comparative information and significant finds from 15 other sites are discussed in the report. "Because of the great range of types of ruins studied, the splendid extensive historical reconstruction in the introduction and Miss Shephard's very pertinent remarks on the nature and use of technological analysis of pottery, this report may be considered the most important which has appeared in the Mesa Verde area" (Brew 1946:53).

Two years later, Morris collaborated with Robert Burgh and published a study of basketry in the San Juan dating from Basketmaker II through Pueblo III (Morris and Burgh 1941). Technology, forms, and decorative designs are described with 127 drawings and 249 photographs, the whole constituting an extremely valuable source book. In addition, it contains a good map of the San Juan drainage.

Before turning to review of archaeological investigations which took place during the 1940s in the project area, one project from southeastern Utah should be mentioned which resulted in an extremely important contribution to the entire San Juan region. During three field seasons, 1931-33, the Harvard Peabody Museum conducted excavations on Alkali Ridge in San Juan County, Utah. In all 13 sites were investigated, including 195 storage and living rooms, 29 subterranean pithouses and kivas, and 10 refuse mounds. The primary research problem for the expedition was to define and clarify the Pueblo II period; however, contributions for all periods of the Pueblo sequence from Basketmaker III resulted. The publication of this work was not completed until 1946 by J. O. Brew, the director of the project. Brew (1946) examined a number of problems then plaguing Southwestern archaeologists (e.g. terminology, culture classifications, and taxonomy) in addition to providing a detailed and highly usable description of the architecture and artifacts on Alkali Ridge. Already mentioned at the outset of this chapter was the "history and extent of Mesa Verde archaeology" written by Brew which covered previous investigations throughout the San Juan region up to the time of his book.

More excavation was done at Mesa Verde National Park during 1941. At that time two Basketmaker III pithouses (designated B and C) were cleared in order to provide readily accessible excavated ruins of the Basketmaker period which would fit into the sequence of cultural periods presented on guided tours. Pithouse A (Earth Lodge A) had already been excavated by Ralph Linton (1919) but was in such a poor state of preservation that it was decided to dig two more sites near it. The location of these sites was on Chapin Mesa above Square Tower House. Lancaster and Watson (1943) published a detailed report on the excavations with plans and photographs. The excavation of pithouses B and C indicated to Lancaster and Watson that the Mesa Verde Basketmaker III "was typical of the period and varied little or none from the normal pattern that had been established for this most important culture." The houses, pottery and various other articles were similar to those that had been revealed in excavations in surrounding areas (Brew 1946; Martin 1939; Roberts 1929).

Another group of tree-ring specimens was collected from the Park in 1941 as part of a regional tree-ring inventory by Gila Pueblo. O'Bryan directed this work and later published the Mesa Verde dates in his report on excavations at sites on the Mesa Verde (O'Bryan 1950).

In the spring of 1942, Erik Reed, Regional Archaeologist with the National Park Service, excavated five sites in the Mancos Canyon, south of Mesa Verde National Park. This work was executed to preserve information from sites threatened with destruction from road construction in that part of the Ute Mountain Ute Indian Reservation. A pithouse, three kivas, and 22 rooms were excavated along with some work in the refuse mounds. Additionally, surface surveys were made of 24 other sites. Initially, Reed (1944) published a brief report on the work which received fuller treatment as his doctoral dissertation at Harvard University. Finally, in 1958, the dissertation with minor revisions was published.

Excavations by Gila Pueblo were carried out in Mesa Verde Park during the years 1947-1948. Under the directorship of Deric O'Bryan, the following ruins were excavated:

Description	Approximate Date (A.D.)
Shallow pithouse (1)	572
Deep pithouse (1)	664
Slabhouse village (2)	840
Small pueblo (1)	950
Small pueblo (1)	1074
Masonry pueblo (1)	1200

This work by O'Bryan is notable, for it was the first use of modern excavation techniques on the Mesa Verde for Pueblo age ruins. Along with a summary of the excavations, O'Bryan also produced a description of two new pottery types and a list and chart of tree-ring dates from Mesa Verde ruins.

In 1946, Samuel Tobin, a graduate student at the University of Utah, began excavations at Cahone Ruin located west of the town of Cahone. Excavations at the site during the summer of 1946 were under the sponsorship of Ansel F. Hall, Mancos, Colorado. The Cahone Ruin is located in Township 39 North, Range 18 West, in Dolores County, and is on land owned by Ansel Hall. Excavations were conducted on two mounds located at the extreme eastern end of the site, one a trash mound and the other a mound containing a house structure (Tobin 1947, 1950). The site yielded Basketmaker III to Pueblo III traits, but is judged to be predominantly Pueblo II to early Pueblo III in age.

Excavations of the Cahone Ruin continued in the summer of 1947. The excavation was part of the Explorer Camp's annual summer program and was directed by Alfred Guthe, a graduate student in anthropology. Guthe investigated "an occupation unit" which included two mounds with occupational refuse and burials, a stone pile with remnants of surface rooms, and a depression, or the remains of a kiva, was partially excavated

during the 1947 season. After analyzing the pottery, architecture stone and some bone artifacts, Guthe suggested the ruin to be in "a transitional stage between Pueblo I and Pueblo III which would lead one to place it in Pueblo II. I would tend to consider it a little closer to Pueblo III than to Pueblo I" (1949:154). Basing his conclusion on the pottery seriation of Rinaldo (Martin, et al. 1949:190, Fig. 71), Guthe concluded that an approximate occupation date for Cahone Ruin would be around A.D. 1000.

At the instigation of the National Park Service, Carroll L. Riley in 1948 conducted an archaeological survey of Pueblo type ruins in the five detached areas of Hovenweep National Monument (Riley 1948b), which are from west to east the Cajon group, the Square Tower group, the Holly group, the upper Hackberry group, and the lower Hackberry group. A total of 38 ruin areas were mapped and described, and potsherd collections were taken whenever possible. The work extended over three months and all parts of the monument were explored and mapped. According to Riley (1948a), "The Hovenweep represents, to some extent, an archaeological frontier. No extensive fieldwork has been made within its confines. Map coverage of this section is poor. As the ruins represent an interesting and somewhat novel aspect of Pueblo life, it is to be hoped that the future will see more interest in this part of the Southwest."

In addition to the Hovenweep survey, two surveys of towers in the Mesa Verde area were published in 1950. Albert Schulman considered pre-Columbian towers which he stated were "restricted to Southwestern Colorado, Southwestern Utah and Northwestern New Mexico" (1950:280). He divided the entire area into five territories which were Mesa Verde, consisting of the national park; McElmo, which includes the Mancos River, McElmo Canyon, Yellow Jacket Canyon, Lost Canyon and numerous tributaries; Hovenweep, the ruins of which are largely in the San Juan drainage basin of eastern Utah and western Colorado; Gallina, which includes sections of Sandoval, McKinley, San Juan and Arriba Counties of New Mexico; and the Navajo Country, which includes some 25,000 square

miles of Navajo Reservation in Arizona, New Mexico and Utah. Within each area, the ecology, history, number of sites, description of towers, dates and conclusions were recorded by Schulman. Of importance to this paper are the Hovenweep, McElmo and Mesa Verde areas. He concluded that the towers in the Hovenweep and McElmo served as watch towers, lookouts and defense units. "Lacking large populations, huge compact settlements, and unity, the people were forced to build numerous small defenses and towers to meet their small group needs" (1950:295). At Mesa Verde, however, the huge cliff houses relegated the towers to a subordinate defensive, and often religious role. He concluded that "Only in the outlying parts of Mesa Verde do towers begin to approach the types that appear in the Hovenweep or McElmo" (Schulman 1950:297).

The second survey of towers in 1950 was conducted by Carroll Riley who studied the "defensive structures" at Hovenweep National Monument (Riley 1950). Riley suggests that there are two types of structures that indicate defense. These types, the true tower and the great house, differ from one another in size and general ground plan. A typical example of a true tower is the square tower in the central ruins group of the Hovenweep Monument. This type of tower is isolated or partly isolated from the surrounding area, is D-shaped in ground plan, contains one or two rooms per floor, and stands two or more stories high. The second type of tower, or great house, is a long rambling building, two stories in height, with several rooms. It often shows two or more stages of construction. All the great houses have nearby true towers. These structures are usually rectangular, though there is some variation. Riley uses Hovenweep Castle as an example of this type of ruin. Riley gives an able summary and classification of Hovenweep Towers. The only regret is that no excavation or completed surface description of any site is included in the report.

In 1948, John B. Rinaldo with others (Martin, et al. 1949) had made a seriation of the principal pottery types in Mogollon sites in western New Mexico and presented it in the form of a wedge bar graph. Because it provided such a detailed and excellent picture of the relationships of these pottery types, it was decided to make a similar seriation of the pottery types in the Ackmen-Lowry area, the results of which were published by Rinaldo (1950). Culture change was analyzed in all Ackmen-Lowry Ruins excavated by the Field Museum of Natural History, which includes Sites 1 and 2 at Cahone Canyon, Sites 1 through 4 at Ackmen-Lowry, and Lowry Ruin. Rinaldo gave new and more complete dates, and the distribution of types of pottery, bone tools, pipes, pendants, ground and chipped stone tools, and other artifacts is traced at the sites. In his conclusion, Rinaldo (1950:105) states that this type of seriation and its graphic method of presentation is a procedure that:

1) contributes a method for the relative dating of the last occupation of structures in the absence of absolute dates;

2) enables one to estimate and measure rates of change in culture as reflected in the material products of human activity, particularly in pottery;

3) indicates by irregularites in the trends where possible gaps in the data and sequences may lie;

4) provides a more detailed and precise trend than that delineated by a phase-to-phase or site-to-site comparison.

Before turning to developments of the next period in the history of southwestern Colorado archaeology, mention should be made of a specialized study on prehistoric agricultural methods. As part of a larger analysis of both historic Pueblo and prehistoric agricultural evidence by Guy Stewart (1940; Stewart and Donnelly 1943), a fairly extensive review was undertaken of check dams, irrigation ditches, and lakes at Mesa Verde National Park. Stewart briefly reviewed the climatic features of the region with relationship to the crops grown prehistorically, and conducted fieldwork to map known agricultural features and record others.

Interpretive Archaeology, Salvage Archaeology, Problem-Oriented Studies, and Cultural Resource Management

(1950-present)

Beginning in the early 1950s, the impetus for doing archaeology in southwestern Colorado, and neighboring regions as well, began to undergo a change. As other authors (e.g. Taylor 1954; Lister 1961) have observed, prior to this time the primary emphasis for archaeological projects was the "filling in of gaps," both temporally and geographically, of the cultural historical record. By and large, projects, even multiyear efforts, focused on such problems as defining the Pueblo II period, or excavating sites of a certain age in order to more fully understand architectural or other cultural developments in a given area. It was generally felt by the early '50s that sufficient data were on hand to begin synthesis of the prehistoric situation. For example, a group of Southwestern archaeologists met in Santa Fe in 1955 to discuss internal and external relationships of the various Southwestern cultures. It was noted that: "There are today enough data to permit a definitive effort at discovery, isolation, and identification of the sources of the several cultural influences or impacts which have contributed to the development of the several recognized Southwestern cultures..." (Jennings 1956:63).

At the same time, there was an interest on the part of individual researchers and institutions to "settle down" in a particular locale with the advent of extensive multiyear research programs. This type of research focus was well-expressed in southwestern Colorado as we shall see, and indicates a willingness to spend a considerable amount of time in an area to understand it better, not only archaeologically but also in the relationship of the sites to their ecological setting.

There have been several themes guiding archaeological research in the project area during the past three decades. These include: (1) interpretive archaeology; (2) salvage archaeology; (3) problem-oriented research; and (4) cultural resource management. At the general

level, it should be noted that these categories are not mutually exclusive of one another and there is considerable overlap between the goals and results of the various types of investigations. Individual projects often include facets of one or more of these items, and in other instances, the themes represent evolutionary trends as research orientations and management concerns change. It is, for example, no longer common to refer to excavations of sites threatened with destruction as "salvage operations;" today such investigations fall into the category of "cultural resource management."

Interpretive archaeology includes large-scale site inventories to identify the numbers and types of sites present in a particular locale, and in the second stage, the excavation and preservation of typical or spectacular ruins for public appreciation. Of course, the efforts of the National Park Service in this vein precede 1950; however, most of the interpretive projects in Mesa Verde Park and Hovenweep National Monument occurred after this date. In recent years, other agencies, including the Bureau of Land Management, Forest Service, Bureau of Indian Affairs, and the Southern Ute and Ute Mountain tribal governments, have also been involved in this effort.

Salvage archaeology also had its start prior to 1950 (e.g. Reed's 1942 work in Mancos Canyon), but once again, the major emphasis in the endeavor to prevent the loss of valuable archaeological data has increased in importance during the past few decades. Beginning in the 1960s, various federal and state legislative efforts have not only reinforced the idea of preserving archaeological information facing loss but agencies have been authorized and directed to take the initiative and ensure that important cultural resource sites are identified and protected. Thus, the tone has changed from one of simply saving data to one of active management of the resource base. The impact of cultural resource management has been tremendous and nearly all archaeological investigations being carried out today in southwestern Colorado fall into this category.

Problem-oriented archaeology had its beginnings in the 1960s as archaeologists began to argue that explicit research designs should be derived to guide archaeological projects. Put simply, if archaeologists could establish research questions and the steps and methods for solving them before entering the research area, the better the likelihood that positive, explanatory answers would be forthcoming. This general procedure was not new since men like Earl Morris and J. O. Brew had certainly gone into the field trying to answer specific research questions; however, what was novel was the idea that a scientifically-based research design, one that contained methods for testing and measuring the validity of results, was also needed. Basically, this line of reasoning called for an explanatory end to investigations rather than simply descriptive results. Today, the problem-oriented approach and cultural resource management investigations at all levels of inquiry are closely interrelated.

Expressions of these themes will be seen in the following paragraphs which describe the archaeological endeavors carried out in southwestern Colorado since 1950. A tremendous amount of research has been conducted during this period and the pace continues at a fast speed today. It is simply not possible herein to accord justice to the results of the numerous large-scale and multiyear projects. Thus, the discussion seeks to outline the projects and results occurring during the past 30 years; interested persons are encouraged to consult the referenced publications for more detailed and complete data.

Most of the archaeological studies during the 1950s were conducted within the confines of Mesa Verde National Park as several sites were excavated for interpretive purposes and an inventory of Chapin Mesa was undertaken. The exceptions to this pattern include limited salvage excavations of a site near Ignacio by the Museum of New Mexico and the beginning of a long term project near Yellow Jacket by Joe Ben Wheat of the University of Colorado Museum.

The salvage excavation of site LA2605 near Ignacio was carried out prior to construction of a supply warehouse and residences, part of the extensive Northern Natural Gas pipeline project (Wendorf et al. 1956). According to Fenega and Wendorf (1956), the excavation was conducted in November of 1953 at the site consisting of a questionable Basketmaker II complex of circular jacal structures and several baking pits. Artifactual materials were scarce, with ceramics completely absent. Olivella shell beads and a Haliotis shell ornament were found with one of the four burials recovered.

In 1954, Joe Ben Wheat began work in the Yellow Jacket area of southwestern Colorado approximately 20 miles northwest of Cortez. Field seasons of the University of Colorado Museum varied in length but were held annually from 1954 to 1966, with the exception of the years involved in the excavation of the Olsen-Chubbuck and Jurgens sites in eastern Colorado. During the years 1954-1966, Dr. Wheat concentrated on the sites 5MT1 and 5MT3. 5MT2, also known as the Stevenson and Porter sites, exhibit overlapping occupations on the same location. 5MT3 is a neighboring pueblo located about 200 meters to the northeast of 5MT1. These are part of a complex of Anasazi sites located on the canyon rim of Yellow Jacket Creek. The Simmons Farm site is another site in the study area located two miles to the east of the main complex but not situated along the main Yellow Jacket drainage (Swedlund 1969). Agricultural land was available both on the plateau surface into which Yellow Jacket Canyon is cut and in lesser amounts in the canyon bottoms. Water was obtainable in Yellow Jacket Creek or in several springs just below the caprock in the canyon. Pinyon, juniper, and sagebrush cover the plateau surface, providing wood for construction and domestic use. Deer and smaller animals were plentiful in the area (Wheat 1955:18).

Using the Pecos classification, the sites are culturally represented as Basketmaker III, Pueblo I, Pueblo II and Pueblo III. Porter Pueblo, which overlies the Stevenson site, is a masonry pueblo of Pueblo II - Pueblo III times. According to Joy Brown (1975:45), its

complexity has resulted in the temporary suspension of its excavation in order to establish a basic chronology of the area through the excavation of 5MT3 which has Pueblo II and Pueblo III cultural components. As of 1975, further work at 5MT1 has revealed three pit-room villages over which a partial masonry, partial adobe pueblo was built. "A later occupation is revealed in part by the construction of a masonry pueblo and a high incidence of remodeling of earlier structures. Ceramic evidence indicates an apparently continuous occupation of the site from A.D. 900 or 950 through Classic Mesa Verde times when the pueblo was cleaned out prior to abandonment" (Brown 1975:48). The fourth site, Simmons Farm, is of the Pueblo I culture period.

The skeletal material obtained from the Yellow Jacket excavations consisted of 52 individuals and was analyzed by Alan Swedlund in 1969. The Stevenson site (5MT1) yielded six individuals, the Simmons Farm site three, the Porter site (5MT1) 22, and site 5MT3 consisted of 21 individuals. According to Swedlund, the majority of the skeletal material was in poor condition so "the total sample for any one topic of investigation turned out to be quite small and often unsatisfactory for any substantive statistical treatment" (Swedlund 1969:2). Swedlund notes the mean life-span for individuals at Yellow Jacket, based on individuals of known age at death, was approximately 16 years. Flexed or semi-flexed burial was the major method of interring the dead. The orientation of the head of the burial and direction faced seemed to be random and no direction or directions were adhered to. Pottery was by far the most common burial accompaniment, occurring with 65 per cent of the burials. The Yellow Jacket crania from Basketmaker III and Pueblo I contexts show no cranial deformation. In the Pueblo II and Pueblo III series, all of the 15 skulls suitable for observation of this trait show lamboidal deformation.

At Mesa Verde National Park, archaeological work of this period began in 1950 as members of the Park staff excavated six ruins (Lancaster et al. 1954). These ruins were excavated and stabilized for interpretive value for "Comprehension of the progressive stages of advancement

resulting in the Classic Pueblo period is needed for appreciation of the cultural achievement of the people, as well as understanding of the architectural features of the structures they built" (Lancaster and Pinkley 1954:23). In order to bridge gaps in the cultural and architectural progress from single family dwellings of the A.D. 400s to great communal structures of the A.D. 1200s, the Park staff undertook a series of excavations. A site with two deep pithouses dating A.D. 572 and 664 was chosen as it filled a time interval between two sites already excavated and used for interpretive value; Pithouse B (Lancaster and Watson 1943) dating A.D. 600 and two pueblo ruins in the Twin Trees area dating A.D. 840 and 950 (O'Bryan 1950). Three mesa top ruins at Site 16 on Chapin Mesa were chosen to "trace architectural progress from single family dwellings of the A.D. 400s to great communal structures of the A.D. 1200s" (Lancaster and Pinkley 1954:23). The specific need for a single ruin of approximately A.D. 1100-1200, which would provide information on this interval and serve as an exhibit for the public, led to selection of the sixth site, a small surface pueblo located approximately one-quarter mile west of Sun Point (Lancaster and Van Cleave 1954). Of note in the publication, in addition to the excellent reports of the evidently meticulous excavations, is a concise summary of Mesa Verde archaeology by Don Watson, an outline of the development of the Mesa Verde kiva by Jean Pinkley, and a discussion of kiva-tower relationship by Philip Van Cleave.

In October 1951, Mesa Verde National Park initiated a survey of its archaeological resources to improve its plan for future development. Efforts were first concentrated on Chapin Mesa where the then-existing exhibits and accommodations were located and where the bulk of previous archaeological attention had been focused. Archaeological features included in the survey were: cliff dwellings, mesa-top ruins, canyon-head ruins, dams, reservoirs, shrines, pictographs, etc. Just under 100 sites per square mile were mapped in the extent of Chapin Mesa, 14 miles long by one half to two and one-half miles wide (Abel 1955:2-3).

One of the results of the Chapin Mesa survey was a publication on the pottery types of the Mesa Verde. Leland Abel in 1955 produced a study which redefined many previous types of pottery and added new ones to conform with the new information. Abel's report included details and photographs of San Juan Red Ware, Mesa Verde Gray Ware, San Juan White Ware, and Mesa Verde White Ware. The problems involved in producing a taxonomy of Mesa Verde pottery and general cultural conclusions which may be drawn from the ceramic evidence were also discussed. This report was the standard reference in Mesa Verde pottery at the time; however, it was not without problems. As Herold (1961:41) has observed, "If any criticism besides possible ones of taxonomic methodology may be leveled at this work, it is that the comments about the range of various pottery types may be too general in view of the meager published information of pottery from some parts of the area." Nonetheless, Abel's work was useful for a period of time, having been superseded only recently by the publication of Breternitz, Rohn, and Morris (1974).

Additional publications resulted from the Chapin Mesa survey, notably Arthur Rohn's recently issued volume on cultural changes and continuities on the mesa (Rohn 1977). This publication, originally the author's 1966 doctoral dissertation at Harvard University, is an important addition to the literature on Mesa Verde archaeology. In an earlier article, Rohn (1963) utilized the Chapin Mesa data to discuss prehistoric soil and water conservation practices on Chapin Mesa.

In the summer of 1951, Francis Cassidy, assisted by Al Lancaster, undertook the cleanup and repair of Fire Temple which had previously been excavated and stabilized by Fewkes in 1920. While doing the stabilization the cleanup resulted in the disclosure of additional features, and the determination of previously obscured details. Because no adequate study had been done previously on Fire Temple, Cassidy mapped and investigated the site. His careful study of architecture and floor plan led him to the conclusion that Fire Temple was a modified great kiva which is an unusual occurrence for Mesa Verde. Since the site had been previously cleared by others including Fewkes, Cassidy found few artifacts (Cassidy 1965).

Later, the Park was the scene for a series of archaeological investigations by the University of Colorado between the years 1953 and 1956. During the four field seasons, three ruins were excavated: Sites 499, 875 and 866--all located on Chapin Mesa. These reports were published by Robert Lister in 1964, 1965, and 1966, respectively. Site 499 is located at the north end of Chapin Mesa. It is a pueblo belonging to the Pueblo I-II time period and consists of 12 rooms with two kiva depressions and a tower. Site 499 was excavated as it was felt that clearing a site with a tower and kiva would shed further light upon the connection between those types of features. Site 875 was tested in 1954 and excavated in 1955 and 1956. The site is one of numerous nearby village ruins of Pueblo II and Pueblo III age. The ruin consists of a pueblo with a kiva surrounded by masonry walled rooms. The final site, 866, is located just north of 499 and 875. It is a Pueblo II village including 10 rectangular single-storied rooms with two associated kivas and a trash mound. These ruins on Chapin Mesa near Far View House will eventually form a stabilized park exhibit and as such will present a more comprehensive interpretation of that region to visitors. Of special interest at the sites is the sequence of kivas which show the various stages in the development of the Mesa Verde kiva.

Also during the summer of 1955, Ralph A. Luebben led several Park-Ranger archaeologists in the excavation of Site 52 located in Mesa Verde National Park (Luebben et al. 1957). Site 52, a small Pueblo III ruin, lies on the east side of the main ridge of Chapin Mesa on a mesa-top. The ruin contains several unusual architectural features, namely step forms, multiple abutments, numerous alignments and a peculiar floor feature, all involving stone construction. These characteristics--combined with the lack of a kiva and trash area near the building, almost complete absence of artifacts, and location of the ruin in a low drainage area--produce an entirely problematical structure of a type never before reported from any other San Juan Anasazi site. The authors hypothesize on the data obtained that Site 52 may have been a platform mound of ceremonial, rather than domestic, significance.

Finally, during the summers of 1957 and 1958 in Mesa Verde National Park, an unusually situated pueblo ruin on Chapin Mesa (Site 981) was completely excavated by Ralph Luebben, Arthur Rohn, and R. Dale Givens to disclose a small Pueblo II structure built into, rather than on, the sloping mesa-top. Distinctive architectural features include partial subterranean construction, bedrock incorporated as part of some of the floors and walls, crude massive stone construction, and floor-level doorways. An elaborate petroglyph on a building stone was found in the site fill. The ruin possessed neither a kiva depression nor a trash mound (Luebben et al. 1962). According to the authors, the unusual architecture and absence of certain features suggest that the small nine-room site may not have been a permanently occupied mesa-top village, but rather a seasonally occupied farmhouse or garrison.

Beginning in the late 1950s, two important large-scale archaeological projects were initiated in the San Juan region. The first of these was the Navajo Reservoir Project, conducted by the Museum of New Mexico over a series of eight field seasons beginning in 1956 and extending through 1963 (Eddy 1966). Initially, the entire area to be flooded by the construction of the Navajo Dam was inventoried for cultural resources, resulting in the identification of 454 prehistoric sites in the maximum pool limits, about 25 of which were located in Colorado in the vicinity of the confluence of the Piedra and San Juan Rivers (Dittert et al. 1961). An important contribution of the survey report was the delineation of a series of cultural-temporal units for the area. These units, which will be defined in more detail later, include the following:

Archaic Period:	3000-500 B.C.
Pueblo Period:	
Los Pinos Phase	A.D. 1-400
Sambrito Phase	A.D. 400-700
Rosa Phase	A.D. 700-900
Piedra Phase	A.D. 850-950
Arboles Phase	A.D. 950-1050
Navajo Period:	
Dinetah Phase	A.D. 1550-1700
Gobernador	A.D. 1700-1775
Historic Period:	
Lucero Phase	A.D. 1860-1960

For purposes of this discussion, the Colorado sites, located in Archuleta County, are of primary concern. Eleven of these sites subsequently received investigation beyond mere surface recording. Of the many Navajo Reservoir publications, the most important for southwestern Colorado is a series of papers in Dittert and Eddy (1963) which describes excavations at four sites, made necessary by a realignment of Colorado State Highway 151. Another seven Colorado sites were also further investigated as discussed in the reports of Eddy (1966), Schaafsma (1963), and Schoenwetter and Eddy (1964). An extended synthesis of the Navajo Reservoir Project efforts and results is given by Eddy (1966), who later provided a more concise, problem-oriented treatise on the work (Eddy 1972).

The second major project was initiated in 1958 on Wetherill Mesa, located in the western portion of Mesa Verde National Park. The guidelines for the project were conceived in 1957 by Oscar Carlson, who at that time was Superintendent of the Park. It was planned that the project would provide for the excavation, stabilization and preparation for exhibit of three major cliff dwellings and six or more representative archaeological features on the mesa-top typical of various periods of prehistoric cultural developments at Mesa Verde.

Also included in this plan was a carefully organized archaeological study of the ruins and recovered material for the purpose of interpreting the Mesa Verde story to those who would visit the sites. A final aspect of this comprehensive plan was provision for publication of the findings as a contribution to the scientific community and any other interested persons.

One of the first priorities of the Wetherill Mesa Project was an intensive survey of the ruins on the mesa. As Alden Hayes stated in his introduction to the survey report:

> The Archaeological survey plays a part in both the development and research aspects of the park plan. Survey is necessary to determine which sites, when exhibited, will best illustrate the various phases represented, and, of course first, and if possible what those phases are. The careful plotting of sites is required for the planning of necessary roads as to destroy as little as possible of the archaeological and natural values which the park was established to preserve (Hayes 1964:21).

The Wetherill Mesa site survey was accomplished in 13 months of field work between 1958-60. The area covered by the survey included all of Wetherill Mesa from the escarpment on the north to the confluence of Horse and Navajo Canyons below the southern tip. The eastern units, from north to south, were the easternmost tributaries to upper Long Canyon following the bottom of the watercourse, along the bottom of Long to its confluence with Navajo Canyon, and down Navajo to its juncture with Horse Canyon at the south end of the Mesa. On the west, the limits were the eastern tributary to East Fork of Rock Canyon into the main course of Rock and down the latter to its confluence with Horse Canyon and then again to Navajo Canyon. The area defined is 10¼ miles long with an average width of a bit less than a mile. The total area surveyed was 6274 acres, or 9.8 sections, of which 4696 acres are within the Park boundary and 1578 on the Ute Mountain Indian Reservation. The survey crew recorded 800 sites and tested several small ones and other isolated manifestations.

As was the case with the Navajo Reservoir survey, the Wetherill Mesa inventory also resulted in the definition of a sequence of cultural phases, in this case restricted to the Puebloan occupation of the mesa. Following Hayes (1964), these phases include: La Plata (A.D. 450-700); Piedra (700-900); Ackman (900-975); Mancos (975-1050); McElmo (1050-1150); and Mesa Verde (1150-1300).

It should also be mentioned that an interpretive survey was made of the Wetherill Mesa in the summer of 1961 by Jack R. Rudy, Assistant Park Archaeologist, Mesa Verde National Park. "Rudy examined the areas which appeared to offer the best interpretive possibilities, as recommended by Hayes on the basis of the archaeological survey, and submitted alternative suggestions for the interpretive loop. Sites have been chosen which will follow one another along the road and will lead the visitor on a logical trip from the earlier into the later archaeological manifestations. Obviously the research value of the individual sites was also considered in setting up the plan for the mesa-top excavations" (Osborne 1964a:3).

Excavations under the direction of various Wetherill Mesa Project archaeologists began in 1959 at Long House and in 1960 at Mug House (Rohn 1971). The 1961 field season saw excavations at Badger House (Hayes and Lancaster 1975), a mesa top Pueblo I - Pueblo III ruin. Hayes also completed excavations at Site 1205 (a small rock shelter). Also in 1961 all major excavation and stabilization at Long House and Mug House were completed. In 1962 Badger House excavation was continued along with the excavation of Basketmaker III pithouses (Site 1644) by Hayes, excavation and stabilization of Step House by Robert Nichols, and excavation of two mesa-top sites: Big-Juniper House (Swannak 1969), a Pueblo I-III site; and MV1645 (Pueblo II) by Swannack.

In addition to the publications already noted, other major contributions include two general articles in National Geographic (Burroughs 1959; Osborne 1964b); an assembled collection of 28 papers dealing with ancillary studies (Osborne 1965); a summary of the tree-ring studies (Osborne and Nichols 1967); and a description of modern environments (Erdman et al. 1969). Two recent reports dealt with the human skeletal remains (Bennett 1975) and paleopathologies of the prehistoric Wetherill Mesa population (Miles 1975). An important report on the excavation of Long House is still in press at the Government Printing Office and other unpublished manuscripts are on file at the Mesa Verde Park research office. Finally, Cordell (1972, 1975) utilized the Wetherill Mesa survey data to produce a computer simulation to predict site abandonment in which she postulated that many abandonments may have been due to decreased crop yields caused by local variation in rainfall and length of the growing season.

The Wetherill Mesa Project ceased in 1965, after which the University of Colorado Mesa Verde Research Center expanded its program at the Park, taking over the Wetherill Mesa research facility. Before entering a discussion of the ensuing and extensive University of Colorado work, however, brief mention should be made of other investigations occurring in the early 1960s.

In a brief but important paper in 1962, Hayes and Chappell (1962) described a copper bell recovered by a farmer from a Pueblo II-III masonry ruin near Goodman Point, approximately 10 miles northwest of Cortez, Colorado. The importance of this single artifact lies in the fact that it is the only such specimen reported for southwestern Colorado. Further, it is the northernmost occurrence of a copper bell which is known to be of Mexican origin. Such items are rare but more common at Chaco Canyon in northwestern New Mexico and are known from a single site, Edge of Cedars Ruin near Blanding, in San Juan County, Utah.

In the Ridges Basin, southwest of Durango, a considerable amount of excavation was conducted during the 1960s by two men from Fort Lewis College, none of which has been formally published. Actually, work in this area was first undertaken by I. F. Flora in the 1930s, who excavated at two sites in the basin to obtain the tree-ring specimens (Dean 1975). Work reached a zenith in the Ridges Basin during the 1960s as Homer Root, associated with the museum at Fort Lewis College, and John Ives, a faculty member at the same school, conducted separate excavations.

Root's work took the form of field schools undertaken annually from 1965 through 1969, excavating at least seven sites. The artifactual materials and journals from Root's efforts are presently housed at the Southwest Studies Center at the school. Ives conducted investigations in 1967 and 1968, working at one site the first year and three others during the second season.

By the mid-1960s, the Wetherill Mesa Project on Mesa Verde was in its final stage, except for the reporting of results, and a contract was negotiated between the University of Colorado and the National Park Service for the university to establish a continuing research center at the Park. Thus, in 1965, the University of Colorado Mesa Verde Research Center (MVRC) began operations, a commitment which was to continue until 1977. Initially, the MVRC's contract called for the institution, then directed by Robert H. Lister, to conduct any

salvage excavations made necessary by the laying of pipelines, building of new roads, or the construction of any other facilities that could not be located so as to avoid archaeological remains. In summarizing the goal of this effort, Lister (1969:47) noted: "Salvage archaeology sometimes results in the excavation of types of remains that might not be recognized or deemed worthy of excavations under ordinary circumstances. On occasions it may reveal significant data previously overlooked, but of course the primary purpose of salvage archaeology is to recover information and specimens from sites that will of necessity be damaged or destroyed." In addition to the need for salvage operations, the MVRC later completed an intensive archaeological inventory of sites throughout the 52,000-acre park.

Lister's responsibilities at Mesa Verde were shifted over to David A. Breternitz in 1969 when Lister accepted an appointment as Director of the Chaco Research Center in New Mexico. Throughout much of the research life of the MVRC, Lister and Breternitz were ably assisted by Jack E. Smith, who, in addition to other duties, assumed responsibility for the multiyear archaeological inventory of the Park. Special mention should also be made of another staff member of the MVRC, James A. "Al" Lancaster. Lancaster retired in 1964 after an illustrious career beginning in 1928 which included work on several major excavation projects throughout the Southwest, and a long period of service with the Park Service at Mesa Verde National Park. Following his "retirement," Al, as he is known to fellow archaeologists and students alike, continued to serve as Research Archaeologist for the MVRC, a position he held during the span of years the MVRC was in operation. Lancaster's visits to the various MVRC excavation projects resulted in cherished memories for dozens of students who benefited from his unparalleled knowledge of the prehistoric Anasazi culture.

During the period of its operation, the MVRC undertook inventory, excavation, and ruins stabilization projects throughout the present project area, performing literally dozens of contracts for all of the

federal agencies concerned with southwestern Colorado. Perhaps as important as the scope of work, however, was the MVRC's program of instruction for the University's graduate and undergraduate students who served in positions from archaeological crew persons to field foremen, gaining extensive experience in the research laboratory as well. It follows that many of the investigations have been reported in masters' theses and doctoral dissertations in the University's Department of Anthropology. The overall impact of the MVRC on archaeological work in southwestern Colorado can be seen in the published bibliography (Hull and Scott 1978), where more than 160 citations are attributed to the staff and students who have participated in the Research Center's operations. Obviously, complete description of all of the MVRC's work is beyond the scope of this report, and the following discussions are necessarily brief. However, major contributions will be noted. Once again, those readers desiring additional information are encouraged to consult the original reports.

Once established, the MVRC quickly set about the task of salvaging endangered sites and conducting other related investigations in parts of the Park. In Morfield Canyon sites MV1086 and MV1088, an isolated early Pueblo III kiva and a late Pueblo II - early Pueblo III village, were excavated near the newly opened campground (Lister 1967; Lister and Smith 1968) and two great kiva sites, MV1067 and MV1930, were partially excavated. The great kivas were reported by McLellan (1969) who expanded his discussion to include comments on the origin, development, and typology of Anasazi kivas and great kivas in general. According to McLellan (1969), the great kiva at MV1930 dates to the Pueblo I period while the one at MV1067 is later, being constructed and used during the Pueblo II - Pueblo III eras. House ruins were associated with both structures, but were not extensively investigated. Additionally, tests were conducted at a nearby prehistoric reservoir (MV1931) (Jack Smith, personal communication).

Between 1965 and 1971, numerous excavations were conducted in association with development of the access road and other facilities to open the Wetherill Mesa ruins to tourist visitation. Several of these efforts are reported in Lister (1968); others are described

by Hallisy, Nordby, and Breternitz (1972). The most substantive contribution to result from this work was the effort of Birkedal (1976), who utilized data from seven sites to reconstruct Basketmaker III social organization. Also as a result of the Wetherill Mesa investigations, Breternitz (1973) produced a short report summarizing tree-ring dates for Basketmaker III and Pueblo I sites in Mesa Verde National Park.

Concurrent with the MVRC excavations in the Park, a multiyear inventory of BLM lands in the Dolores Grazing Unit was conducted between 1965 and 1969 (Martin 1971). During a total of 15 months of fieldwork, some 278 square miles of public domain was surveyed, resulting in the recording of 1587 archaeological sites. As Martin (1971:2) noted, the purpose of this work was to "locate and assess the significance of the archaeological resources on the designated land in terms of their potential for relating the prehistory of that area." The survey encountered sites ranging from Basketmaker III through Pueblo III in age and indicated that the entire area is one which saw concentrated prehistoric occupation.

Other archaeological surveys were occurring during this time on the Ute Mountain Indian Reservation, south of Mesa Verde National Park and the Mancos River. In 1966, the MVRC completed archaeological reconnaissance of an area known as "Ute Pasture," recording and flagging about 225 sites prior to chaining of the pinyon-juniper forest to allow livestock grazing (McLellan 1966). A year later, the Laboratory of Anthropology of the Museum of New Mexico conducted a similar inventory on the mesa north of Johnson Canyon and recorded 203 sites (Schaafsma 1967). Neither of these surveys was complete in the sense that not all archaeological sites in the project areas were recorded; rather, the obvious sites were identified to prevent chaining over the site areas. The results of these surveys were not published, but site forms and maps are on file at the University of Colorado and the Laboratory of Anthropology for the respective projects.

Returning to the MVRC work in Mesa Verde National Park, the balance of the Research Center's work from 1968 to 1978 was directed by Jack E. Smith. During the course of two field seasons (1968-1969), excavations were carried out at MV820, a Pueblo II pueblo near Far View Ruin on Chapin Mesa. The excavation and stabilization of this ruin was undertaken to further complete the range of ruins available for visitation and interpretation on Chapin Mesa. In 1969, Mummy Lake (Site MV833), also in the Far View area, was tested to confirm its function as part of a water storage system. Stabilization of the structure was also undertaken at that time.

Beginning in 1971 and continuing through 1977, Smith directed an archaeological survey of those portions of the Park necessary to complete the inventory of the entire Park. This inventory resulted in the discovery and evaluation of nearly 3900 prehistoric and historic sites. A manuscript report discussing the Mesa Verde survey has recently been forwarded to the Park Service by Smith (n.d.) and the final report should be available in the near future.

Beginning in the late 1960s, the MVRC began extended and intensive salvage and research programs away from Mesa Verde National Park on tribal lands of the Southern Ute and Ute Mountain Reservations and other lands managed by the BLM and Forest Service. The most extensive of these efforts took place in the Mancos Canyon and its tributaries, located on the Ute Mountain Reservation. Beginning in 1968 and continuing through 1977, numerous surveys and excavation of archaeological sites were completed by MVRC crews in conjunction with planned development of a tribal park in which the Mancos Canyon Indian Ruins would be the focal point. During the first year of investigations in Mancos Canyon, MVRC archaeologists examined about 11 miles of proposed road right-of-way, recording 79 prehistoric sites. Also during 1968, a cliff dwelling survey was conducted in the northern tributaries of the Mancos River immediately south of the Mesa Verde National Park (Kane et al. 1968). In anticipation of road construction, salvage excavations were begun at one site (5MTUMR1268) in 1969 (McLellan and Hallisy 1970); however, before excavations were complete, the MVRC crew was ordered from the reservation.

The excavation program was renewed in 1972 and continued for the next six years. During this span, nearly 20 sites, ranging from Basketmaker III to Pueblo III in age, were partially or entirely excavated along the road into the canyon. The results of these investigations are primarily found in reports by Nordby (1973, 1974), Hallisy (1974), Gillespie (1975, 1976), Farmer (1977), Emslie (1977a), and Euler (1978). Perhaps the most substantive of these many contributions was that of Gillespie (1976) who, based on the numerous superimposed Basketmaker III - Pueblo II remains at the Ute Canyon Site (5MTUMR2347), devoted considerable attention to the mechanisms of culture change associated with the Pueblo I - Pueblo II transition from subterranean pithouse dwellings to surface room habitation structures associated with underground ceremonial chambers. Also during this sequence of investigations, the distinctive archaeological complex known as "Kiva Point" was formally recorded and evaluated in 1975 (Breternitz 1975). This complex, located in the Mancos Canyon on the southern tip of Chapin Mesa, includes several habitation pueblos with kivas, isolated kiva groups several of which appear to be great kivas, rock art panels, and towers. Occupation spanned a period from Pueblo I through Pueblo III times.

Three categories of specialized studies on materials from the Mancos Canyon materials deserve mention. A series of reports discussing characteristics of the skeletal populations was issued beginning in 1974 (Nickens 1974a, 1974b, 1975b, 1975c, 1975d; Robinson 1976). These studies provided metric and nonmetric data for about 115 individuals along with discussions of pathological observations. A second important comparative analysis was that of Emslie (1977b, 1978a&b) who examined nonhuman osseous remains from four of the Mancos Canyon sites. Emslie reviewed the evidence for hunting and butchering patterns noting that the large artiodactyls (deer, bighorn sheep, and pronghorn) usually comprised over 80 percent of the total animal weight at each site. Secondary meat sources included rabbits, dogs, and turkey. Finally, palynological analysis of sediments from several of the Mancos Canyon sites by Scott (1974a, 1974b, 1977, 1978) has resulted in the identification of many economically important plants utilized by the prehistoric inhabitants of the canyon.

Additional archaeological ventures, also associated with the MVRC Mancos Canyon effort but of a different sort, were conducted in a large southeastern tributary of the Mancos known as Johnson Canyon. Situated in the side canyons of Johnson Canyon are several large, important cliff dwellings which were to be included in the tribal park. In 1972, seven of the largest ruins were surveyed, mapped, and recommendations were made regarding stabilization needs (Breternitz and Breternitz 1973). Following the survey, an excavation and stabilization project was initiated in 1974, at which time Lion House (5MTUMR2156) and Hoy House (5MTUMR2155) were investigated (Breternitz et al. 1974). The following season (1975), a small-scale survey of the mesa top near the cliff dwellings was conducted, designed to gather information on the natural and cultural features present in the vicinity of the excavated sites (Nickens 1976a).

The results of the Johnson Canyon Project were presented in several volumes either edited or authored by Nickens (1975a, 1976b, 1977a), which contained analyses of several classes of artifactual materials. Concurrent with the cliff dwelling excavations in 1974, personnel from the Laboratory of Tree-Ring Research, Tucson, completed a dendrochronological survey of the Johnson Canyon sites which resulted in 352 dates for the occupations at the sites (Harrill and Breternitz 1976).

All of these data were employed by Nickens (1977a) to reconstruct the prehistoric ecosystem and the human support system characterizing the past Johnson Canyon communities. It was suggested that a complex combination of variables was responsible for periods of abandonment evident in the archaeological and tree-ring records. Although drought was probably the primary indirect cause, Nickens suggests that declines in the corn (and other) crops, animal protein, and drinking water, and a probable increase in child mortality rates, were the direct causes of abandonment. As a consequence, several settlement pattern shifts occurred, with the population first moving off of the mesa tops about A.D. 1130, where they lived until about 1160. The canyon sites were then abandoned until about 1195, when the cliff dwellings were reoccupied, only to be finally abandoned at approximately 1230.

To close the Johnson Canyon studies, a road right-of-way extending from the Mancos Canyon around the head of Johnson Canyon and to the excavated and stabilized cliff dwellings was inventoried for archaeological sites in 1976 (Farmer and Emslie 1976). The survey resulted in the identification of 35 sites, predominantly dating from Basketmaker III - Pueblo II times.

To the east of the Ute Mountain Reservation, the MVRC initiated a long-term program of investigations on the Southern Ute Reservation in 1969. The emphasis on Southern Ute lands, however, was more oriented toward inventory than excavation work. In fact, only two excavation projects were undertaken, both in 1969. An isolated human burial of Basketmaker III age was salvaged by a survey crew from Site 5AA60 (Anderson 1970), and a Pueblo I site (5LP11) located near the town of Ignacio was excavated by McLellan (Lister et al. 1970).

On the other hand, cultural resource inventories by the MVRC on the Southern Ute Reservations have been numerous and extensive. Field survey programs were completed in 1969-70 and 1973 (Adams 1975), 1975 (Leidy 1976), 1976 (Fetterman 1977), 1977 (Metzger 1978b), and 1978 (Tucker 1979). As a result of these investigations, some 473 sites were recorded in these areas. A preponderance of these sites are Pueblo I occupations.

By far the most definitive results from this work are those of Adams (1974, 1975), who utilized data from the first three seasons of survey to explicate the cultural and environmental processes underlying past settlement systems in the area. Adams noted that the study tract was occupied between A.D. 750 and 1050 and was able to document cultural responses to a shift in the seasonality of rainfall during this period. Specifically, a change from a winter to summer dominant storm pattern took place, reducing the effective moisture available and causing stream entrenchment and headward erosion. Adams (1975:166) reports that in response, the aboriginal communities abandoned the upland areas and congregated in the riverine areas where they developed a new farming technology. Also observed was an increase in the ratio of limited function sites to habitation sites.

Seven Gobernador Phase Navajo sites were also located during the inventory. The sites lie near permanent flowing streams and are probably seasonal camp or field house sites. No permanent features of Gobernador Phase age (1680-1780) have been located. The sites are characterized by light scatters of polychrome or bichrome pottery with an orange paste and sand of crushed rock temper, and are associated with Pueblo IV Period occupations. The most common pottery type is Gobernador Polychrome (Adams 1976:25). Adams hypothesizes that the cause of the sudden, short-lived influx of Navajo people into this area was due to population pressure from dislocation of Pueblo groups to the south following the Pueblo revolt of 1680.

An inventory in the western portion of the Southern Ute Reservation by Leidy (1976) also noted the existence of an early but brief Navajo presence along the La Plata River drainage. Based on cross-dating of ceramic types, the La Plata Navajo campsites were also believed to be refugee situations related to the Pueblo Revolt against the Spanish. Leidy's work has further significance since it marks the beginning of studies for the Animas-La Plata Project, a proposed irrigation and multiple purpose water resource development by the Water and Power Resources Service. Following Leidy's survey of selected project features, a second-stage document covering previous work and known cultural resource sites was produced for the project by Nickens (1978).

Between the years 1970-1972, a survey and excavation program was conducted in the Chimney Rock Mesa area by the MVRC. This project, under the direction of Frank W. Eddy, was undertaken on lands of the San Juan National Forest to provide outdoor interpretive facilities in an archaeological preserve withdrawn from commercial leasing by the Forest Service. The research district examined by Eddy and his crews was an arbitrarily defined tract of 6.12 square miles located between the Piedra River and two of its tributaries--Stollsteimer and Devil Creeks. During the course of the project, an intensive survey of the study area resulted in the identification of 91 sites, all dating to the Pueblo II Anasazi

period between A.D. 925 and 1125. A majority of the sites could be placed into seven groups, thought by Eddy (1977) to represent largely self-sufficient, organized prehistoric communities.

Four sites were excavated, the most important being Chimney Rock Pueblo (5AA83) which had been partially cleared by Jeancon in 1921. According to Eddy (1975), the Chimney Rock Pueblo was occupied by an intrusive Chacoan colony (from northwestern New Mexico).

Eddy notes: "5AA83 is the material residue of a colony derived from the Chaco Canyon area around A.D. 1076 which intruded into the High Mesa Community made up of local Chimney Rock residents, indigenous Indians whose ancestors had resided in the Upper San Juan Basin since at least A.D. 1" (Eddy 1977:49). He bases his conclusion on the wall construction, kivas in the Chacoan style and the presence of a great kiva. Eddy further postulates that the Chacoan immigrants were men and probably priests (Eddy 1977) and states that the reception of the priestly colony by the local Chimney Rock society seems to have been friendly since there is no sign of violence upon their arrival--only upon their departure as evidenced by the burning of the building. He also observes that the commanding situation of the Chimney Rock Pueblo, located upon the upper mesa and immediately adjacent to the Chimney Rock pinnacles suggests that the colonizing inhabitants exerted a dominating influence on the remainder of the High Mesa community and perhaps the entire indigenous population.

> Perhaps the local people accepted the Chaco variety of the Pueblo religion as practiced by male immigrant priests, who then became ceremonial leaders. The very location of 5AA83 high up near the base of the Chimney Rock pinnacles suggests an association between these two natural spires and the religious theme of the building. We know that the pinnacles were part of a shrine to the Twin War Gods according to the Taos Indians..., and it may be that this attribution was first made in prehistoric times by the priests of 5AA83. Since there is no sign of warfare, trade, or other practical reason why the occupants of the Chimney Rock Pueblo should construct their home 1000 feet above the canyon floor, a religious motivation to build and live up near the gods seemsto be the most likely compelling motive for what was otherwise a difficult living arrangement (Eddy 1977:50).

Other nearby sites, 5AA84, 86, 88 (Truell 1975), and 92, were also excavated during the Chimney Rock investigations. Data from these excavations, along with the survey information from the mesa, were employed by Eddy to define the Chimney Rock Phase, a comparatively short-lived expression of the Anasazi culture in the vicinity of Chimney Rock. This phase, dating between A.D. 925 and 1125, included a dichotomy between upland and lowland occupations and a series of integrated site (or community) clusters spread throughout the district (Eddy 1977:68-69). Eddy further posited that between 1215 and 2025 people inhabited the area during the extent of the phase, noting that the lowland, or riverine communities, were denser than the upland communities, as a result of the greater agricultural potential for floodwater farming along the Piedra River.

Another project on the San Juan National Forest was conducted by MVRC personnel in 1975 north of the town of Dolores. This work, which took place in the House Creek drainage, encompassed survey of a 6.3 square-mile tract and resulted in the recording of 10 archaeological sites. As summarized by Zier (1977), the sites include temporary encampments, some attributed to the Anasazi and others to the preceding cultural configuration in the area known as the Archaic hunter-collectors. One historic aboriginal sweat lodge was also encountered. Zier observes that the area apparently witnessed temporary but repeated use by small groups of hunters.

In order to complete the discussion of the MVRC's scope of work in southwestern Colorado, it is necessary to review a large number of surveys, excavations, and stabilization projects which have taken place, in the main, on BLM lands in the Sacred Mountain Planning Unit, and primarily since 1972. Beginning that year, and continuing on an annual basis through 1976, a series of inventories was completed of several project features of the then impending Dolores River Project, part of the larger Colorado River Storage Project of the Bureau of Reclamation (now Water and Power Resources Service). These surveys recorded nearly 600 archaeological sites in proposed reservoir, canal and

lateral, and recreation areas which are reported in the following reports: Breternitz and Martin (1973); Toll (1974, 1977); and Kane (1975a, 1975b, and 1977). A summary of this work and the resources was completed by Nickens (1977b), under contract to the Bureau of Reclamation. In 1978, construction of the Dolores Project began and a contract for cultural resource mitigation was awarded to the University of Colorado; this ongoing work is discussed in a later section.

Two important excavation programs were completed in 1975 and 1976 for the BLM by MVRC archaeologists at the Escalante (5MT2149) and Dominguez (5MT2148) ruins. The Escalante site is historically important as it is believed to be the one mentioned by Escalante during the 1776 exploratory trip through southwest Colorado. Hence, as part of our nation's bicentennial celebration, the BLM sponsored excavation and stabilization of the ruin. In all, eight rooms and one kiva were either completely or partially excavated (Halasi 1979). The investigation revealed that the site was another Chaco-related site--often termed Chacoan outliers--similar to Chimney Rock Pueblo, Lowry Ruin, and Yucca House Ruin, which is situated southwest of Cortez. Halasi (1979:396-398), employing a combination of ceramic and tree-ring data, dates the major occupation of the site to the first half of the twelfth century.

Located below the Escalante Ruin at the base of the hill is Dominguez Ruin, which consists of a roomblock containing four rooms and a small kiva. On the basis of its architecture, dendrochronological dates and material culture, the site has been assigned to the early 1100s. The Dominguez Ruin was selected for excavation and stabilization because of its proximity to both Highway 147 and the Escalante Ruin and also "because it was hoped that its excavation could demonstrate the relationship between the large and architecturally preplanned Escalante Ruin and the small and relatively simple yet contemporaneous surrounding sites" (Reed 1979). The relationship between the two sites is of importance in that the Escalante Ruin is considered a Chacoan outlier (Halasi 1979) and the Dominguez site is in most ways a

typical Mesa Verde area site. Reed's (1979) master's thesis discusses the excavation of Dominguez Ruin and examines "the nature of the relationship between the 'indigenous' Mesa Verde sites and the Chacoan outliers and attempts to determine how the nature of this relationship might affect our notions of Anasazi political organization."

Besides the importance of its relationship with Escalante Ruin, the Dominguez site is of great interest because of a "high status" burial discovered in Room 2. The remains of a female, approximately 35 years of age, were found in the center of the room beneath an infant burial. Found with the adult were "three elaborate pendants, six humerus scrapers, 6,900 turquoise, jet, and shell beads, three turquoise and shell mosaics, two ceramic vessels, impressions of a burial mat, several obsidian and chert flakes, and some fragments of unmodified animal bone" (Reed 1979:101). Reed (ibid:129) believes the internment represents evidence of differential status for the burial, and that this reflection of social position may also be extended to the infant interred nearby, perhaps at the same point in time.

Between 1974 and 1978, the MVRC undertook stabilization of several ruins on BLM lands under contract to the Bureau. This important facet of cultural resource management actually began at BLM-managed ruins in 1966 when Al Lancaster did some stabilization at the Lowry Ruin (Fig. 14), a site which he had helped excavate in the 1930s. In 1974 the Research Center, under the direction of Breternitz and the supervision of Lancaster, held the first of what was to become an annual field school situation in which students were instructed in ruins stabilization and new techniques were perfected. This ongoing effort has resulted in whole or partial stabilization of Lowry Ruin (White and Breternitz 1976), the Escalante and Dominguez Ruins (White and Breternitz 1979) (Fig. 15), a small cliff dwelling (5MT264) in East Rock Canyon (White 1976), and towers in Sand Canyon and McLean Basin, and a portion of Cannonball Ruin (Tipps 1978). In 1978, further stabilization was completed at the Lowry Ruin and 5MT765, and the Cannonball Ruin was completely mapped in order to assess future management

Figure 14. Ruins stabilization in 1967 of Lowry Ruin (BLM photo files).

Figure 15. Wall reconstruction at the Escalante Ruin. This work was completed in 1976 under the supervision of David Breternitz and Al Lancaster (BLM photo files).

needs at the ruin (Douglas Scott, personal communication). Additionally, a stabilization evaluation survey was done for 49 cliff dwellings in the Sand Canyon area (Martin 1976). The results of these efforts can best be seen at the Lowry Ruin (Figs. 16 and 17), and the Dominguez-Escalante Ruins, where easy access makes these ruins ideal for public viewing.

Although the MVRC, located at Mesa Verde National Park, ceased operations by 1977, it was in name and location only. The Research Center, still directed by Breternitz, changed its name to the Mesa Verde Regional Research Center and moved from the Park to Dove Creek. The MVRRC, again associated with the University of Colorado, continues to be active in cultural resource studies in southwestern Colorado. Late in 1977, Breternitz and his co-workers began work to develop a model to identify archaeological constraints in two proposed carbon dioxide well fields located north and northwest of the town of Cortez. A computerized model of archaeological site location and significance has been developed. During the summer of 1978, limited field surveys were undertaken to verify the model (Metzger 1978a); the results of the verification test were not included in the report, as only a description of the sites encountered in the sample units was discussed.

A major archaeological program was initiated in 1978 when the University of Colorado began field operations for the Dolores Project Cultural Resources Mitigation Program. This work, directed by Breternitz, included excavations at seven sites, along with additional survey of project features, during the first year. The results of this continuing project are just beginning to appear and hold promise for numerous important contributions to the study of prehistoric and historic cultural resources in southwestern Colorado.

Having brought the activities of the University of Colorado's Mesa Verde Research Center up-to-date, in order to complete the picture of archaeological investigations in southwest Colorado, the work of other

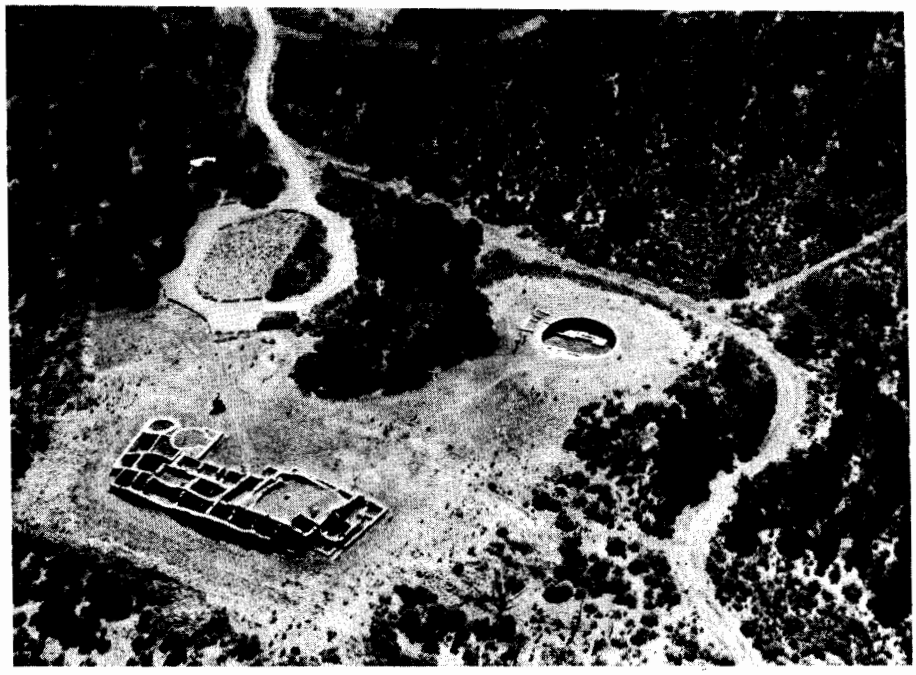


Figure 16. Aerial view of the excavated and stabilized Lowry Ruin (BLM photo files).

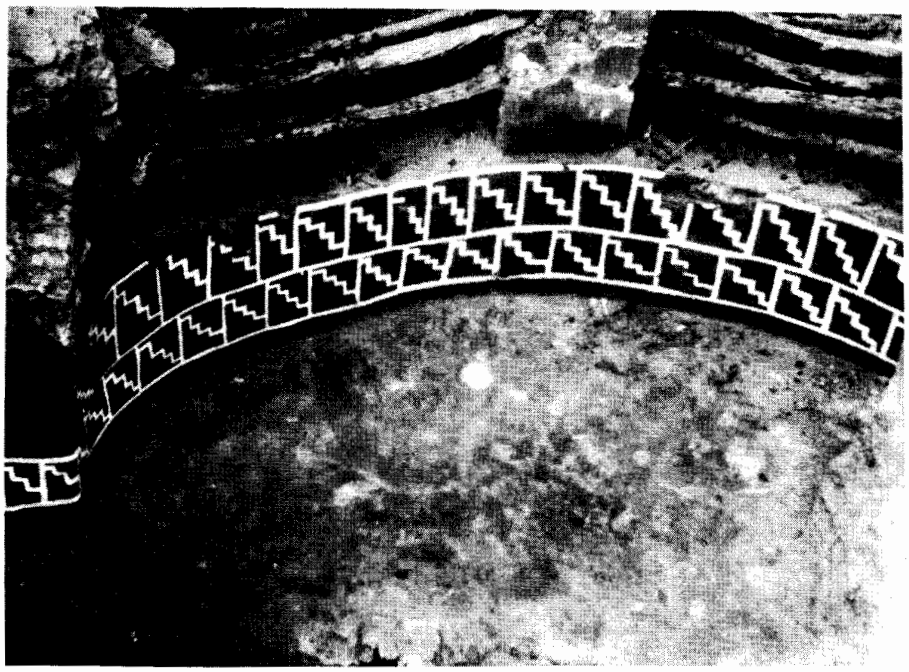


Figure 17. Interior of Kiva B at Lowry Ruin as photographed by Paul S. Martin in 1934. This structure was reexcavated, roofed, and opened to public viewing in 1975 (photo courtesy of The Division of Photography, Field Museum of National History, Chicago).

institutions and individuals needs to be examined. Although the work of these entities is not as extensive as that of the MVRC, many important contributions have nonetheless been made in recent years and they continue to accumulate.

The results of some of these projects remain at this time largely unreported and can be briefly detailed. A field school program sponsored by Fort Lewis College, and directed by John C. Ives, was conducted on public land located on Mockingbird Mesa, northwest of the town of Cortez. During the years 1970 through 1973, 17 sites were excavated; however, only brief annual reports have been filed with the BLM. Another academic field school investigation took place at the Grinnell and Ismay sites near Yucca House National Monument in 1971 and 1974. This work, supervised by Ralph Luebben of Grinnell College, involved partial excavation of each site, both of which date to the late Pueblo II - early Pueblo III time frame. A third investigation occurred at the Wallace Ruin, a site included in the Lakeview Group, northeast of Cortez on private land (Bradley 1974). Limited excavations between 1969 and 1974 have cleared one kiva and five two-story rooms. Bradley believes the site evinces two building phases, one in the early Pueblo II period and another in early Pueblo III times.

Another series of field school sessions has been conducted in the vicinity of Yellow Jacket under the direction of Arthur Rohn of Wichita State University. In 1966 and 1968-1969, Rohn and his student workers recorded 136 sites in the area, mostly in a tract east of Yellow Jacket Canyon. Rohn has also excavated several sites in this area beginning with the Ewing Site in 1966 and 1968, a large Pueblo II - early Pueblo III four-unit surface pueblo which was partially stockaded. In 1971-72, Rohn (1975) excavated the Gilliland Site, a Basketmaker III village consisting of four pithouses, eight ramadas or shades, some 22 subsurface storage pits, five small above-ground storage structures, and a wide variety of surface pole and mud structures that may or may

not have been roofed. The entire site area was surrounded by a stockade of vertical poles averaging 15 cm in diameter and 20-30 cm apart. Rohn theorizes that the stockade may have been used for either defense, a windbreak, a method of containing children, or a manner of demarcating the village boundary. Although few other stockaded villages have been reported in southwestern Colorado, he projects that a great many of the Basketmaker III through Pueblo II villages were once surrounded by such features.

In 1974 Rohn continued his work at the Payne Site, known to be contemporaneous with the Gilliland Site, to test his theory of stockaded villages (Rohn 1974). The objective was achieved as it was observed that the pithouse village at the Payne Site was also surrounded by a circular post stockade.

One of the most ambitious and important research projects of the 1970s was that of San Jose State in the Hovenweep area. The multi-year project, directed by Joseph Winter, was oriented toward delineating Anasazi farming practices in the Hovenweep-Cajon Mesa area and the overall nature of prehistoric adaptation to the local environmental setting. Winter concentrated efforts during the first two field seasons, 1974 and 1975, on surveying prehistoric sites on lands administered by the Park Service and the BLM (Winter 1975, 1976). A total of 404 sites was recorded during this phase of the project. Concurrent with the survey, Winter and his colleagues conducted several ancillary studies including collection of modern botanical specimens, investigation of prehistoric agricultural features, pollen sampling, and modern faunal evaluations. In addition, experiments were conducted to assess methods of prehistoric water control and horticulture in order to judge the potential of various locations for aboriginal farming (Winter 1976). After the third season in 1976 in which 30 of the recorded sites were tested, Winter (1977) was able to begin interpretive synthesis of the data. In brief summary of the Anasazi situation, he notes that:

> . . . an intensive agricultural and foraging economy was developing by Basketmaker III times, at approximately AD 660. The deep soils of the mesa top seem to have been the focal point for this economy, and by the 11th and 12th centuries numerous mesa top pueblos were organized around the dry farming of corn, beans, squash and various manipulated weeds. Certain of these pueblos and farming areas were probably used well into the 13th century, but after AD 1200 dramatic shifts in settlement and field location apparently occurred, as the Anasazi moved their villages and farms to the springs, arroyos and floodplains in and around the canyons. Although many of these locations were probably utilized before the 1200s as well, it was during the mid 1200s that most of the canyon-head tower clusters, and probably the water control farm fields around them, were built and utilized. None of the towers and associated ruins appear to have been built or remodeled after AD 1277, and by AD 1280 the Hovenweep area was probably totally abandoned (Winter 1977:245).

In addition to the above projects which were primarily associated with academic institutions, some federal and state agencies have been actively conducting archaeological studies in southwestern Colorado, particularly the Forest Service and the Colorado State Highway Department. Beginning in 1975, initially through a cooperative agreement between the Forest Service and Office of the Colorado State Archaeologist and more recently by in-house studies, numerous cultural resource inventories have been completed throughout the San Juan National Forest, lying generally north of the BLM San Juan Resource Area. In the main, this work has been prompted by timber sales and land exchanges. The first year's work, reported by Ward-Williams (1976), covered inventory work on about 15,000 acres of forest, resulting in the identification of 29 sites, 25 lithic scatters, and numerous isolated artifacts. She notes that although the survey areas were near the Anasazi population centers, comparatively little pottery was found along with a complete lack of architectural features. Temporally, the sites were believed to range in age from about 2000 B.C. up to the historic period. Numerous other timber sale inventories have been conducted by archaeologists working for the forest office in Durango where the reports are on file.

The State Highway Department program, directed by John Gooding, has undertaken several inventory and excavation projects along highway rights-of-way in the study area (e.g. Schaafsma 1974; Schaafsma and Gooding 1974; Clarke and Carothers 1979). As part of this project, important excavations have been completed at Anasazi sites south and north of the town of Durango. South of the town, two Basketmaker III sites were investigated and a detailed report covering the work prepared (Gooding n.d.); however, the report has not yet been published. The other project is located about 20 miles north of Durango and includes excavation of the Tamarron Site (5LP326), a Basketmaker II occupation. The site consists of a habitation structure with four subfloor storage cists and a heating basin (Reed and Kainer 1978). The authors note the similarity of the living structure to those at the nearby Talus Village excavated by Earl Morris (Morris and Burgh 1954).

To bring to a close our discussion of previous and current archaeological work in southwestern Colorado, mention should be made of two projects nearing completion which concern cultural resources in the Sacred Mountain Planning Unit. These projects, both of which have been contracted for through the Montrose District Office and directed by Paul R. Nickens, include a Class II, or sample-oriented, inventory of the entire planning unit and a separate study of factors affecting vandalism to archaeological sites in southwestern Colorado. For the Class II inventory, a set of seven strata were chosen based on potential nature vegetation zones throughout the planning unit. From these strata, 80-acre sample units were randomly selected from each stratum in proportion to the amount of each stratum in the universe. In all, 8000 acres were intensively inventoried, resulting in a four percent sample of the planning unit. The primary goal of this work was to arrive at a predictive model for archaeological site density and type based on the sampling design. Site densities in the various strata ranged from 0.8 to 36.92 sites per square mile with a mean density of 22.64 sites per square. By extending this method, it was predicted that some 7000 prehistoric sites could be expected to occur on public lands in the planning unit (Chandler et al. 1980).

The second project seeks to evaluate for management purposes the extent and character of widespread illegal vandalism to prehistoric sites in southwestern Colorado. A research design was developed to more fully identify and define the problem and to delineate the critical factors affecting the vandalism of cultural resources. Topics such as access to sites, types of sites being vandalized, and the motives of those destroying the resources are being evaluated through combined site file and literature searches, interviews, and on-the-ground assessments. Once the project is completed, these data will assist the BLM in developing proper surface protection measures to minimize the effects of vandalism and to aid in the planning of long-term protection of the cultural resource base.

To briefly summarize the previous and ongoing archaeological work in southwestern Colorado, it may be said that the extent and intensity of investigations in this area may be unparalleled throughout North America. The work of Jackson, Holmes, Morley, Roberts, Martin, and many other investigators of the previous 100-plus years has resulted in a tremendous breadth of data and ideas. It is probably equally important that as the results of the past few years' work and continuing investigations--such as the Dolores Project--become available, many of our basic perceptions of the prehistoric Anasazi and earlier cultural patterns will undergo extensive modification. Such is the nature of the discipline of archaeological study and, similarly, the management responsibilities of the BLM and other federal and state agencies charged with the task of identifying and protecting the immense cultural resource base found in southwestern Colorado.

IV.

THE HISTORIC PERIOD

The advent of historic time in the project area began with the written diaries and reports of the seventeenth and eighteenth century Spanish explorers who traversed the region in search of geographic information or economic rewards. Concentrated interest in the San Juan region occurred soon after the middle of the nineteenth century, spurred by the presence of precious metals. Still later, agricultural and ranching pursuits brought settlers to the area, both of which are still important to the economic picture today. The events connected with the historic period in southwestern Colorado resulted in two widely differing sets of circumstances involving cultural resources, both of which require explication in this overview. The first of these situations includes the various impacts, primarily of a detrimental nature, which have affected the abundant prehistoric site locales. This set of problems has come about in response to several motivating factors such as an interest in the romance of collecting prehistoric relics, the commercial aspects of such ventures, or simply the results of surface activities aimed at altering the native vegetation and soils for economic purposes. The second development regarding cultural resources of the historic period which has been very recent, in this region anyway, is the realization that the early cultural remains of Euro-American activities are equally in need of study and projection as the prehistoric sites. We can further add to this category of study the need to similarly examine and evaluate cultural resources of historic aboriginal groups. It is not within the scope of this document to provide a detailed account of the historic period in this report as a separate report is being prepared on this topic (O'Rourke 1979); however, a condensed discussion will be useful to provide a background for our examination of vandalism to archaeological sites and historic archaeology in the study area.

Historic Aboriginal and Euro-American Patterns in Southwestern Colorado

Following the abandonment of the San Juan region by the Anasazi ca. 1300, little is known of what took place in terms of cultural utilization of the area. Simply put, archaeological data for the period following the demise of the Anasazi villages up to the appearance of the first Spanish records in 1765 are entirely lacking, although the Utes were living in the area at the time of initial European contact. Mention has been made in the previous chapter of the scant evidence for Navajo, and perhaps Puebloan as well, temporary campsites along several of the major drainages in southwestern Colorado, but these manifestations appear to be related to events in New Mexico during the late 1600s when conflicts between the Spanish and the indigenous groups forced refugee groups to flee the more northerly areas. Thus, aside from the early brief Navajo excursions into the area, and more recent evidence for Navajos which is discussed below, the Utes hold claim to be the primary aboriginal occupants of southwest Colorado during the historic era. With the actual influx of Euro-American miners and homesteaders into the area, in the middle to late 1800s, it becomes possible to examine the historical patterns in terms of two cultural traditions: the Athabaskan-Shoshonean groups and the Euro-Americans. In this context, brief discussions of each tradition are presented below.

Athabaskan Tradition (post-A.D. 1300 - present)

The arrival of the Athabaskan-speaking Navajos and their linguistic relatives, the Apache, in the Southwest appears to date about A.D. 1500 based on available archaeological and linguistic data (Hester 1962). The bulk of these early evidences is from north-central New Mexico, and Navajo occupation of southwestern Colorado has been somewhat sporadic, largely in response to specific causal factors, rather than extended or permanent habitation. Some of these reasons for

Navajos in the area include: (1) the previously noted refugee sites ca. 1680; (2) interaction with the Southern Utes in the late 1800s (Swadesh 1962); (3) employment at the national parks and monuments as laborers and for ruin stabilization crews (cf. Hayes 1964:122; Franke and Watson 1936); (4) work in the lead-zinc mines at Rico in the 1940s and 1950s (Luebben 1964); and (5) temporary activities such as woodcutting, hunting, and herding (Winter 1976). All of these situations except the early refugee encampments have occurred since the latter part of the nineteenth century.

Due to the overall nature of Navajo presence in southwestern Colorado, the extant evidence for such activities is correspondingly scant. Scattered dwellings, or hogans (Fig. 18) may be expected in the extreme western sector of the San Juan Resource Area. The most frequent form of Navajo remains encountered are sweathouses (Fig. 19), small conical structures made of poles covered with earth. These facilities are built by Navajo men for ceremonial and other cleansing sweat baths; it is not uncommon to find sweatlodges near work locations. It should be noted that the Utes also use sweathouses (Stewart 1942), apparently a practice adopted from the Navajo; and some of the recorded structures in southwestern Colorado may actually be Ute rather than Navajo. Seldom are artifacts encountered near sweathouses and, unless the presence of one or the other group has been documented (e.g. Navajo workmen stabilizing a ruin), cultural affiliation is difficult to discern.

Ute Tradition (ca. A.D. 1600 - present)

The time and direction of entry into western and southern Colorado by the Numic-speaking Utes have not been determined, but probably post-dates the Anasazi abandonment of the area with the movement coming from the west (cf. Schroeder 1965; Stewart 1966). The only chronometrically-derived archaeological data for Ute occupation is the dendrochronological determination by Dean (1969) that one of the structures in the Basketmaker II Talus Village near Durango is actually Ute in origin and dates to

Figure 18. Ruins of a historic Navajo hogan, located northeast of Aneth, Utah.

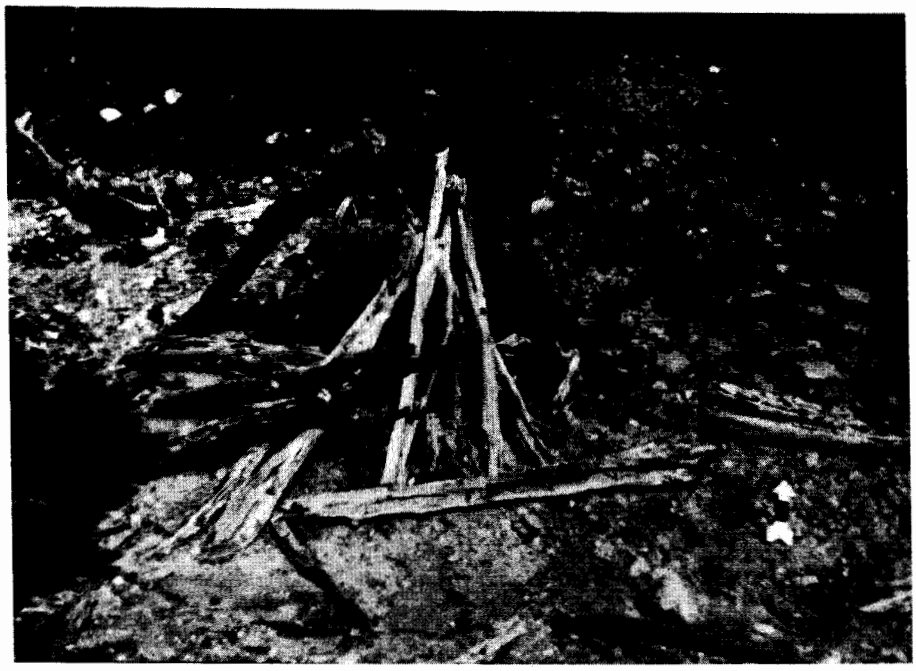


Figure 19. Remains of a historic aboriginal sweat lodge (5MT4812).

just about A.D. 1600, and perhaps as late as 1774. The earliest historic period reference made by the Spanish regarding the Utes was made in 1626 and by the time of the Pueblo Indian Revolt of 1680, the Spanish had made a treaty with the Colorado Utes and some Spanish had visited their country (Schroeder 1965:54). It is generally accepted in the literature that although the Utes frequently ranged south of the San Juan River, the Ute homelands were north of the river which separated their land from that of the Navajos.

Following a series of treaties in the late 1880s, a parcel of land was set aside for the Utes in southwestern Colorado. The Utes living in the area at that time were divided into three bands, the Mouache, the Capote, and the Weeminuche. After 1900, the reservation was divided into the Southern Ute Reservation, the home of the Mouache and Capote bands, and the Ute Mountain Ute Reservation, the home of the Weeminuche band (Delaney 1974:68-71).

While the early historic presence of Utes in southwestern Colorado is clearly documented (e.g. Rivera's 1765 diary [Cutter 1977]), archaeological sites attributed to Ute affiliation have seldom been reported in the many previous archaeological inventories for the area. On the surface this situation may appear somewhat enigmatic; however, reference to Ute ethnographic and culture material literature yields several possible solutions to the problem. Pre-twentieth century Ute encampments were apparently temporary in nature with relatively unsubstantial brush shelters being the rule. Domed- or conical-shaped frames covered with brush or bark (termed "wickiups") were present among the Weeminuche band (Stewart 1942), the evidence of which would have disappeared rather quickly after abandonment. One pole shelter of a more permanent nature was discovered near Johnson Canyon (Nickens 1976a) (Fig. 20), which is believed to be of Ute origin (Omer Stewart, personal communication) even though diagnostic artifacts were lacking. After the arrival of the Americans and the adoption of horses by the Utes, skin-covered tipis came into vogue which were capable of being moved from

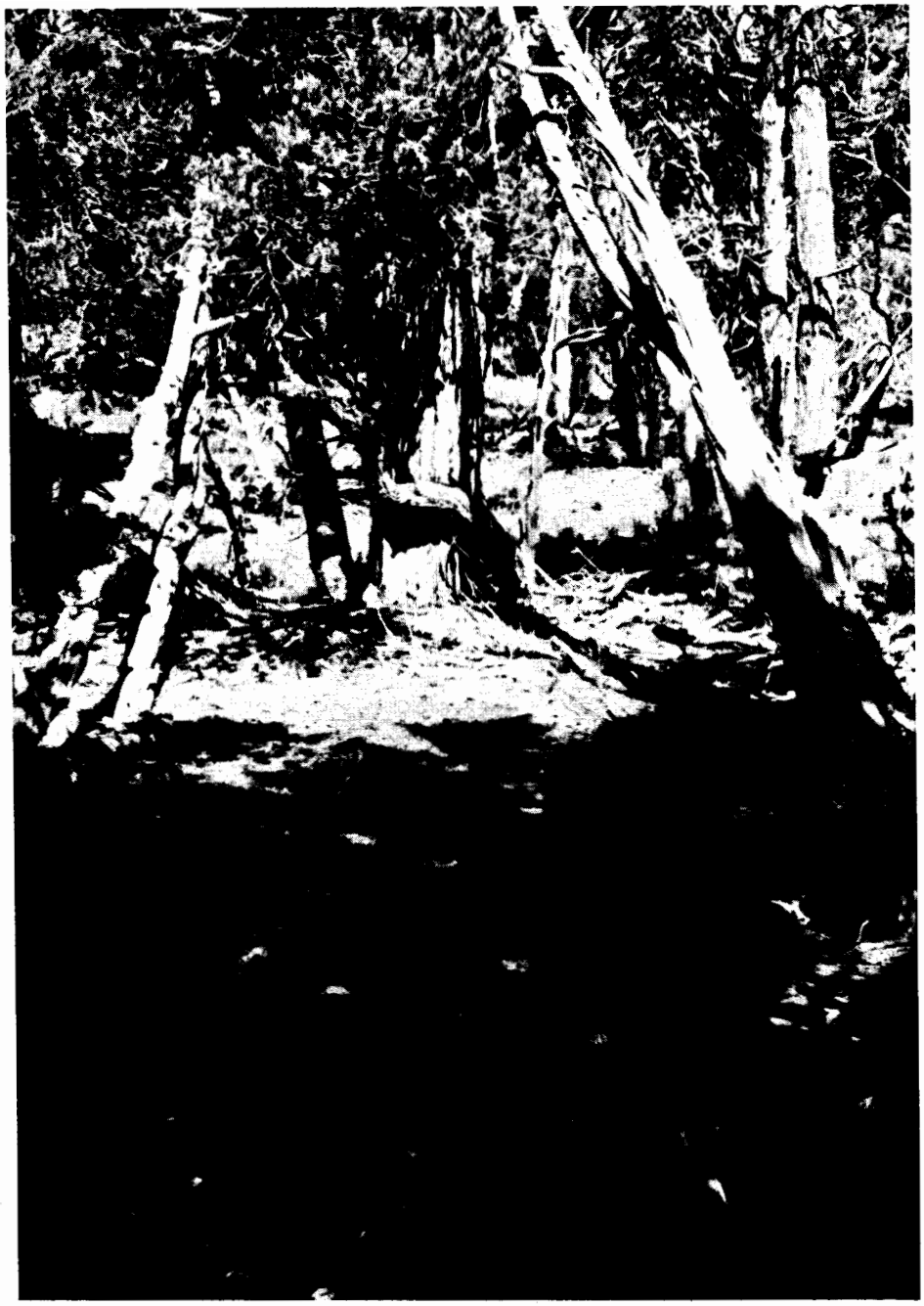


Figure 20. Historic Ute (?) wood pole lean-to or wickiup structure (5MTUMR 2568) located near Johnson Canyon.

one camp to another. Thus, even though Ute wickiups are more prevalent in other parts of western Colorado (Reed and Scott 1980:55-58), it is not too surprising that such structures have not survived in southwestern Colorado. The presence of Ute wickiups were noted in accounts of early settlers, for example in the Mancos Canyon, in the last two decades of the nineteenth century, but none of these have been documented in recent archaeological investigations.

Studies of Ute material culture provide additional clues to the problem of identifying Ute sites. Pottery, one of the diagnostic hallmarks of archaeological investigation, was very rare among the Southern Ute groups. Opler (1939) noted that Ute pottery was evidently not manufactured in quantity and, despite a careful search of several known Ute camping spots in southwestern Colorado, he could find no examples of ceramics. He further states that informants of 60 years and older at the time of his study in 1936-37 related that they had never seen ceramic vessels made by Utes. Evidently, basketry and skin sacks were the preferred containers among the Southern Utes. An exhaustive study of Ute culture elements and their distributions by Stewart (1942) which included Weeminuche and Mouache informants adds further confusion to the problem. The Southern Ute informants' stone tools, including arrow points, knives, drills, grooved stone axes, and grinding stones, were not manufactured but rather were collected for use from prehistoric sites. In the case of arrows, hardwood points were employed frequently in place of stone tips. Some percussion and pressure flint knapping was done, but stone tools which might be considered as being diagnostic were generally scavenged from prehistoric sites which are plentiful in the area. In short, it appears that some recorded archaeological sites which lack ceramics and contain only stone tools, even diagnostic Anasazi artifacts, may have been incorrectly attributed to the earlier cultures. Seemingly, however, this mistake is unavoidable unless historic documentation of Ute encampments at a particular locale can be substantiated.

Euro-American Tradition (ca. A.D. 1700 - present)

The first European people to enter the vicinity of the project area were in the form of Spanish explorations. Three early expeditions passed along the northern boundary of the project including the Rivera Expedition of 1765, the Escalante-Dominguez Expedition in 1776; and the Arze-Garcia Expedition of 1813, although the exact route of this expedition is not known (Jefferson et al. 1972:12-17). Throughout the 1600s and 1700s there are several Spanish accounts of encounters with the Utes and settlement of the Upper San Juan Basin was not attempted.

Intensive European interest in the San Juan region began with exploration for gold in 1859-61 in southwestern Colorado, an interest which brought European settlers into conflict with the Utes who claimed the territory as their homelands. According to the account of Logan (1960), La Plata County was organized in 1874 and included the entire southwestern corner of Colorado. Parrot City, located on the La Plata River about 10 miles west of the proposed Ridges Basin Reservoir, became the first county seat and remained in that capacity for six years. Animas City was started in 1876 on the Animas River as a supply depot for the gold mines in the Silverton area. Animas City declined rapidly, however, when the Denver and Rio Grande Railroad chose a spot about two miles to the south for a depot, around which the City of Durango was incorporated in 1881. Durango immediately became the new county seat of La Plata County and the county records were moved from Parrot City. During this time, ranchers and cattlemen followed on the heels of the prospectors and choice locations were taken up as cattle from other parts of Colorado and from Texas were brought into the area.

During the decades 1880-1900, Hispano settlement of the San Juan Basin occurred (Swadesh 1974) and La Plata County received additional Euro-American settlers (Culhane 1934). Montezuma County was founded in the western portion of the old La Plata County in 1899 with its principal towns of Mancos (1881), Cortez (1886), and Dolores (1892). North of Montezuma County, Dolores County was delineated in 1880 with Rico,

then a bustling mining town, designated as the county seat a year later. When the mines at Rico had all but ceased to produce, the county seat was moved in 1941 to Dove Creek. The final county comprising the present study area is Archuleta County which, along with its county seat of Pagosa Springs, came into being about 1880.

An inevitable result of this activity was the concern for safety of settlers from the Utes who still occupied portions of the territory. A number of treaties in the last half of the 1800s with the Utes had failed to produce satisfactory results to the problem for either side. In the year of 1880, the U.S. Government, through the War Department, issued orders for the establishment of the Fort Lewis Army Post, two miles due south of Parrot City on the banks of the La Plata River (Ayres 1931). After its troops had intervened in many skirmishes between Utes and the whites and among Indian groups themselves, the post was ordered abandoned in 1891. The fort was made into a school for children from the Ute and Navajo tribes in 1892. However, the school was beset with problems as Indian pupils, angered at being compelled to attend school, burned many of the fort's buildings and the following year an epidemic broke out, killing many of the Indians. In 1904, the former Fort Lewis Military Reservation and Indian School was granted to the State of Colorado as part of the land grant college system of the state. In time it became an agricultural experiment station and a branch college, only to be abandoned again when the campus of Fort Lewis College was moved to Durango.

After attempts to remove the Utes to Utah could not gain enough support, the problem of a homeland for the Indians was finally resolved in 1895 when the Utes agreed to the present reservation in southwestern Colorado. In 1896 Utes, in the eastern section of the reservation, accepted land allotments on the Southern Ute Reservation and the western portion (later the Ute Mountain Ute Reservation) was set aside for those who did not desire allotments. Allotments on the Southern Ute Reservation totaled 72,811 acres of land which had been allotted to 371 Utes. In 1899, unallotted lands, 523,079 acres, were opened for Anglo settlement at a minimum of $1.25 per acre (Delaney 1974).

Vandalism of Archaeological Sites

Nearly coincident with the arrival of Euro-Americans in southwestern Colorado was the initiation of wanton and uncontrolled despoilation of prehistoric sites. Witness the following statements made by early scientific investigators who, quite properly, were much concerned with what was taking place.

> . . . as a rule the Southwestern ruins are now suffering more from the white man than from the Indian. If this destruction of the cliff houses of New Mexico, Colorado, and Arizona goes on at the same rate in the next fifty years as it has in the past, these unique dwellings will be practically destroyed and unless laws are enacted, either by states or by the general government, for their protection, at the close of the twentieth century (19th ?) many of the most interesting monuments of the prehistoric people of our Southwest will be little more than mounds of debris at the bases of cliffs. A commercial spirit is leading to careless excavations for objects to sell, and walls are ruthlessly overthrown, buildings torn down in hopes of a few dollars gain. The proper designation of the way our antiquities are treated is vandalism. Students who follow us, when these cliff houses have all disappeared and their instructive objects scattered by the greed of traders, will wonder at our indifference and designate our negligence by its proper name. It would be wise legislation to prevent this vandalism as much as possible and good science to put all excavation of ruins in trained hands (Fewkes 1896:269-270).

> The great hindrance to successful archaeological work in this region lies in the fact that there is scarcely an ancient dwelling site or cemetery that has not been vandalized by "pottery diggers" for gain (Hough 1901:590).

> (In the Hovenweep area) . . . few mounds have escaped the hands of the destroyer, cattlemen, ranchmen, rural picnickers, and professional collectors have turned the ground well over and have taken much pottery, breaking more, and strewing the ground with many crumbling bones (Prudden 1903:263).

> The pueblo-like cliff dwellings being situated under heavy, overhanging ledges are well protected from the elements and unmolested would endure for centuries. But their destruction seems to have been made the peculiar pasttime of a certain class of human beings. The early explorers of the Mancos Canyon would now find, in many cases, unrecognizable heaps of stone where thirty years ago were well preserved structures. The excavation of cliff dwellings without due regard to the preservation of walls should be made a grave misdemeanor (Hewett 1904).
>
> Most of the ruins of the Southwest are given over today to unbridled vandalism. A pot or a skull is worth a few dimes to a trader and a few dollars to the tourist, and so has been evolved the holiday and professional pot-hunter. Everywhere the ruins are ravaged. More is destroyed in the search than is saved. No records are kept (Prudden 1907:172).
>
> Probably no cliff dwelling in the Southwest has been more thoroughly dug over in search of pottery and other objects for commercial purposes than Cliff Palace. Parties of "curio seekers" camped in the ruin for several winters, and it is reported that many hundred specimens therefrom have been carried down the mesa and sold to private individuals. Some of these objects are now in museums but many are forever lost to science. In order to secure this valuable archaeological material, walls were broken down with powder, often simply to let light into the darker rooms; floors were invariably opened and buried kivas mutilated. To facilitate this work and get rid of the dust, great openings were broken through the fine walls which form the front of the ruin. Beams were used for firewood to so great an extent that not a single roof now remains. This work of destruction, added to that resulting from erosion due to rain, left Cliff Palace in a sad condition (Annual Report of the Secretary of the Interior for 1909:486 [quoted in Ise 1961:145]).

As tragically as these statements portray the general situation of that time, even they do not fully expose the true extent of the destructive actions. In order to stem the tide, Congress passed the Federal Antiquities Act in 1906 which declared that:

> Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that any person who shall appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States without the permission of the Secretary

of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court.

Sadly, however, the presence of the Antiquities Act did little to prevent the pothunting of prehistoric sites. The ongoing problem and some of its ramifications have been succinctly summarized by the Listers (Lister and Lister 1968:161-162) in the following manner:

> The decade of the 30's witnessed one of the most virulent epidemics of pothunting ever to sweep any sector of the San Juan. The center of the outbreak was concentrated in the upper Animas valley of southern Colorado. Here signs of the ancient ones were not spectacular. Yet from the first thrust of white penetration into the region in the 1870's occasional finds of Indian relics had been made. They were so rare and generally without individuality that they excited little interest in a public impressed only by the biggest or the oldest, one of which lay unknown at the town's limits.
>
> With a growing awareness of the tremendously rich archaeological finds coming to light elsewhere in the San Juan basin, local weekend collectors formed a society where enthusiasm and knowledge could be pooled. They were met with unexpected success as reports of more and more ruins were made, and collections of artifacts grew to sizeable proportions. . .
>
> Archaeologists, lacking the strengthening rod of law, sought to stem the tide of potting by preaching. Too often their manner was either condescending or threatening. The reaction in the collector ranks was defiance and hostility, resulting in fortified determination to continue the Sunday hobby regardless of antipathy in certain quarters. Many pursued the avocation because of the love of the quest. Others were genuinely interested in the study of the Indians. A few, mistakingly believing the oldness meant remunerative value, saw what was hoped to be a chance to pick up some extra cash. These were the ones inadvertently encouraged in their digging for relics by the professionals themselves who bought collections rather than see them dispersed into a dozen channels.

The problem of vandalism and destruction of both archaeological and historical cultural resources continues to be an enormous one in southwestern Colorado today for land managing agencies (cf. Scott 1977; Rippeteau 1979; Reyman 1979). The total or partial destruction of cultural resources takes many forms: the defacement of rock art (Fig. 21); clearing and plowing of agricultural lands (Fig. 22); surface altering projects such as pinyon-juniper clearing (Fig. 23); and the outright illegal digging in ruins on public lands (Figs. 24 and 25). Indeed, the problem is so widespread and severe that it is all but impossible to control. Nonetheless, the BLM has effected several preventative programs including fencing of sites (Figs. 26 and 27), excavation and stabilization of significant sites, patrols of the area, and education of the public on the values of preserving the cultural resource base for future generations. When all other measures fail, law enforcement of antiquities violations may be brought into play. The BLM has hired a law enforcement specialist in the state office and has signed a cooperative agreement with the Montezuma County Sheriff's Department for additional supervision. Recently, the Archaeological Resources Protection Act of 1979 was enacted to replace the vague and outdated 1906 Act and to provide for more strict and meaningful penalties for vandals apprehended for site destruction of public lands.

Unfortunately, the end is not in sight for a solution to the issue. A cultural resource surveillance report for 1979 in the San Juan Resource Area (Harden 1979) reveals that systematic vandalism continues using the most modern equipment--airplanes to locate sites, 4-wheel drive vehicles and motorcycles to reach out-of-the-way locations, and CB radios as a warning system to prevent apprehension. It is doubtful whether the problem will ever be completely eradicated. The BLM, however, has embarked on a course of action to this end through the implementation of the measures noted above and the recent funding of a project to assess the overall situation in southwestern Colorado as mentioned in the previous chapter.

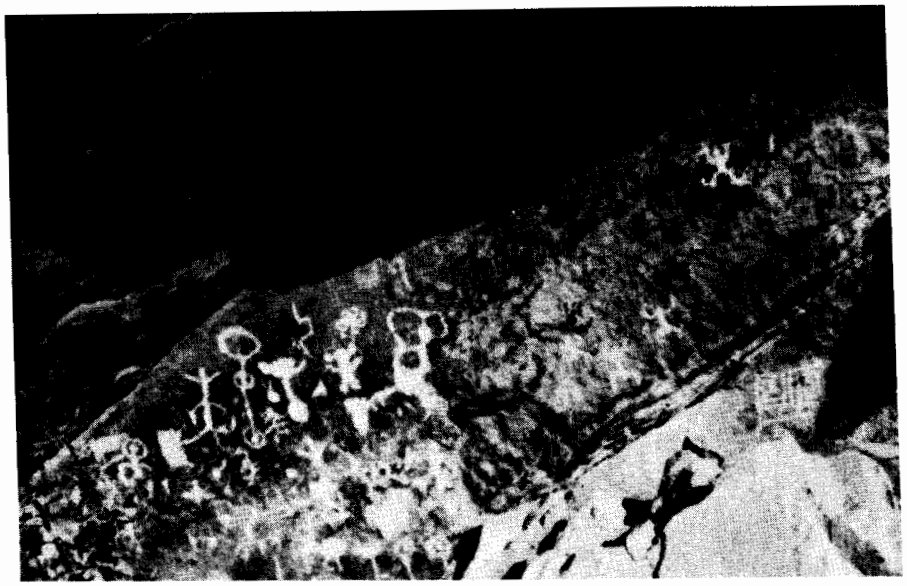


Figure 21. Rock art panel (5MT295) located in McElmo Canyon, about one mile east of the Ismay Trading Post. The view shown in the top photo was taken by J. W. Fewkes ca. 1918. The bottom photo was taken in recent years and indicates vandalism of the panel by adding elements and signatures to the original artwork. (Top photo courtesy Smithsonian Institution National Anthropological Archives; bottom photo from BLM files.)

Figure 22. Remains of a plowed site (BLM photo files).

Figure 23. Results of pinyon-juniper woodland chaining on the surface of an archaeological site (BLM photo files).

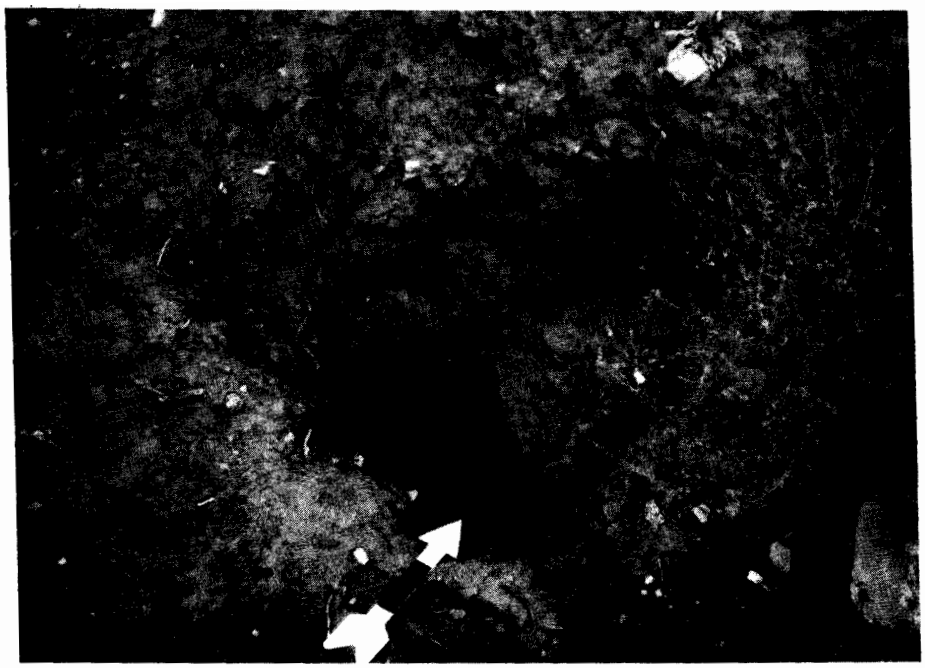


Figure 24. Vandal's pothole at 5MT4855.

Figure 25. Human skeletal material at 5MT1700 unearthed by illegal digging.

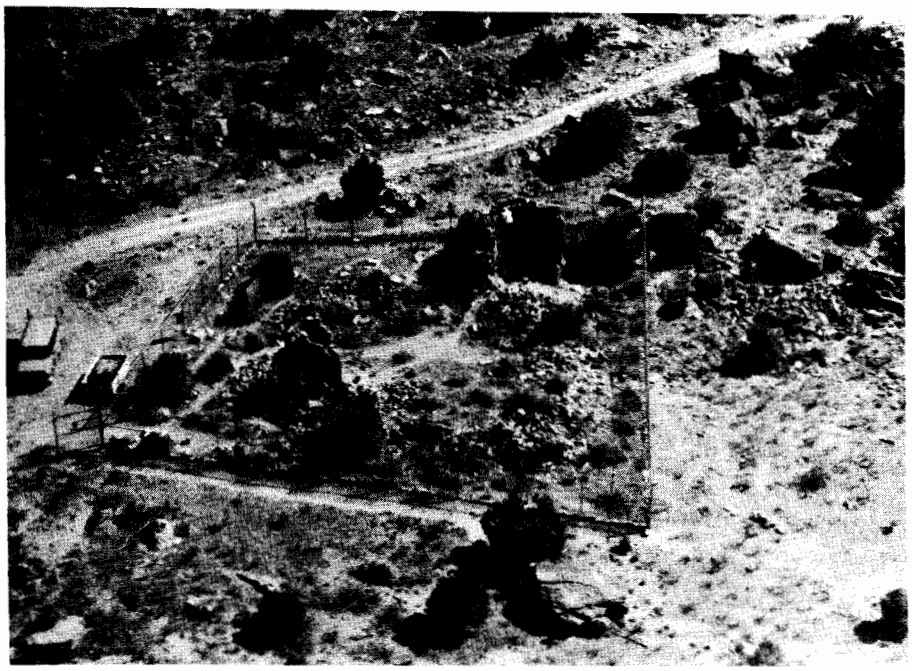


Figure 26. Protective fencing of 5MT705 in McLean Basin (BLM photo files).

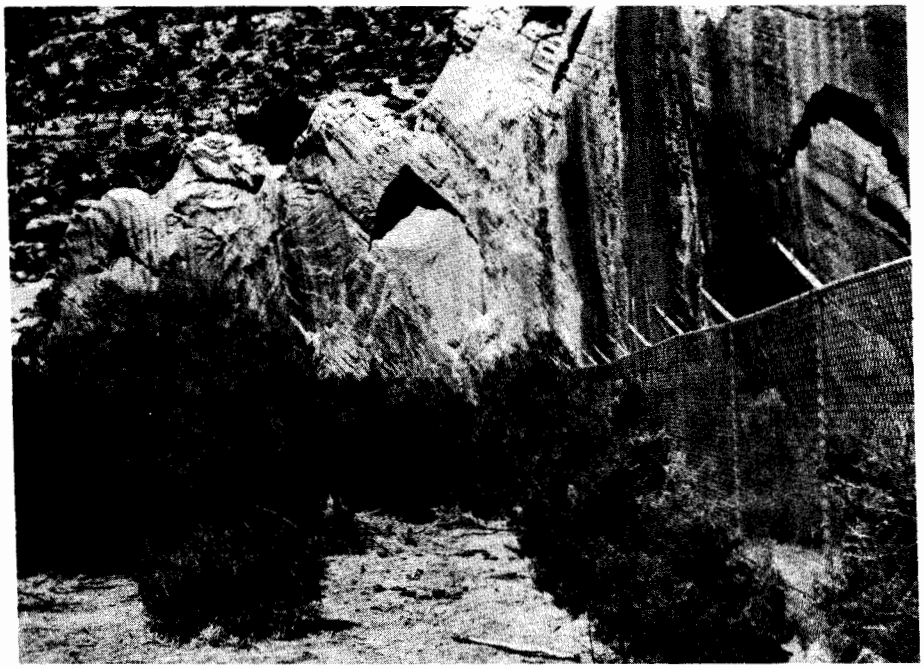


Figure 27. Protective measures at the Painted Hand Site (BLM photo files).

Historical Archaeology in Southwestern Colorado

Within the past few years the realization has come about that the remains of Euro-Americans are important to a complete elucidation of past cultural patterns in the study area. Consequently, historic architectural features (Fig. 28) and other instances evincing Euro-American activities are today routinely recorded along with prehistoric sites. Such was not the case even ten years ago. Under the provisions of the Archaeological Resources Protection Act of 1979, cultural sites of at least 100 years of age are considered "archaeological resources" and are protected on public lands. More recent historical sites may be afforded protection if they qualify for listing on the National Register of Historic Places. Presently, however, few of the area's historic resources have been listed on the National Register as only parts of the Cumbres-Toltec (Archuleta County) and Durango-Silverton (La Plata County) Railroads are included along with the Rico city hall in Dolores County.

The scientific study of historic sites in the project area is also a recent concern. Actually, J. Walter Fewkes, better known for his studies of prehistoric ruins, was the first to mention historic remains from southwestern Colorado in an archaeological report. Fewkes (1919:68) observed that metal artifacts, presumably of Spanish origin, had been found near the head of Yellow Jacket Canyon and other nearby areas. The items included iron lance heads and fragments of a stirrup and harness or saddle. Fewkes did observe, however, that the artifacts may have belonged to Indians who would have obtained the metal objects from the Spanish. Another attempt at historic archaeology occurred in 1963 at Mesa Verde National Park when Al Lancaster directed a brief excavation on Point Lookout of a reported early heliograph station. A stone foundation or arrangement was uncovered, but a lack of artifacts made identification of the site's age and function impossible (Gary Matlock, personal communication).

Figure 28. Historic Euro-American log structure (5MT5015).

The first meaningful contribution to historical archaeology in the area resulted from the 1970 salvage of Gustaf Nordenskiold's 1891 campsite on Wetherill Mesa, Mesa Verde National Park. The campsite was investigated by a crew from the University of Colorado MVRC and subsequently reported by Scott (1972). Although the actual date of Nordenskiold's camp had been historically documented, Scott independently evaluated the artifacts, arriving at a range of 1888-1894 for the expected date based on recovered materials.

In 1976 Robert G. Rosenberg (1976:204-222) briefly discussed historical sites encountered during archaeological inventory of timber sales on the San Juan National Forest. Included are descriptions of Narraguinnep Fort, dating to 1885, and the remains of a logging operation and narrow gauge reservoir near Millset Reservoir, located southeast of the town of Dolores.

As part of the University of Colorado's Dolores Archaeological Program, historic resources in the project area are presently being investigated. During the first year of the project (1978), 14 homesteads, townsites, and other locales were recorded and evaluated in terms of legal and scientific significance, and two historical overviews of the project lands were prepared (Baker and Smith 1979). Historical investigations by the University of Colorado are continuing and, at some point in the future, the research results from the Dolores Project should provide a baseline study for historical archaeology in southwestern Colorado.

In a recently completed but unpublished draft report covering the 1971-77 archaeological inventory of Mesa Verde National Park, Smith (n.d.) provides a discussion of 109 historic sites which have been recorded in the park. Included in the group are remains of early homesteads, old dumping grounds, Navajo hogans and sweatlodges, and a variety of other features of historic age. The Mesa Verde survey, directed by Smith, was probably the first in the area to treat, record and evaluate historic sites on a par with prehistoric sites.

Thus, while the study of historic sites as cultural resources is in its nascent stages, contributions are beginning to appear in the literature. To date, little actual investigation beyond the surface recording of sites has taken place, but it would be hoped that detailed examination of the architectural features of these sites as well as probing of the subsurface patterns will be foci for scholarly research in the future. The development of American culture itself has left a rich and varied archaeological record, and there is much to be learned concerning the Euro-American settlement of southwestern Colorado and the interactions between the miners, homesteaders, and ranchers, and the historic aboriginal groups.

PART II

CULTURAL HISTORY AND PAST LIFEWAYS

V.

PREHISTORIC CULTURE HISTORY FOR THE SAN JUAN RESOURCE AREA

The appearance, growth, and decline of prehistoric cultural patterns in southwestern Colorado is reflected in the thousands of archaeological sites which have been formally recorded in the area--primarily on public lands--as well as in many times more which await location and recordation. Our review of previous archaeological investigations hinted at the fact that much of this work was oriented toward definition of cultural sequences and subsequent refinement as additional data was acquired. As we shall see, while the general patterns of diachronic cultural developments are fairly well known, especially for the Anasazi situation, further delineation of local sequences is still under review in some areas. Before undertaking discussion of cultural sequences and their characteristics, it will be beneficial to place the study area and its cultural resources within a proper context among broadly-defined North American cultural development.

General North American Cultural Developments

It is difficult to place cultural developments in southwestern Colorado in proper perspective without reference to broad, recognizable patterns of cultural development in the prehistoric New World and, more specifically, in North America. Most archaeologists subscribe to a series of general stages of prehistoric cultural development offered by Willey and Phillips (1958). In this sequence, which extends from the first arrival of Homo sapiens sapiens to the New World to historic contacts, Willey and Phillips defined five stages: Lithic, Archaic, Formative, Classic, and Postclassic. Of these stages, only the first three occur in North America, the last two being restricted geographi-

cally to Mesoamerica and South America. It should be added that the three stages recognized for cultural developments in North America did not occur simultaneously throughout the entire continent.

In concise format, Willey and Phillips (1958:200-204) define the Lithic, Archaic, and Formative stages in the following manner. The Lithic stage began with the initial peopling of the New World from the Old World, a migration or series of population movements across the Bering Strait which joins present-day Alaska and Siberia. This development, also termed the Paleo-Indian or big game hunting stage, was characterized by chipped-stone tools and weapons, and was associated with the late glacial environments of the Pleistocene and the early postglacial situation. Lithic stage cultural remains are often found with skeletal materials of extinct megafauna. In a recent review of the archaeological record for this stage, MacNeish (1976) has concluded that human occupation of the New World may have begun some 70,000 $\pm$ 30,000 B.P. in North America. For our purposes, the Paleo-Indian complexes of North America dating to the terminal Pleistocene (ca. 11,000 - 7,000 B.P.) represent the earliest apparent occupation of the region surrounding southwestern Colorado; the evidence for these cultural developments in the project area will be discussed below.

The succeeding Archaic stage was characterized by a continuation of hunting and gathering patterns into environmental conditions similar to those of the present. Like the Lithic stage, the Archaic was apparently a continent-wide cultural development but it differed in subsistence pattern being geared toward a diffuse exploitation of the smaller and more varied post-Pleistocene fauna and many floral species. The widespread and successful Archaic lifeway persisted until new cultural developments--domesticated plants, pottery, and sedentary village life--spread northward from Mexico and marked the initiation of the Formative stage. Thus, the interface between the Archaic and Formative stages represents a profound change in North American cultural development, a fundamental economic shift from hunting and gathering to agricultural

food production. In the American Southwest, the arrival of these traits occurred by 350 B.C., and, in time, three major regional traditions become recognizable, culturally and geographically. These traditions are the Hohokam, Mogollon, and Anasazi. The Anasazi tradition was responsible for the majority of prehistoric cultural resource sites being recorded in southwestern Colorado today. In subsequent paragraphs data relating to the presence and characteristics of the various earlier cultural units in the project area are presented along with observations on the local relationships of the various expressions of the stages to each other and to adjacent areas.

Paleo-Indian Stage

The designation "Paleo-Indian" stage (or Lithic stage of Willey and Phillips) is a cultural term applied to the earliest definable human occupants of the Colorado Plateau including the present project area. The later part of this New World cultural development can be subdivided into three cultural units or complexes: Llano, Folsom, and Plano (cf. Jennings 1974, Schroedl 1977). It has been common in the past to define each of these complexes on the basis of distinctive projectile points attributed to each, and by the primary animal(s) hunted. Additionally, although overlapping occurs, it is generally possible to place the complexes into a temporal ordering with the Llano complex being earliest, followed by Folsom, and ending with the Plano cultures.

Thus, the first of these complexes, the Llano, was characterized by the manufacture and use of the Clovis point, a unique, fluted, lanceolate point averaging 3 to 6 inches in length. Although other late Pleistocene fauna have been found in association with Clovis points, the mammoth (Mammuthus sp.) appears to have been the primary prey for these groups. As a result of several radiocarbon determinations throughout the Southwest, it is estimated that the Llano complex of the Paleo-Indian stage dates between 10,000 and 9,000 B.C.

Sites and other items associated with the Folsom complex (ca. 9000 - 7000 B.C.) are more numerous than Llano sites and have a wider distribution throughout North America. The distinctive projectile point of this complex was the Folsom point, also lanceolate in form and made with delicate, pressure-flaked retouch. The points were thinned by the removal on each face of a long, thin flake. Animal remains found associated with Folsom points are those of large-horned, extinct bison--usually Bison antiquus.

The third and terminal Paleo-Indian subdivision was the Plano complex which has been dated to the period 7000 - 9000 B.C. This complex is identified by a number of projectile point types which have considerable variation in form and geographic distribution. Plano points are generally lanceolate-shaped, unfluted, and exhibit fine pressure-flaked flintwork. Typically. Plano complex points and other tools are discovered with early postglacial modern fauna, such as bison or antelope.

Aside from temporal changes in projectile point manufacture and big game preference, there are certain cultural characteristics which typify each of the Paleo-Indian complexes. Groups in each period appear to have oriented their subsistence patterns toward the larger, migratory faunal forms. One aspect of Paleo-Indian subsistence orientation we should not overlook, however, is a probable dependence on smaller animal species and many varieties of edible floral species available in the environmental settings occupied by these groups. In the archaeological context, difficulties of preservation and the transitory, nonsedentary lifestyle of the Paleo-Indians undoubtedly mask the overall importance of these food items in the economy.

In a general vein, the lifeways of the Paleo-Indians include completely nomadic small groups, or bands which were involved in year-around exploitative activities. Data relating to these groups is usually scant in the archaeological record. Wendorf and Hester (1962) have provided a comparative analysis of the known information and have observed that Paleo-Indian sites fall into one of two categories: campsites and kill sites. Campsites frequently occur on ridges or dunes, and the artifacts include hearths; broken, split, and charred food bones; flint knapping debris; and a wide range of stone tools

(fluted or unfluted points, hammerstones, several varieties of scrapers, and utilized flakes). Kill sites, on the other hand, are found near the banks of former lakes or streams, or at the base of a cliff where animals were stampeded to their death. Kill site contexts are usually restricted to animal skeletal materials and tools, including points of the various complexes, which were utilized in the killing and butchering processes. In the majority of the cases, the kill sites contain multiple killings, ranging all the way from one animal to 200. Site situations for both types of Paleo-Indian activities appear to be dictated by proximity of primary economic resources, and by a need for observation of game.

There are presently only hints of the existence for each of the Paleo-Indian complexes in southwestern Colorado and adjoining areas. These include limited but definite reported surface finds of projectile points which have been attributed to each of the three Paleo-Indian complexes. To date, however, no finds have been made of a concrete association between Paleo-Indian points and extinct forms of fauna in the Four Corners area. A Clovis point was found in Oak Creek Canyon, San Juan County, and reported by Lindsay (1976). Another Clovis point has been noted just south of the Utah-Arizona stateline in Navajo County (Agenbroad 1967). A fragmentary Folsom point was recovered in 1977 on Lime Ridge, Utah, about two miles northwest of the confluence of Comb Wash and the San Juan River (Bruce D. Louthan, 1978 personal communication). On the Dark Canyon Plateau, west of the Abajo Mountains in Utah, Sharrock and Keane (1962) have described a fragmentary Folsom point from Sweet Alice Springs and Folsom points have been reported from the Moab, Utah vicinity (Hunt and Tanner 1960).

Unfluted Plano points have also been reported from the region. Hunt (1953:24) reported on a Angostura-like projectile point from the La Sal Mountains east of Moab, Utah, and Hicks (1975:44) has noted four Plano complex points from the vicinity of Hovenweep National Monument. Tentative classifications of the Hovenweep points include a

complete Gypsum Cave point, and fragments of a possible Scottsbluff I or Eden point, a possible Plainview point, and a possible Agate Basin or Angostura point. A little farther east, Hayes (1964:88) recovered a single Plano point of the Milnesand type during an archaeological inventory in Mesa Verde National Park.

Thus, a combination of faunal and cultural evidence suggests that big game hunters of the Paleo-Indian complex occupied the Colorado Plateau. Based on the evidence at hand, it may be inferred that this occupation was somewhat more limited and sporadic than contemporaneous developments in neighboring regions such as the Southwest and the Great Plains east of the Rockies. Whether or not this occupation was continuous and static over the span of several millenia cannot be stated for certain. Irwin-Williams and Haynes (1970) have presented a model for explaining early population change and movement in relationship to climatic fluctuations. Their reconstruction is based on large-scale environmental and cultural patterning; nonetheless, the model can be scaled down to a specific area such as southwestern Colorado to provide a possible background for defining Paleo-Indian culture change (Fig. 29).

According to this model, the mammoth-oriented Llano groups represent a relatively short-lived adaptation to a late-Pleistocene environment marked by more effective moisture than the present. This environmental context was capable of supporting important economic species such as the mammoth, bison, sloth, horse, and camel. By 9000 B.C., a shift towards less effective moisture conditions was occurring, with the end result being the drastic decline or extinction of the mammoth and other members of the faunal species hunted by the Clovis groups. Apparently, conditions following this period saw a return to a moister climate, one which was very favorable to large herds of now-extinct forms of bison. This situation coincides with the Folsom complex which, as of 8500 B.C., ranged eastern Utah and Arizona, and Colorado and New Mexico. By 7000 B.C., a drier period had forced the Paleo-Indian hunters eastward toward the Great Plains, leaving southeastern Utah abandoned. The Great Basin Archaic groups now

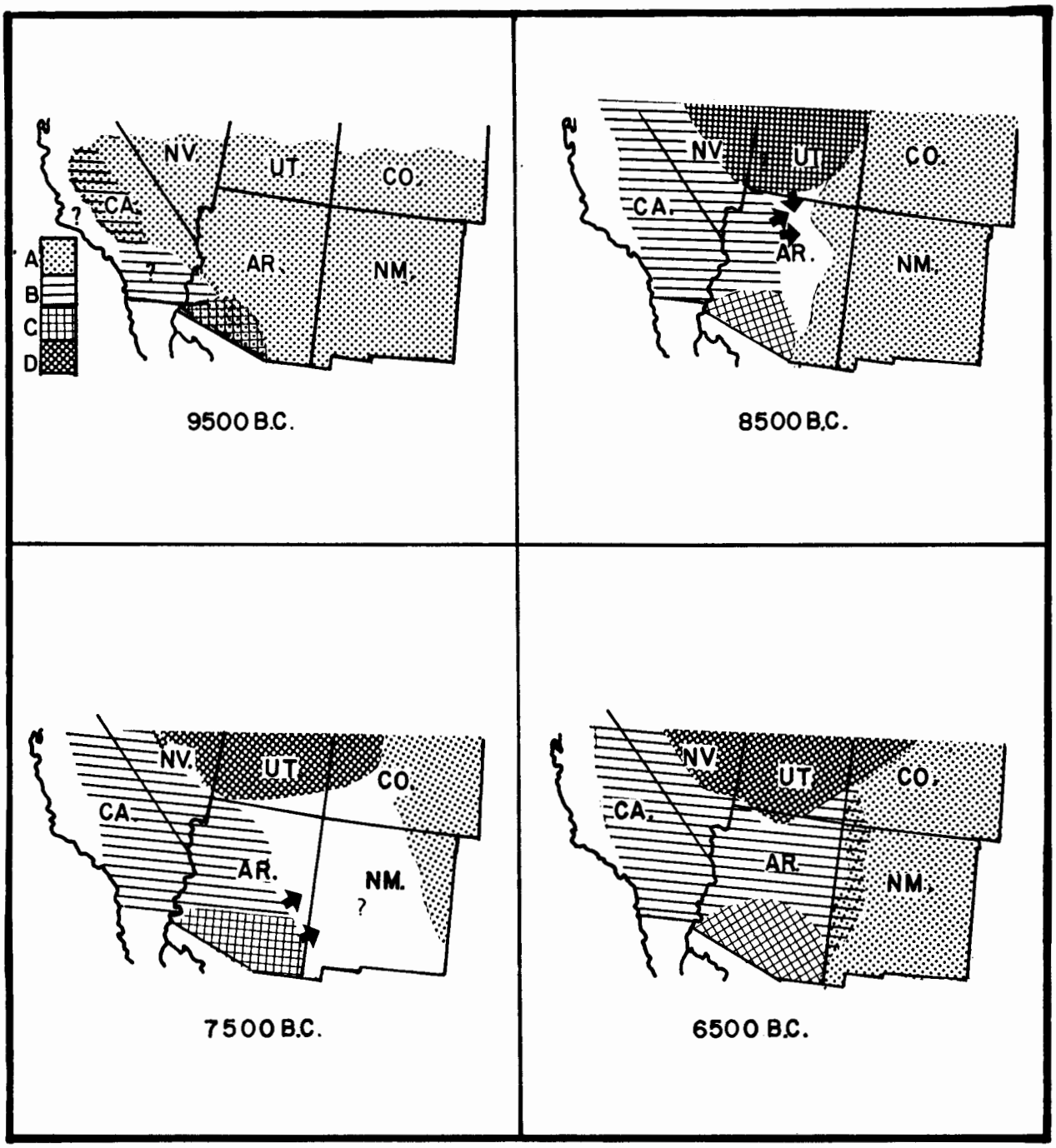


Figure 29. Suggested Paleo-Indian and early Archaic culture distribution and spread at several points of time.

Pattern A: Plains-based Paleo-Indian
Pattern B: Western-based Archaic cultures
Pattern C: Southern-based Archaic cultures
Pattern D: Great Basin Archaic cultures

(After Irwin-Williams and Haynes 1970:Figs. 2-4).

occupied all of Utah north of the Colorado River, and the western-based Archaic cultures were spreading toward the Four Corners area from the extreme southwestern portion of the southwestern United States. Irwin-Williams and Haynes see another period of increased moisture beginning about 6700 B.C. which, by 6500 B.C., was reflected by a concomitant westward movement of the Plano complex groups to near the present Utah-Colorado line. This population movement correlates well with the reported distribution of Plano points in the Mesa Verde-Hovenweep area and the La Sal Mountains. By this time, the western-based Archaic cultures occupied much of the southern Colorado Plateau, including the South San Juan project area; the Great Basin Archaic groups persisted on the northern Colorado Plateau.

In summary of the Paleo-Indian stage, then, we see an initial occupation of the Four Corners region by the Llano hunters sometime around 9500 B.C. Changing environmental conditions may have ushered in the Folsom complex shortly thereafter; however, by the end of the Folsom period, the Paleo-Indian big game hunters seem to have withdrawn to the east, again in response to fluctuating environmental situations. A reoccupation of the southeastern Colorado Plateau by Plano hunters occurred by 6500 B.C. who may have co-existed with Archaic cultures in the region of southwestern Colorado. It cannot be stated with certainty when the last Paleo-Indian hunters were found in southwestern Colorado. The evidence suggests that the Archaic lifeway, characterized by a wider flexibility in resource-oriented subsistence patterns, was dominant in the Four Corners area by at least 5500 B.C.

Archaic Stage

The Archaic way of life which followed the decline of the Paleo-Indian big game hunters is viewed by most investigators as a cultural adaptation to the postglacial environmental settings found throughout North America subsequent to the end of the Pleistocene Epoch. In many regions, human groups could no longer depend on the large herds

of migratory game animals which, except for the Great Plains, had been replaced by smaller, more solitary animals such as deer. To be successful in terms of subsistence economy during this period required a less centralized and more diffuse exploitation geared toward the use of several species in the ecosystem and versatility to utilize various resources from season to season.

In the eastern United States this situation called for adaptation to the moist woodlands and in the midlands to grasslands and river systems. In the West and Southwest, however, the Archaic lifestyle necessitated adaptation to highly variable conditions of aridity and often sparse biotic resources. There were, of course, certain parts of the West, one example being the Colorado Plateau, where resources were found in more abundance when compared to regions such as the Great Basin.

The origins of the Archaic stage and its relationship to the preceding Paleo-Indian groups are not completely understood and there is little evidence for direct development from one stage to the other. There is, in fact, good data available to indicate that the two stages coexisted as far back as 8000 B.C., perhaps earlier in some areas of the West (Jennings 1974). One of the clearest examples of this situation is the Great Basin where Jennings (1957) has posited the existence of a widespread uniform Archaic tradition, known as the Desert Culture, which was found throughout nearly all of the western United States. Based on his work in the Great Basin, Jennings sees the origins of the Desert Culture occurring as far back as 8000 B.C., well within the projected ages for the Paleo-Indian Folsom and Plano complexes.

A primary theme of Jennings' Desert Culture tradition was a cultural adaptation to environmental conditions which, although marked by minor oscillations, have remained nearly constant over the past 10,000 years in the Great Basin. It should be noted that an alternative model has been offered (cf. Swanson 1966; Butler 1968), which suggests that both the marked aridity of the Great Basin and the corresponding advent of the Desert Culture are more recent developments.

In this model, the Desert Culture is seen as an adaptation to a distinct climatic change (toward desiccation) beginning about 5000 B.C. which corresponds with Antevs' (1955) altithermal climatic period. According to Swanson (1966), the Desert Culture developed out of an older big game hunting tradition in response to this period of aridity in the Great Basin.

Whatever the derivation and time depth associated with the Desert Culture, the original definition of this tradition has become synonymous with the Western expression of the North American Archaic pattern. It is perhaps best viewed at the synthetic level (Irwin-Williams 1967:444-445; Jennings 1978:29) as a way of life adapted toward general climatic conditions of aridity found in the western United States.

Definition of the Desert Culture

The Desert Culture concept, or Western Archaic pattern, includes many characteristics that are common throughout the West as well as to comparable cultures in the eastern United States. Many of the basic traits are even common to world-wide cultural patterns found among prehistoric and ethnographic cultures engaged in a hunting and gathering way of life. Further, elements of this lifeway persisted into the 1800s in some places in the western United States. Thus, it will be of benefit here to briefly define this general pattern of Archaic existence in that the concept represents an important part of the culture history in the San Juan Resource Area and surrounding regions.

As noted previously, Jesse D. Jennings has produced the most comprehensive and definitive contributions to the delineation of the Desert Culture and his various publications form the basis for the following descriptions. Readers interested in extended discussions of this concept should consult Jennings (1956, 1957, 1964, 1978).

Generally speaking, the Desert Culture is seen as oriented toward the exploitation of many animal and plant species, as opposed to the earlier Paleo-Indian concentration only upon big game animals. This

hunting and gathering pattern was characterized by many techniques--hunting, trapping, and snaring of birds, insects, deer, antelope, mountain sheep, rabbits, and other animals; and exploitation of available plants: seeds from plants and grasses, lily bulbs, nuts, roots, and berries.

Given the environmental and hence available resource constraints found throughout the region, it is assumed that the food quest must have been nearly continuous throughout the year. Small groups of people, perhaps 25 to 50 kin-related individuals, were probably moving from place to place within a definable territory in response to the growth and maturing of certain plants and/or animal populations. Caves and overhangs appear to have been favored for base camps, especially in the winter time. However, just because the majority of our data come from caves or overhangs where preservation is best, we should not overlook the fact that much of the time was probably spent at seasonal specialized activity camps located in the open. From the ethnographic literature, we also see that several groups might be able to congregate in the area of an especially "rich" temporary food resource for a short time period. During such occasions social interaction, including visiting, marriages, and the forming of alliances, would have been possible between groups.

As expected, the technological aspects of the Desert Culture are geared toward an array of tools for specialized tasks associated with the food quest, and also are related to the nonsedentary lifestyle. Nonetheless, the diagnostic artifacts of this stage are extensive and include: basketry (twined basketry generally predominant) and cordage; fur cloth; woven sandals; the atlatl (or spear-throwing device) and dart; a wide variety of small projectile points; chipped-stone knives; flat and basin millingstones and the one-handed grinding stone; digging stick; wooden clubs; tubular pipes; use of Oliva and Olivella shells from California for beads; firedrill and hearth; and a variety of bone and antler tools.

In brief, then, the Desert Culture concept provided a useful and unifying scheme for expressing the overall pattern of the Archaic groups of the western United States. Soon after the definition was outlined,

however, it was apparent that discrete regional trait clusters defining subareas within the larger Desert Culture area could be delineated. These regional or subareal variations adhered to the general definition of the Desert Cultures, but they each possess distinctive culture traits and developmental sequences which serve to distinguish them from other regional variants.

Archaic Development in the Project Area

One of these regional variants of the Desert Culture, which includes the area of southwestern Colorado, was identified by Irwin-Williams (1967, 1968) as the "Picosa" or "Elementary Southwestern Culture." The Picosa was defined as a continuum of similar, closely related preceramic cultures existing in the Southwestern United States, going back to 3000 B.C. but resulting from a cultural synthesis of uniform developments originating as early as 8000 B.C. Irwin-Williams further posited that the Picosa substratum served as the progenitor for most of the Formative stage cultures in the Southwest. Jennings (1974:154, 1978:29) believes that the Picosa development does represent a regional variation of the overall Desert Culture (but see Martin and Plog, 1973:79-80 for an alternative point of view).

In her early definition of the Picosa, Irwin-Williams (1967) considered the development to share many elements of economy and cultural traits with contemporary cultures of the Great Basin; however, detailed traits and culture-history were seen as being sufficient to define a spatially recognizable entity for the Southwest. The Picosa was subdivided into three broad spatial dimensions: the Southern, Western, and Northern sectors. The latter sector includes southwestern Colorado as well as the rest of the Four Corners region (Fig. 30). Employing then admittedly scant data, she posited two major periods of development for the Picosa: 1) an early period from about 3000 to 1000 B.C.; 2) a late period from 1000 B.C. - A.D. 1. Aside from artifactual typology differences, an important feature which separates the

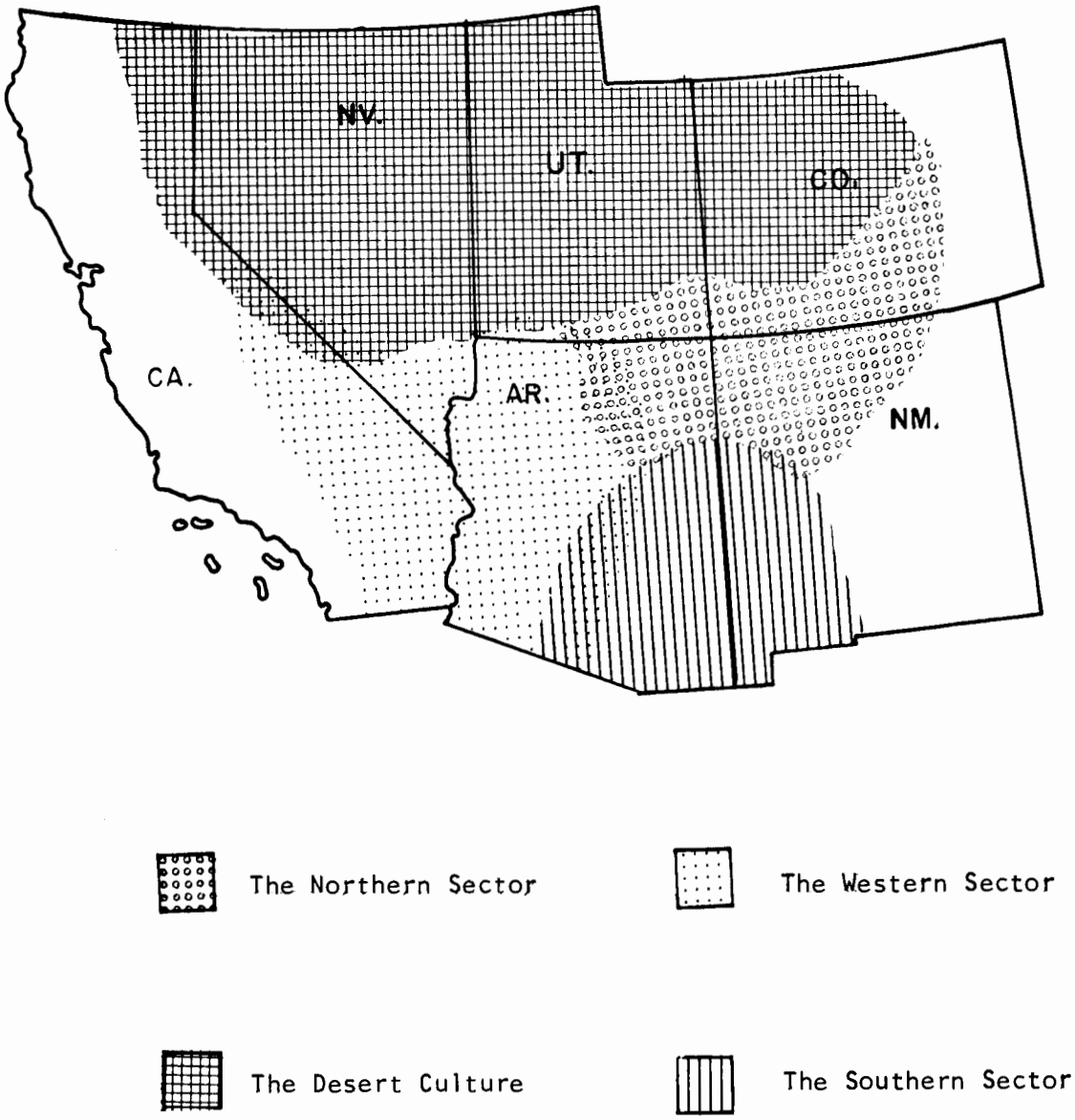


Figure 30. Distribution of Archaic cultural patterns in the Southwest and Great Basin, about 4050 B.P. (After Irwin-Williams 1967:Fig. 2).

Picosa from the Great Basin Archaic groups, is an early presence and importance of horticulture (ca. 2000 B.C.). This early presence of domesticated plants in the Archaic diet was undoubtedly limited, but its significance to the Archaic lifestyle was great in that it: 1) somewhat restricted annual movement; and 2) created the potential for further sedentism.

Several groupings of artifactual materials from the Four Corners area were believed to fit into the Northern sector of this continuum, although it must be noted that none of these data are very extensive, many consisting solely of limited surface finds. In nearby southeastern Utah, these manifestations include: 1) the Aneth complex (Mohr and Sample 1959); 2) the Montezuma Creek complex (Botelho 1955); 3) the Moab and La Sal complexes (Hunt and Tanner 1960). Additionally, a similar manifestation, the Uncompahgre complex, was defined from western Colorado (Wormington and Lister 1956). As the situation now stands, each of these "complexes" is based on scant and/or ill-defined information such that more precise data is necessary in each case before cultural affiliation(s) can be defined.

The Oshara Tradition

The Oshara Tradition represents a refinement of the Archaic/Formative continuum in the Northern sector of the Picosa Culture resulting from the more recent work of Irwin-Williams in the Arroyo Cuervo region of northwestern New Mexico (Irwin-Williams 1973). As such, it represents an important piece of work for its contributions; yet it would seem that much investigation remains to be done before the sequence is considered to be valid for the entire region in question (i.e. the northern Southwest). Nonetheless, there are several important aspects of the Oshara development which should be approached as testable hypotheses, including the delineation of a phase system (cf. Fig. 33) for the Archaic stage on the southern Colorado Plateau, and a preliminary discussion of the sequence and mechanisms related to the development of sedentary, horticultural-based aboriginal societies from an Archaic substratum.

In the Arroyo Cuervo region, the earliest inhabitants were the Paleo-Indian big game hunters, including the Llano, Folsom, and Plano complexes. Paleobotanical and geological investigations suggest a climatic change toward decreasing effective moisture, which led to the withdrawal of these groups from this area by about 5500 B.C. In the earliest Archaic phases of the Oshara tradition (Jay, 5500-4800 B.C. and Bajada, 4800-3300 B.C.), the subsistence pattern was based on extensive mixed foraging and hunting, employing a wide but not total range of locally available flora and fauna. The basic social unit was the small nomadic band, who carried out these activities in a relatively unstructured continuing seasonal movement. Importantly, the technology and tool types of the early Archaic differ greatly from the preceding Paleo-Indian stage and Irwin-Williams sees no generic connection between them. Rather, the tool assemblages of the Jay and Bajada phases appear to be related to the western-based Archaic cultures in California and western Arizona. Following the Bajada phase, a period of increased effective moisture began, accompanied by a new cultural phase, termed San Jose (3300-2000 B.C.). This phase witnessed changes in food processing and settlement patterns which permitted more intensive and efficient use of natural resources. These changes were coupled with a regional population increase, but not much alteration in the basic social or economic structure. Next, the Armijo phase (2000-800 B.C.) shows the introduction of limited maize horticulture, which made possible a small seasonal surplus and permitted a seasonal pattern of population aggregation in the fall or fall-winter to develop. This new resource initially contributed more toward increased complexity in social ceremonial interaction than to the economic pattern. In the succeeding En Medio phase (800 B.C. - A.D. 400) and final phases of the Oshara tradition (Trujillo, A.D. 400-600; Sky Village, A.D. 600-700; Loma Alta, A.D. 700-850), the full transition to sedentary, agriculturally dependent communities was initiated in northwestern New Mexico. While the earlier phases of the Oshara tradition seem to be applicable

to parts of southwestern Colorado, the last three phases are more specific to Irwin-Williams' study area, and local phases (defined below) have been recognized for our project area.

The importance of the Archaic phases of the Oshara tradition in northwestern New Mexico to the rest of the Four Corners area, however, lies in the similarities between artifact assemblages between the two areas. Irwin-Williams (1973) places the Moab complex (Hunt and Tanner 1960) into the Jay, Bajada, and San Jose phases, and the Aneth complex (Mohr and Sample 1959) with the Bajada, San Jose, and Armijo phases of the Oshara sequence. More recently, surface finds in the Hovenweep area have been related to the San Jose, Armijo, and early En Medio Archaic phases (Hicks 1975). Here, Winter and his colleagues (1975) have recorded 28 Archaic sites which cluster on ridges around canyon heads and springs where faunal and floral resources occur in greater abundance.

Presently, the Archaic occupation of southwestern Colorado is not well defined, probably an indication that Archaic groups did not use the area to a great extent since such evidence would have appeared in the results of the many surveys. Aside from the Hovenweep area, sparse surface finds of Archaic projectile points have been reported from Mesa Verde National Park (Rohn 1977:220), and the San Juan National Forest (Ward-Williams 1976; Zier 1977). It might be well, however, to treat many of these finds with suspicion until further substantiating data are available since the proclivity for Ute hunters to reuse earlier projectile points has already been noted and there is no reason to suspect that Anasazi hunters did not do the same. For example, Hayes and Lancaster (1975:185) note that Archaic points have been found on Anasazi sites.

The Formative Stage

Willey and Phillips (1958:146) provided a basic definition of the Formative stage as being based on "the presence of agriculture, or any other subsistence economy of comparable effectiveness, and by

the successful integration of such an economy into well-established sedentary village life." As it applies to the prehistoric Southwestern Culture Area, this definition specifically includes the diffusion of certain domesticated plants, the most important being maize, beans, and squash, from Mexico to an area occupied by various regional manifestations of the Archaic Desert Culture. The processes underlying the transition from hunting and collecting groups into food producing communities are not well understood and, indeed, have only begun to come to light as investigators have expanded our knowledge of late Archaic adaptations. One example of this transition is the previously discussed Oshara tradition of northwestern New Mexico.

The onset of the Formative stage cannot be viewed as a sudden occurrence in the Southwest, nor can it be considered to represent a totally new way of life. The exploitation of nondomesticated plant and animal resources continued after the widespread acceptance of horticulture, especially in areas considered marginal for horticultural products, such as the Colorado Plateau.

Before discussing the evidence for the transition from the Southwestern Archaic to the Formative lifeway, it will be beneficial to briefly review the historical development for the classification of Formative cultures as it pertains to the northern Southwest, including the San Juan Resource Area. Indeed, many of the data used to develop and refine the chronological and developmental sequences for the Colorado Plateau originated from southwestern Colorado. Once the various periods and phases are placed in historical perspective, it will then be possible to more fully delineate in the next chapter the various aspects which characterize the past lifeways of the prehistoric horticultural-based groups who once occupied the study area and contiguous areas.

Spatial and Temporal Systematics

The presence of horticulturally-based, ceramic-producing sedentary village societies in the Four Corners region of the Southwest

was recognized in the late nineteenth century. In part this recognition came from observations of ethnographic situations extant in the occupied Pueblo villages, but it largely derived from well-preserved remains in the cliff dwellings sites of southwestern Colorado and southeastern Utah. Despite this early identification of what we now designate generally as Formative groups, it was not until the second decade of the twentieth century that sufficient data were on hand to allow for definitive but tentative statements on the age, relationships, and developmental sequences in the prehistoric Four Corners area. Indeed, there is still much discussion and ongoing refinement of such topics even today as changing methodologies and theoretical orientations cause archaeologists to explore new avenues of inquiry, and sometimes reinvestigate old ones.

Spatial Considerations

The Formative stage in the vicinity of the present project area is synonymous with the development of the Anasazi, or Pueblo culture. Within the Southwestern culture area, the Anasazi occupied southeastern Utah, southwestern Colorado, and roughly the northern halves of Arizona and New Mexico. The early definition of the Anasazi was based on the late nineteenth and early twentieth century investigations of numerous archaeologists working primarily in the San Juan River drainage, or the Four Corners area. This work resulted in the famous Pecos Classification of Anasazi development in 1927 (Kidder 1927) which is discussed later. It soon became apparent that the Anasazi situation did not apply to the entire Southwest, and by 1940 two additional Southwestern Formative cultures had been recognized: the Hohokam of southern Arizona and the Mogollon of southern New Mexico and east-central Arizona. Further, another Formative tradition, the Fremont, was identified occupying nearly all of Utah north of the Colorado River.

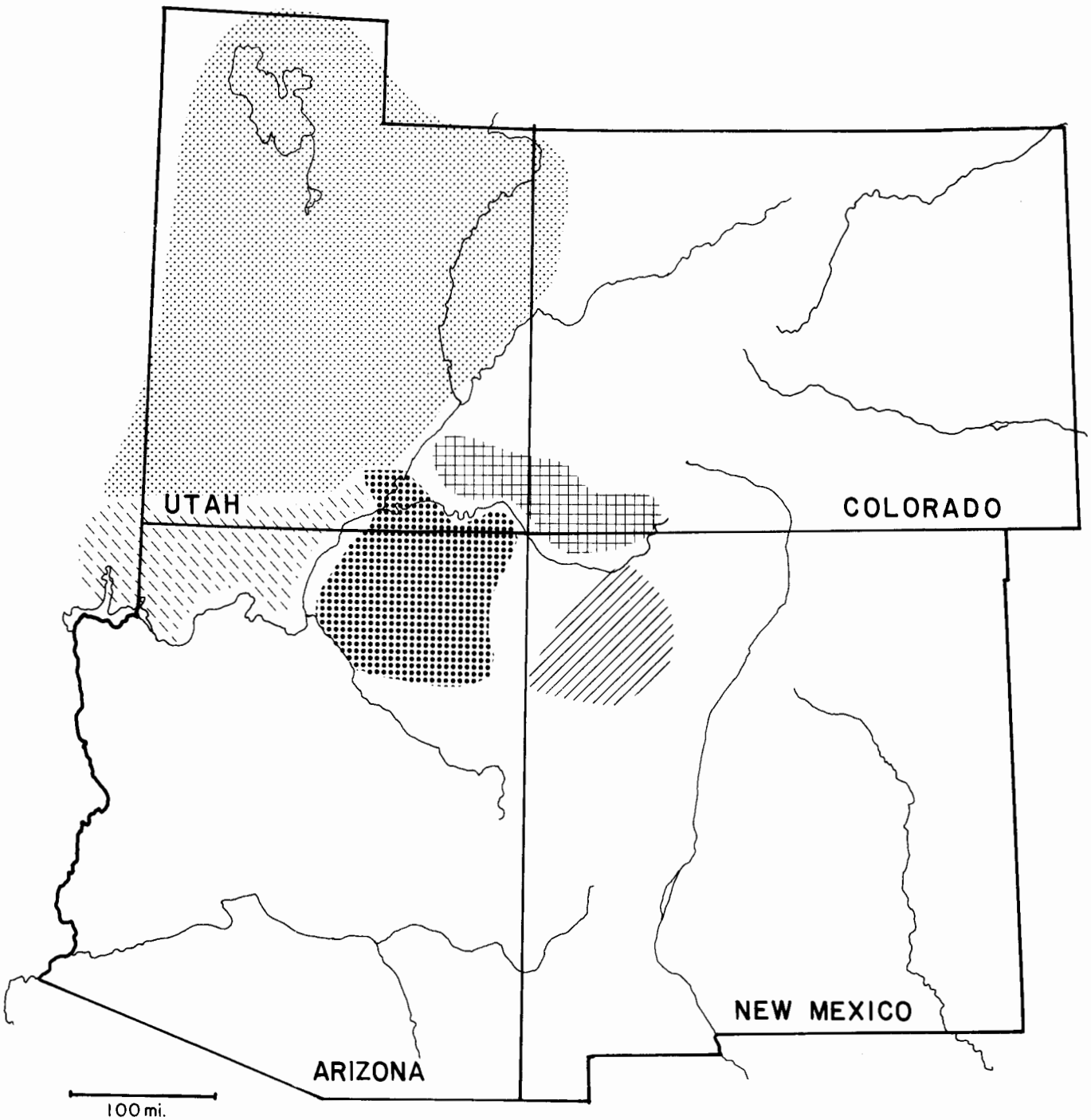
As the same time, subareas or cultural variations were soon recognized in each of these larger areas. The Anasazi area included: the Kayenta subarea of northeastern Arizona and southeastern Utah below

the San Juan River; the Chaco subarea of northwestern New Mexico; the Virgin subarea of northwestern Arizona and southwestern Utah; and the Northern San Juan, or sometimes Mesa Verde, subarea of southeastern Utah and southwestern Colorado. The general boundaries of the Anasazi and Fremont areas and subdivisions are shown in Figure 31.

The project area lies entirely within the Northern San Juan Anasazi Area, which includes the geographic area north of the San Juan River from the Colorado River on the west to the San Juan Mountains of Colorado on the east. The northern boundary is variable and awaits further delineation; however, Gillespie (1976:13) believes it approximates the limits of the San Juan drainage under elevations of ca. 9000 feet, along with a segment of the Dolores River drainage.

Based on previous investigations, it is possible to further delimit prehistoric cultural districts within the Northern San Juan Anasazi area. The boundaries of these districts are somewhat poorly known, but they do correspond with recognizable differences in cultural manifestations. From west to east, these districts include the Grand Gulch, Western, Yellow Jacket, Mesa Verde, and La Plata Districts. Farther to the east, three additional districts have been defined: the Durango, Piedra, and Navajo Reservoir Districts. The suggested boundaries of these districts are illustrated in Figure 32.

One additional cultural/geographical concept needs clarification. In the past, some writers have chosen to utilize the term "Mesa Verde Anasazi Region" as a synonym for the Northern San Juan Area. Gillespie (1976) has observed that the Mesa Verde Region properly only applies to the central portion of the Northern San Juan Area and includes the Western, Yellow Jacket, Mesa Verde and La Plata Districts. The Grand Gulch District, for example, is considered marginal to the Mesa Verde Region and, while Mesa Verde influence was at times present, apparently it received primary cultural stimuli from the Kayenta Anasazi to the south. Similarly, the easternmost districts, the Piedra and Navajo Reservoir, while also containing certain Mesa Verde traits, seem



Northern San Juan Anasazi

Fremont

Virgin Anasazi

Chaco Anasazi

Kayenta Anasazi

Figure 31. Approximate distribution of the Formative groups in the northern Southwest.

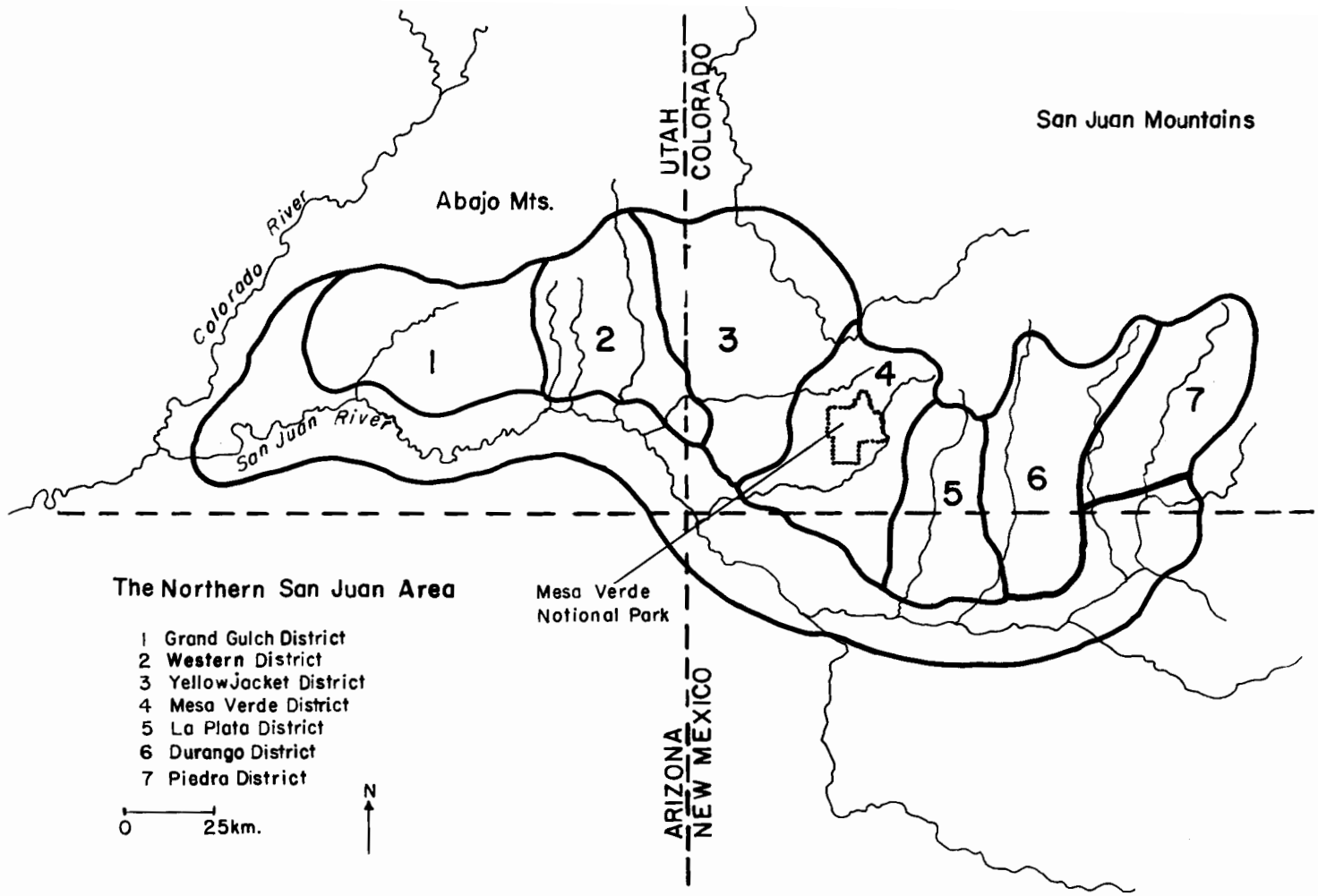


Figure 32. The Northern San Juan Area and districts (Modified from Gillespie 1976:Fig. 1).

to have received cultural stimuli (e.g. pottery types) more from the south along the San Juan River than from the west. For example, Eddy (1972) considers Mesa Verde pottery types as trade wares in the Navajo Reservoir District.

Temporal Classifications

The quest for definition of stages of cultural development in the Northern San Juan Anasazi Area was a major preoccupation for archaeologists during the first decades of this century. This concern continues today although the emphasis is more often centered on refinement of local sequences rather than stage development. Before entering discussions of these developments, it will be useful to briefly list certain definitions which will appear often throughout succeeding paragraphs. The archaeological unit definitions used herein follow those provided by Willey and Phillips (1958) and include:

> Component - A component represents a single identifiable occupation of an archaeological site. In many instances, as such, a specific site can be defined on the basis of a single instance of occupancy or it may contain successive or interrupted multiple components, each somewhat foreign to the other(s).
>
> Phase - This designation refers to "an archaeological unit possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived whether of the same or other cultures or civilizations, spatially limited to the order of magnitude of a locality or region and chronologically limited to a relatively brief interval of time" (Willey and Phillips 1958:22).
>
> Period - In the Anasazi Southwest, chronological sequences have often been defined as a series of definite cultural concepts, or periods, which emphasize a generalized cultural picture over a large geographic area. In this context, archaeological periods often delineate both cultural development and chronological situations in a region. It has been common to equate or substitute the term "stage" for period: however, in this discussion "stage" refers to the broad, generalized continent-wide cultural developments (e.g. Lithic. Archaic, and Formative stages).

As is the case with prehistoric archaeological sequences in any part of the world, the successful culmination of the slow, arduous processes of piecing together cultural developments revolves around the adequacy of extant dating techniques. In the northern Southwest, relative techniques quickly came into play as investigations sought to elucidate archaeological evidences in an anthropological perspective. Before the end of the nineteenth century, it was recognized that remains stratigraphically beneath others represented earlier cultures, although generally only differences between artifacts and other materials were noted as relationships could not be properly understood. During the first two decades of the twentieth century, great strides were made in defining stratigraphic situations, principally in the establishment of pottery sequences which could then be utilized to cross-date other sites.

The inherent problem in using stratigraphic positioning and artifact cross-correlation is that year placements are not possible. Fortunately, a chronometric technique was soon perfected for the northern Southwest to provide these data. By the late 1920s, A. E. Douglass (1929) had completed certain dendrochronological, or tree-ring, sequences for the area in which archaeological wood specimens could be analyzed and dated. Although additional chronometric techniques (e.g. radiocarbon, archaeomagnetism, thermoluminescence, and obsidian hydration) have appeared in the past 30 years, dendrochronology remains today by far the most useful dating technique in the Southwest as literally thousands of archaeological wood specimens are processed and dated annually at the Laboratory of Tree-Ring Research in Tucson, Arizona.

With the above general comments serving as a background, we can now briefly review the development of cultural and chronological sequences for the Northern San Juan Anasazi Area, and more specifically. the San Juan Resource Area. Again, much of the data on which the early sequences were based, as well as those in vogue today, were generated from the Four Corners region, including southwestern Colorado.

As early as the mid-1890s, Richard Wetherill was using data from Cottonwood Wash, Butler Wash, and Grand Gulch in southeastern Utah to argue that there was a different culture, termed the Basket Makers,

found underneath the more obvious Cliff Dweller remains (McNitt 1957). Just as important, Wetherill and others were stressing a similarity between the artifacts, architecture, and skeletal remains of the Cliff Dwellers and groups who inhabited the large open sites on mesa tops and valley floors.

Further work in the next few decades throughout the Anasazi area led to increasing agreement among archaeologists that there were in fact other manifestations besides the Basket Maker - Cliff Dweller dichotomy. By 1921, three sequences had been proposed as follows (earliest cultures at the bottom of each list):

Kidder and Guernsey (1919)
Cliff House Culture
Slab House Culture
Basket Maker Culture

Morris (1921)
Cliff House Culture
(divided into early and late black-on-white pottery periods)
Pre-Pueblo Culture
Basket Maker Culture

Guernsey and Kidder (1921)
Cliff Dweller Pueblo
Pre-Pueblo Culture
Post-Basket Maker Culture
Basket Maker Culture

The cultural and skeletal traits used to define these cultural periods are not listed here as they will become apparent in subsequent discussions; for a summary listing of the traits for each of these early classifications, the reader is referred to Brew (1946:32-34).

By 1935 two period classifications had been proposed to account for temporal and cultural development of Anasazi culture. The first of these classifications resulted from a meeting of Southwestern archaeologists at Pecos, New Mexico in 1927. This meeting, organized by A. V. Kidder, produced a series of periods accounting for the then - unknown antecedents of the Anasazi through the historic pueblos and

was based, in the main, on previous archaeological investigations in the Four Corners region, where many of the participants had worked. As summarized by Kidder (1972), the periods and their general characteristics were as follows (from earliest to most recent):

> Basket Maker I or Early Basket Maker. A postulated pre-agricultural period. (This period is today recognized as the Archaic stratum preceding the development of Formative Southwestern cultures.)
>
> Basket Maker II or Basket Maker. The first recognizable agricultural, atlatl-using, non-pottery-making stage. . .
>
> Basket Maker III or Late Basket Maker. The pit- or slab-house building, pottery-making stage.
>
> Pueblo I or Proto-Pueblo. The first stage with cranial deformation, ceramic vessel neck corrugation was introduced, and villages composed of rectangular living rooms and true masonry were developed.
>
> Pueblo II. The stage marked by widespread geographic extension of life in small villages; corrugation (of pottery), often of elaborate technique, extended over the whole surface of cooking vessels.
>
> Pueblo III, or Great Period. The stage of large communities, high development of the arts, and growth of intensive local specialization.
>
> Pueblo IV, or Proto-Historic. The stage characterized by the contraction of the area formerly occupied; by the disappearance of corrugated pottery; and, in general, by decline from the preceding cultural peak of Pueblo III.
>
> Pueblo V, or Historic Pueblo. The period from A.D. 1600 to the present.

This classificatory scheme, commonly referred to as the "Pecos Classification," remains in general usage today although often with modifications, particularly in response to local situations. Though written several years ago, Earl Morris' (1939:8-46) extended descriptions of the Pecos periods in the La Plata area contain a good discussion of the cultural patterns evident in each period.

A contemporary of Kidder's, F.H.H. Roberts, Jr., later suggested slight revisions to the Pecos Classification resulting from his extensive fieldwork in the Anasazi area. Since his classification has been employed by many Southwestern archaeologists, it deserves brief mention. For purposes of our later discussions, however, the Pecos terminology will be utilized. According to Roberts (1935), the following changes in terminology should be made:

Basket Maker. To designate the period formerly known as Basket Maker II.

Modified Basket Maker. To replace Basket Maker III, Late Basket Maker, or Post-Basket Maker.

Developmental Pueblo. This term would supplant Pueblo I and Pueblo II, incorporating them under one heading.

Great Pueblo. An alternate title for Pueblo III.

Regressive Pueblo. To replace Pueblo IV.

Historic Pueblo. Proposed as being preferable to Pueblo V.

Thus, the basic modifications proposed by Roberts to the Pecos Classification were to drop the numerals and to combine the Pueblo I and Pueblo II periods. The latter change resulted from Roberts' perception that one or the other of these developments was absent in some areas.

Once dendrochronology had come of age, it was possible, using timbers and wood specimens from archaeological sites, to provide dates for the various periods of whichever sequence was used. In terms of the Pecos Classification, the following dates are commonly used today for the various periods:

Basketmaker I	- pre-A.D. 1
Basketmaker II	- A.D. 1-500
Basketmaker III	- A.D 500-750
Pueblo I	- A.D. 750-900
Pueblo II	- A.D. 900-1100
Pueblo III	- A.D. 1100-1300
Pueblo IV	- A.D. 1300-1600
Pueblo V	- A.D. 1600 - present

A correlation of the Pecos and Roberts' Classifications, along with suggested dates, is presented in the first two columns of Figure 33.

Phase Sequences

The development of local and/or regional cultural sequences must often be defined in more precise terms since the period categories discussed above generally provide pigeonholes which are too broad for effective integration of archaeological data from any one cultural subarea or district. In response to this situation, Southwestern archaeologists, while recognizing the general utility of schemes such as the Pecos or Roberts' Classifications, have often devised more discreet categories for use in defining chronological and cultural development in any given area. The term most frequently applied to these designations is the "phase," which has been previously defined. The development of phase sequences in the northern Southwest usually requires intensive and regional examination of the relevant data. Due to the requirements for a body of substantial cultural data for a workable phase system, sequent phase categories have tended to result from rather large-scale and intensive investigation programs. It is important to recognize that any phase system so offered may be, and usually is, somewhat restricted in geographical applicability, being defined in accordance with a set of local cultural criteria and chronological data. In this context, phase systems with relevance to the San Juan Resource Area are briefly reviewed in the following paragraphs. In many cases, distinctive traits defining the phases are listed (e.g. ceramic types, architectural styles, etc.), each of which will be discussed in more detail in subsequent discussion on the lifeways of the Formative groups in the Four Corners region.

There are several extant phase sequences in effect for southwestern Colorado, including at least one which is still being defined and others which have been superseded by later work. All of these systems are shown in Figure 33 along with the more general Anasazi periods,

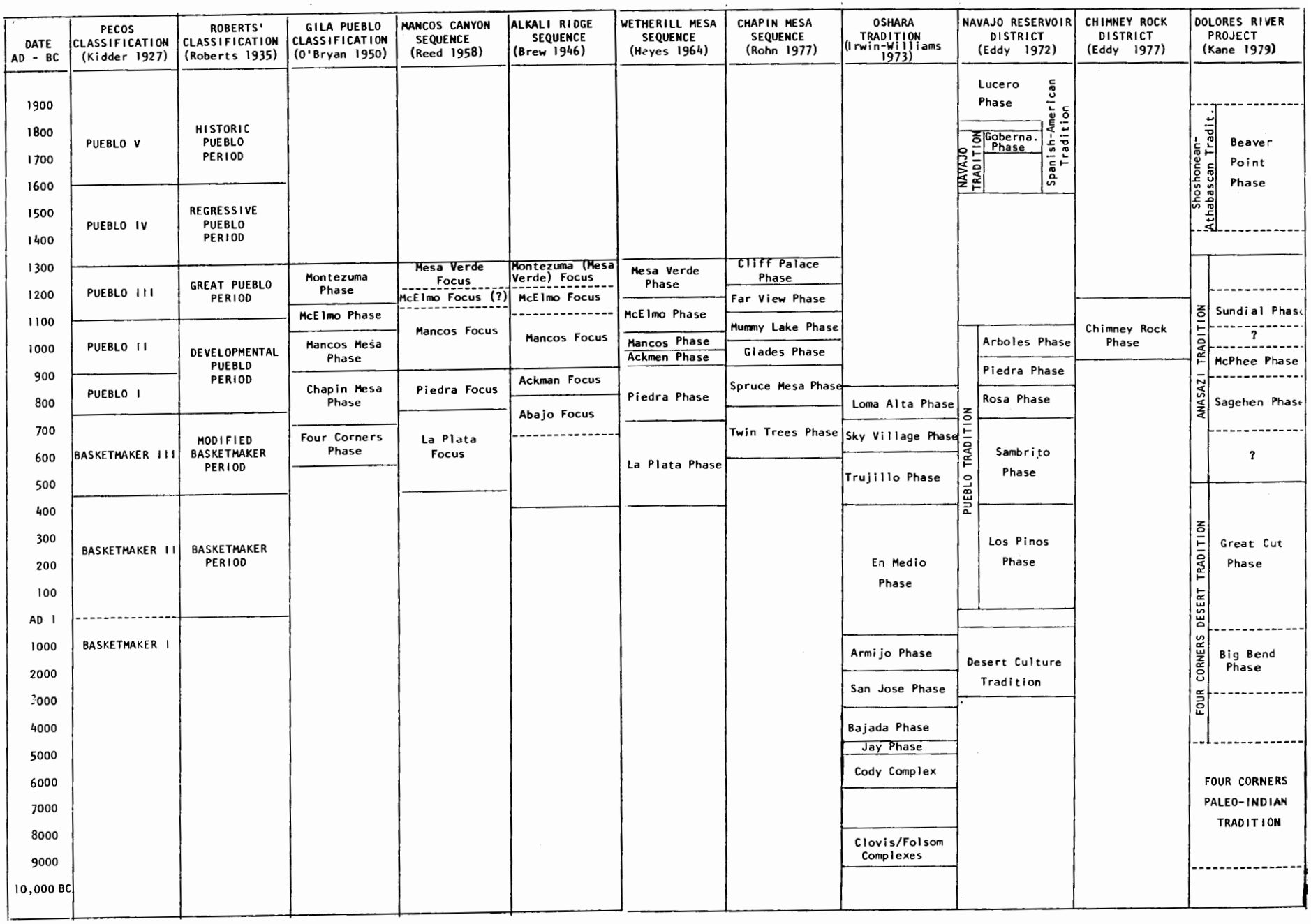


Figure 33. Cultural classifications for southwestern Colorado.

and those currently in use are briefly defined in the following paragraphs. It will be observed that phase sequences in some areas, the Mesa Verde and Navajo Reservoir Districts for example, are fairly well known, while similar sequences in other districts await further delineation.

The first attempt at establishing a system of phases descriptive of the Mesa Verde Region, or more properly the Northern San Juan Anasazi Area, was made by the Gladwins (1934), who proposed a La Plata Phase for Basketmaker III and Pueblo I, a Mancos Mesa Phase equivalent to Pueblo II, and McElmo and Montezuma Phases for early and late Pueblo III. Based on his work on Alkali Ridge, southeastern Utah, Dr. Brew (1946) modified this sequence to include an Abajo Focus to refer to the Basketmaker III - Pueblo I situation, and continued the usage of the Mancos Focus (Pueblo II) and the McElmo and Montezuma Foci (Pueblo III). In the Mancos Canyon of southwestern Colorado, Reed (1958) found the Gladwins' original phase system to be usable, but he added the Piedra Phase to account for the Pueblo I period in the Mesa Verde area. O'Bryan (1950), working with data from Mesa Verde National Park, also employed the Gladwins' phase system in retaining the latest three phases but replacing the La Plata Phase with the Four Corners and Chapin Mesa Phases for the Basketmaker III and Pueblo I periods. In current terminology the Gladwin, Brew, Reed, and O'Bryan systems have been replaced although many of the elements of each have been incorporated in those systems presently in use.

Based on the earlier work and the Wetherill Mesa survey, Alden Hayes (1964) developed a phase sequence for the western portion of Mesa Verde National Park. This system continues to be used for a large portion of the Mesa Verde Region, but, as with any localized phase sequence, slight temporal and cultural variations may be expected away from the locale where the sequence was defined. Each of Hayes' phases is briefly listed and discussed below. It will be noted that a phase designation is not available for the Basketmaker II period, a reflection of the lack of early Basketmaker remains in Mesa Verde National Park.

La Plata Phase (A.D. 450-700). The trait list for this phase includes turkey domestication, cultivation of corn, beans and squash, troughed metates, basally notched projectile points, undeformed skulls, and pottery of Chapin Gray and Chapin or La Plata Black-on-white. The dwellings were shallow pithouses, circular to roughly rectangular, with four roof-support posts, a bench support for sloping wall poles, a fire hearth often intersected by a low partition wall, and a ventilator that is sometimes narrow but more often widened to form an antechamber. Houses are oriented with the ventilator/entrance to the south or southeast, and above ground storage structures may be associated.

Piedra Phase (A.D. 700-900). The Piedra Phase is considered to represent the transition from the year-round residence in the pithouses to habitation of surface rooms. Pithouses continue to be used, however, in association with surface rooms and are sub-rectangular in shape with narrow or true ventilator shafts. These surface structures are commonly crescentic rows of contiguous rooms of jacal and adobe, often slab-based, from one to three rows deep. Ceramics associated with this phase include Piedra Black-on-white, Chapin Gray, Moccasin Gray, and Abajo Red-on-orange.

Ackmen Phase (A.D. 900-975). This phase was characterized by the appearance of the first true kivas, a development from the earlier pithouses, first true masonry, and the introduction of corrugated culinary pottery. The kivas usually lacked the southern recess, a characteristic of later structures. Masonry characteristics included poorly developed coursing of sandstone blocks, infrequent chinking, and frequent use of adobe. Surface habitations typically consisted of a few contiguous rooms in a straight line located north of the kiva and well-defined trash area. Utility pottery types included Mancos Gray and Mancos Corrugated and the decorated white wares were predominantly Cortez Black-on-white while the introduction of Mancos Black-on-white occurred.

Mancos Phase (A.D. 975-1050). Surface structures of this phase were still one-story and usually were a single or double row of up to 12 rooms laid in a straight line. Sometimes a perpendicular wing of

rooms was added to one end of the linear roomblock to form an "L"-shaped configuration. Masonry techniques improved with uniformly selected building blocks which were sometimes given a rough shaping with a hammerstone used to spall back the edges of the block. Kivas were still located south of the houses, but were drawn closer to the surface rooms, often immediately adjacent. The kiva structures were constructed with masonry pilasters to support the superstructure and were usually lined with masonry from floor to bench level and often all the way to the roof. Another architectural innovation of this period was the introduction of circular, surface structures commonly called towers. The precise function of these features remains unknown.

Mancos Corrugated is the culinary ware during this phase and Mancos Black-on-white continued as the dominant decorated pottery type. Deadman's Black-on-red was important in some areas of the Mesa Verde region. Slab metates replaced the earlier troughed variety and side-notched projectile points appeared for the first time.

McElmo Phase (A.D. 1050-1150). During this phase the Pueblo III or so-called "Classic" Pueblo period was initiated in the Mesa Verde region. Towers were occasionally two-story structures and some multi-story dwelling units were built. Masonry itself became more highly developed with well-finished building blocks and compound walls more common. Communities of 30 or more rooms were constructed, though pueblos of 10 to 15 rooms were more common. Kivas during this period were fully lined with masonry and occasionally incorporated within the roomblocks. In some parts of the Mesa Verde region, construction of sizeable cliff dwelling units was initiated toward the end of this phase.

Ceramics during this time included Mancos Black-on-white, McElmo Black-on-white, and Mancos Corrugated. While Mancos Black-on-white continued as the dominant decorated ware, the introduction of McElmo Black-on-white marked the beginning of the utilization of carbon-painted pottery which became dominant during the next phase.

Mesa Verde Phase (A.D. 1150-1300). This time period marked the termination of the Anasazi occupation of the Mesa Verde region including the project area. Little in the way of architectural innovation took place during this phase. The chief difference in dwellings was that the majority of the sites were in alcoves where limitations imposed by the configuration of the cave wall were frequently more important to village layout than were the inherited notions of the builders. Examples of the result of this space constraint included other than circular-shaped kivas and more frequent multi-story rooms. Ceramics from this phase include McElmo Black-on-white, Mesa Verde Black-on-white, and Mesa Verde Corrugated as a replacement of the earlier Mancos type.

Causal factors leading to the abandonment of the Mesa Verde region by the Anasazi groups are not fully understood, but probably include a combination of reasons. Possible causes include climatic deterioration in the form of extended and recurring droughts, erosion of agricultural lands, increased disease levels, and the arrival of Athabaskan or Shoshonean groups.

Another phase sequence has been delineated for Chapin Mesa, also in Mesa Verde National Park, by Arthur Rohn (1977). Like the Wetherill Mesa sequence, the Chapin Mesa one is largely based on survey data and extends from the Basketmaker III period to the Pueblo III era. Rohn does observe that Chapin Mesa may have had some limited Archaic and Basketmaker II occupation, but the evidence is too scanty to postulate characteristics for those manifestations. Also noted in this sequence is the presence of the twentieth century Navajo sites. Generally speaking, the Chapin Mesa situation seems to mirror the Hayes breakdown with slight variations in relationships. Consequently, extended definitions of each phase are not included herein; interested readers should consult Rohn's definitive statements (1977:231-246). The phase names, suggested dates, and Pecos period equivalents are listed as follows:

Chapin Mesa Phase	Dates	Pecos Classification
Twin Trees	A.D. 590-750	Basketmaker III
Spruce Mesa	A.D. 750-900	Pueblo I
Glades	A.D. 900-1000?	Early Pueblo II
Mummy Lake	A.D.1000?-1100	Late Pueblo II
Far View	A.D. 1100-1200	Early Pueblo III
Cliff Palace	A.D. 1200-1300	Late Pueblo III

To the northwest of Mesa Verde National Park, a cultural sequence is currently being developed by members of the Dolores Project for the northeastern sector of the Yellow Jacket District (Kane 1979). Initial results from the first of several projected field seasons have allowed definition of four traditions: Four Corners Paleo-Indian (9000 B.C.? - 5000 B.C.?); Four Corners Desert (5000 B.C.? - A.D. 500?); Anasazi (A.D. 450-1300; and Shoshonean-Athabaskan (A.D. 1400-1880). At the present no manifestations of the earliest and latest traditions have been recovered from the project area. Two tentative phases (the Big Bend Phase, 3000-1000 B.C., and the Great Cut Phase, 1000 B.C.-A.D. 500) have been delineated for the Archaic Four Corners Desert Tradition. No indications of the first phase are known, but a few sites have been identified and placed, based on surface evidence, in the Great Cut Phase.

As expected, the Anasazi Tradition is well represented in the Dolores Project area and three phases have been outlined: Sagehen Phase (A.D. 650-850); McPhee Phase (A.D. 850-975); and Sundial Phase (A.D. 1050-1150). The Anasazi phases have been defined largely on settlement patterns which are summarized in the following manner:

> Sagehen Phase: During this phase the population was distributed in small hamlets, consisting of pithouse structures, located in favorable farming areas. Limited activity sites and seasonal loci associated with hunting and gathering subsistence activities are found. Specialized farming sites are lacking indicative of simple horticultural practices. No evidence of nucleated settlements is present with dispersed local communities being the rule.

McPhee Phase: This phase, lasting only about 125 years, represents a cultural and population climax in the Dolores Project area. The Anasazi population was distributed in nucleated villages or large hamlets rather than dispersed settlements characterizing the preceding phase. Habitation units in these villages were in the form of surface roomblocks of domiciliary and storage rooms associated with a circular subterranean ceremonial kiva. Also, a wider range of sites was present being associated with hunting and gathering activities and specialized farming sites such as field houses and perhaps check dams and terraces.

Sundial Phase: During the last part of the McPhee Phase there was a rapid population withdrawal from the area under study by the Dolores Project. The succeeding phase, the Sundial, witnessed lower population levels and a return to a simple, dispersed settlement pattern. Certain large ruins of this phase, Escalante and Sun Dial Ruins for example, appear to represent anomalous habitation situations, the function of which is not fully understood. The pattern of the Sundial settlements has been termed a "frontier," presumably to the Chacoan Anasazi area of northwestern New Mexico whose influence is seen at several of the larger ruins ca. A.D. 1100 in the Yellow Jacket District.

No phase systems currently exist for the La Plata and Durango Districts lying to the east of the Mesa Verde District. In the absence of data to the contrary, the Hayes' classification is probably applicable in this general area with one important exception--the well-documented Basketmaker II manifestation which is not present on the Mesa Verde. In fact, nearly all of our knowledge regarding Basketmaker II adaptations in southwestern Colorado is from the northern portion of the Durango District where two excavated sites, Talus Village (Morris and Burgh 1944) and the Tamarron Site (Reed and Kainer 1978), are located.

Although additional work is needed for parts of the Piedra District, the easternmost of the Northern San Juan Anasazi Area, the well-defined phase development for the Navajo Reservoir District seems generally applicable along the drainage system of the Piedra River. One exception is a single phase and district designation for a small part of the Piedra District found in the vicinity of Chimney Rock. The Navajo Reservoir phase sequence (Eddy 1966) extends from the Archaic Desert Culture Tradition (3000-500 B.C.), through the Pueblo Tradition (A.D. 1-1050), followed

by the Navajo Tradition (A.D. 1550-1775), and culminates with the historic Spanish-American development (A.D. 1600-present). In addition to the Chimney Rock Phase (Eddy 1977), three phases of the Pueblo Tradition (Rosa, Piedra, and Arboles) and the Navajo and Spanish-American Traditions have also been documented for the Piedra District.

The earliest two phases of the Navajo Reservoir District, the Los Pinos (or Basketmaker II, A.D. 1-400) and Sambrito (or Basketmaker III, A.D. 400-700) Phases, have not been identified by several inventories on Southern Ute lands in Colorado. As Adams (1975:25) observes, however, sites dating to these early phases are difficult to identify from surface evidence because of the age and nature of the architectural features and artifacts. Future excavation may reveal components of these phases. On the other hand, the remainder of the Pueblo Tradition as outlined for the Navajo Reservoir District is fairly well represented in the Piedra District; thus, brief definitions of these phases are necessary.

Rosa Phase (A.D. 700-850): This phase correlates with the early Pueblo I period of the Pecos Classification. This period saw a population build-up over the two earlier phases, so extensive that immigration to the district is thought to have occurred. Habitation sites were comprised of pithouses, from a single unit to villages of six or more, and associated surface structures (fire hearths, storage pits, and cooking ovens). Locally-produced pottery of this phase includes Rosa Gray, Rosa Neckbanded, Rosa Black-on-white, and Rosa Brown as the dominant types with some persistence of Sambrito Brown from the preceding phase. By A.D. 750, San Juan Red Ware types were first introduced to the district providing a horizon marker for the late Rosa Phase. Other artifacts include side-notch, expanding stem and triangular projectile points, side-notch axes (first appearance), one-end closed trough metate, and marine shell artifacts as trade items.

Piedra Phase (A.D. 850-950): The Piedra Phase, or late Pueblo I period, was the first identified north of the Navajo Reservoir area on Stollsteimer Mesa, near Chimney Rock by Roberts (1930). In the Navajo Reservoir District, the large population evident in the Rosa Phase continued; however, there was a noticeable demographic shift occurring upstream (of the San Juan). Significant cultural changes observed in this phase include stockades at some sites, large intercommunity kivas at villages, ceramic innovations, introduction of some religious cult paraphernalia, and refinements in utilitarian tools. Decorated ceramics of the Piedra Phase included Mancos Black-on-white and Piedra Black-on-white as the dominant local types with Piedra Gray and Piedra Neckbanded as the primary utilitarian vessels. The phase saw a reduction in the emphasis on hunting, and a concomitant increase in agriculturally-related tools (e.g. hoes and metates).

Arboles Phase (A.D. 950-1050): Early Pueblo II time in the Navajo Reservoir District was characterized by the Arboles Phase which marks the culmination of the Pueblo Tradition in the district, and in most of the Piedra District as well. Populations, which had reached a peak during the late Rosa and Piedra Phases, decreased as the upstream migration continued. Environmental analyses indicate increasing dessication of the lowlands and headward channel cutting as the cause behind this demographic movement. By A.D. 1050 all the Puebloans had left the Navajo Reservoir District. Settlements were similar to those of the preceding phases with one or two pithouses and associated surface features common. Slipped pottery (Arboles Black-on-white) and corrugated pottery (Mancos Corrugated and Payan Corrugated) were the dominant types, along with Arboles Gray and Arboles Neckbanded Gray wares. Mica and turquoise were first noted in the archaeological record, but marine shell ornaments declined in number from the earlier phases.

The Navajo Tradition (A.D. 1550-1775) was fairly well represented in the Navajo Reservoir District with two phases defined from survey and excavation data: the Dinetah Phase (A.D. 1550-1700) and the Gobernador

Phase (A.D. 1700-1775). Navajo remains in the lower Piedra District are not as abundant, however, and seem to date only to the Gobernador Phase. Adams (1976) has documented the occurrence of seven such sites, all apparently campsites without permanent features and light scatters of Gobernador age ceramic sherds. Schaafsma (1963:51) also reports a Navajo petroglyph site (LA 4413) along the Piedra River which has depictions of yei figures and a horseback rider along with other figures.

The final tradition of the Navajo Reservoir sequence is the Spanish-American (A.D. 1600-present), in which one phase has been delineated. The Lucero Phase (A.D. 1870-present) covers the homesteading of the canyon bottom lands. Common site types include sheep camps, farms and towns, many of which are covered by the Navajo Reservoir today. Eddy (1972:50-55) gives a brief discussion of this tradition.

A single cultural phase has been defined for a portion of the Piedra District, termed the Chimney Rock District by Eddy (1977). Apparently, this unit is a "research district" with arbitrarily defined boundaries which comprises a Forest Service archaeological preserve (Eddy 1977:1). Within this area of some 6.12 square miles, the prehistoric archaeological resources exhibited distinctive cultural traits sufficient to define a new cultural pattern, the Chimney Rock Phase.

This phase, dated between A.D. 925 and 1125, represents a Pueblo II occupation of this area which persisted after abandonment of the Lower Piedra and Navajo Reservoir Districts. Indigenous pottery types of the Chimney Rock Phase trend more toward the Mesa Verde region with Mesa Verde white wares (especially Mancos Black-on-white) and Mancos Corrugated the predominant types. Sites in the district were placed in a series of clusters which are thought to represent a community level of social integration. Ecologically, the manifestation is seen as an upland occupation in which more favorable agricultural conditions drew the Anasazi farmers to the Chimney Rock locale.

Summary

By way of conclusion, it is evident that the San Juan Resource Area and surrounding areas have seen a varied and lengthy past as far as cultural occupations. If we combine the historic aboriginal and Euro-American situations described in Chapter IV with the prehistoric data just discussed, it is possible to posit a sequential set of cultural traditions for southwestern Colorado. At this time, the earliest documented presence of humans in the area seems to have occurred between ca. 8000 to 6000 B.C. in the Hovenweep vicinity. As expected, the Paleo-Indian tradition, lasting to perhaps 5500 B.C., is the least known cultural tradition. Due to the tremendous amount of archaeological work which has taken place in southwestern Colorado, it seems unlikely that substantive data will ever appear for this period because of sporadic use of the area by big game hunters. Based on current indications, this occupation is restricted to the west portion of the Yellow Jacket District and the Western District of the Northern San Juan Anasazi Area.

Not much more is known about the Archaic Tradition which followed the Paleo-Indians in the Four Corners region. The Archaic era could have begun by 5000 B.C., but a starting date of 3000 B.C. seems more likely based on projectile points from the Hovenweep area. Additional localities have yielded surface finds of Archaic point styles; however, to date no Archaic sites have been investigated beyond surface recording. At the southeastern edge of the present study area, just south of the Colorado-New Mexico stateline along the San Juan River, a few preceramic campsites have been recorded which, based on comparison of diagnostic artifacts with other areas, date between 3000 and 500 B.C. It seems probable, due to the limited but widespread evidence, that at some point in the future we may know much more about the Archaic Tradition in southwestern Colorado.

By the last few centuries B.C., the transition to the Anasazi Basketmaker way of life had occurred in some parts of southwestern Colorado, notably in the vicinity of the town of Durango where tree-ring dates from the B.C./A.D. time division have been reported (Dean 1975). The early Basketmaker II groups were somewhat localized in a few select

locales throughout the Four Corners Region, and the area around Durango was one of these spots. We will have more to say about the growth and decline of Anasazi culture in the project area in the next chapter, but for now it can be noted that the succession of cultural periods and phases listed in the preceding pages took place primarily between A.D. 450 and 1300. During this span the various attributes of Anasazi culture were indelibly imprinted on the landscape of southwestern Colorado in the ruins of thousands of villages and other special use sites. Following the Anasazi departure from southwestern Colorado by A.D. 1300, the next occupants were probably the Shoshonean Utes. The archaeological record has not yet given us evidence of the Ute appearance. One linguist (Goss 1965) believed the language evidence revealed that the Utes followed the Anasazi by 400 years, or A.D. 1700. We have already noted, however, that the first historic reference to Utes in the area was in A.D. 1626 (Schroeder 1965:24), indicating a somewhat earlier date. Madsen (1975) has shown that the Shoshoni began expanding from a homeland in southern Nevada about A.D. 1000, reaching northern Utah by A.D. 1200-1300. No documented co-existence between Pueblo III Anasazi and the Utes has come to light. It would seem, then, that the evidence for the Ute appearance, probably sometime between A.D. 1300 and 1600, awaits discovery in the project area. Whatever the initial date of entry for the Utes into southwest Colorado, they have been continuous occupants ever since.

The period known as the Pueblo V or Historic Pueblo (A.D. 1600 to the present) is only evident in small traces, some of which are of questionable origin. Briefly, Roberts (1930) notes the possible presence of Puebloans from the Jemez, New Mexico area in the Piedra drainage and O'Bryan (1950) mentions the presence of one historic Zuni camping area recorded during his 1935 survey of the La Plata Valley. Given the more recent information for Navajo refugee sites in both drainages, the Jemez and Zuni sites may actually be Navajo. A Hopi sherd was recorded at 5MT2710, a petroglyph site west of Cortez (Kane 1975a). Past presence of Hopi parties in the project area would not be unreasonable since evidence of similar visits by small Hopi groups to southeastern Utah

has also been archaeologically documented. Lipe (1967:321) feels these trips to areas north of the San Juan River may have been hunting forays, visitation of shrines, or trading ventures with Utes or Paiutes.

Aside from the Utes, the other historical aboriginal occupants of southwestern Colorado were the Navajos. Following the brief refugee situation in the late 1600s, Navajos are not documented in the area until the early twentieth century albeit there are a few earlier references to Navajos employed as sheepherders by Utes and of Navajos trading with Utes. During the third decade of this century, Navajos were employed as construction and archaeological laborers at Mesa Verde National Park, a situation which has continued on and off to recent years. During the 1940s and 1950s, Navajos were employed at the mines in Rico.

The Euro-American exploration and settlement of the project area progressed through several phases. Spanish explorers in the mid-1700s provided the first detailed accounts of their visits, and were followed a century later by United States government expeditions. Seekers of gold and silver provided the initial impetus for settlement of the area and by the 1880s, homesteaders and ranchers were in evidence.

VI.

PREHISTORIC LIFEWAYS OF THE SAN JUAN RESOURCE AREA

In this chapter we undertake brief examination of the various cultural patterns which characterized the prehistoric occupation of southwestern Colorado. For purposes of our discussion, the prehistoric lifeway is subdivided into the following categories: (1) architecture and settlement patterns; (2) material culture and technology; (3) subsistence strategies; (4) social and religious systems; and (5) physical anthropology and health problems. In many instances archaeological data bearing on the aspects of these lifeways are voluminous and consequently are only outlined herein. Readers are referred to the many archaeological papers and reports listed in the bibliography for additional information and details.

While the topics listed above provide distinct discussion items, it should be remembered that each category forms an integrated component of what was an interwoven whole, the cultural system. Nor should we forget that the cultural system, with its various interacting components, interfaced and adapted to another dynamic system, the natural environment comprised of abiotic and biotic constituents. In reality we cannot properly or completely understand past cultural systems in the study area without reference to the environment since these cultures were small group communities which existed in close relationships to the external environmental variables and had to react to fluctuations in the natural surroundings. It would, however, be overly deterministic to view past cultures as mere pawns of the environment since, as will become apparent, cultural adaptations were altered in response to changing stimuli from the natural world, especially climatic inconsistencies such as multiyear drought periods. Similarly, influences and contacts with other cultural systems must be considered as well. Thus, while the following discussion seeks to segregate and define the earlier cul-

tural patterns solely in southwestern Colorado, the reader is asked to bear in mind that cultural growth and change reflected in the archaeological record were not isolated situations.

Site Type Definitions

Before initiating description of the various aspects of the prehistoric lifeways, it will be useful to provide short descriptions of the types of cultural resource sites which have been recorded in the study area. The definitions in the following list are somewhat generalized and without doubt other investigators might prefer slightly different terminology or definitions. Nonetheless, we believe the site types given below to be generally acceptable to all and reflective of the range of prehistoric sites which might be encountered in the San Juan Resource Area.

Some caveats are in order for those looking for precise site type information in the archaeological record. Site type, which is often correlated with supposed function, is in some cases difficult to ascertain from survey data alone; the case at a particular locale may change radically once testing or excavation of the site has occurred. The designation of site types by previous investigators has at times been characterized by a high degree of variability. Some researchers, for example, will define a site type based on a single attribute while others require a combination of definitive variables to be present before designation as one kind of site or another. Unfortunately, all too often the basis for designating site types is not described in archaeological reports. Finally, the definitions given here are not mutually exclusive since some types, such as rock art or towers, may occur alone or in association with other site configurations.

1. Habitation sites in this report refer to those open sites, usually found on mesa tops or valley floors, at which sustained year-around occupation took place. Commonly one or more of the following habitation-related features are seen at these locations: pithouses, masonry roomblocks, kivas, trash scatters.

2. Cliff dwellings are masonry-walled buildings situated in the many scattered, shallow rock shelters of the vertical sandstone cliffs which characterize the canyon walls of the area. These sites are also indicative of sustained occupation and usually date to the later periods of the Anasazi sequence.

3. Rock shelters are sandstone overhangs or alcoves showing signs of former human occupation but lacking visible architecture. Some of these indications are ceilings blackened by smoke, ceramic and/or lithic trash, and rock art.

4. Granaries are small masonry rooms and walled off areas which usually occur in rock overhangs and crevices. It is generally thought that crops and other items were cached there, though some may have been used for shelter.

5. Towers are circular, masonry-walled structures found in isolated situations or associated with habitation sites. The precise function of these features is often enigmatic with possibilities including use for shelter, as lookouts, ceremonial purposes, or for making astronomical observations. A combination of one or more of these hypothesized functions would seem to be a good possibility.

6. Ceramic/lithic scatters; sherd scatters; lithic scatters are defined by the presence of one or both of these artifactual materials. Usually structural or other cultural features are lacking. In many cases, it has been shown through excavation that surface indications of these types indicate the presence of buried habitation structures. In other instances such evidence might reflect pre-ceramic Archaic or early Basketmaker age sites, or they may simply be traces of temporary encampments.

7. Campsites are sites where ceramics and/or lithic artifacts occur, often in association with hearths or storage cists, but where the absence of more permanent structures indicates limited, short-term use. These sites were probably associated with hunting and plant-gathering activities, and may have been satellite locations for the more permanent habitation sites.

8. Field houses are distinguished by their small size, generally one to three rooms, and by a lack of evidence for kivas or large amounts of occupational trash. Often an association with evidences of aboriginal farming, such as field locations or agricultural features, may be discerned.

9. Agricultural or water control sites are found in a variety of forms, the most common being check dams, terraces, reservoirs, and ditches. Often a system of such features is observable.

10. Rock art sites apply to naturalistic or geometric figures inscribed on rock surfaces by painting, pecking, or incising techniques. Rock art figures are commonly found directly associated with cliff dwellings or rock shelters, where they have the distinct advantage of being dated, or in complete isolation from other cultural manifestations. A particular type of rock art which should not be disregarded is historic signatures, especially those that relate to the late nineteenth century exploration activities in southwestern Colorado.

11. Axe-sharpening grooves are another form of evidence of human activity, usually found on bedrock or alcove rock fall, which often is associated with cliff dwellings but may be encountered in isolated circumstances.

12. Hearths may be found in isolated situations without associated artifactual materials.

13. Quarries are primary source areas for lithic materials. They are represented by large cores and flakes in association with veins and outcrops of the same material.

14. Human burials are sometimes recorded away from habitation or cliff dwelling sites, often in the process of being exposed by erosion.

15. Storage cists are occasionally encountered in open, relatively isolated circumstances. Usually these structures are roughly circular, semi-subterranean features constructed of upright sandstone slabs.

16. Stone alignment may be used to refer to such features which are of unknown function, but obviously result from human activity.

17. Trails and/or pecked stone steps are passageways, often routes leading in and out of canyons.

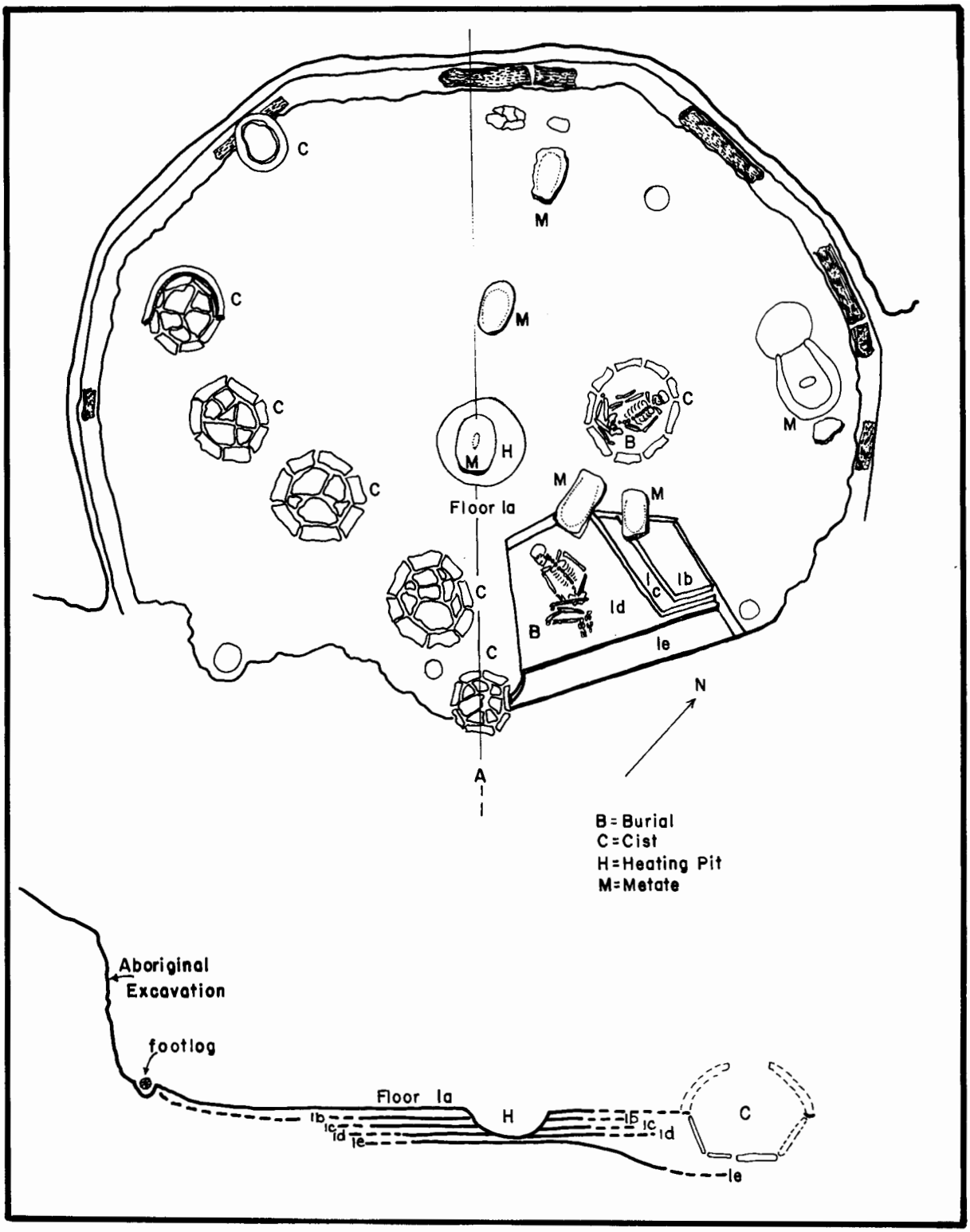
Architecture and Settlement Pattern

Each of the first two stages, the Paleo-Indian and Archaic, lack architectural features and, as might be expected, little information is available in the project area concerning settlement patterns of these stages. This situation can be attributed to both a lack of data and to the absence of long-term or permanent encampments, a reflection of the general way of life during those times. Another reason apparent in the literature is that it seems unlikely that southwestern Colorado ever witnessed large numbers of Paleo-Indian big game hunting groups or Archaic hunter-collectors. In the extreme western portion of the area, on Cajon Mesa in the vicinity of Hovenweep National Monument, Winter (1975:282) has observed that Paleo-Indian projectile points, usually found in association with extensive scatters of lithic debris, tend to occur on ridges above springs and canyon mesa edges. Such locations may have been hunting camps overlooking favorable hunting zones. Given the mode of economic pursuit of the groups, sites providing overlooks would seem to have been preferred as campsites. Similar patterns were noted in the Rio Grande Valley of New Mexico where Judge (1973) has provided the most complete analysis of Paleo-Indian settlement patterns yet undertaken in the Southwest. We can further hypothesize that these camps were temporary in nature, but we have no further evidence for the remainder of the annual movement which characterized these small groups.

During the lengthy Archaic stage, small foraging groups in the Hovenweep vicinity once again favored ridges for camping locations, especially around canyonheads where seeps and springs are found. Winter and his associates found through studies of the modern fauna that these zones are among the most productive on Cajon Mesa (Winter 1975:283). Sites of Archaic age in this area are more numerous than those of the preceding stage, and it seems that relatively permanent groups of seasonal wanderers may have repeatedly used certain locations.

Evidence is also available that Archaic hunters and collectors were also exploiting resources in the higher elevations, probably in the summer months, in the surrounding region. This upland utilization has been documented from the San Juan National Forest (Ward-Williams 1976; Zier 1977), and north of the present study area on the Uncompahgre Plateau (Wormington and Lister 1956) and the La Sal Mountains in Utah (Hunt and Tanner 1960). One important type of Archaic site which has not been encountered in southwestern Colorado is a utilization of rock shelters, presumably in the winter months. Archaic rock shelter sites are relatively common throughout western Colorado north of the San Juan Mountains and in Utah, with a good example found at Sand Dune and Dust Devil caves in southeastern Utah (Lindsay et al. 1968).

At some point during the Archaic/Basketmaker II transition, the first observable habitation and storage structures came into being. The best example of the earliest permanent dwelling structures in southwestern Colorado comes from Talus Village, north of Durango, where Morris and Burgh (1954) discovered the remains of circular houses apparently constructed of cribbed logs laid in mortar. These structures were built over shallow saucer-shaped depressions which included sandstone slab subfloor storage cists, some of which also found use as places for burial of the dead (Fig. 34). A similar configuration was found at an open site, the Tamarron Site, located nearby (Reed and Kainer 1978). Tree-ring dates from the Durango Basketmaker sites range from nearly 300 B.C. to A.D. 400 (Dean 1975).



0 1 2 3 4 5 meters

Figure 34. Plan and cross-section of a Basketmaker II occupational floor at Talus Village (after Morris and Burgh 1954:Fig. 5).

Away from the Durango area, the evidence for Basketmaker II sites is limited. Winter (1976) has noted the presence of sites of this period in the Hovenweep vicinity, based on the presence of surface artifacts. There, the sites tended to occur in the deeper soils of the mesa ridges and in the broad canyon bottoms, perhaps indicative of site location for horticultural reasons. Winter (1976:284) suggests the probable presence of shallow pithouse structures at two sites. East of the Durango area, Basketmaker II sites have not been identified in the Piedra District, although Eddy (1966) has documented such sites in the Navajo Reservoir District to the south. Other probable Basketmaker II sites are reported for the Durango District on Florida Mesa (Eddy 1961:16) and near Ignacio at sites LA2605 (Fenega and Wendorf 1956:207-214) and LA4573 (Johnson n.d.).

In the succeeding Basketmaker III period, and continuing into Pueblo I times, the principal dwelling place was the pithouse (Fig.35), a unit with a sunken floor and a superstructure supported by posts. In a comparative study of Basketmaker III - Pueblo I pithouse types and distribution, Bullard (1962) includes the following traits as those most common to the western portions of the Northern San Juan Anasazi Area. Pithouses tend to be circular in shape, averaging about 17 square meters in size, and excavated on the average from .75 meter to 1.29 meters below the ground surface. The general orientation was to the south or southeast where a supplemental room, the antechamber, served a probable entrance function from the outside. Commonly, a four-post configuration distributed in a square or rectangular pattern in the house supported the roof. Often the southern portion of the main room was partitioned off by a low wall or very low floor ridge sometimes joining the fireplace rim. In addition to the fireplace, other floor features often include a deflector immediately south of the fireplace to ward off entering air, an ash pit, subfloor storage

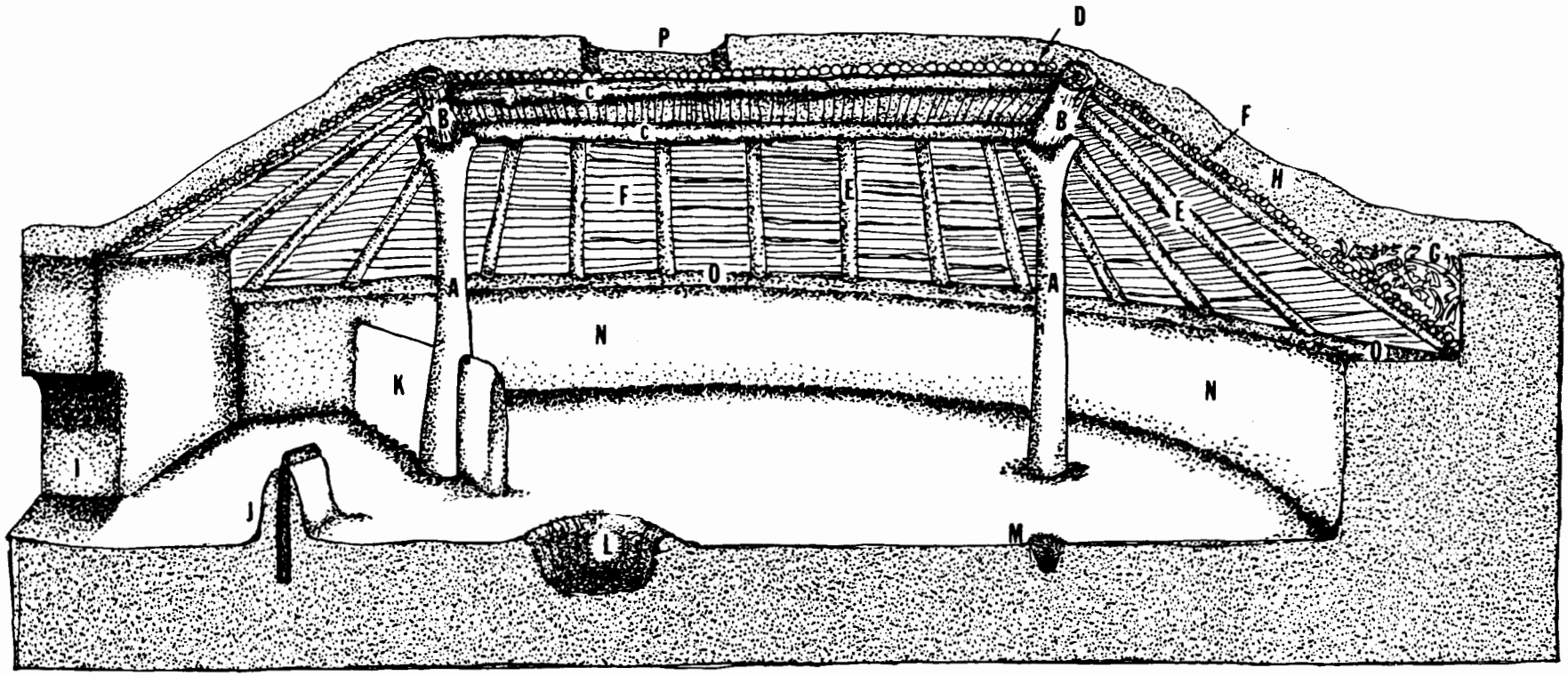


Figure 35. Postulated Method of Roof Construction of First Pithouse at Mesa Verde (after Lancaster and Watson 1954).

A. Main support posts
B. Main stringers
C. Secondary stringers
D. Slender poles or withes
E. Sloping side poles
F. Poles, brush, or reeds
G. Bark and trash fill
H. Earth covering
I. Tunnel to antechamber
J. Deflector
K. Wingwall
L. Firepit
M. Sipapu
N. Plastered walls
O. Bench
P. Smokehole and hatchway

pits, above-floor bins, and a small circular hole north of the fireplace known as the sipapu--or sacred hole--which, in modern Pueblo ritual, is the spot where the ancestors emerged from the underworld.

With the pithouse as the domiciliary structure, Basketmaker III settlements were distributed throughout southwestern Colorado, generally on the mesa tops and plateaus. The small, dispersed hamlets or rancherias were variable with respect to the number of pithouses, usually ranging from one or two dwelling units to more than 12. Nearby, separate circular, sandstone slab-lined storage cists and other outdoor activity areas complete the settlement layout. In some cases, small surface rooms or granaries can be discerned, and at least some of the hamlets were surrounded by a vertical log stockade. A distinctive architectural feature known as the great kiva first appeared during this period in southwestern Colorado (cf. Wheat 1955; Gladwin 1957; Carlson 1963). These structures are distinguished by their large size, often three or four times the size of the pithouses, and by the assumed ceremonial function (see McLellan 1969 for a discussion of these features).

During the Pueblo I period, an important shift occurred which saw the movement of family living quarters from the pithouses to surface post and adobe (jacal) walled rooms and the conversion of the pithouse to a religious structure. An example of a Pueblo I, or Piedra Phase, village layout from Wetherill Mesa is shown in Figure 36. At this site, the house contained a row of surface living rooms, backed by a row of smaller storage rooms. In front, to the south, was an associated subterranean religious feature, designated as a "protokiva," in this case indicating that its features represent a transitory stage between the former pithouse and the later true kiva. This particular house and protokiva were dated to ca. A.D. 860 (Hayes and Lancaster 1975:34). In some instances, Basketmaker III - Pueblo I village sites evince large integrated settlements, one example being the famous Site 13 on Alkali Ridge in southeastern Utah which includes a village of 15 or more pithouses

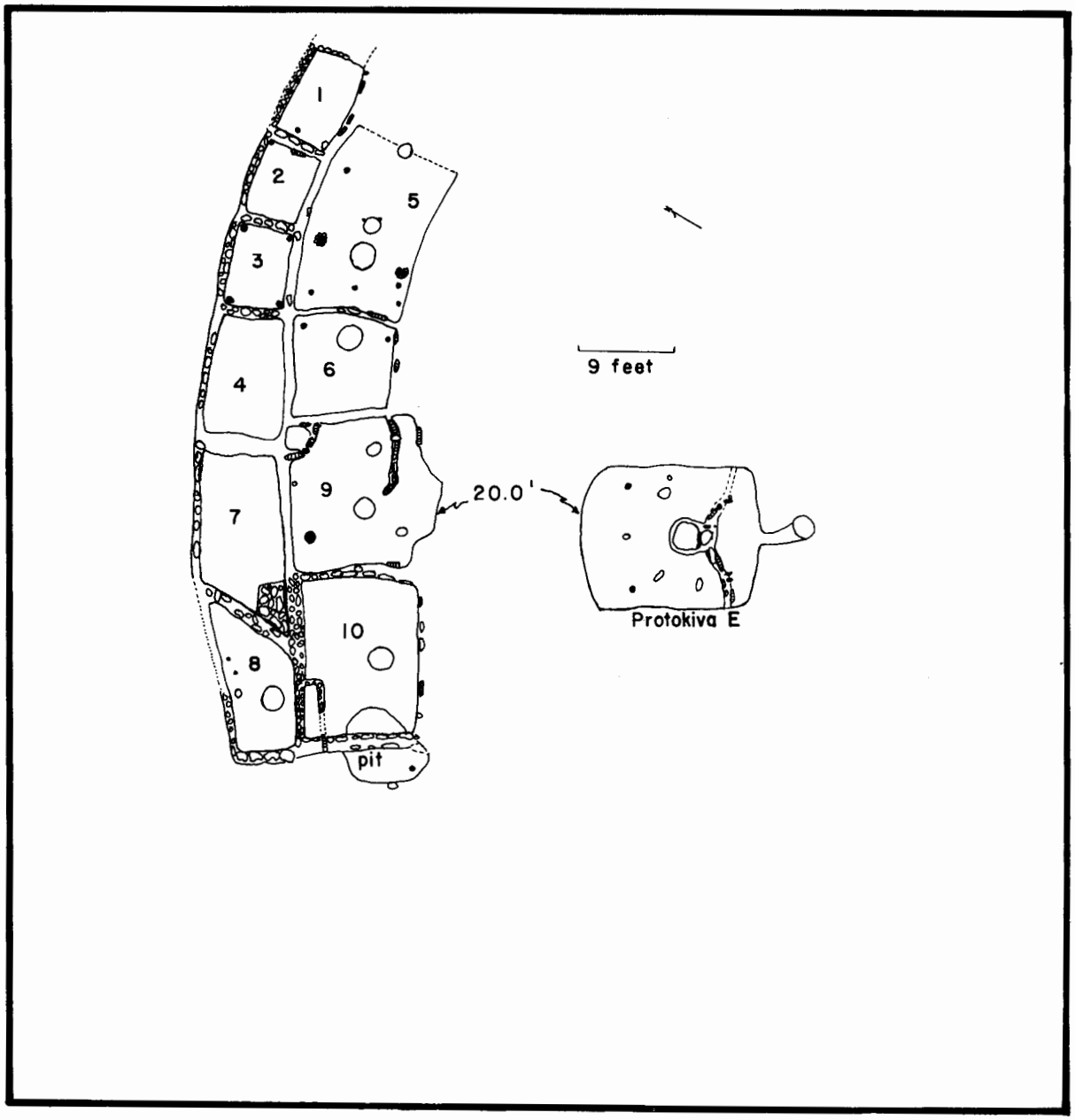
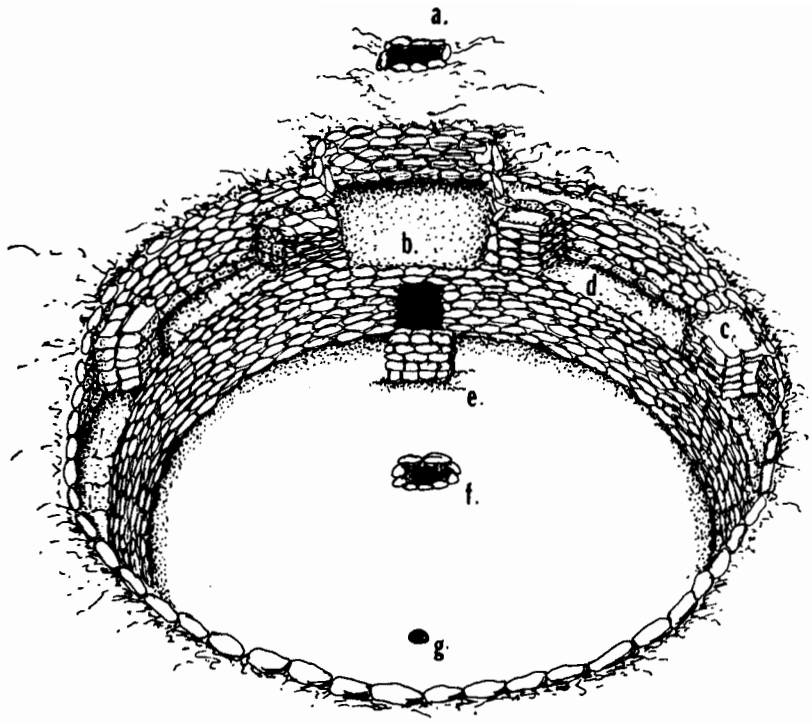


Figure 36. Village layout of a Piedra Phase (ca. A.D. 860) house and protokiva in the Badger House community at Mesa Verde National Park (after Hayes and Lancaster 1975:Fig. 24).

along with a complex of several hundred above-ground living and storage rooms. Perhaps the single most significant architectural change which ushered in the Pueblo II period was the complete loss of the habitation function for the subsurface rooms which assumed a male-oriented religious usage. The former pithouses became "kivas," a term from modern Pueblo languages whose speakers still utilize such structures in their villages today in the Southwest. In the Northern San Juan Anasazi Area the "typical" kiva retained some of the earlier characteristics: ventilator system, deflector, firehearth, and sipapu. Other characteristics were added including: (1) the entire interior lined with masonry from floor to roof; (2) a formalized bench which encircled the interior; (3) four to six (most common) pilasters upon this bench, or masonry pillars which supported the superstructure; and (4) a "southern recess" (a deep recess at the bench level on the south end of the kiva), the function of which is unknown (Fig. 37). The kiva was most frequently roofed with a cribwork of logs laid between the pilasters. Entrance to the underground room was made through an entryway/smokehole located near the center of the roof.

Village layout became more formalized during the Pueblo II span in the form of what is referred to as the "unit house" (Prudden 1903). This type of structure consisted of a single or double row of rooms (habitation and storage) comprising a rectangular block sometimes with a short extension of rooms at one or both ends. A kiva was located a short distance in front of the rooms, invariably to the south (Fig. 38). A trash or midden area was located southward of the kiva. In architectural detail, Pueblo II masons were relying more on the use of coursed stone walls with adobe mortar than the jacal and slab construction of the preceding period. Late in the Pueblo II period, building blocks were given rough shaping by spalling back the edges.

The settlement pattern of the Pueblo II period has often been described as one marked by population dispersal and growth throughout the Northern Anasazi Area. Winter (1976:286), for example, has documented a three-fold increase in the number of Pueblo II sites over Pueblo I sites in



a. Ventilator
b. Southern recess
c. Pilasters
d. Bench
e. Deflector
f. Firepit
g. Sipapu

Figure 37. Reconstruction of a typical Mesa Verde style kiva of the Pueblo II-III era. Note similarity of the floor features to those of the earlier pithouses, Fig. 35 (after Breternitz and Smith 1975).

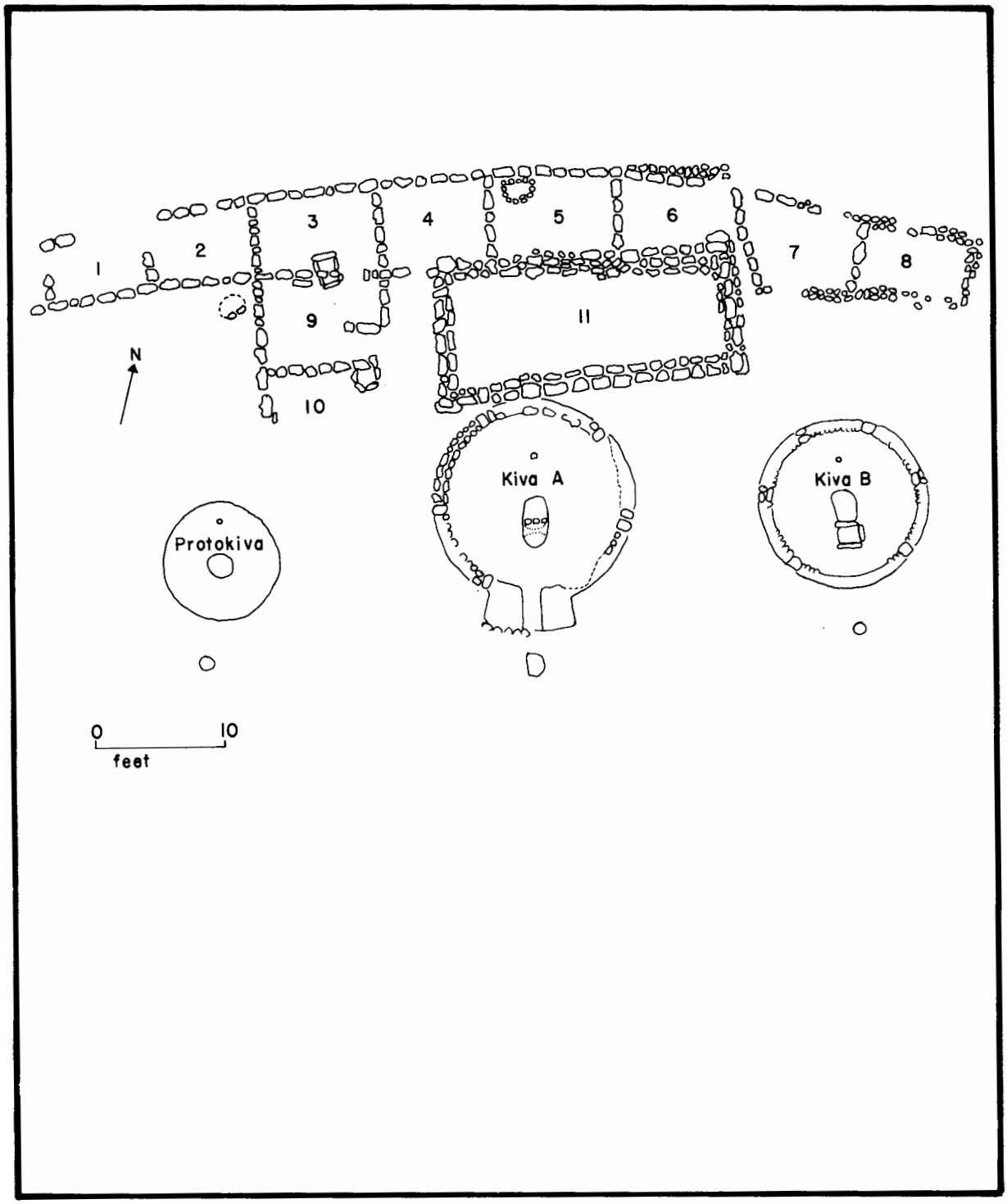


Figure 38. Village plan of the Pueblo II Site 866 at Mesa Verde National Park (after Lister 1966:Fig. 4).

the Hovenweep area, and he feels this situation reflects population increase. Pueblo II unit pueblos tend to be located on mesa ridges or deep-soil divide areas where mesa top dry farming was possible (e.g. Winter 1976). It should be noted that special use/limited activity sites dating to the Pueblo II period are also common; these sites usually consist of ceramic sherd and lithic debris scatters without observable architectural features. Two additional structural features, towers and water control devices, apparently had their genesis during these periods; towers are discussed below and water control features are covered in the next section.

The Pueblo III architectural methods generally elaborate on those present during the Pueblo II period with one exception: sites are consistently larger reflecting a concentration of populations. In addition to very large multistory apartment-type pueblos, villages were built in caves in the sandstone walls of the canyons characterizing the Four Corners region. Kivas in the open villages and cliff dwellings tended to be multiple, often being incorporated within the roomblocks.

A distinctive feature of Pueblo III times is the presence of towers, notably in the Hovenweep area, although these structures first appeared during the Pueblo II period. Pueblo III towers (Fig. 39) were often two and three stories high, and were constructed of brick-like sandstone blocks shaped by pecking (a Pueblo III stonemason's technique). Tower construction in the Hovenweep area has been dated through the use of tree-rings to have occurred between A.D. 1163 to 1277 but the majority were built after A.D. 1230 (Winter 1976:287-289). Tower function(s) has remained enigmatic; however, Winter and his colleagues (1977:211), based on a series of test excavations and observations, have noted the possibility that "a variety of different economic, social, and ceremonial activities probably occurred, including possible storage, ceremonial, food processing, toolmaking, calendric and other activities." Another recent analysis of these structures has supported the idea of multiple functions, and documented the possibility of making regular

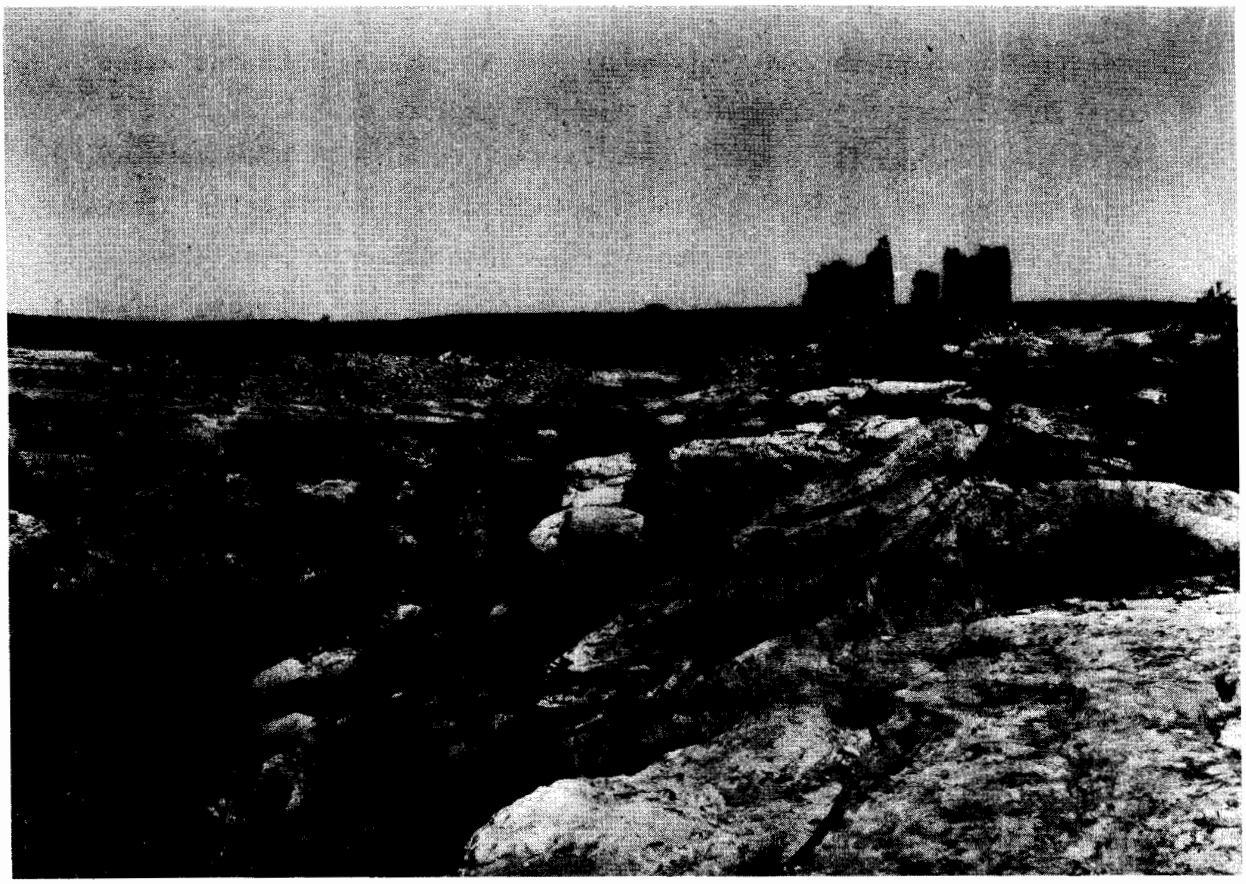


Figure 39. Canyonhead tower complex at Hovenweep National Monument. Photo taken ca. 1905 (courtesy Walker Art Studio, Montrose).

solar observations for the purpose of determining a calendar (Williamson et al. 1977; Williamson 1978). Further, Williamson and others (1977) have observed that the proximity of many towers to kivas, and a direct linkage of many towers and kivas by tunnels, indicate a strong connection between sunwatching practices and ceremonialism.

Certain trends in architectural style and settlement pattern occurred during Pueblo III times which require brief examination. These include the presence of large integrated village units which show affinities to the Chaco Anasazi of northwestern New Mexico, and events associated with the latter half of the period when widescale abandonment of the general region was initiated with concomitant changes in settlement patterns.

The Chaco-influenced sites date approximately to the period A.D. 1090 to 1140 and are generally restricted to the Yellow Jacket District, except for Chimney Rock Pueblo in the eastern sector of the study area. At sites such as Lowry Ruin (Fig. 40), Escalante Ruin, Yucca House, Mud Spring Ruin, and Goodman Point Ruin as well as others, Chacoan architectural methods and style apparently indicate a time of population pressure and expansion within the Chacoan settlement system. The precise function of these villages has not been fully delineated, although some form of resource procurement or trading center sites seems likely. Similarly, the effects of these centers on the indigenous population and the resultant interrelationships are not completely understood at this time. Many of these sites, in southwestern Colorado and the Chaco area alike, include great kivas which some investigators (e.g. Plog 1974; Lightfoot 1979) believe functioned as trading and redistribution centers for extensive redistribution networks, perhaps directly related to and stimulated by similar trading systems of Mesoamerica (Kelley and Kelley 1975). By the middle of the twelfth century, these sites in southwestern Colorado were abandoned, coincident with the demise of the Chaco culture in northwest New Mexico.

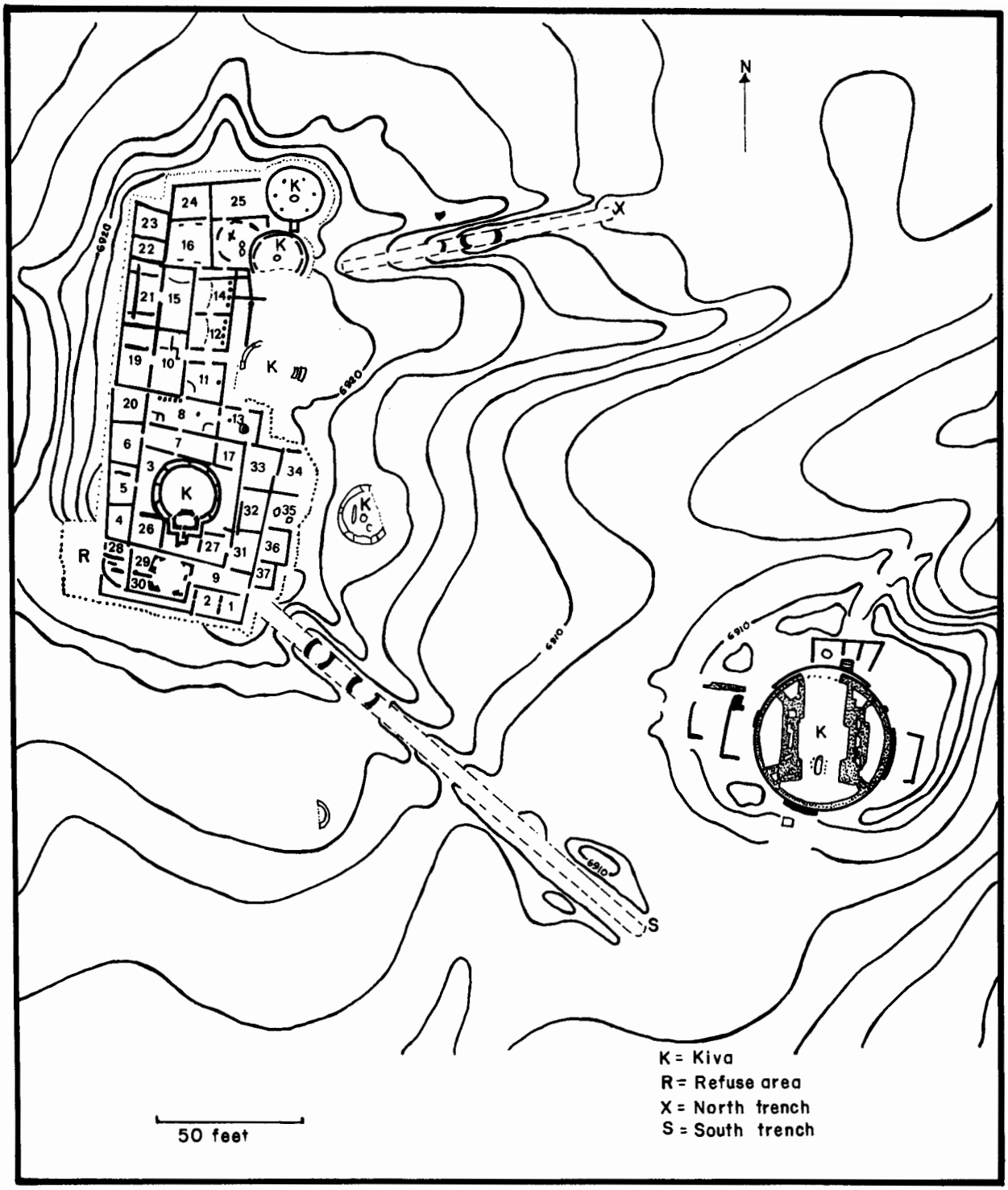


Figure 40. Village plan of Lowry Ruin. Note the presence of intramural kivas and the detached great kiva structure (after Martin 1936:Map 1).

By A.D. 1200, the Anasazi had withdrawn from portions of southwestern Colorado which had been previously occupied. It may be that some of this movement was related to the disappearance of the Chaco influence, but it is more likely related to an extended period of climatic deterioration which gripped the region from about 1160 to 1195. In general terms, much of the Yellow Jacket District, and the La Plata, Durango, Piedra, and Navajo Reservoir Districts were void of Anasazi villages. In two areas, the Mesa Verde and Hovenweep areas, communities congregated in specific localities: large alcove cliff dwellings in the canyons of the Mesa Verde (Figs.13 and 41) and around the canyonheads in the Hovenweep vicinity (Figs. 12 and 39). The remaining Anasazi groups maintained these locations for another 50 to 75 years before completely abandoning the Northern San Juan Area sometime prior to A.D. 1300. The latest tree-ring date in the Hovenweep area is A.D. 1267 from Holly House (Winter 1977:212) and Long House at Wetherill Mesa with a date of A.D. 1280 (Nichols and Harlan 1967).

Material Culture and Technology

With a few exceptions, the technological efforts and resultant material culture of the prehistoric inhabitants of southwestern Colorado were oriented toward those items necessary for the daily functioning of the lifestyle and protection from the elements. Within this general context, a few basic materials--bone and antler, clay, stone, wood and plant fiber, and rarely, shell--at the disposal of these groups were shaped or formed into usable, utilitarian artifacts. Each of these materials was subjected to a variety of techniques, employed to produce whatever effect, shape, and size was desired by the craftsperson. In general, these methods include chipping, flaking, pecking, abrasion or polishing and drilling or reaming. Moreover, some natural materials were woven, molded or sewn into a variety of containers and articles of clothing.

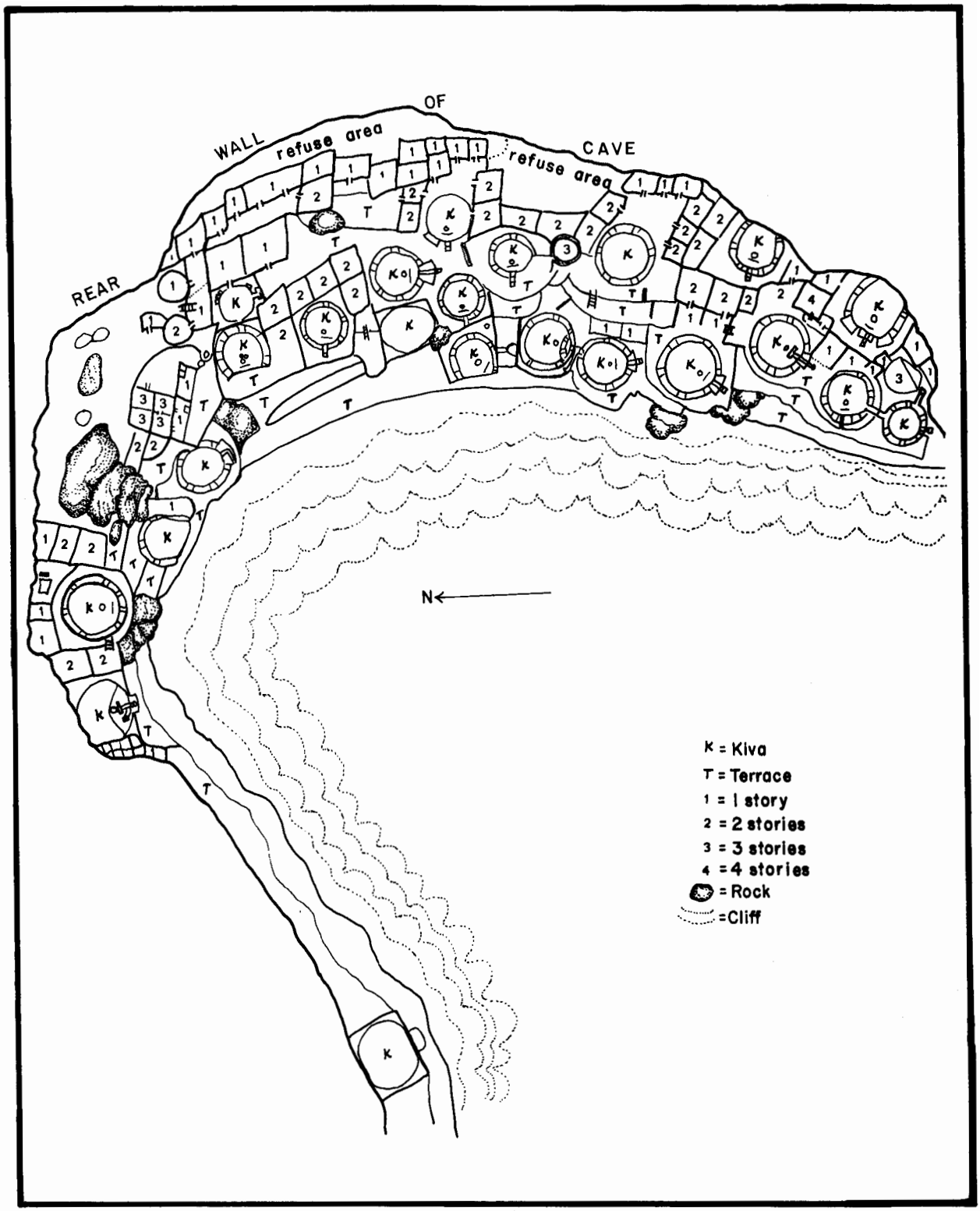


Figure 41. Cliff Palace, a late Pueblo III cliff dwelling at Mesa Verde National Park (after Fewkes 1911:Plate 8).

The technological aspects of the prehistoric Southwest have received considerable attention in the past and still form major sections of archaeological survey and excavation reports today. The discussion which follows is intentionally general, designed to give the reader an overview of the situation. Several illustrations are included to provide a visual representation of relevant material culture. The figured artifacts were redrawn from a variety of sources, most concerned with southwestern Colorado. For additional information of a general vein, the following works can be consulted:

1) prehistoric Southwestern crafts (Barnett 1973; Tanner 1976);
2) ceramics (Breternitz 1966; Breternitz et al. 1974; Oppelt 1976);
3) stone artifacts (Woodbury 1954);
4) basketry (Morris and Burgh 1941);
5) cotton-weaving (Kent 1957).

More specific data can be found in the numerous bibliographic references at the end of this volume which report previous investigations in the project area. Also, Morris' (1939) review of technology and material artifacts in La Plata District of the Mesa Verde region remains profitable reading for persons interested in the Northern San Juan Anasazi Area and Rohn (1977) provides a discussion of important continuities and changes in Anasazi technology.

For the purposes of our discussion, the following general functional categories of material culture will be examined. The first category includes domestic tools made from a variety of materials which were generally associated with subsistence activities (e.g. hunting, agriculture, food processing), or were used in the manufacture of other items. In reality, a large number of the tools in this category must be considered multifunctional although archaeologists often assign a supposed primary function to any given tool or composite artifact. A second category includes containers, principally those made from clay or plant materials (baskets and squash vessels). As we shall see, containers, especially basketry and pottery, have distinctive temporal and geographical characteristics; thus, these items, or in most cases

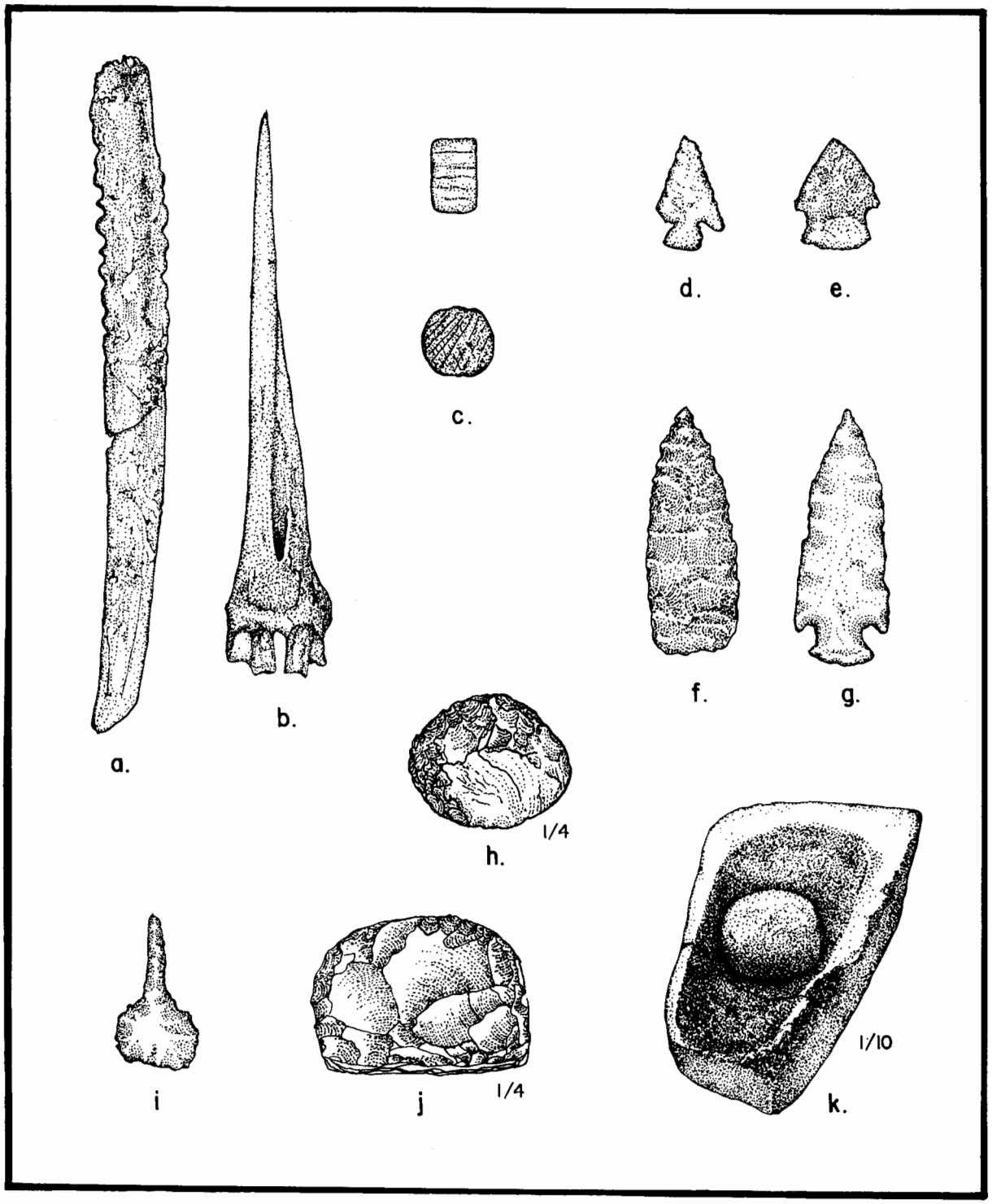
their fragments, are important to archaeologists for dating and identifying cultural relationships. Third, we will examine the evidence for clothing and adornment, including weaving of such items as cloth and sandals. Finally, examination will be made of certain items which have been assigned a real or suggested ritual function within prehistoric societal patterns. For the most part, reliable information and artifactual materials for these categories are entirely lacking in the project area for the Paleo-Indian and Archaic stages; hence the following paragraphs relate mainly to the various periods of Anasazi development.

Domestic Artifacts

A multitude of utilitarian items comprise this category of material culture with all of the available raw materials being widely used. Figure 42 shows the general range of such tools from the Basketmaker II sites north of Durango. Many of the artifacts, particularly stone and bone tools, reflect little change throughout the Anasazi sequence while others reflect one or two significant changes.

During the Basketmaker II period, the spear and atlatl (spear-thrower) (Fig. 43) was the common implement. During the Basketmaker III era, the spear-thrower was gradually replaced by the bow and arrow throughout the Northern San Juan Anasazi Area. Arrow points, when not of pointed hardwood, included finely-chipped stone points, corner-notched and tanged in Basketmaker III - Pueblo I times but giving way to side-notched forms during the succeeding Pueblo II-III periods (Fig. 44). Throughout the Anasazi sequence various nets, snares, and traps were also in common use.

Two basic methods of working stone for the production of utility objects were practiced in the project area: (1) pecked and ground, and (2) flaked and chipped. Materials most commonly used in the first technique include coarse to fine quality sandstone, basalt, diorite, andesite, and others. The second technique required a very different type of stone, one with a cryptocrystalline structure in which the



scale x 1/2 unless otherwise noted

Figure 42. Variety of Basketmaker II artifacts from the Durango sites (after Morris and Burgh 1954): (a) notched rib; (b) bone awl; (c) two-bone gaming pieces; (d-e) projectile points; (f-g) knives; (h) hammerstone; (i) drill; (j) chopper; and (k) mano and metate.

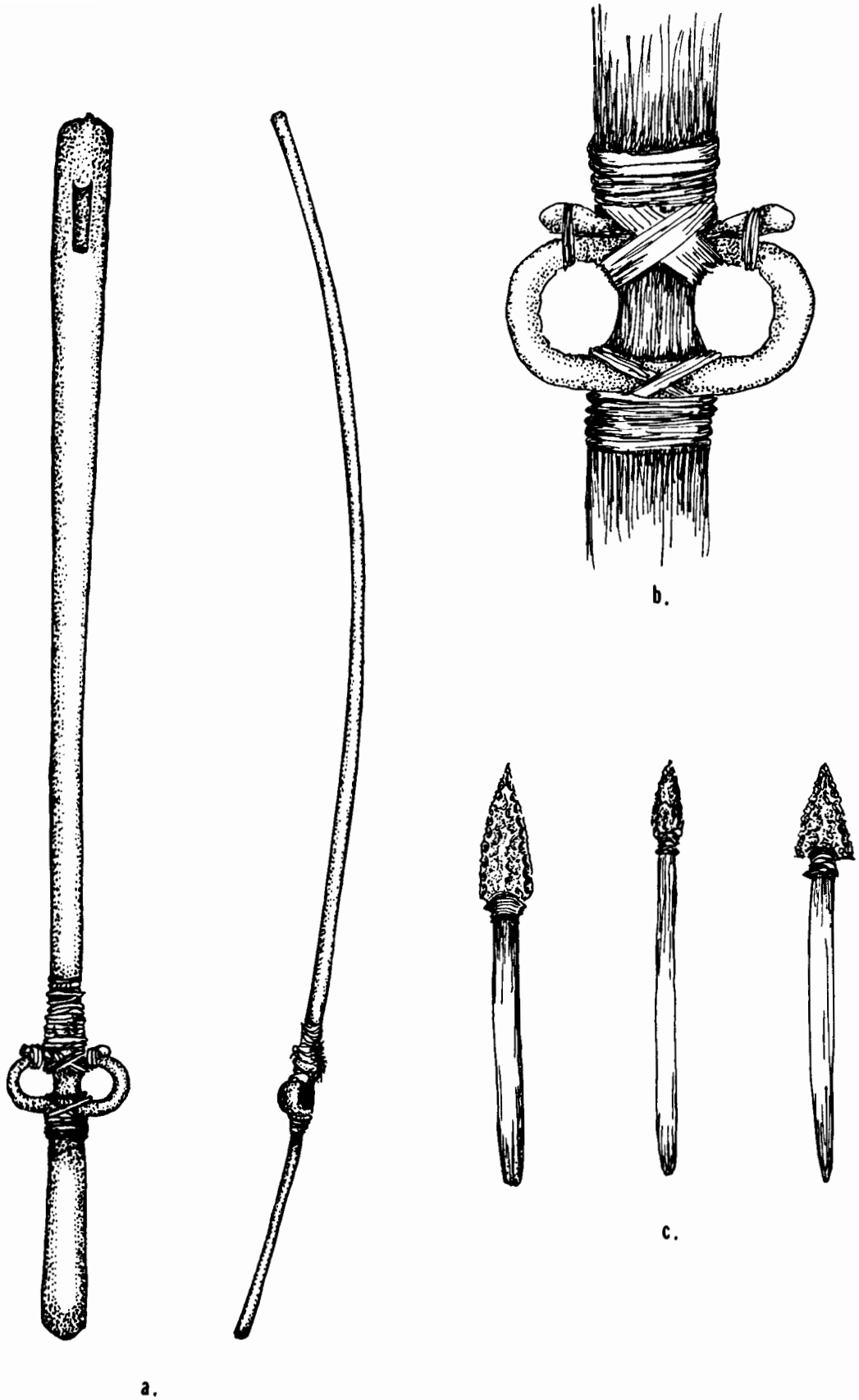


Figure 43. Example of a Basketmaker II atlatl from Sand Dune Cave in southeastern Utah (after Lindsay et al. 1968: Figs. 40-42): (a) front and side view of atlatl (length is 59 cm.); (b) detail of finger grip construction; and (3) atlatl dart foreshafts.

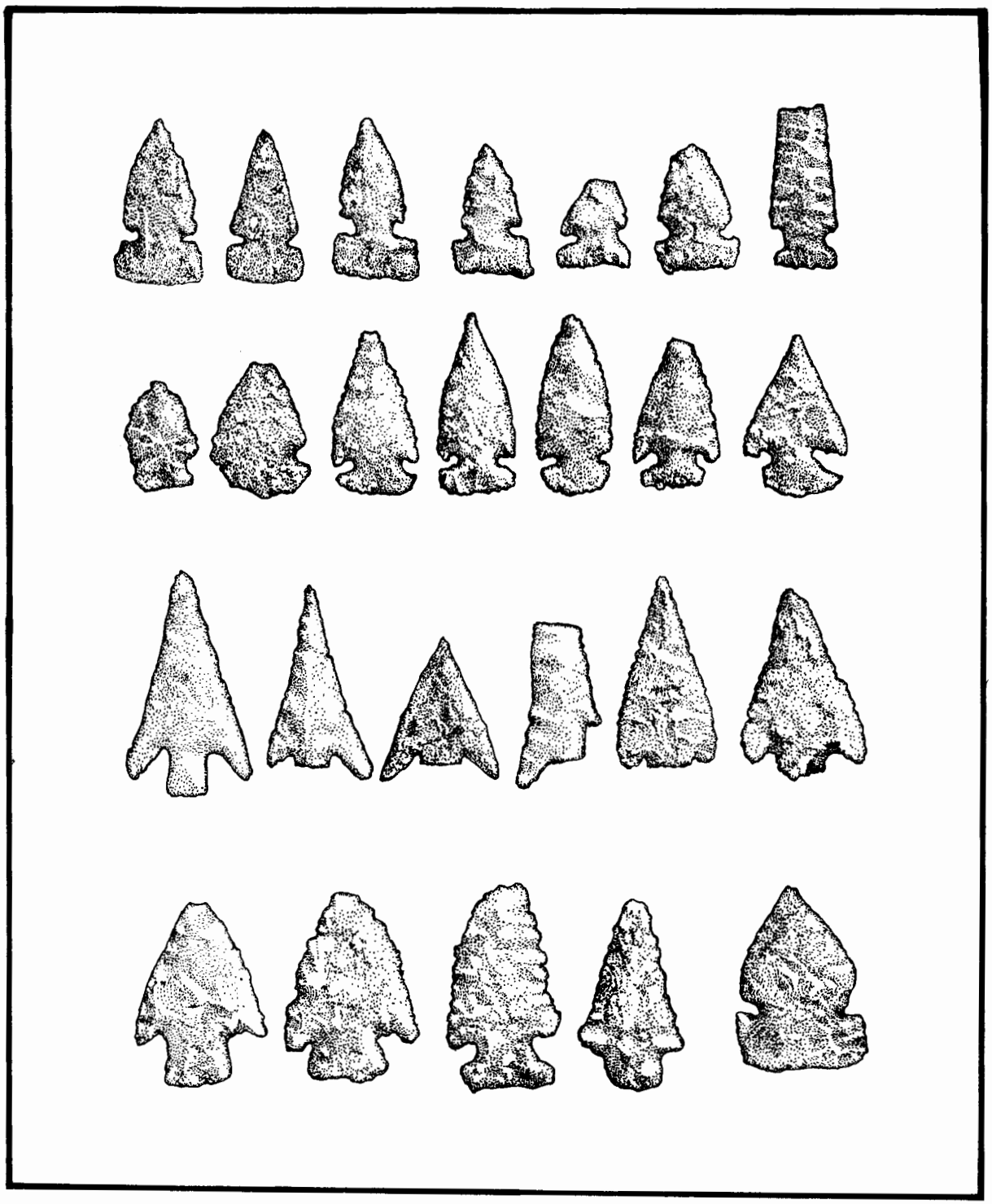


Figure 44. Anasazi projectile points: (bottom row) Basketmaker III; (second row) Pueblo I; (top two rows) Pueblo II and III (after Rohn 1977:Fig. 74).

chipping could be controlled to arrive at the desired end product. Common among the materials used in this technique were fine-grained quartzite, chert, chalcedony, jasper, and obsidian if available.

Foremost among the pecked and ground tools were the millingstone/metate and handstone/mano which were probably present throughout the several millenia of aboriginal occupation of southwestern Colorado and used for milling of wild plant seeds and agricultural products. The early metates were of the trough type, open at one or both ends with parallel side flanges. Later, slab metates became more common; mortars and pestles occurred widely as well. Fine and medium-grained stones were used in the manufacture of groundstone axes and agricultural hoes. Chipped-stone manufacture resulted in a wide range of artifacts. In addition to projectile points, the most common tools of this technique were scrapers, knives, gravers, drills, chippers, and hoes.

Bone and antler served for a great variety of items and functions. Bones from medium and large-sized birds and mammals were fashioned into awls, reamers, scrapers, needles, tubes, and gaming objects. Wood derived from nearly every available shrub and tree in the ecosystem was used in a myriad of ways for utilitarian artifacts, construction components, and for fuel to heat the early pithouses and later domestic rooms and kivas. Among the more common and useful wooden items were agricultural digging sticks, throwing sticks, cradleboards, arrow shafts, and bows.

Containers

Containers in which to collect and store subsistence items form an integral component of the material culture of any early culture regardless of the economic mode. Varieties of portable containers include forms of basketry, flexible twined bags, skin bags, ceramic vessels (Figs. 47 to 51), and hollowed-out squash fruits. As noted above, temporal changes in materials, form, and technique of manufacture

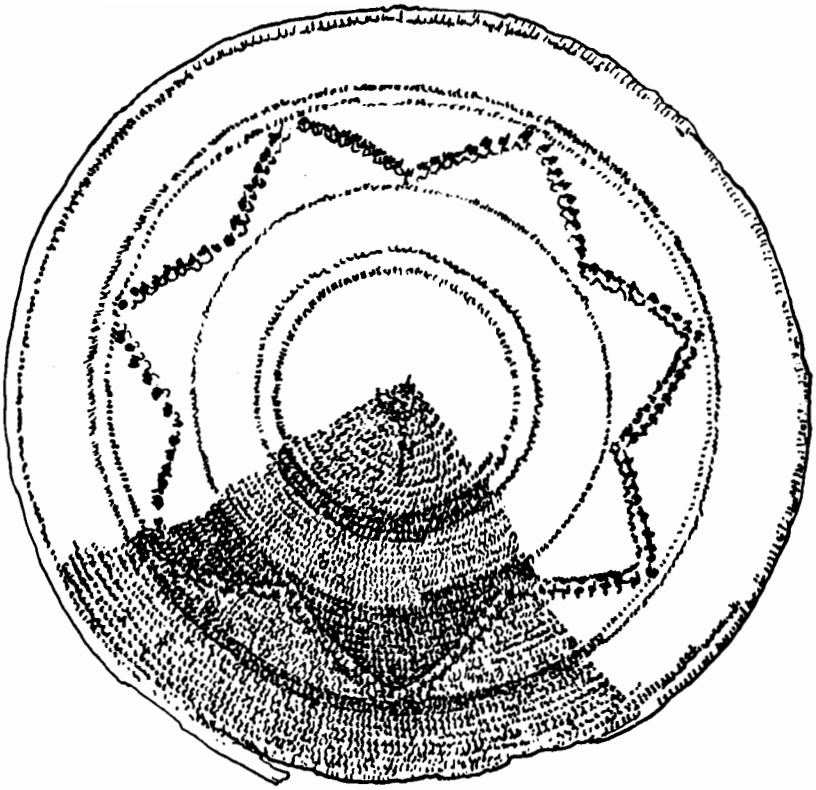
have been of extreme importance in assessing temporal placement of archaeological remains throughout the Southwest and often cultural affiliations as well. Thus, it will be beneficial to examine the types and technological background of containers, especially ceramics, in more detail.

Basketry

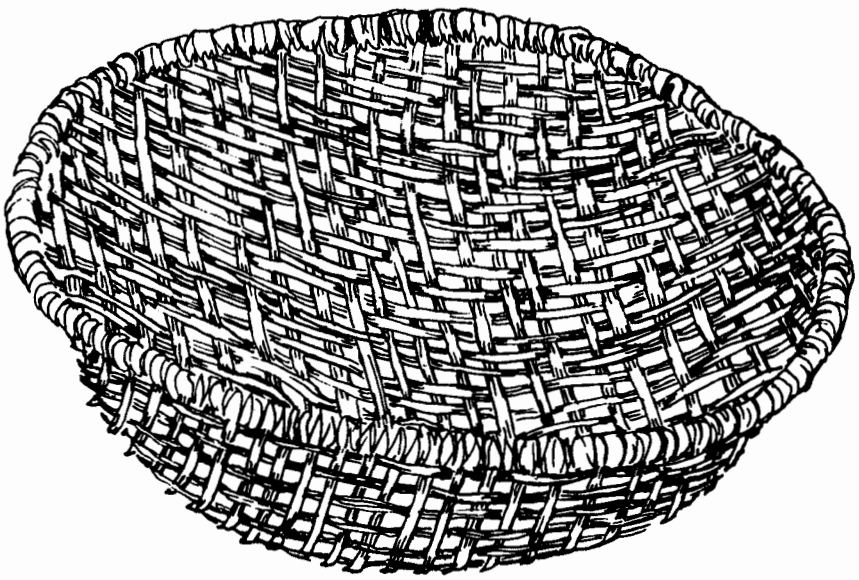
Basketry apparently has a long history reaching back to the early Archaic stage and perhaps was used by the Paleo-Indian groups as well. Jennings (1957) notes that several techniques and forms of baskets were present in the Desert Culture by about 7000 B.C., but decoration other than structural variation was lacking. The earliest Anasazi are aptly named Basketmakers, because their baskets were of extremely high quality and preceded the advent of ceramic containers. Basketmaker II baskets ranged in size from a few inches to several feet in diameter, were often decorated with geometric designs in black, and in some instances, were resin-treated or so tightly woven that they were waterproof. Most Basketmaker II baskets were manufactured by coiling, a technique which uses a foundation of twigs or split twigs wrapped with the sewing splints which bind each successive coil to the previous one. One of the more common shapes was a shallow tray used to store or cook foods (Fig. 45a).

Large conical carrying baskets--30 inches or more in diameter--were utilized for gathering and carrying plant foods. These flexible baskets were carried on the back by means of a tumpline that was attached to the basket and then passed across the forehead. Most Basketmaker II tumplines were undecorated; however, beginning in the following periods, tumplines were often finely decorated with tapestry weave and/or woven or painted designs.

Basketmaker III basketry was very similar to that of the Basketmaker II period in many respects, but one of the most observable changes was the addition of twilled basket manufacture. These containers were made by interweaving yucca leaves in an over two, under two, or over three, under three, pattern into a flat mat and then attaching this to a circular wooden ring, creating a shallow form (Fig. 45b).



a.



b.

Figure 45. Anasazi basketry:

a) Basketmaker coiled specimen from Grand Gulch (after Pepper 1902);

b) Pueblo twilled yucca-ring basket from the Glen Canyon area (after Lipe 1960:Fig. 58).

Both the coiled and twilled basketry techniques continued to be used through Pueblo III times in the Northern San Juan Area, and the techniques have survived to historic times among the Southwest Pueblos. The twilled basket, however, apparently became more common during the later prehistoric Pueblo periods.

Another early container deserving mention is the flexible woven bag of plant fiber string. These bags, usually six to eight inches in diameter with geometric designs woven in or sometimes painted on the exterior surface, were common during Basketmaker II times. These bags continued through the Basketmaker III period, but they were more likely to be undecorated then.

Ceramics

It is not surprising that once the transition to a sedentary Formative way of life had been completed, that ceramic vessels, more useful than baskets in household activities like cooking and storing, replaced basket forms as the most important type of container. The earliest forms of pottery appear in the archaeological context about A.D. 575 (Basketmaker III) in the Northern San Juan Anasazi Area (Breternitz et al. 1974). It is generally accepted, however, that ceramics were present in the more southerly Southwestern groups, the Mogollon and Hohokam, several centuries earlier, a result of diffusion from the Mesoamerican sphere.

Technologically speaking, methods of making pottery throughout the Southwest varied only slightly. Neither the potter's wheel nor true kiln was known. Native clay was collected and ground into a fine consistency. Nonplastic materials, such as sand, crushed rock, or crushed pottery pieces (sherds), were added to the clay as temper to prevent formed vessels from cracking or breaking as the vessels dried. Together, the clay, tempering material, and water could be kneaded into a doughlike mass to construct vessels. The method of construction employed in the Anasazi area was that of adding con-

centric coils of clay on top of each other, pinching and scraping the coils together as the vessel walls were formed. In this method, known as the "coil-and-scrape" technique, a small piece of dried squash rind was commonly utilized to smooth and scrape the coils. These small, even-edged squash pottery scrapers are found in dry cave sites in the Mesa Verde region, often with clay still adhering to the surface.

In some cases, on utilitarian or undecorated pots, coils or parts of coils were left visible on the exterior of the vessel. This surface finish is called "corrugation." If the vessel was to be decorated, however, the coils were scraped smooth and often repeatedly rubbed with a water-worn pebble to smooth and polish the surface. In later Anasazi pottery manufacture, a slip or wash of watered-down clay was applied, smoothed and polished also, to remain as the finished surface or serve as a base for decoration of the vessel. Decorations, often quite elaborate in layout and design, were then painted onto the vessel surface using black, red, or white pigments of mineral or vegetal origin. Once the vessel had been formed and decorative motifs applied, the pot was fired by exposing it to a burning or smoldering fire. Two methods of firing were utilized, in either an oxidizing or reducing atmosphere, with the difference being that oxygen gets to the vessel as it is being fired in the first method, while the pot is covered--almost cutting off the oxygen supply--in the latter process.

Although the vessels were certainly susceptible to breakage, once it is fired pottery is practically indestructible and is readily preserved in the archaeological context. As a result, it is widespread and abundant in prehistoric sites. Thus, because it is easy to collect, handle, and analyze, and because pottery manufacture and decoration reflect spatial and temporal changes, its value to the study of Formative groups in the project area and surrounding regions cannot be understated. Indeed, prior to the advent of modern dating techniques, typologies of ceramic spatial and temporal variability were utilized to define cultural units and establish relative chronologies. As pottery

types, now numbering about 900 names (Oppelt 1976), could be sufficiently tree-ring dated (e.g. Breternitz 1966), it was possible to date sites from surface evidence within fairly precise parameters. The practice of designating temporal placement, and often cultural affiliation, for such sites continues to be a widely used practice today.

In much of southwestern Colorado three traditions of ceramic manufacture are represented; gray, white, and red pottery are all present (cf. Abel 1955; Breternitz et al. 1974; Hayes 1964; and Rohn 1977, for detailed discussion). Within these traditions there is great variety in function, form, and decoration of ceramic vessels. Figure 46 summarizes the pottery types along with suggested dates of manufacture for the Mesa Verde Region, and representative types and vessel forms are illustrated in Figures 47 through 51. The ceramic types found in the Mesa Verde Region (Fig. 46) were predominant, during their dates of manufacture, throughout much of the Northern San Juan Anasazi Area except western and eastern ends of the area. Within our area of concern, the Mesa Verde types are common from the Utah-Colorado border east to the Animas River. The only exception to this general distribution is the Pueblo I Piedra Black-on-white, which enjoyed popularity throughout southwestern Colorado between A.D. 750 and 900.

Gray utility pottery types last from Basketmaker III through Pueblo III times. Early forms were constructed by the coil-and-scrape technique with obliterated coils. This pottery is tempered with crushed igneous rock, unslipped, and fired in a reduced atmosphere. The Basketmaker III Chapin Gray (Fig. 47 a-d) was followed by the Pueblo I period in which unobliterated coils were left on the necks of the vessels (Figs. 47e and 48a). Smoothed bodies with neck bands continued into the Pueblo II and early Pueblo III periods in the form of Mummy Lake Gray, but the more common utilitarian wares of these periods were corrugated forms. Corrugated vessels (Fig. 48 d and e) occur primarily as globular cooking and storage vessels in which the original coils were pinched or crimped before firing to leave the distinctive appearance.

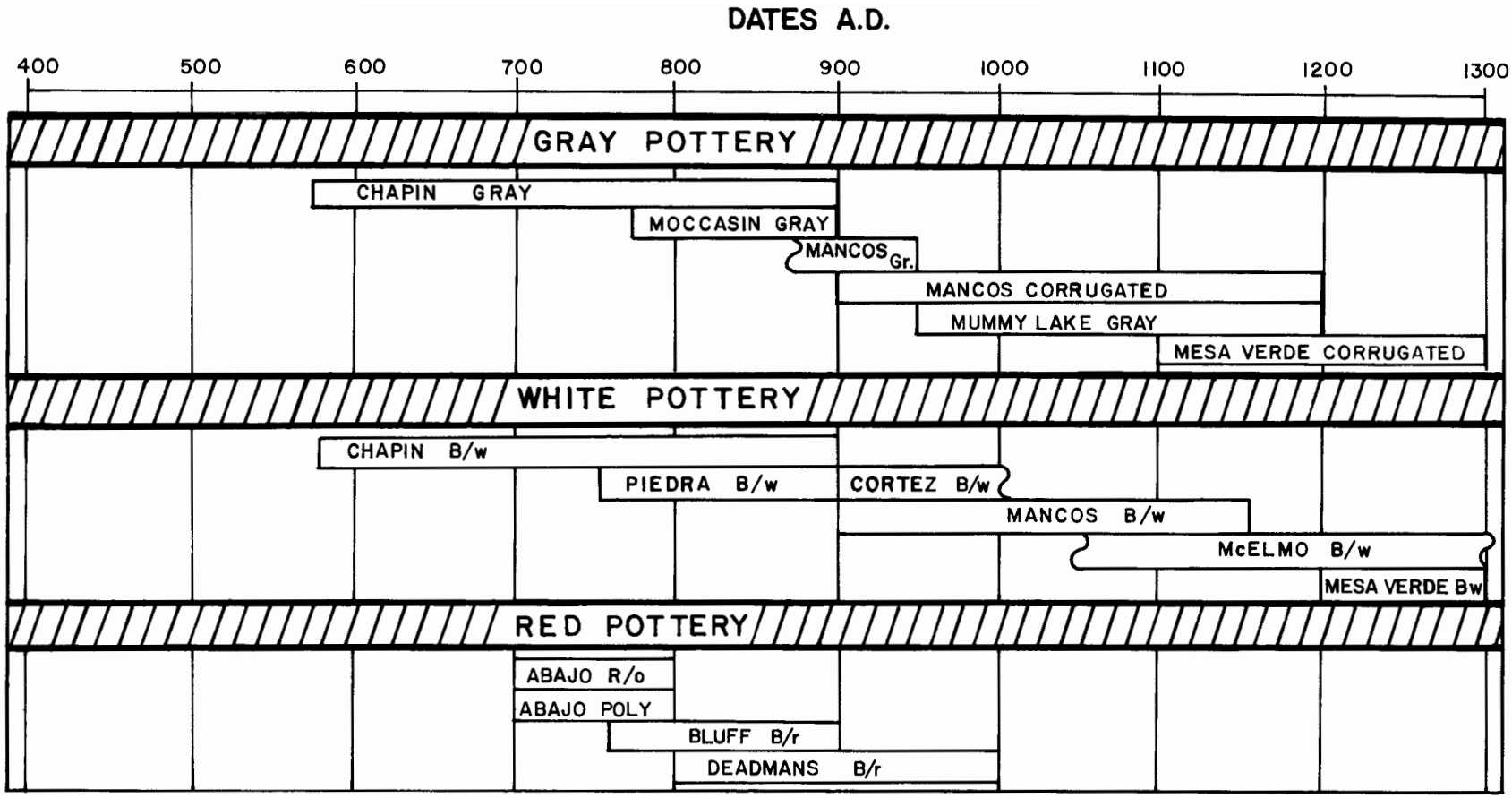


Figure 46. Mesa Verde Anasazi pottery types and suggested dates of manufacture (modified from Breternitz et al. 1974:Table 1).

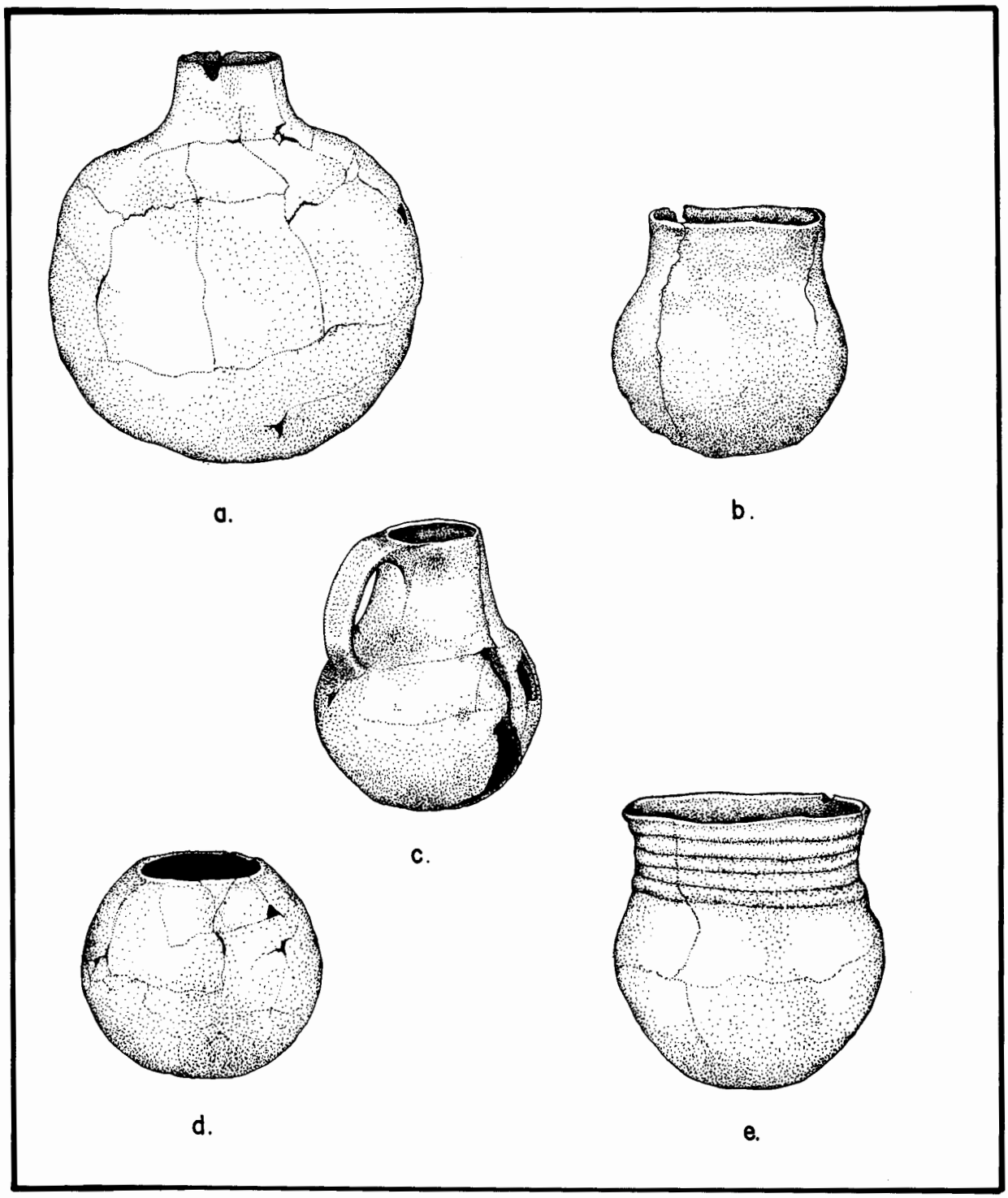


Figure 47. Mesa Verde Anasazi pottery: (a-d) Chapin Gray (after Hayes and Lancaster 1975:Fig. 84); (e) Moccasin Gray jar (after Hayes and Lancaster 1975:Fig. 88b).

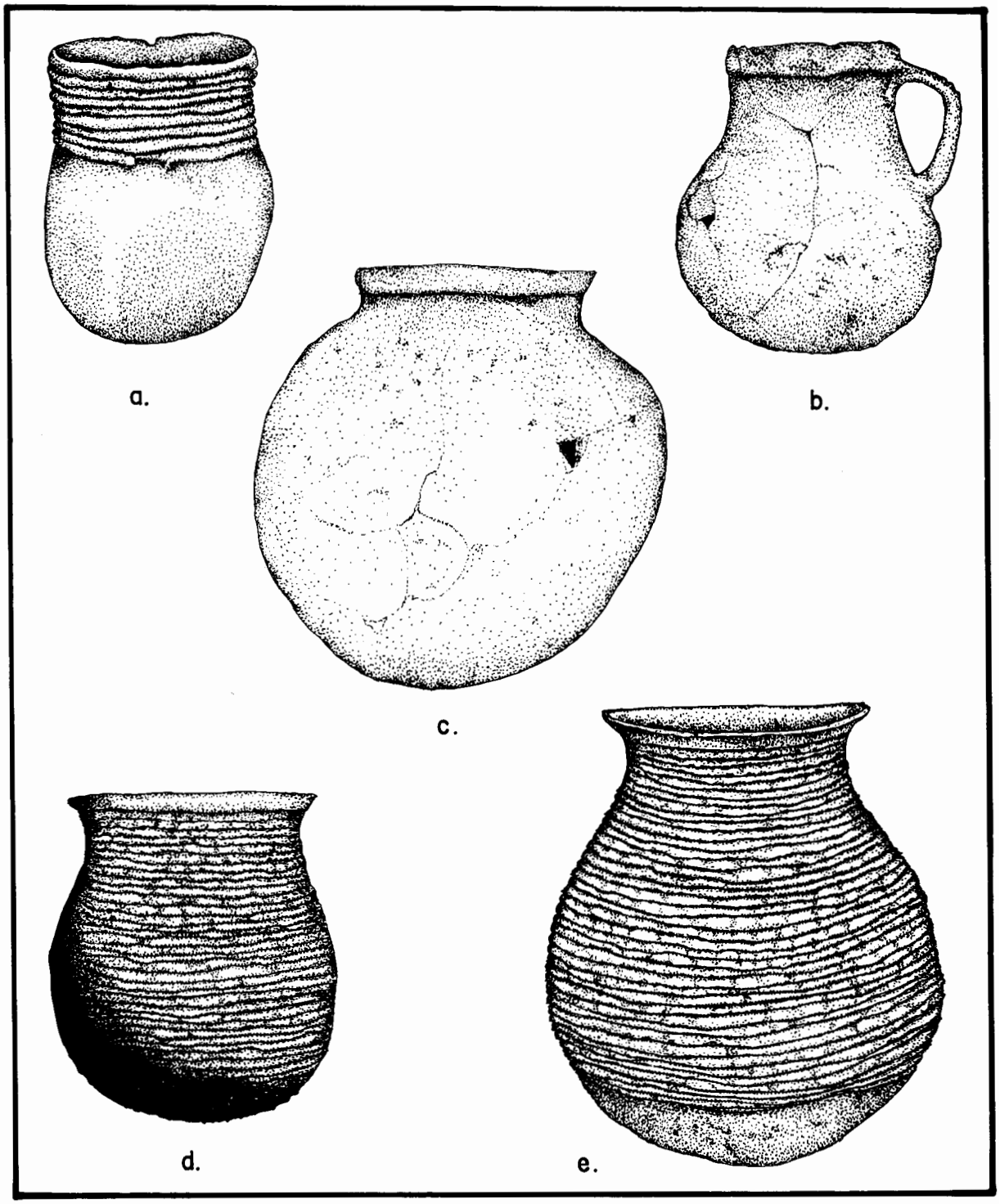


Figure 48. Mesa Verde Anasazi pottery: (a) Mancos Gray (after Martin 1936:Fig. 46c); (b-c) Mummy Lake Gray (after Hayes and Lancaster 1975:Figs. 100 and 103); (d) Mancos Corrugated (after Lancaster and Pinley 1954:Plate 55); (e) Mesa Verde Corrugated (after Martin 1936:Fig. 42).

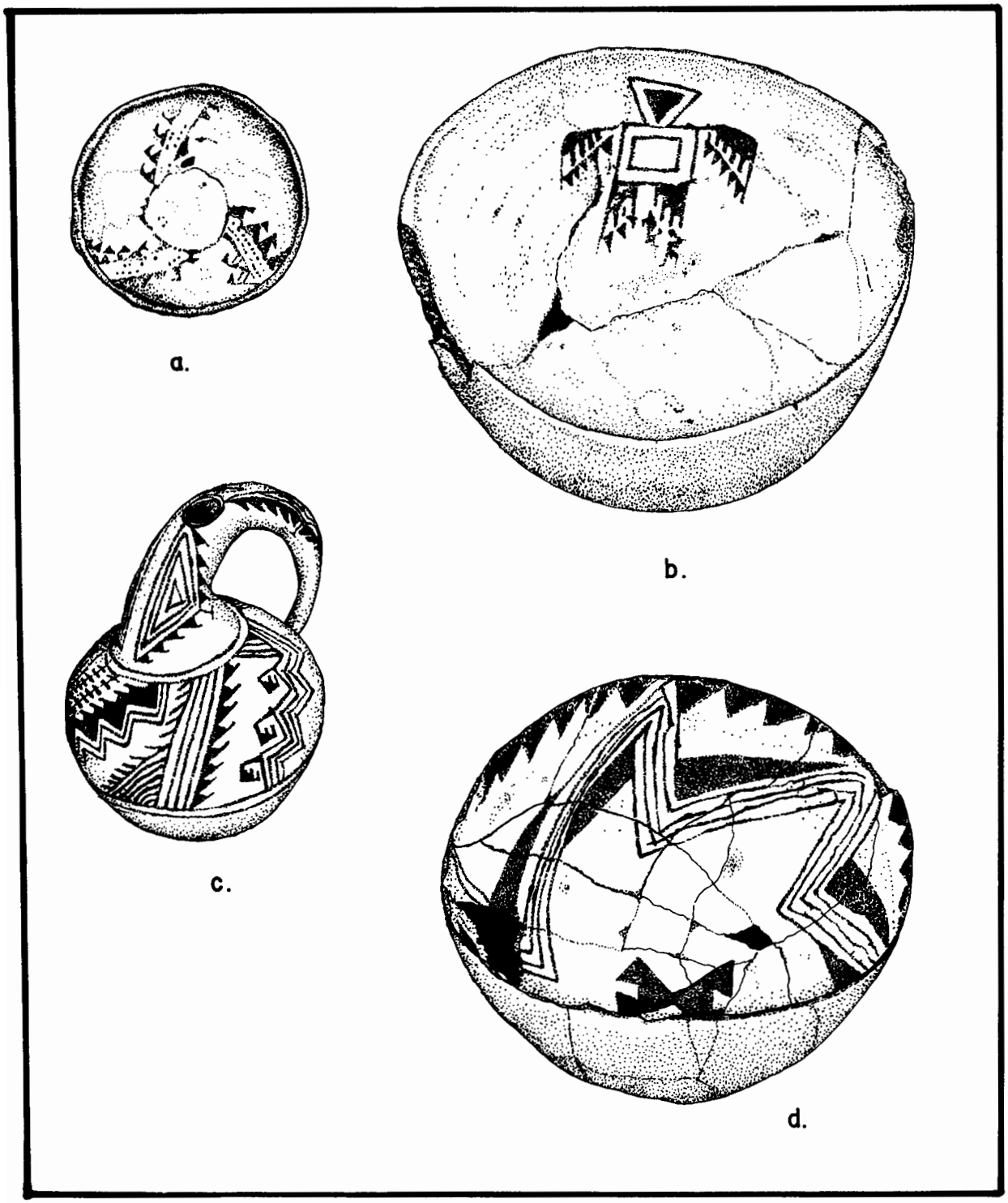


Figure 49. Mesa Verde Anasazi pottery: (a) Chapin Black-on-white (after Rohn 1977:Fig. 61); (b) Chapin Black-on-white (after Hayes and Lancaster 1975:Fig. 109); (c) Piedra Black-on-white (after Breternitz et al. 1974:Fig. 16f); (d) Piedra Black-on-white (after Lister 1965:Plate 30a).

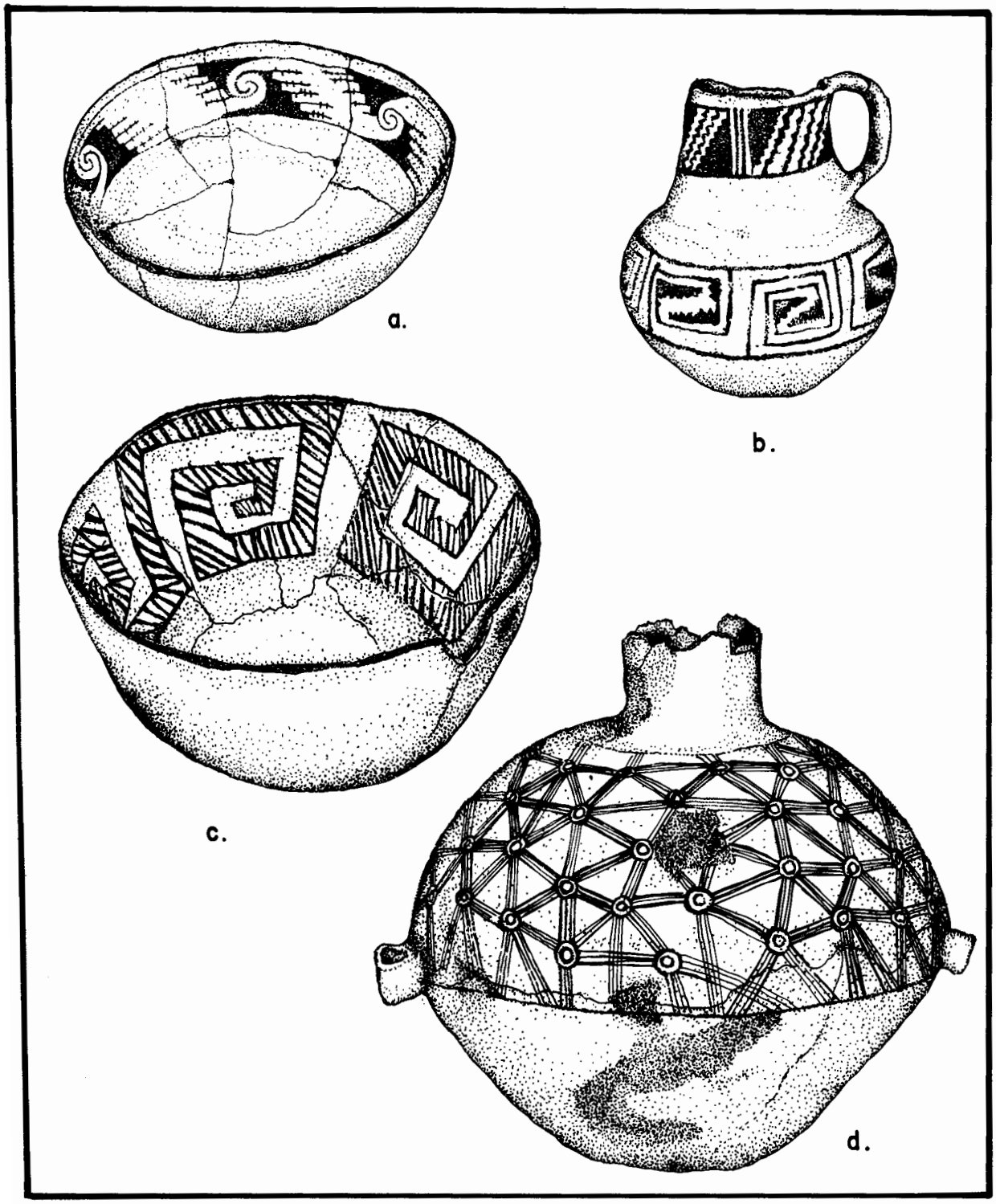


Figure 50. Mesa Verde Anasazi pottery: (a-b) Cortez Black-on-white (after Lister 1965:Plates 30b and 31b); (c) Mancos Black-on-white (after Reed 1979:Fig. 16); (d) Mancos Black-on-white olla from Lion House.

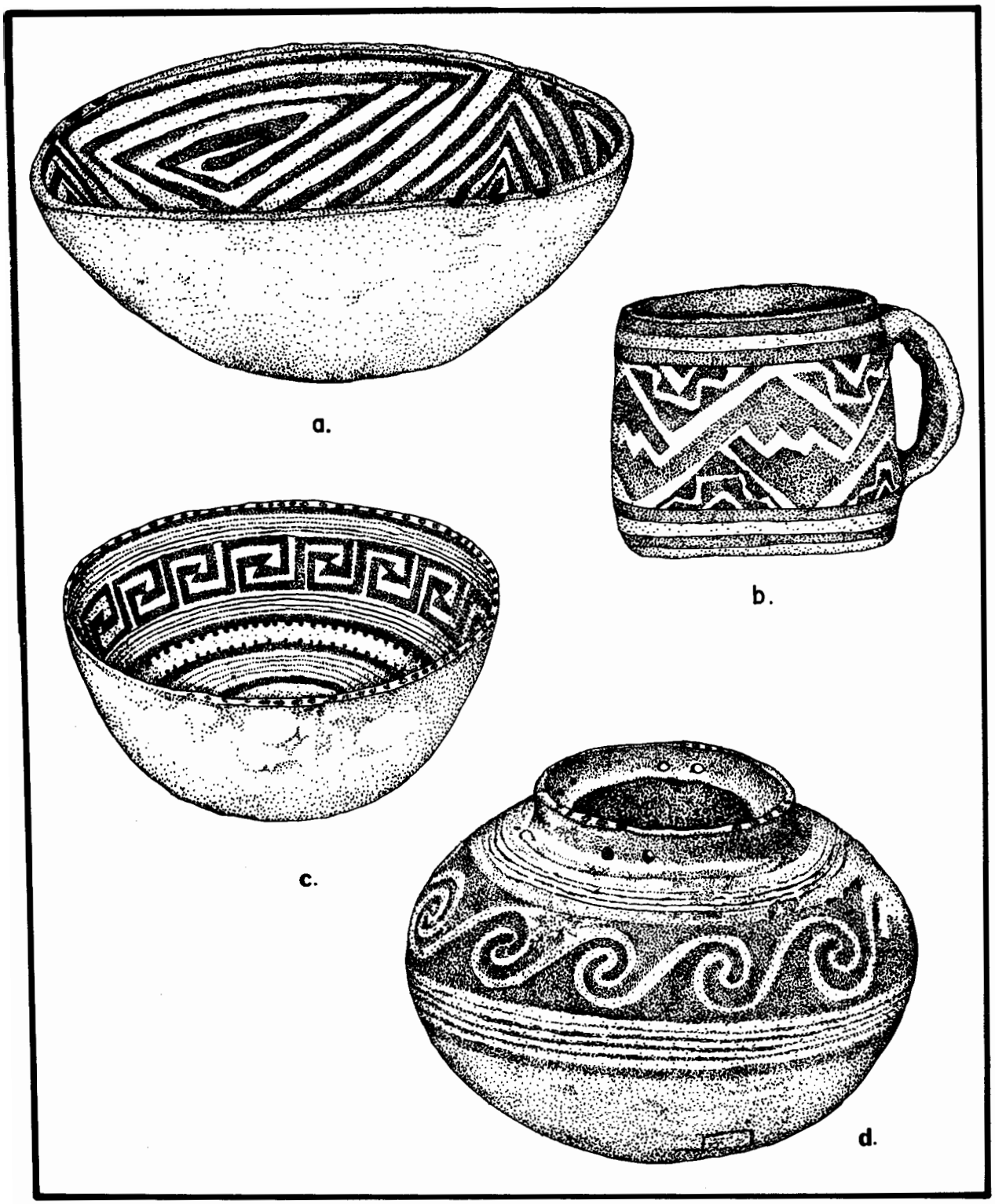


Figure 51. Mesa Verde Anasazi pottery: (a-b) McElmo Black-on-white bowl and mug from Lowry Ruins (after Photo No. 73560, Division of Photography, Field Museum of Natural History); (c) Mesa Verde Black-on-white (after Nordenskiold 1893: Plate 26); (d) Mesa Verde Black-on-white kiva jar (after Fewkes 1911:Plate 27).

The Mesa Verde pottery types and variations predominate throughout much of the study area except in the lower Piedra District and the upper part of the Navajo Reservoir District found in Colorado where an analogous ceramic development occurred, but with locally different types. The Pueblo pottery in that region includes 16 types, only two of which (Mancos Corrugated and Piedra Black-on-white) overlap with the Mesa Verde traditions. Table 3 lists these types along with their definitive characteristics; for additional information, the reader is referred to Eddy (1966).

In addition to locally manufactured ceramics, pottery originating from outside the Northern San Juan Anasazi Area occurs infrequently in the ceramic collections from sites in southwestern Colorado. This non-local pottery is especially important for cross-dating of sites and for defining trade connections between the various prehistoric Southwestern culture areas. Generally speaking, intrusive pottery types are prehistoric sites in the Mesa Verde area derived from (1) Kayenta Anasazi of northeastern Arizona; (2) the Chaco area of northwestern New Mexico: (3) the upper Little Colorado River district, north of the White Mountains of Arizona; or (4) the Mogollon area of southwestern New Mexico. Trade wares in the Mesa Verde Region are more common (although still scarce) during the Pueblo II-III periods, with the strongest influence coming from Chaco and Little Colorado areas (Baldwin 1976; Hayes and Lancaster 1975:140). In the eastern sector of our study area, both Chaco and Kayenta potsherds were noted at Chimney Rock Pueblo (Eddy 1977:43), and in the lower Piedra and upper Navajo Reservoir Districts, pottery from the Mesa Verde Region, along with vessels from northwestern New Mexico and northeastern Arizona, are recorded as trade types.

Clothing and Adornment

Evidence for clothing is generally lacking except from dry deposits in sheltered caves. From these sites, however, comes evidence that a variety of textile and cord products were fashioned into clothing

Table 3. Pottery types and characteristics of the lower Piedra and Navajo Reservoir Districts (after Eddy 1966:Table 2 and Fig. 47).

TRADITION	TYPE	FIRE	TEMPER	PAINT	SURFACE TREATMENT	PHASE
Brown Paste	Los Pinos Brown	Oxidized	Quartz sand	None	Unslipped, polished	Late Los Pinos - Sambrito
	Sambrito Brown	Oxidized	Quartz sand	None	Unslipped, polished	Sambrito - early Rosa
	Rosa Brown	Oxidized	Quartz sand	None	Unslipped, unpolished	Late Sambrito - late Rosa
	Piedra Brown	Oxidized	Crushed rock	None	Unslipped, unpolished	Piedra
Gray Paste	Rosa Gray, Neckbanded	Reduced	Quartz sand	None	Unslipped, unpolished	Rosa - early Piedra
	Piedra Gray Neckbanded	Reduced	Crushed rock	None	Unslipped, unpolished	Piedra - early Arboles
	Piedra Plain	Reduced	Crushed rock	None	Unslipped, polished	Piedra - early Arboles
	Arboles Gray Neckbanded	Reduced	Crushed rock	None	Unslipped, unpolished	Late Piedra - Arboles
	Arboles Plain	Reduced	Crushed rock	None	Unslipped, polished	Late Piedra - Arboles
	Mancos Corrugated	Reduced	Crushed rock	None	Unslipped, polished	Arboles
	Payan Corrugated	Reduced	Crushed rock	None	Unslipped, polished	Arboles
Carbon Paint	Rosa B/W	Reduced	Quartz sand	Organic	Unslipped, unpolished	Late Sambrito - early Piedra
	Bancos B/W	Reduced	Quartz sand	Organic	Unslipped, unpolished	Piedra
Mineral Paint	Rosa B/W	Reduced	Quartz sand	Green glaze	Unslipped, unpolished	early Sambrito - early Piedra
	Piedra B/W	Reduced	Crushed rock	Mineral	Unslipped, polished	Late Rosa - early Arboles
	Arboles B/W	Reduced	Crushed Rock	Mineral	Slipped, polished	Late Piedra - Arboles

which served to protect the people from the elements. Foremost among utilitarian garments were robes or blankets which, during Basketmaker times, were made by wrapping strips of rabbit skin around heavy strings made from yucca fiber, and then weaving the furry strings together with rows of twining to form a blanket. It is not uncommon in cave sites to find burials, adults and children alike, with the bodies wrapped in such items. During the Pueblo periods, fur cord blankets continued to be made, but even more popular were feather blankets, made in about the same manner but with split turkey features wound around the cordage instead of fur strips.

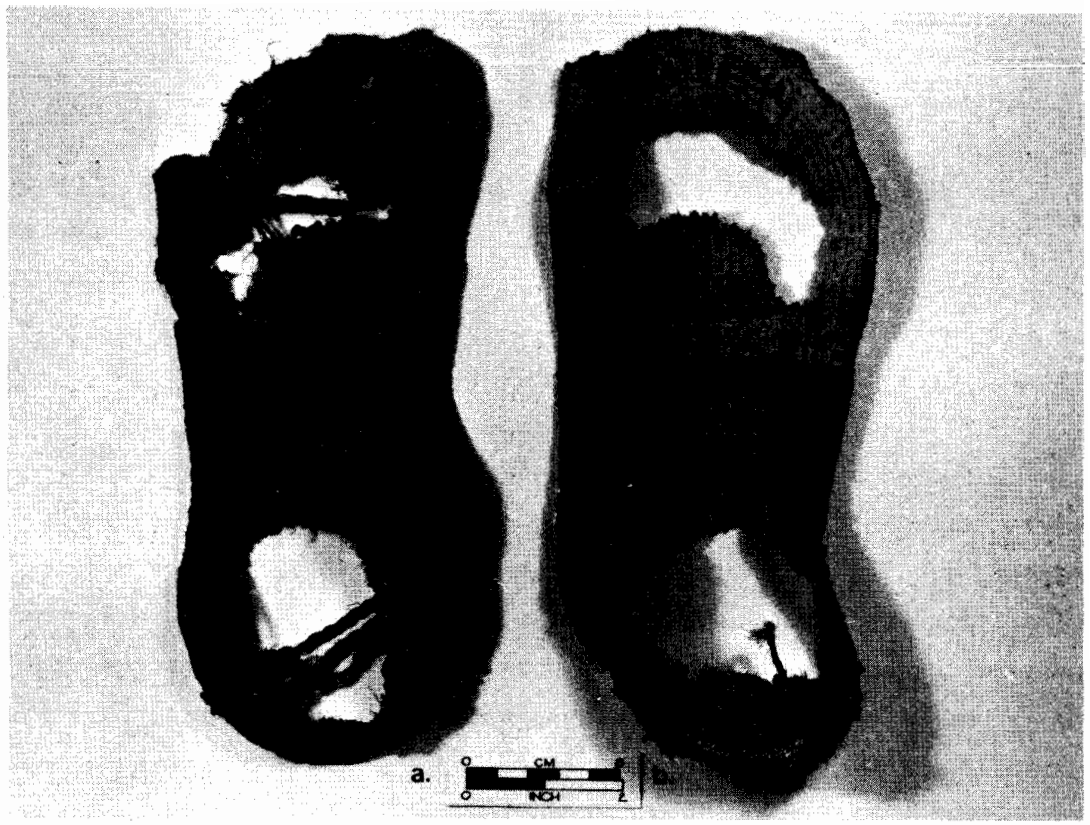
By the end of the Basketmaker era, loom weaving and cotton textiles (Fig. 53) had been introduced into the northern Southwest. Very few examples of raw cotton fiber and no other parts of cotton plants have been recovered from sites with good preservation in southwestern Colorado. It appears, therefore, that most of the cotton cloth was traded into the area in the finished form, although recoveries of weaving tools indicate some weaving was taking place locally. In all instances, cotton products and weaving tools are rare occurrences. Interestingly, only small fragments of cotton cloth have been found in the Mesa Verde cliff dwellings--the largest (reported) being a piece 43 centimeters wide found at Mug House (Rohn 1971:121)--and it would seem that small objects, possibly bags containing trade items, were present in our study area. Cotton shirts and blankets have been recovered from nearby sites in southeastern Utah, however (Tanner 1976:83-86).

A principal clothing item was sandals, and a wide variety was manufactured by the Anasazi. Beginning in the Basketmaker II period, sandals of two different styles were made. One type, known as wickerwork, was made out of partially washed yucca leaves and had four warps of a few leaves each, with more leaves woven back and forth across them. A second type of Basketmaker II sandal, one that became more common in Basketmaker III times, was the cord type. The cord sandal undoubtedly took longer to manufacture, being made from woven string prepared from yucca and other fibrous

plants. By the late Basketmaker era, elaborate patterns were produced on these sandals with raised designs (Fig. 52a), woven colored designs (Fig. 52b), or painted motifs found. After Basketmaker III, broad-leaf and narrow-leaf yucca twill-plaited sandals became the common type (Fig. 52 c,d), although decorated cord sandals continued in use. Apparently people of all ages wore sandals as children's sizes have been recovered along with the more plentiful adult sandals.

Personal appearance was also of concern to the Anasazi. Hair brushes, usually made from grass stems or pine needles, have been found in dry cave sites in the project area, and jewelry, particularly necklaces, pendants, bracelets and rings, is somewhat common in artifactual collections. Materials for ornaments were variable; pendants made from shaped stone and ceramic sherds as well as traded shells, and necklaces made from Olivella shells and bone, turquoise, and drilled circular stone beads have been found. Walnuts, originating in Arizona, and dried juniper berries were also strung as necklaces.

The most elaborate jewelry collection came from a burial at the Dominguez Site (Reed 1979), in which nearly 6900 disk-shaped stone beads (jet, shale, and turquoise) were found, along with a frog-effigy pendant made of shell/turquoise, and two circular ornaments of shell and turquoise. Two mosaic ornaments were also found with this burial. The two circular objects were tentatively identified as pendants by Reed (1979:61-62, Fig. 25), although they lacked evidence for suspension. A Mesoamerican specialist has recently observed that these objects resemble ear spools in that area (Michael Foster, personal communication) and, indeed, the ornaments were found near the face and neck of the burial. It would appear, then, that this one individual's ornaments are somewhat atypical for southwestern Colorado, evidently representing an example of differential status burials. Such internments are found exclusively in association with the Chaco towns of northwestern New Mexico and Chacoan outlier sites.



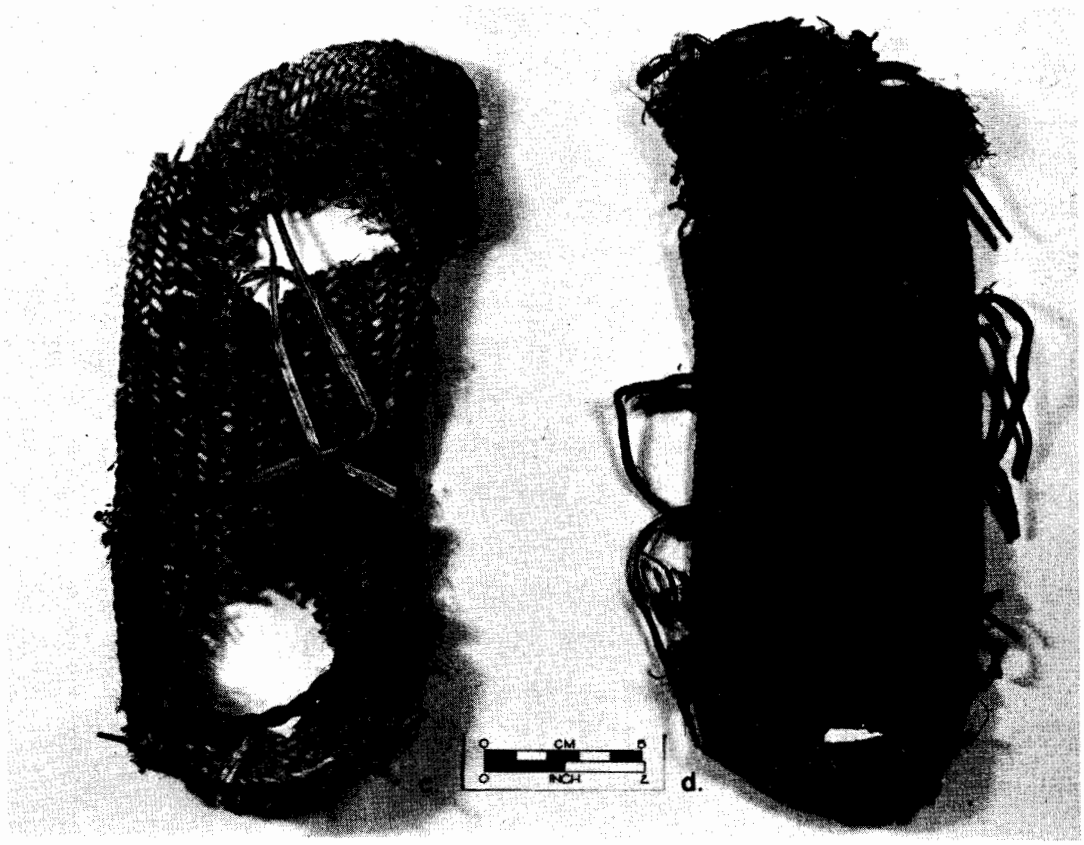


Figure 52. Anasazi sandals from the Johnson Canyon cliff dwellings: (a) cord sandal with raised designs; (b) cord sandal with woven colored designs; (c-d) yucca twill-plaited sandals.

Religious Artifacts

A final class of artifactual materials includes those items which are thought to have served a function in the religious sphere of Anasazi society. All too often, concrete data supporting such functions are lacking and such assignments are made only by reference to the ethnographic picture for historic Pueblos, or in some cases, based on the archaeologist's point of view that only a nonutilitarian function can be given to certain artifacts. This latter category includes such things as so-called "medicine bundles" consisting of bags containing assorted small objects, and wooden artifacts such as one from a Basketmaker cave in northeastern Arizona which included carved sunflowers, cones, and birds (Kidder and Guernsey 1919). A similar burial cache was found in a basket with a burial at Site MV200 in Mesa Verde (Rohn 1977). The basket contained 90 objects, some of which were functional tools and tool manufacturing materials, but others of possible religious meaning were also included.

Certain pottery forms in the Mesa Verde area, especially animal and bird effigy vessels, may have had a religious function. One jar form, commonly known as the "kiva jar," was elaborately decorated, with a lip around the top and fitted lid, and may have been used to hold special ceremonial items although, once again, supporting data is absent. Tinklers, made from rabbit tibiae, are widespread and seem to be found associated with kivas where drafts entering the ventilator system or roof entryways would have provided a noise from such suspended items.

Smoking paraphernalia, both pipes and cigarettes, are common and, based upon ethnographic analogy, are thought to have been used for ceremonial purposes rather than pleasure smoking. In later historic times, similar pipes were called "cloud blowers," and were often used in ceremonies to create images of clouds designed to bring rain. Musical instruments--flutes, rasps, and whistles--were common and could have been used for ceremonial purposes.

Another item of unknown significance was the copper bell. These artifacts were not manufactured in the Southwest, but rather were traded to the area from Mesoamerica. A single example of a copper bell has been recorded from southwestern Colorado and was found near the Goodman Point Ruin (Hayes and Chappell 1962).

Subsistence Patterns

During the past few decades, archaeologists and their colleagues in botany and zoology have combined to produce considerable data regarding prehistoric subsistence resources and their utilization. In southwestern Colorado, as in the remainder of the Southwest, this attention has focused on the varieties of plants cultivated, the agricultural techniques employed to grow them, the types of wild plants collected for food, and the exploitation of nondomesticated fauna. These general topics will form the basis for our discussion of subsistence patterns.

Plant and animal remains are to be found in differing quantities in nearly every archaeological site. In most cases, however, these materials are not retrievable without excavation of the site and often specialized recovery and analytical techniques are required. Consequently, since there are few pre-Formative sites in southwestern Colorado, and none have been excavated, we have no direct data bearing on Paleo-Indian and Archaic subsistence modes and comparative information from other areas must be used. In contrast, the Anasazi situation is fairly well known, due not only to the large number of sites that have been wholly or partially excavated in southwestern Colorado but also to the location of many sites in dry, sheltered alcoves where preservation is excellent in many instances.

Pre-Formative Subsistence

Our knowledge of actual subsistence patterns of the Paleo-Indian groups who apparently sporadically occupied the Four Corners area is nonexistent. Based on evidence from other regions, we expect these

groups to have participated in a general big-game hunting way of life; however, smaller animals and plant species would have also been important. The primary prey of the Paleo-Indians, the late Pleistocene megafauna, do not appear to have been present in the area, based on current evidence.

The Western Archaic subsistence pattern can be generally classified as a hunting and collecting situation with the hunting of modern big game animals (e.g. deer, elk, sheep, and antelope) and smaller mammals and rodents. In many localities, nearly every available and edible plant was exploited including seeds, bulbs, nuts, roots, and berries. To date no Archaic sites have been intensely investigated within the project area, but two Archaic cave sites (Lindsay et al. 1968), located near Navajo Mountain in southeastern Utah south of the San Juan River, give us at least a partial picture of Archaic subsistence ways. At these sites, Sand Dune and Dust Devil Caves, the presence of many milling stones and relatively large amounts of grass pollen may indicate an importance of grass seeds in the diet. The most common faunal remains were those of cottontail and sheep, with ground squirrel, pocket gopher, and jackrabbit occurring with some frequency. Based on their work, Lindsay and his co-authors (1968:120) conclude that the local Archaic subsistence pattern "was one of primary dependence on wild plant foods and small game with large game being only occasionally utilized." Although substantive data are not available, similar patterns of mixed foraging and hunting have been posited for the Oshara Tradition (Irwin-Williams 1973) and Archaic groups in the Hovenweep area (Winter 1976).

Domesticated Animals

Domestic animals apparently never were extremely widespread and populous during the Anasazi sequence. In fact only two species, dogs and turkeys, are known to have been kept at the villages. The dog (Canis familiaris), which may go back to Paleo-Indian times in North America, is known to have been present in southwestern Colorado since the Basketmaker III period, although the species has been dated to Basketmaker II sites elsewhere in the Southwest. It is possible that

dog materials were found at the Durango Basketmaker II sites; however, a distinction between dogs and coyotes was not made (Rodeck 1954). The most complete description of prehistoric Anasazi dogs is that of Emslie (1978a), who notes that dogs may have been used for food (as indicated by butchering marks) and certain ceremonial or religious purposes.

The turkey (Meleagris gallopavo), a native to the area, seems to have been domesticated by early Basketmaker III times, although the use of turkeys is also documented for the preceding period. To our knowledge, it has not been conclusively proven that the turkey was actually domesticated, but they were clearly kept at the villages as evidenced by pens with layers of excrement, eggshells, and the presence of immature birds. Nonetheless, turkeys were eaten and their bones and feathers used to manufacture several tool and clothing articles.

Plant Domesticates of the Formative Stage

Corn, beans, and squashes (Fig. 54) were the primary plants cultivated in southwestern Colorado by the Anasazi. As noted previously, it is doubtful if cotton, although a Southwestern domesticate, was ever grown in the study area; if it was, the substantiating data are presently lacking except maybe for the Hovenweep area (Winter 1977). It is also possible that certain wild plants may have been fostered in a semi-cultivated state, being encouraged and tended proximal to the villages. Jennings (1966) believes that amaranth, beeweed, and prickly pear cactus were probably tended in favored locations by the prehistoric inhabitants of the Glen Canyon area in Utah. Likewise, Winter (1977) has found through pollen analysis of fields in the Hovenweep area that a number of wild or weedy economic plants were probably manipulated and allowed to grow in fields. It was, however, the triad of cultigens that formed the basis for the diet, particularly corn (cf. Nickens 1977a; Scott 1979).

Corn

Corn (Zea mays), or maize, first appeared in the Southwest from Mexico about 3600 to 2300 B.C., but it did not reach the northern Southwest until about the beginning of the Christian era. Corn was recovered from the Durango Basketmaker II sites (Morris and Burgh 1954) and at a Basket-

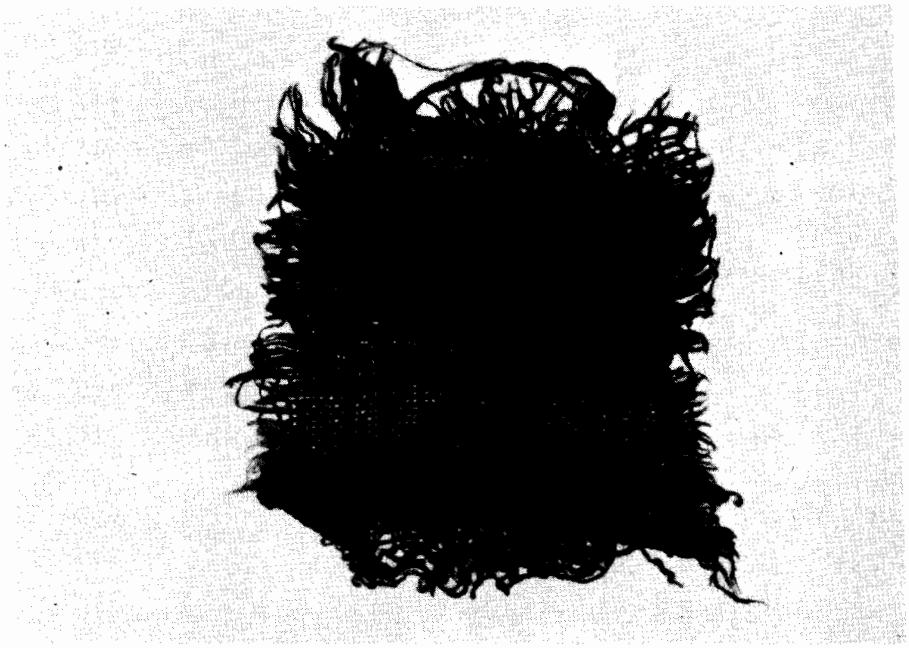


Figure 53. Woven cotton cloth fragment from the Johnson Canyon cliff dwellings.

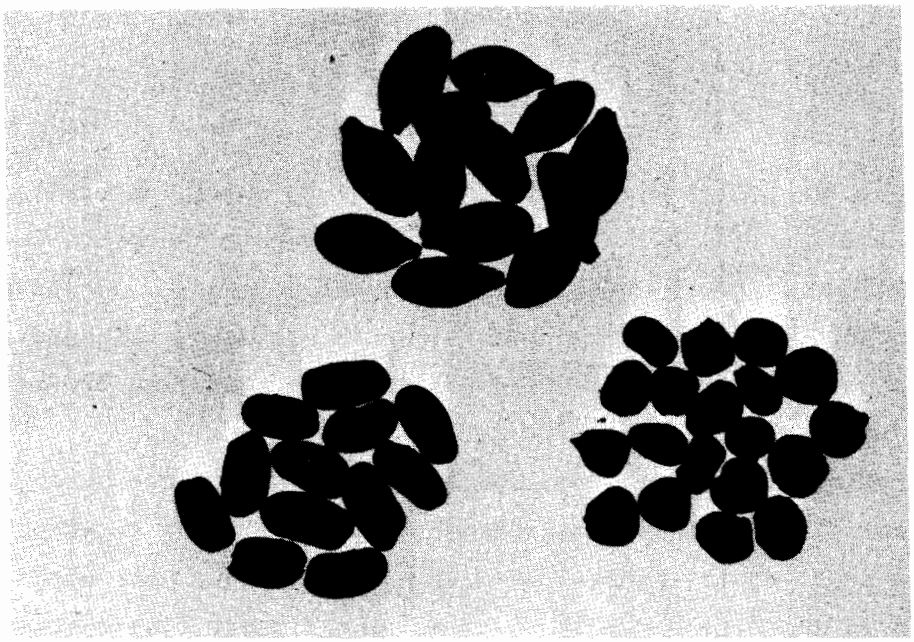


Figure 54. Examples of domesticated crops from the Johnson Canyon cliff dwellings: (top) squash; (bottom, left) beans; (bottom, right) corn.

maker II site on Cedar Mesa in southeast Utah where cobs were dated to A.D. 255 and 380 (Winter 1973). Without doubt, following its introduction, corn continued to increase in importance to the Anasazi diet through the Pueblo III period when, based on studies of coprolites (human paleofecal specimens) (e.g. Stiger 1975), nearly every meal included corn in some form. Readers interested in details on the genetic background and other characteristics of prehistoric corn in southwestern Colorado are referred to Jones and Fonner (1954), Cutler and Meyer (1965), Reaves (1977), Minnis and Ford (1977), and Valdez (1978).

Beans

Several varieties of beans were grown in the Southwest, but several types apparently never reached the Mesa Verde Region. Beans first appear in archaeological context during the Basketmaker III time (Carlson 1963) with two varieties present, the common bean (*Phaseolus vulgaris*) and the tepary (*P. acutifolius*). However, only the common bean seems to have been grown in later periods (Kaplan 1965; Nickens 1977a; Minnis and Ford 1977).

Squash

The term "squash" refers to a plant group which includes squash, pumpkin, and gourds. All of these plants belong to the genus *Cucurbita*, except the common gourd which is of the genus *Lagenaria*. In prehistoric times, and continuing into the modern Pueblo villages, the seeds, flesh, and leaves of the plants were used for food and the dried fruits were employed as containers.

Pumpkins of undetermined species were found at the Durango Basketmaker II sites (Jones and Fonner 1954). At later sites only *Cucurbita pepo* (common pumpkin) and *C. Mixta* (cushaw) have been recovered in the Mesa Verde Region (Cutler and Meyer 1965; Nickens 1977a), with *C. pepo* the dominant species. Another form of squash known to have been cultivated in the prehistoric Southwest, *C. Moschata* (field pumpkin) has not been found in the present study area.

Prehistoric Agricultural Practices in Southwestern Colorado

Indications of various forms of agricultural techniques are clearly evident in some areas of the Mesa Verde region, notably in the Hovenweep vicinity (Winter 1975, 1976, 1977) and on the Mesa Verde (Rohn 1963; Smith n.d.). Hack (1942) has defined four primary types of fields from his extensive work on aboriginal agricultural techniques in northeastern Arizona, three of which appear to have widespread usage in prehistoric southwestern Colorado. These field types also include a number of variations and subtypes within each category, many of which have also been documented in the present project area. Each of the principal types of fields and the evidence for their existence is briefly reviewed below.

1. Floodwater Farming: Floodwater farming involves planting crops in fields watered by surface runoff. Fields watered in this manner generally occur in one of four locations: on alluvial fans at arroyo mouths, along the course of shallow arroyos or rivers, in the lower terraces of arroyos, and in the bottom of arroyos. In the Four Corners area, the success or failure of these fields depends on the rainfall pattern in a given watershed which determines the streamflow or flooding in the watercourses.

In the project area, there is abundant evidence for the presence of prehistoric floodwater farming. Farming of the deep, sandy alluvial soils found along river courses has been widely suggested, based primarily on associated settlement patterns (Winter 1976; Gillespie 1976; Eddy 1966; Adams 1975). On the other hand, several instances of actual floodwater farming sites have been recorded, and in some cases a farming function has been documented through pollen analysis of field sediments (e.g. Winter 1977). These features, commonly termed "water and soil control sites," include terraces and check dams across arroyos (Fig. 55) and have been found at Hovenweep (Winter 1977) and in the Yellow Jacket District (Chandler et al. 1980), but some of the best examples occur at Mesa Verde National Park (Rohn 1963). In the Hovenweep

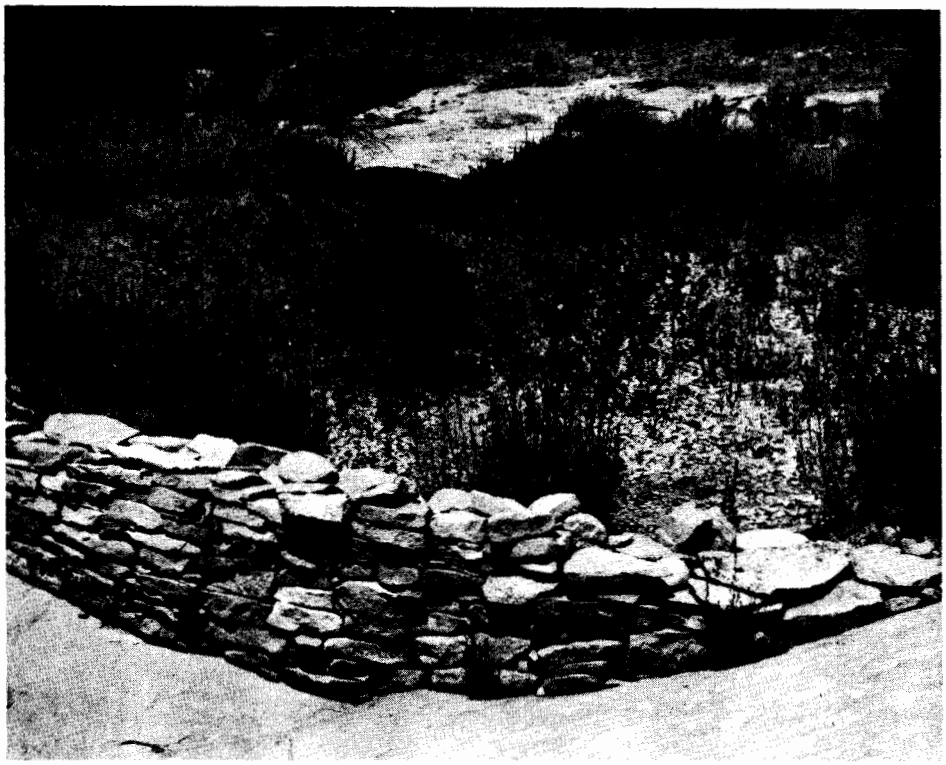


Figure 55. Experimental check dam constructed by San Jose State University at Hovenweep National Monument. The feature itself was reconstructed at the location of an Anasazi dam. The impoundment of silt and subsequent growth of flora is evident.

area, Winter (1977:188-209) found four kinds of floodwater fields including: (1) alluvial farms, including check dam structures; (2) main wash floodplains, which appear to have been extensively utilized; (3) arroyo bottom fields; and (4) slope wash sites consisting of linear terraces which ran along talus slopes.

2. Fields Watered by Rainfall: Fields watered by rainfall, or dry farming, would be expected to occur on the mesa tops where deep soil profiles are found. Unfortunately, this method of agriculture is characterized by a lack of structural associations, except for field houses, and fields are, therefore, difficult to identify. Utilizing an innovative approach to dry farm field identification, Winter (1977) examined a series of pollen transects around Anasazi mesa top pueblos in the Hovenweep area and found abundant corn pollen along with that of beans and squash. Winter concluded that dry farming was probably fairly common around these sites, but it was probably restricted to areas immediately adjacent to the villages.

3. Fields Watered by Irrigation: In this form of farming, water is taken from rivers, springs, or slope wash, and transported by ditch or canal to fields. Prehistoric ditches were not discovered at Hovenweep, but have been noted farther east at Mesa Verde (Rohn 1963:451-454). Thus, this practice appears to have been of lesser importance in southwestern Colorado than floodwater or dry farming.

4. Fields Watered by Subsurface Seepage: Hack (1942) noted this type of field to occur at mesa edges in the Hopi area of northeastern Arizona where water aquifers fed both colluvial soils and sand dunes. This mode of farming has not been documented for prehistoric contexts in the project area. However, Winter (1977:201) has recorded the use of seeps which were modified to feed what he has labeled springside gardens. The presence of the farming at one seep near Hackberry House was revealed through palynological studies.

In summary of the agricultural practices, then, a wide variety of techniques was employed prehistorically. In light of Winter's extensive data, it is perhaps beneficial to briefly present his conclu-

sions for the Hovenweep area, which are probably valid for other parts of the San Juan Resource Area as well:

> Maize, beans, and squash were probably the most common crops at Hovenweep. Based on the pollen samples it appears that extensive fields grew in dry farm locations around the villages on the mesa tops and in floodwater locations in the canyons and mesa top arroyos. Maize and squash were probably grown in almost every arable location, except for the broad mesa tops and canyon bottoms away from the villages, while beans seem to have been restricted to the fields around the mesa top villages. All three crops were sometimes grown in the same field, but at times corn grew alone, and at other times corn grew with beans or squash. Cotton was also probably grown as indicated by pollen. . .. The exact location of the cottonfields is not known but they may have been around the springs, since (modern) Hopi cottonfields were restricted to the moist springside terraces around the mesa and in irrigated fields . . .. (Winter 1977:230).

Wild Flora and Fauna Exploitation

The utilization of nondomesticated plants and animals by the Anasazi for food and other economic uses appears to have been extensive throughout the time of occupation. It is probable, however, that as agricultural techniques were perfected and productivity increased during the later periods, the reliance on wild resources diminished. Nonetheless, tabulations of micro- and macro-plant and animal remains from archaeological sites in southwestern Colorado indicate widespread usage of edible plants and both large and small animals. Although there are numerous references to such uses in the literature, the broadest coverages of this topic for the project area may be found in the following sources: Morris and Burgh (1954); Rohn (1971); Emslie (1977a); Eddy (1977); Nickens (1977a, n.d.); and Scott (1979). Some of these data are briefly reviewed below, and Tables 4 through 6 list the scientific and common names of flora and fauna which have been recovered from certain sites in southwestern Colorado. These lists are not complete in terms of all biotic resources utilized; however, they represent the most comprehensive tabulations of such artifacts from individual projects in the study area.

Table 4. Scientific and common names of fauna recovered from the Johnson Canyon cliff dwellings (Nickens 1977a). The list is not a complete tabulation of all animal species utilized by the prehistoric occupants of southwestern Colorado, but it is fairly representative of the primary economic fauna.

SCIENTIFIC NAME	COMMON NAME
Class Reptilia	
Order Squamata	
Family Iguanidae	
Sceloporus sp.	Spiny Lizards
Sceloporus undulatus	Eastern Fence Lizard
Sceloporus graciosus	Sagebrush Lizard
Suborder Serpentes	
Family Colubridae	Non-poisonous Snakes
Class Aves	
Order Falconiforms	
Family Cathartidae	
Cathartes aura	Turkey Vulture
Family Accipitridae	
Accipiter cooperii	Cooper's Hawk
Buteo sp.	Hawks
Buteo jamaicensis	Red-tailed Hawk
Buteo swainsoni	Swainson's Hawk
Buteo lagopus	Rough-legged Hawk
Buteo regalis	Ferruginous Hawk
Family Falconidae	
Falco sparverius	Sparrow Hawk
Order Galliformes	
Family Meleagrididae	
Meleagris gallopavo	Turkey
Order Strigiformes	
Family Strigidae	
Bubo virginianus	Great Horned Owl
Asio otus	Long-eared Owl
Order Passeriformes	
Family Corvidae	
Cyanocitta stelleri	Steller's Jay
Aphelocoma coerulescens	Scrub Jay
Corvus corax	Common Raven

(cont'd)

Table 4 (continued).

Class Mammalia	
Order Lagomorpha	
Family Leporidae	
Sylvilagus sp.	Cottontails
Sylvilagus nuttallii	Nuttall's Cottontail
Sylvilagus audubonii	Desert Cottontail
Lepus californicus	Black-tailed Jackrabbit
Order Rodentia	
Family Sciuridae	
Marmota flaviventris	Yellow-bellied Marmot
Cynomys gunnisoni	Gunnison's Prairie Dog
Spermophilus sp.	Rock and Ground Squirrels
Spermophilus variegatus	Rock Squirrel
Spermophilus lateralis	Golden-manteled Ground Squirrel
Sciurus aberti	Abert's Squirrel
Tamaiasciurus hudsonicus	Red Squirrel
Family Geomyidae	
Thomomys bottae	Botta's Pocket Gopher
Family Crecetidae	
Peromyscus sp.	Mice
Peromyscus crinitus	Canyon Mouse
Peromyscus maniculatus	Deer Mouse
Peromyscus boylii	Brush Mouse
Peromyscus truei	Pinyon Mouse
Peromyscus nasutus	Rock Mouse
Neotoma sp.	Wood Rats
Neotoma mexicana	Mexican Wood Rat
Neotoma cinerea	Bushy-tailed Wood Rat
Family Erethizontidae	
Erethizon dorsatum	Porcupine
Order Carnivora	
Family Canidae	
Canis sp.	Dogs and Coyotes
Canis familiaris	Dog
Canis latrans	Coyote
Canis lupus	Gray Wolf
Urocyon cinereoargenteus	Gray Fox

(cont'd)

Table 4 (continued).

Order Carnivora (Cont.)	
Family Mustelidae	
Taxidea taxus	Badger
Family Felidae	
Lynx rufus	Bobcat
Order Artiodactyla	
Family Cervidae	
Cervus canadensis	Elk (Wapiti)
Dama (Odocoileus) hemionus	Black-tailed or Mule Deer
Family Antilocapridae	
Antilocapra americana	Pronghorn
Family Bovidae	
Ovis canadensis	Mountain Sheep

Table 5. Listing of flora recovered as artifacts and macrofloral specimens from the Johnson Canyon cliff dwellings (Nickens n.d.).

SCIENTIFIC	COMMON
EQUISETACEAE	Horsetail Family
Equisetum sp.	Horsetail
EPHEDRACEAE	Jointfir Family
Ephedra viridis Coville	Mormon Tea
PINACEAE	Pine Family
Juniperus osteosperma (Torr.) Little	Utah juniper
Picea sp.	Colorado blue spruce
Pinus sp.	Pine
Pinus edulis Engelm.	Pinyon pine
Pinus ponderosa Dougl.	Ponderosa pine
Psuedotsuga menziesii (Mirb.) Franko	Douglas fir
ACERACEAE	Maple Family
Acer negundo L.	Boxelder
AMARANTHACEAE	Amaranth Family
Amaranthus sp.	Pigweed
ANACARDIACEAE	Sumac Family
Rhus trilobata Nutt.	Skunkbush
ASCLEPIADACEAE	Milkweed Family
Ascelepias sp.	Milkweed
BETULACEAE	Birch Family
Betula occidentalis Hook.	Rocky Mountain birch
Alnus sp.	Alder
CACTACEAE	Cactus Family
Coryphantha vivipara (Nutt.)Britt & Rose	Ball cactus
Opuntia sp.	Prickly pear
CAPPARIDACEAE	Caper Family
Cleome serrulata Pursh	Beeplant
CHENOPODIACEAE	Goosefoot Family
Atriplex canescens (Pursh) Nutt.	Fourwing saltbush
Chenopodium sp.	Goosefoot
Sarcobatus vermiculatus (Hook.) Torr.	Greasewood

(cont'd)

Table 5 (continued).

SCIENTIFIC	COMMON
COMPOSITAE	Sunflower Family
Ambrosia type	Ragweed
Artemisia frigida Willd.	Fringed sagebrush
Artemisia tridentata Nutt.	Big sagebrush
Chrysothamnus nauseosus (Pall.) Britt.	Rabbitbrush
Helianthus annuus L.	Common sunflower
CONVOLVULACEAE	Morning-glory Family
CRUCIFERAE	Mustard Family
Lepidium sp.	Pepperweed
CUCURBITACEAE	Pumpkin Family
Cucurbita mixta Pang.	Green striped cushaw
Cucurbita pepo L.	Squash/pumpkin
CYPERACEAE	Sedge Family
Scirpus sp.	Bulrush
ELEAGNACEAE	Oleaster Family
Shepherdia argentea (Pursh) Nutt.	Buffaloberry
FAGACEAE	Beech Family
Quercus gambelii Nutt.	Gambel oak
GERANIACEAE	Geranium Family
Erodium circutariam (L.) L'Her	Storksbill
GRAMINEAE	Grass Family
Oryzopsis hymenoides (R.&S.) Ricker	Indian ricegrass
Phragmites communis Trin.	Common reed
Poa fendleriana (Steud.) Vasey	Mutton grass
Zea mays L.	Corn
JUGLANDACEAE	Walnut Family
Juglans major (Torr.) Heller	Walnut
LABIATAE	Mint Family
Poliomintha sp.	Rosemary mint
Salvia carnosa Dougl.	Sage
LEGUMINOSAE	Pea Family
Phaseolus vulgaris L.	Common bean
LILIACEAE	Lily Family
Yucca baccata Torr.	Broad-leaf yucca
Yucca harrimaniae Trel.	Narrow-leaf yucca
Zygadenus paniculatus S. Wats.	Death camas

(cont'd)

Table 5 (continued).

SCIENTIFIC	COMMON
MALVACEAE	Mallow Family
Gossypium hopi Lewton	Cotton
Sphaeralcea coccinea (Pursh) Rydb.	Globe mallow
PLANTAGINCEAE	Plantain Family
Plantago purshii Roem. & Schult.	Woolly plaintain
POLEMONIACEAE	Phlox Family
Phlox sp.	Phlox
POLYGONACEAE	Buckwheat Family
Eriogonum sp.	Buckwheat
PORTULACACEAE	Purslane Family
Portulaca sp.	Purslane
ROSACEAE	Rose Family
Amelanchier utahensis Koehne	Utah serviceberry
Cercocarpus montanus Raf.	Mountain mahogany
Prunus virginiana L.	Chokecherry
Rosa sp.	Wild rose
RUBIACEAE	Madder Family
Galium aparine L.	Bedstraw
SALICACEAE	Willow Family
Populus fremontii S. Wats.	Fremont popular
Populus tremuloides Michx.	Aspen
Salix sp.	Willow
SAXIFRAGACEAE	Saxifrage Family
Fendlera rupicola A. Gray	Fendlerbush
Philadelphus microphyllus A. Gray	Mockorange
Ribes leptanthum A. Gray	Gooseberry
SCROPHULARIACEAE	Figwort Family
Castilleja sp.	Indian paintbrush
SOLANACEAE	Potato Family
Physalis fendleri A. Gray	Ground cherry
TYPHACEAE	Cattail Family
Typha latifolia L.	Cattail
ULMACEAE	Elm Family
Ulmus	Elm
UMBELLIFERAE	Carrot Family

Table 6. Additional plant remains (cf. Table 5) which were excavated from Mug House, Mesa Verde National Park (Rohn 1971).

SCIENTIFIC	COMMON
AMARANTHACEAE	Amaranth Family
Toxicodendron radicans (L.) Kuntze	Poison Ivy
BERBERIDACEAE	Barberry Family
Berberis repens Lindl.	Oregon grape
BORAGINACEAE	Borage Family
Hackelia gracilenta (Eastw.) Johnston	False Forget-me-not
Lappula redowskii (Hornem.) Greene	Stickseed
Lithospermum ruderale Dougl.	Puccoon
CACTACEAE	Cactus Family
Echinocereus coccineus Engelm.	Hodgehog cactus
Opuntia davisii Engelm. & Bigel.	Rattail cactus
CAPRIFOLIACEAE	Honeysuckle Family
Sambucus coerulea Raf.	Blue elderberry
Symphoricarpos oreophilus A. Gray	Snowberry
CELASTRACEAE	Staff Tree Family
Pachystima myrsinites Raf.	Mountain lover
CHENOPODIACEAE	Goosefoot Family
Atriplex canescens (Pursh) Nutt.	Fourwing saltbush
COMPOSITAE	Sunflower Family
Artemisia ludoviciana Nutt.	Prairie sage
Brickellia californica (T. & G.) A. Gray	Brickellbush
CRUCIFERAE	Mustard Family
Stanleya pinnata (Pursh) Britt.	Prince's plume
CYPERACEAE	Sedge Family
Corex sp.	Sedge
EUPHORBIACEAE	Spurge Family
Euphorbia sp.	Spurge
FAGACEAE	Beech Family
Quercus gambellii Nutt. X Q. Greene	Wavy-leaf oak

(cont'd)

Table 6 (continued).

SCIENTIFIC	COMMON
GRAMINEAE	Grass Family
Hordenum sp.	Barley
Koeleria cristata (L.) Pursh	Junegrass
Muhlenbergia richardsonis (Trin.) Rydb.	Mat muhly
LABIATAE	Mint Family
Salvia reflexa Hornem.	Lanceleaf sage
LEGUMINOSAE	Pea Family
Astralagalus sp.	Milkvetch
LILIACEAE	Lily Family
Allium textile Nels. & Macbr.	Wild onion
POLEMONIACEAE	Phlox Family
Polemonium foliosissimum A. Gray	Jacob's ladder
Polygonum sawatchense Small	Sawach knotweed
PORTULACACEAE	Purslane Family
Montia (perfoliata ?)	Miner's lettuce
RANUNCULACEAE	Buttercup Family
Clematis lingusticifolia Nutt. ex. T. & G.	Virgin's bower
ROSACEAE	Rose Family
Purshia tridentata (Pursh) DC	Bitterbrush
SCROPHULARIACEAE	Figwort Family
Nicotiana attenuata Torr. ex. S. Wats	Wild tobacco

The remains of wild fauna commonly occur in archaeological contexts in southwestern Colorado and lend themselves to a variety of analyses. It is possible, given adequate samples, to not only ascertain the species hunted, but often the number of faunal individuals represented, dietary preferences, butchering techniques, and seasonality of procurement (vide Emslie 1977a). Such studies indicate continued dependence on the larger mammals--deer, elk, mountain sheep, antelope, and bison--for food and artifact manufacture. At nearly all sites, the ubiquitous mule deer ranks as the primary food animal, followed by mountain sheep and elk. Antelope and bison bones occur in small quantities at many sites. These species are not present today in the area and the presence of such remains indicates either former presence, trade, or hunting forays.

The smaller mammals were also important in the Anasazi subsistence pattern. At Mug House, the cottontail rabbit, rock squirrel, and wood rat were listed among the primary food animals, along with deer and the turkey (Rohn 1971:105). Gillespie (1976) and Emslie (1977a) both note the importance of cottontails and jackrabbits as common meat sources at sites in the Mancos Canyon. Interestingly, several investigators (cf. Emslie 1977a; Gillespie 1976; Hayes and Lancaster 1975) have revealed a decline in the relative frequency of jackrabbits to cottontails in the Pueblo II and III periods. This secular decline in jackrabbit procurement may be related to a shift in Anasazi dietary preference; but an explanation involving ecological factors, such as overexploitation of jackrabbits by Basketmaker III and Pueblo I hunters, may be more plausible. Without a doubt, numerous other small mammals, rodents, birds, and even insects, played a role in Anasazi diet. More often than not, however, the importance of these smaller forms is either unidentifiable in the archaeological record or masked by the dominance of the larger animals.

Utilization of wild plant resources for food, medicine, architectural components, and artifacts was similarly widespread, although often the presence and function of such materials is difficult

to define. Plant items do not preserve as well as animal bones in open sites and sometimes, as in the case of pollen evidence, direct association with occupation of the site may be uncertain. On the other hand, the presence of alcove sites throughout the study area allows for a more precise and extended listing of utilized plants. Tables 5 and 6 present a combined listing of nearly 90 species recovered from Mug House (Rohn 1971) and the Johnson Canyon cliff dwellings (Nickens n.d.). Quantitative data from the Johnson Canyon ruins in the form of human coprolite components (Stiger 1975), pollen (Scott 1979), and macro-floral specimens (Nickens 1977a, n.d.) indicate reliance on several wild plants for foodstuffs including: prickly pear cactus; ground-cherry; Indian rice-grass; purslane; saltbush; bee weed; amaranth; and chenopods. Relative frequencies between domesticated and wild plants in the Johnson Canyon coprolites indicate that wild plants were subsidiary to cultigens in the diet, at least in Pueblo III times.

Socio-Political and Religious Systems

Defining social, political, and religious organizations which characterized prehistoric populations is often an elusive research question in archaeology. Stated simply, the data needed to reconstruct such situations are not as evident in the archaeological context as those related to settlement pattern, subsistence strategies, and material culture. We are fortunate to have a long cultural continuum in the Southwest extending from the prehistoric Anasazi to the present-day Pueblos from which inferences, or more properly analogies, can be drawn regarding the configuration of extinct social organizations. In the past few years, several attempts have been made to project historic patterns into the past using the many ethnographic accounts available for the Southwest and other general treatments of historic Pueblo social organization (e.g. Parsons 1939; Eggan 1950; Dozier 1970). Pertinent examples of this type of analysis includes various papers in Longacre's collection (1970) and Dozier's (1965) examination of Southwestern social units and archaeology.

The following discussion serves to call attention to the types of social and religious organization which probably were associated with the various stages of cultural development in prehistoric southwestern Colorado. The review is intentionally rendered at the general, or synthetic, level to give an overview of the prehistoric situation. Several notable efforts at understanding earlier social systems in southwestern Colorado are available and can be consulted for additional information. These include: Rohn (1965, 1971), Birkedal (1976), Eddy (1975, 1977), and Gillespie (1976).

At the outset, it is of benefit to define the terms "social and religious organization" and the roles they play in the maintenance of a given cultural grouping. Social organization is concerned with the arrangements and relationships of human beings one to another. Within this situation, a specific structure can be delineated regarding the component groups of a society and the configuration of their arrangement (e.g. residential groups, social position and statuses, etc.). Religious or ideological systems serve primarily to provide understanding of the social and natural environments and to structure individual and intra-group relationships. In this vein, Dozier (1970:133) has observed that historic Pueblo society and religion revolves around five basic concerns: (1) weather, (2) illness, (3) warfare, (4) control of flora and fauna, and (5) village harmony. We can expect, based on observable archaeological data, that the prehistoric Four Corners Anasazi shared the same concerns and structured their social and religious patterns around similar ideas. A final observation is that social and religious organization is not a static entity and changed, often markedly, throughout the stages of cultural development in the project area as other facets of the lifeway and natural environment underwent alteration.

Service (1971) has outlined a useful classification of levels of sociocultural integration which can be applied to the prehistoric developmental situation in southwestern Colorado. In this scheme, three stages are identified in the evolution of primitive social organizations: (1) band level of integration, (2) tribal level of integration, and (3) chiefdom level of integration. The band level characterizes the

network of relationships found in hunting and gathering or pre-agricultural societies (i.e. the Paleo-Indian and Archaic groups). Generally speaking, a band is a local group made up of several families who camp, forage, and migrate seasonally together. The band is a politically autonomous entity, composed of nuclear families who hunt and gather within a definable territory. Typically, population density is low in this case, and overall band size ranges from 10 to 50 persons. Inter-band relationships may be solidified through marriage patterns. It is theorized that most pre-European contact band societies were of the "patrilocal" type which is organized around a nucleus of males and in which the marriage pattern has the bride moving from her own band to that of the groom (Service 1971). The patrilocal band is the simplest form of social structure, but for a very good reason. Jennings (1975:278) has observed that the prehistoric Great Basin Desert Culture way of life involving "a constant food quest could militate against the development of a rich esthetic or socially complex life."

Once the agricultural-based way of life became dominant in the northern Southwest, the band level of integration would have been too simple to handle the more complex group activities and social relationships of the larger, sedentary communities. At this point, we see the advent of Service's tribal level of integration, a stage of organization which probably characterized nearly the entire span of Anasazi occupation of the project area. At this level, there is an increase in the social complexity as economically self-sufficient residential groups or families became more important. Integration of these groupings ranged from households (various types of families), to lineal groups (lineages or clans).

The lineage and clan are very important to modern-day Pueblo societies and thus deserve brief elaboration. A lineage is a consanguinal residential group whose members can trace their common relationship genealogically. Belief in descent from a real or mythical common ancestor (e.g. a bird or animal), localized residence, and lineage ceremonies may contribute to lineage solidarity. If a lineage becomes

too large, it may divide up into several smaller groupings called clans, whose members hold to the myth of a common ancestor, marry outside the group, and share common rituals. Steward (1955:161-170) has argued for a developmental sequence from lineages to clans in prehistoric Southwestern social organization in which Basketmaker III pithouse villages began as lineage groupings, and eventually evolved into clan segments in larger villages in late Pueblo times (Pueblo II-III).

At the same time, as Anasazi communities evolved from Basketmaker to Pueblo times, spatial contexts developed in the villages separating the domestic households from the ritual structures. McFeat (1974) has observed that this separation produced distinct intra-community spatial units which were separate yet interdependent, thus lending to centralized unity of the village. Hence, the religious kiva structure became a central focus for the village--it was centrally located and domestic rooms were oriented toward it--and it served an integral function as social patterns became more complex at the tribal level of organization.

In reality, there is a close interrelationship between kinship groupings and religious structure in Pueblo social organization. Crosscutting even these forms of structure were non-lineal groups (e.g. moieties or dual divisions of the villages) and village associations, such as curing, hunting, and clowning associations (Dozier 1965).

It has been posited (e.g. Martin and Plog 1973) that some communities in the prehistoric Southwest, including the Northern Anasazi Area, may have reached a level of social integration known as the chiefdom. In this form of integration a society is even more complex and organized, being particularly distinguished from tribes by the presence of centers which coordinate economic, social, and religious activities (Service 1971). Importantly, incipient specialization in production and redistribution of produce from the controlling center is necessary to this level of integration. Possible evidence for chiefdoms in the northern Southwest include the degree of authority and integration necessary for constructing and maintaining large-scale water control systems (Vivian 1974), the possibility that great kivas may have served, among other things, a redistribution function (Plog 1974:122-127), and

the presence of high status burials at certain sites (Reed 1979). Overall, the evidence for the chiefdom level of social integration has not been fully documented for the Southwest, and few results related to this problem are presently available for the study area.

In summary, the first two stages--the Paleo-Indian and Archaic eras--were characterized by the rather simple band level of society, a social organization geared toward a nonsedentary, hunting and gathering economy. Beginning with the advent of the Formative stage, new subsistence and settlement patterns brought about concomitant increasing levels of socio-political and religious integration, namely the tribal and, possibly, the chiefdom levels. There remains, however, much research to be done before this increasing complexity and its ramifications can be fully understood.

Physical Anthropology and Health

In order to describe in complete detail the lifeways of a past cultural group for any given area, it is necessary to include the biological aspects of the human communities in question. Such an undertaking includes physical characteristics of the population and pathologic or other health conditions affecting the individual members. The data for reaching these conclusions comes from analyses of the deceased members which are not uncommon finds in the trash areas and rooms of the abandoned houses (Fig. 56).

Once again, the existing literature on skeletal populations from southwestern Colorado is voluminous as it is conservatively estimated that well over one thousand prehistoric burials have been described to some extent. The interest in the physical aspects of the prehistoric Mesa Verdeans occurred nearly coincident with the late nineteenth century discovery and exploration of the ruins. The first extended (and fairly detailed) discussion appeared in Nordenskiold's report on his 1891 work at Mesa Verde (Retzius 1893). Since that time many similar reports have appeared, although the most useful have been written during the past few decades. Among these later reports, two dealing with Wetherill Mesa Project skeletons are very useful (Bennett

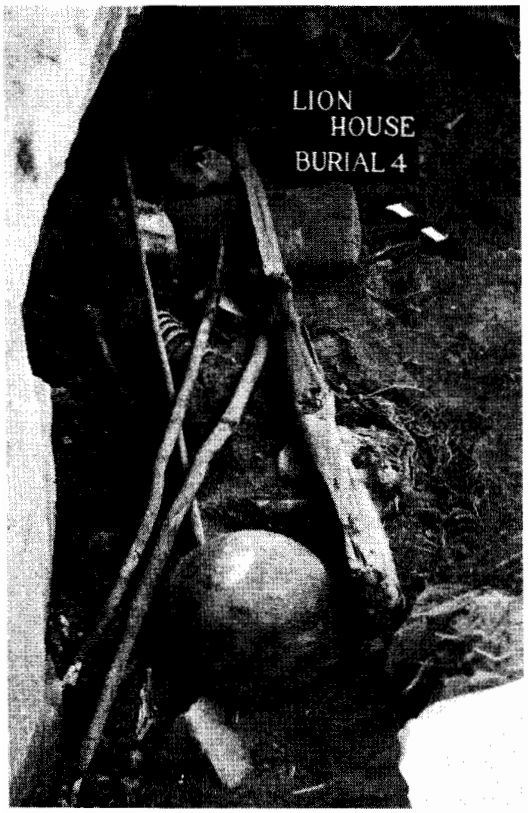


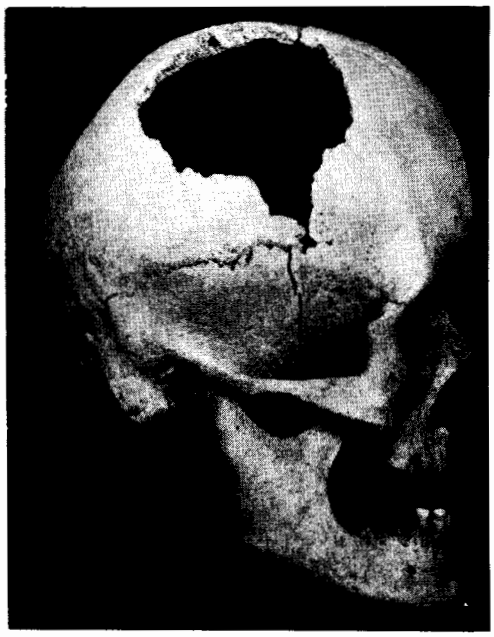
Figure 56. Two human burials from the Mesa Verde area. At the left is an adult male interred at Lion House with the body lying on the right side. The remains of mats and a robe can be seen and the head rests on a wooden pillow. Burial accompaniments include ceramic vessels and some wooden implements. The burial was covered with a willow mat. The burial shown in the right-hand photo was uncovered at an open site in the Mancos Canyon. Overall this burial is similar to the one from Lion House, except that the differences in preservation between alcove and open sites is clearly evident.

1975; Miles 1975), especially Dr. Miles' report on orthopedic problems. Several other reports produced in conjunction with the University of Colorado Mesa Verde Research Center's Mancos Canyon excavation program were noted in Chapter III. From these contributions and others, it is possible to briefly summarize the physical characteristics of the Anasazi and the health problems which they faced on a day to day basis.

During the early part of this century, it was noticed that a dichotomy existed between the head forms of the early Basketmaker populations who had long heads (or undeformed) and the later Pueblo groups who possessed broad, or round-shaped crania. A prevalent theory at that time saw a "Pueblo invasion" in which the Pueblo peoples replaced the Basketmaker culture. During the 1930s, comparative studies of Southwestern skeletal populations, including the extensive collections of Basketmaker II crania from southeast Utah which were found in several eastern museums, dispelled the idea that two distinct populations had occupied the northern Southwest in the past (Seltzer 1944). Rather, it was shown that there was indeed genetic continuity between early Basketmakers and the Puebloans, and that the advent of wooden cradleboards during the Pueblo I era was responsible for the flattening of the lamboidal and/or occipital areas of the skull during infancy (Fig. 57a).

Physically the Mesa Verde Anasazi were relatively short: the men averaged about 5 feet 4 inches tall; and women around five feet. The long bones of the arms and legs generally show signs of well-developed musculature, probably a reflection of the physical requirements necessary to derive a livelihood in the prehistoric ecosystem. By the Pueblo II and III periods, nearly all individuals showed the cradleboard deformation of the back of the skull, which has the effect of producing a roundness of the cranium (Fig. 57b).

As might be expected, the rigors of Anasazi life resulted in numerous physical difficulties for individuals. Among the more common maladies were broken bones (Fig. 57 c and d), osteoarthritis of the spine (Fig. 57e), osteoporosis (an anemic condition evident on the skull), and a wide variety of dental problems. Also evident in the



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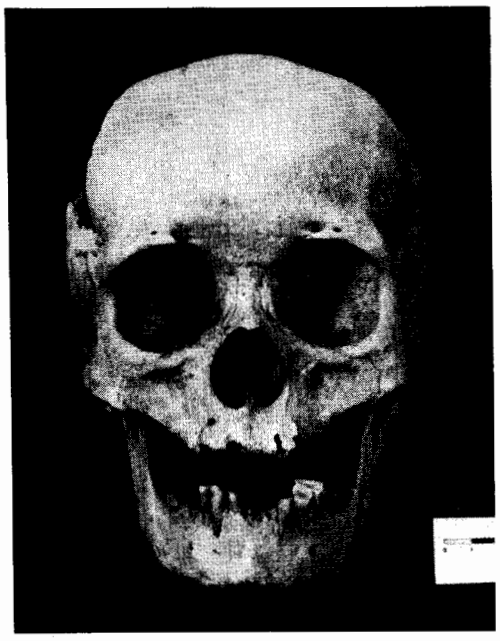

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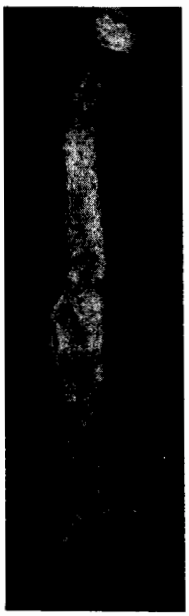


c.

d.

e.

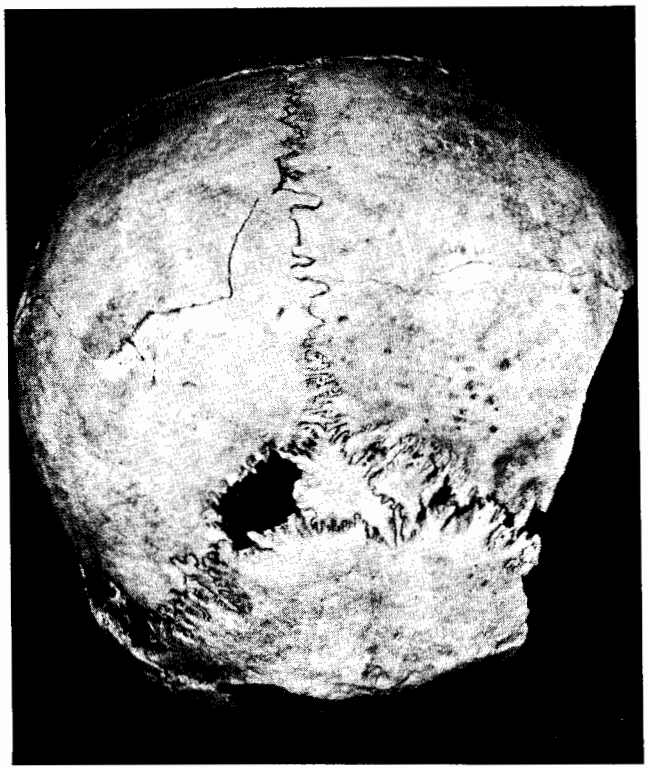
Figure 57. Prehistoric human skeletal conditions: (a-b) skull indicating artificial flattening of the lambdoidal area; (c) healed fracture of the femur, or upper leg bone; (d) healed fracture of the humerus, or upper arm bone; (e) partial spinal column showing lipping and boney growth (at the right) associated with arthritis.

skeletal materials are numerous nonorthopedic genetic anomalies, some of which are shown in Figure 58. Because of these and many other circumstances, infant mortality was relatively high, perhaps as much as 50 per cent due to infectious diseases, and few individuals lived past 50 years of age. The average life expectancy was probably about 30 to 35 years.

Abandonment

Based on archaeological and tree-ring dates, the Anasazi populations had abandoned southwestern Colorado by A.D. 1300, moving in a general southeasterly direction to present-day New Mexico. The problem of widespread abandonment of the northern Southwest has received considerable attention in the archaeological literature. The most common causal factors cited have either been related to the arrival of Athabaskan or Shoshonean groups, or climatic changes in the form of drought, erosion, or shifts in the seasonal rainfall pattern. These hypotheses have been challenged on a number of grounds (see Jett 1964 and Martin and Plog 1973:318-333, for example), such that none adequately or completely provides reasons for these drastic demographic changes in all cases. Other ideas which have received even less support include lower temperatures resulting in shortened growing seasons, widespread diseases and epidemics, overhunting of wild animals, soil depletion, and deforestation.

In all likelihood, more than one of these causal factors combined to contribute to the abandonment of separate localities. It is known, for example, that various areas of the Northern San Juan Anasazi Area were not abandoned simultaneously, a situation probably related to local environmental conditions and social aspects. In this context, detailed analyses are required in order to arrive at causal explanations. An example of this type of situation from southwestern Colorado recently resulted from an intensive study of two Pueblo III communities south of the Mesa Verde (Nickens 1977a). In that locality, it was suggested that although drought conditions were probably the indirect cause, declines



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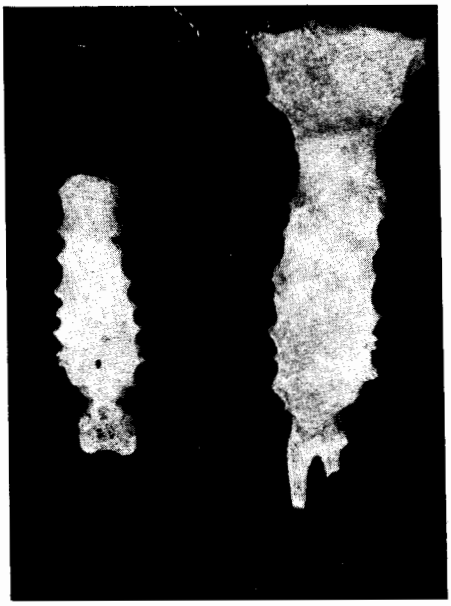

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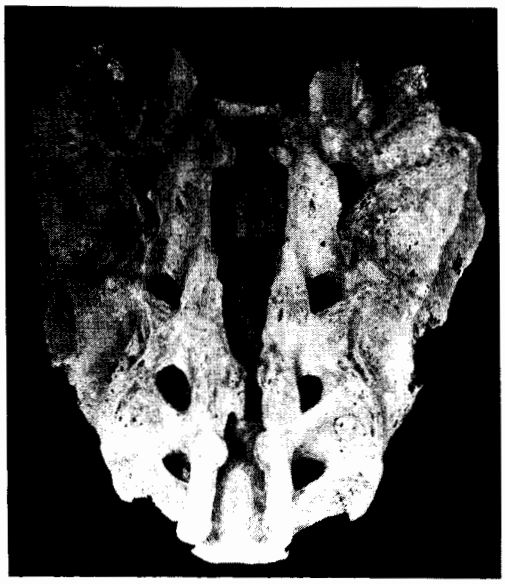

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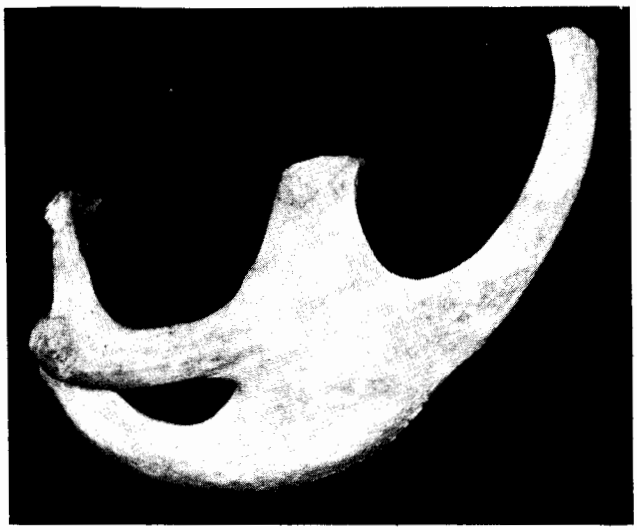

d.

Figure 58. Anomalous conditions from Mesa Verde skeletons: (a) supernumerary or wormian bones along the lambdoidal suture at the back of the head; (b) two examples of ossified sterni, or breast bone. In each case, the xiphoid process at the bottom, normally cartilaginous, has ossified which is indicative of old age. (c) Spina bifida Occulta of the sacrum in which incomplete fusion of the neural arch occurs; (d) a rare defect in which the first two ribs are joined by a boney bridge between them.

in the corn and bean crops, animal protein, and drinking water, and a probable increase in child mortality rates may have been the direct causes of the abandonment, along with the failure of the local farmers to develop an intensive water control network. Such a model cannot be expected to apply to similar situations throughout the entire Northern Anasazi Area; however, the point to be made is that abandonment of the region was probably due to a complex combination of variables and not any single causal factor.

PART III

CULTURAL RESOURCE SYNTHESIS
AND
CURRENT AND FUTURE RESEARCH ORIENTATIONS

VII.

CULTURAL RESOURCE SYNTHESIS AND CURRENT AND FUTURE RESEARCH ORIENTATIONS

To conclude our overview of prehistoric cultural resources in southwestern Colorado, it is necessary to provide a concise synthesis of the existing cultural resource data which summarizes past human use and occupation of the area. Additionally, it will be of benefit to examine current directions and research orientations in the study area, and to suggest some broadly-defined research goals and problem domains which might serve as a partial guide for future cultural resource investigations.

It is rather obvious from a reading of the previous chapters that the cultural resource base under review is tremendous and that the amount of investigative interest in the prehistoric remains represents a prodigious research effort. It is probably realistic to observe that the duration and intensity of archaeological inquiry in southwestern Colorado is equal to or surpasses similar quests in other parts of North America. To be sure, larger and more spectacular ruins--depending upon one's point of view--may be found elsewhere, but site density figures of nearly 100 per square mile (e.g. Chapin Mesa, Mesa Verde National Park) and an average of almost 23 sites per square mile for the entire BLM Sacred Mountain Planning Unit clearly indicate the distinctiveness of the resource base in this region. Further importance of this area is seen in the large number of citations to previous archaeological work (cf. Hull and Scott 1978 and the Appendix to this volume).

As a result of these circumstances it may be said that, archaeologically-speaking, we know more about the extent and significance of the cultural resource base in the San Juan Resource Area than for similar geographic units elsewhere; certainly this would hold true for other BLM-

managed lands in Colorado. Given this situation, it might appear that the management of such a well-known resource base might be simplified compared to areas where the prehistoric resources are largely unknown or less conspicuous. Actually, the opposite is true since the abundance and visibility of the archaeological sites in the San Juan Resource Area creates special problems (e.g. identification of large numbers of sites and vandalism) not evident in other areas. It also requires a more concentrated, and therefore more costly, program to manage and protect areas with high site densities and individually visible and important archaeological sites.

Cultural Resource Synthesis

There is evidence that aboriginal groups have occupied southwestern Colorado periodically during the past 8000 years or perhaps a little longer. During some time intervals our evidence is too limited to state with certainty that this occupation was continuous and, consequently, it would appear that at some points in the prehistoric continuum, southwestern Colorado was devoid of human occupants. Nonetheless, a sequence of cultural traditions is evident which is related to cultural developments elsewhere in the contiguous Great Basin and Southwest areas. In southwest Colorado, archaeological expressions of the Paleo-Indian, Archaic, Anasazi, Shoshoni, and Athabaskan cultural traditions have been recorded. Each of these traditions is briefly summarized as follows:

Paleo-Indian Tradition: Limited but seemingly definite evidence is on hand to indicate that southwestern Colorado saw some cultural activity as early as 8000-5500 B.C. The aboriginal occupants of the region were oriented toward the hunting of big game animals, accompanied by a reliance on smaller animals and plant foodstuffs. Significantly, no bones of the primary prey of these groups, many species of which are extinct today, have been found in either archaeological or noncultural contexts in southwestern Colorado. The nearest association of cultural remains and extinct animal forms is to the east in the San Luis Valley.

The best indications for Paleo-Indians in the study area come from the Hovenweep area where some campsites are believed to represent late Paleo-Indian (Plano) use of the area. Other contemporaneous cultural manifestations in neighboring locales in southeastern Utah further indicate that the region was at least sporadically visited by these groups. It appears, however, that most of the area under consideration was not utilized by the Paleo-Indians since no clear evidence has been revealed by the many previous archaeological inventories.

Archaic Tradition: The Archaic Tradition (ca. 5000-500 B.C.) is likewise poorly represented in southwestern Colorado. Well-expressed Archaic manifestations are found in nearby regions of the Four Corners area and, here again, if significant Archaic remains were present in the San Juan Resource Area and adjacent lands, they should have appeared by now. Based on surface finds of projectile points, the Archaic hunter-collectors seem to have ranged over more of the project area than the earlier Paleo-Indians and were probably using the more upland, forested zones as well as the lower elevations.

In point of fact, however, we have no chronometric dates for this period in southwest Colorado. It might be well in many instances to assume a cautious position with respect to Archaic site designations since it is known that both Anasazi and the later Shoshoni groups were known to have collected earlier projectile points for use. At this time, all sites designated as being Archaic in age have been so defined either on the basis of a lack of ceramics or the presence of surface Archaic-type projectile points.

On the other hand, the Hovenweep vicinity has yielded good surface evidence for Archaic campsites, located primarily on ridges near canyon-heads where springs are found. Following Winter's (1976) designation, the Hovenweep Archaic sites appear to be culturally (i.e. technologically) related to the Oshara Tradition of northwestern New Mexico. Throughout the remainder of the study area, however, the presence of Archaic sites and cultural patterns is either absent or awaits documentation.

Anasazi Tradition: The overwhelming bulk of the cultural resources in southwestern Colorado is related to the sequent periods of Anasazi development. The early Basketmakers were restricted in distribution essentially to the upper drainage of the Animas River. The material culture of the Basketmaker II groups did not include pottery, but the cultivation of corn and squashes was supplementing hunting and the collection of wild plant foods.

By about A.D. 450, other cultural traits became evident in the Anasazi way of life. Small villages or hamlets of semisubterranean pithouse structures were scattered throughout much of southwestern Colorado, located primarily on ridge locations where suitable agricultural soils were available. Corn and squashes, along with the newly acquired beans, were grown by dry-farming techniques on fields near the villages. The presence of ceramic containers and storage facilities to accommodate crop surplus indicates the increasing trend toward sedentism.

During the Pueblo periods, numerous architectural, technological, and social changes are reflected in the archaeological remains. Initially, domestic structures gradually changed from partially subterranean, circular or square houses to surface rooms. Wall construction of both habitation and storage surface roomblocks was initially vertical pole and adobe, with masonry sandstone building stones becoming the mode by Pueblo II time. The early building stones were shaped by bifacial spalling of the edges. In the Pueblo III period, masons utilized pecked-face stones to construct both single and double-coursed walls of exceptional quality. Multiple-storied buildings were erected in both open and alcove locations by the Puebloans.

While distinct changes in construction techniques occurred, the basic village layout remained essentially the same throughout the Pueblo periods. The tendency for orientation to the south, i.e. kivas and trash areas lying south of the domiciliary structures, was common throughout all periods. Some later cliff dwellings were oriented toward other directions because of cave exposure, but whenever possible the southern orientation was maintained even in these situations. In the Pueblo III period, larger

sites, reflecting population aggregation, became predominant over the more numerous single habitation units of the earlier periods. This trend began in late Pueblo II time in some districts.

External connections, best seen in trade items, began with the early Basketmakers who obtained shells from the Pacific Coast and/or the western coast of Mexico. In the later periods, however, evidence of foreign items was more widespread as some 13 such artifacts can be recognized in Pueblo II-III collections. Another important influence from outside the Northern San Juan Area included cultivated plants and agricultural techniques. More difficult to quantify are social and religious influences which no doubt diffused from regions to the south to southwestern Colorado. The role of external influences in cultural changes evident in the Northern San Juan Area is one aspect which requires additional comparative study. Despite the amount of previous archaeological investigation in southwestern Colorado, some of these relationships are only just beginning to become evident.

Settlement patterns, demography and land use underwent marked change between A.D. 450 and 1300. Moreover, these changes were not completely similar nor contemporaneous in the various districts of the Northern San Juan region. In general terms, the early Basketmaker III hamlets tended to be small and were found scattered on the broader, level portions of the mesa tops where the deeper soils occur. On Mesa Verde, the mesa top continued to be occupied through Pueblo I and Pueblo II, but there was increasing use of distributary ridges on the mesas. By late Pueblo II and early Pueblo III time, houses tended to be located relatively close to canyon rims. Another trend, which began in the Piedra Phase and reached its greatest expression in the Mesa Verde Phase, was the occupation of cliff sites; by the end of the Mesa Verde Phase 66 percent of the sites were located in alcoves (Hayes 1964:110). Away from the Mesa Verde similar patterns were evident during the Pueblo I and Pueblo II eras, but the post-A.D. 1200 movement to cliff houses is not as apparent in other districts, a reflection of a general lack of many large inhabitable alcoves. Instead, late Pueblo III Anasazi communities

congregated around the heads of canyons in the Yellow Jacket and Western Districts. Areas east of Mesa Verde were nearly abandoned by Pueblo III.

One demographic aspect noted in all districts where intensive surveys have been conducted is a marked population increase over the previous centuries, circa A.D. 900. In several of the districts, this point in time is believed to represent a peak population for the Anasazi occupation of southwestern Colorado. In areas which exhibit a Pueblo III occupation, such as Mesa Verde and the southwest portions of the Yellow Jacket District, a second population peak has been noted at Hovenweep (Winter 1976), Wetherill Mesa (Hayes 1964), Chapin Mesa (Rohn 1977), and the BLM Sacred Mountain Planning Unit (Chandler et al. 1980) after A.D. 1100.

Land use underwent significant change from the earlier periods when dry-farming was the rule, perhaps with some floodwater farming present, in the Pueblo II period when water control and diversion features began to appear. These facilities include water runoff capture and storage reservoirs, ditches to distribute water and checkdams and related features to hold both soil and water. Frequently, a series of these features was combined to form a water-control system. It is entirely possible that extensive water conservation and diversion systems were widespread in certain areas of southwestern Colorado (e.g. Rohn 1963; Winter 1977). Herold (1961:102-107), for example, summarizes the characteristics of 15 reservoirs in the Mesa Verde area (and others have been since located), and she notes from other sources that ditch systems may have been present around several of the larger sites, including Cannonball, Yellow Jacket, and Lowry Ruins. Aside from the obvious importance of these features to the increased extent and efficiency of subsistence practices, there may have been implications for social organization as well. Vivian (1974) notes that the potential for a centralized authority for water management purposes was present in the Anasazi region; however, whether or not such authority would have been necessary for the construction and maintenance of water-control systems remains an open question.

As noted earlier, the demise of the Anasazi occupation in southwestern Colorado was not a sudden happening nor did it occur simultaneously throughout the area. The Navajo Reservoir and Piedra areas were abandoned by A.D. 1050, but Chimney Rock Pueblo managed to hang on until ca. A.D. 1125. The Dolores River Project area seems to have been abandoned by before A.D. 1200, with a gradual southwesterly movement of Anasazi communities to locations around canyonheads where villages were occupied until around A.D. 1280. In the Mesa Verde, communities continued occupying the large cliff houses until the last few decades of the thirteenth century. Based on present indications, no Anasazi were left in southwestern Colorado by A.D. 1300.

Shoshoni and Athabaskan Traditions: There is little evidence extant in the archaeological record for southwestern Colorado which delineates the early cultural patterns of the Ute and Navajo groups. In the case of the Utes, it would seem that more information might have accrued since they were occupying the area at the time of Spanish contact. However, the difficulties of identifying Ute sites and the characteristic way of life of the early Utes combine to indicate that very little will probably ever be known archaeologically about this group.

Similarly, next to nothing is known regarding Navajo sites. These sites, often easier to identify than Ute sites because of the presence of ceramics and distinctive architecture, are not common in southwestern Colorado. Navajo sites can be lumped into two categories: brief campsites along some rivers which were refugee situations during the Pueblo Indian Revolt of 1680, and twentieth century habitation or limited use sites which are usually the result of Navajo laborers being brought into southwestern Colorado. In opposition to the Ute situation, however, it would appear that the potential to learn more about both phases of Navajo presence through archaeological techniques is promising.

Current Directions in Archaeology of Southwestern Colorado

From a reading of the history of explorations and scientific investigations listed in Chapter III, one gains a diachronic picture of the progression of analyses and ideas which has characterized the examination of prehistoric remains in southwestern Colorado. From the very first encounter, the ruins generated interest as to who the groups were that occupied the houses and how long ago. Toward the end of the nineteenth century, serious study of the archaeological sites had begun; however, another interested group was active in unsystematic looting in search for antiquities for sale and, in some cases, to provide collections for several Eastern museums.

Shortly after the turn of the century, the newly enacted antiquities law provided loose protective measures for archaeological sites located on federal lands. Unfortunately, early protection was afforded only to the most spectacular ruins, which were designated as parks or monuments. In some instances, the establishment of archaeological "preserves" merely provided license for appointed archaeologists to conduct their personal work on government lands. By the 1920s, however, legitimate attempts at protection and preservation of important ruins were underway, along with better-controlled archaeological investigations.

It was also during the 1920s, and continuing for the next two decades, that substantive descriptions of archaeological data began to appear in the literature. In the main, these contributions resulted from researchers generally selecting an area for investigation, often one with promising yet relatively unknown sites located therein, and conducting multiyear programs of data recovery. In southwestern Colorado, those of importance include the work of Roberts in the Piedra District, Morris in the La Plata and Durango, and Martin and his col-

leagues in the Yellow Jacket District. Brew's work on nearby Alkali Ridge in southeastern Utah should also be mentioned here. Later significant contributions of this time period include Reed's Mancos Canyon excavations and the work of Gila Pueblo, directed by O'Bryan, at Mesa Verde National Park. Each of these projects ended with the publication of seminal reports, all of which continue to be standard references for archaeologists of today who follow in the steps of these men.

Beginning about 1950, the tone of archaeological undertakings began to change. Initially, an emphasis was placed on interpretive archaeology at Mesa Verde National Park where several sites were excavated and stabilized for the benefit of the viewing public. Sites were not randomly selected for excavation, rather the concern was to pick sites based on their potential to play a role in depicting the cultural and, more specifically, the architectural history of the prehistoric occupation of the Park. This goal provided direction for numerous projects by Park Service personnel, University of Colorado excavations in the 1950s, and the subsequent Wetherill Mesa Project. Not surprisingly, extended discussions of topics, such as evolutionary stages of kiva construction and village plan layout, are found in the reports of these projects.

Another concern which began slowly in the 1950s, but achieved greater importance in the succeeding 1960s and 1970s, was the interest of "salvaging" critical information which was endangered from ongoing and changing land uses such as reservoir or other construction and pinyon-juniper woodland chaining. Some of this work would be considered successful even by today's standards (e.g. the Navajo Reservoir Project); others, such as the chaining programs, were minimally helpful in that archaeological surveys were of necessity hastily done and, more often than not, the entire cultural resource base was not completely nor adequately identified. The salvage ethic continued in full force into the 1960s, notably evidenced by the extensive work of the Mesa Verde Research Center.

During the last part of this decade, however, there was a general recognition that not enough was being done nationally to identify and protect cultural resources. Between 1966 and 1979, several pieces of federal and state legislation were effected to provide for proper and detailed identification and evaluation of cultural resources on public lands. More importantly, procedures were established for the systematic management of these resources and today each of the federal agencies controlling lands in southwestern Colorado has one or more archaeologist stationed in the area to oversee this process. In the current vernacular, this effort is generally known as "cultural resource management," and, although there have been a few exceptions in recent years, it is fair to state that a majority of the archaeological projects being conducted in the region today fall into this category in one sense or another.

Coincident with the effective management and protection of the cultural resource base, and in keeping with the development of archaeological methods and theory, has been the growth of awareness on the part of archaeologists at all levels that investigations should be conducted within a framework of topical and theoretical research designs. Ideally, broadly-stated research designs should provide avenues for both prehistoric and historic archaeological studies, and they should be capable of incorporating data and results from large- and small-scale projects alike. Several efforts are currently underway in southwestern Colorado which reflect a regional approach to cultural resource management and archaeological problem solving. Included in this category are such recent and ongoing investigations as the Water and Power Resources Service's Dolores River and Animas-La Plata Projects, the BLM's Class I and Class II inventories in the San Juan Resource Area, and studies resulting from the development of carbon dioxide well fields by Shell Oil Company. Overriding concerns for these and other projects are varied, but commonly include as goals the following: (1) to provide land managing agencies the data necessary to effectively plan for development and to protect and conserve the cultural resource base;

(2) to provide substantive research results; and (3) to ensure meaningful expenditure of public monies. Above all, however, is the common intent to see that adequate identification, evaluation, and protection of cultural resources takes place and, if necessary in advance of imminent destruction, professional data retrieval programs are initiated.

Another important current direction in southwestern Colorado is the concern for protecting and preserving the extant resources. This interest is manifest at several levels, including the recent proposal to declare much of the Sacred Mountain Planning Unit as a National Conservation Area. This designation would center on multiple use of the area, but with an emphasis on protecting and managing the unique archaeological resources. One critical aspect is the responsibility for reducing the ongoing illegal vandalism of archaeological sites on public lands. Here, the BLM has been instrumental in effecting public education programs, cultural resource surveillances, and by pursuing prosecution for offenders. Also, the recent funding of a project to assess factors associated with vandalism in the Sacred Mountain Planning Unit reflects this concern. At a second level, agencies such as the BLM, NPS, and Forest Service have realized the importance of preserving (stabilizing) significant ruins to curtail natural or cultural destruction. Numerous ruins in southwestern Colorado have been afforded this form of protection in recent years, thereby prolonging the sites' roles as archaeological data storehouses and public education entities. Finally, efforts to create a regional research and repository facility, such as the proposed Anasazi Heritage Center, revolve around the need for a centralized permanent facility to store and make information, artifacts, and other materials available to interested researchers. Thus, the protection of both sites and data forms an integral part of current directions in cultural resource study and management.

In summary of the current directions, we note that today's perceptions about cultural resources and how they should be managed are quite different from preceding decades. Fortunately, the various

concerns for this resource base continue to expand and evolve as new forms of management and scientific investigation approaches come into being. Over the past century, we have seen the interest in southwest Colorado archaeology grow from one in which little or no attention was given to protection of archaeological sites and data to one in which protection and conservation principles have come to the forefront. Based on existing historical preservation laws and the concerns of land managers and professional archaeologists, it is apparent that these concerns will be important in the years to come.

Research Orientations

In this concluding section we undertake brief discussion of problems and research orientations that may be applicable to the continuing study and management of the distinctive and extensive cultural resources found in southwestern Colorado. The emphasis here is to view the situation at the regional level as opposed to more specific hypotheses and test implications which might serve to guide individual projects. Prior to listing the potential research goals, however, some comments need to be offered concerning the overall adequacy of the cultural resource data as they exist today. This particular discussion is presented to indicate that certain problems do occur in our extant records and that investigators and land managers must be prepared to cope with possible situations when utilizing the known data to obtain desired results.

The first step in the cultural resource management process includes the proper identification of the distribution of resources, and evaluations regarding their age, nature, classification, and significance in terms of historic preservation needs. At the present, some 8300 archaeological sites in the four counties under consideration in this document have been formally recorded and entered into the centralized site files at the Office of the State Archaeologist, of which nearly 7700 are located in Montezuma County. Without a doubt, there are many times more which have been recently recorded and await

listing in this system, or which were previously recorded and never submitted to the State Archaeologist. It is estimated that about 3000 of these known sites are located on public lands in the Sacred Mountain Planning Unit; another 50 sites are believed to be known for the Durango-Chromo Planning Unit.

On the surface, these figures would seem to imply that the cultural resource situation should be fairly clear and, in comparison with other areas, this is the case. We can confidently state that the general, and in many cases specific, chronological picture is known. The widespread use of dendrochronology and ceramic cross-dating contributes to this somewhat comfortable position. However, room for improvement is evident. It is not uncommon, for example, to encounter the designation "Pueblo" given for the age of recorded sites on site forms. In defense of this situation, it is sometimes difficult to correctly assess a more precise age based on surface indications; however, in many instances this problem seems to be one of failure to adequately evaluate the materials. At the other end of the spectrum, a case can sometimes be made that investigators have attempted too precise an age designation, in some cases probably using a particular phase system which is not entirely applicable to a particular area. These points are not meant to be overly critical of the dating situation, but simply point out that these data cannot always be taken at face value.

One aspect of this initial step which is critical to management and planning is accurate information on the density of resources and the distribution of site types of varying significance. Despite the large amount of previous work on BLM lands in southwestern Colorado, it is obvious that we are only beginning to generate valid results in this regard for the area as a whole. One example of the basic statistic of site density will suffice to indicate this situation. Extensive inventory of portions of the Sacred Mountain Planning Unit between 1965 and 1969 covered 278 square miles, resulting in the identification of 1587 sites for an average density of 5.7 sites per square mile (Martin 1971). More recently, a stratified, random sampling of this same

general area resulted in zonal differences in the planning unit ranging from 0.8 to 36.92 sites per square mile, but the overall predicted site density was 22.64 sites per square mile (Chandler et al. 1980). Quite clearly, the discrepancy evident here is not in the cultural resource base itself, but rather in the methodological approach utilized to record and evaluate the data. It should also be pointed out that the more recent prediction of site density was based on a four percent sample of the planning unit, somewhat less than a preferred sample size from which to make more accurate estimates.

In short, although large amounts of data are on hand regarding the basic archaeological site pattern, there is considerable need to increase and refine this information in order to enhance the management and planning of the cultural resources. Such efforts will also contribute greatly to our knowledge concerning past cultural patterns in the area. In a similar vein, there are some districts of the Northern San Juan Anasazi Area (e.g. La Plata, Durango, and parts of the Piedra Districts) in which there is much to be learned about site distribution. For our purposes, however, these districts, which fall in the Durango-Chromo Planning Unit, do not include significant contiguous parcels of BLM-controlled lands.

The point to be made here is that if we are to eventually have an accurate and dependable record of cultural resource site numbers, types, and ages in southwestern Colorado, then upgrading of existing files is necessary. The first step in this process is the identification of data of little or no practical value and of gaps in the existing information. How many sites, for example, which have been recorded and assigned numbers do not have precise locational information, or were perhaps recorded before National Register considerations became important and do not have adequate descriptions to allow significance assessments? Simply put, it is of the utmost importance to management and planning goals to have problem areas and/or deficiencies in existing records identified. Once such problems have been noted, avenues to fill in the data gaps and needs can be projected.

It follows that a research goal for the BLM in this instance centers around the need for additional Class II and III inventories, undertaken with an eye toward increasing our knowledge and amount of primary data from which predictive results may be generated. To reiterate an earlier example, we believe that the most defensible data regarding the overall nature and extent of cultural resources on BLM lands in southwestern Colorado have resulted from the recent Sacred Mountain Planning Unit Class II survey, yet these data are based on an extremely low sample fraction of only four percent of the total acreage in that unit. The problem here is that to obtain meaningful results it is difficult to combine data collected under varying circumstances, and at different intervals in the past, into a single, solid data base from which predictive results may be drawn.

Turning now to the matter of research domains or questions, we note that potential research questions open for evaluation in southwestern Colorado are myriad. Individual investigators and projects of both a small- and large-scale nature have limitless opportunity to examine data and test ideas regarding past cultural adaptations to the area at all levels of investigations-site specific, regional, and interregional. One recent example of range of possibilities for investigative pursuits which may be undertaken is the detailed research design guiding mitigation efforts on the multiyear Dolores River Project (vide Kane 1979). There, investigators have identified a set of five broadly-defined problem domains including: (1) economy and adaptation; (2) paleodemography; (3) social organization and settlement patterns; (4) extraregional relationships; and (5) culture process. The problem domains are further subdivided into literally dozens of specific questions, each of which it is hoped may be answered by forthcoming data retrieval and analysis.

To be sure, few projects possess the overall breadth and scope of the Dolores River Project; hence, such detailed research designs may not be applicable in all instances. Nonetheless, it is important at this juncture to identify and list certain research orientations which may be said to have importance for the San Juan Resource Area

as a whole. Again, these concerns are presented at the general rather than the specific level. It is, for example, unlikely that any one project, no matter how large, will generate sufficient data to conclusively answer such research questions. Rather, each requires a collective, regional, and long-term commitment on the part of those managing and/or investigating the cultural resource base.

Thus, a set of research problem domains, derived from information presented in previous chapters, may be presented for consideration. Listed in succint format, these domains include the following:

1. Improvements of local (i.e. district) chronologies and cultural developments.
2. Paleodemography - population numbers at synchronic and diachronic intervals; population shifts and causal factors.
3. Prehistoric land use - especially water control systems and their relationship to productive organization.
4. External influences and relationship to adjacent areas - e.g. Chacoan evidence and extent and function of trade relationships.
5. Internal relationships between districts.
6. Intra- and inter-village community structure.
7. Ideology and ceremony - especially great kiva function.
8. Better understanding of the overall nature of horticultural and other subsistence practices, and the relationships between the various subsistence procurement systems.
9. Paleoenvironmental conditions - local and regional correlations.
10. Early cultural traditions - Paleo-Indian and Archaic; transition to Formative patterns.
11. Mortuary patterns - population characteristics and health problems.
12. Anasazi abandonment - identification of cultural and environmental factors behind withdrawal from the area.
13. Later traditions - Ute; Navajo; and Pueblo refugees.
14. Euro-American social and material culture patterns.

This listing of research orientations, or broadly-derived problem domains, includes topics which we believe can be addressed from a regional perspective, by <u>both</u> small- and large-scale

investigations. It is entirely conceivable that a single archaeological site, recorded in association with a proposed well location, for example, may have the capability to contribute data to one or more of these domains. It may be, however, that such input may not be realized until a later date when additional comparable information has been compiled on a regional basis. Indeed, in each case listed above, only a regional approach can be expected to explain these phenomena which have relevance throughout the portion of southwestern Colorado covered in this document. At the same time, we must exercise care and realize that answers are not imminent without proper reference to geographic zones adjacent to and away from the present project area.

To summarize, there exists considerable latitude for additional cultural resource inquiry in southwestern Colorado, despite the apparent wealth of data which have accrued from the numerous earlier investigations. It can be fairly stated that, due to the overall extent of the cultural resource base in this area and the obvious complexity associated with the resources, full confirmation of all our suspicions and hypotheses regarding past cultural patterns will never be attained. Likewise, the management potential of these unique resources may never be fully realized since protection and conservation measures generally reflect current professional ideas on the significance or importance of archaeological and historical sites to regional and specific research designs. Indeed, both management and professional study of the cultural resources will hopefully continue to evolve in their respective approaches to the commonly shared problems of protecting our heritage values and providing information for public consumption.

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APPENDICES

APPENDIX A

UPDATED BIBLIOGRAPHY FOR THE ARCHAEOLOGY OF SOUTHWESTERN COLORADO

This appendix contains bibliographic resources which update and expand the previously issued "Bibliography of the Archaeology of Southwestern Colorado" by Deborah Hull and Douglas Scott, published as Bureau of Land Management, Cultural Resource Series, Number 5. The citations listed herein update the bibliography to January 1980 and, just as important, numerous references have been included which were omitted from the initial compilation.

Without doubt, the combined bibliography for southwestern Colorado, now numbering about 1150 entries, still has some omissions; however, we believe all major contributions to archaeological knowledge of this area have been identified. In this context, readers are encouraged to submit updated bibliographic citations, or others known to be omitted from the original listing and not included here, to:

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Montrose District
Bureau of Land Management
P. O. Box 1269
Montrose, Colorado. 81401

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APPENDIX B

BLM Field Conservation Manual

INTRODUCTION

The primary concern of archaeological field conservation is to provide a controlled environment for all vulnerable or perishable materials, to ensure that no unnecessary damage occurs from the time an object is excavated until it arrives at a processing facility.

Conservation involves not only the repair and restoration of objects, but, more importantly, the prevention of deterioration to begin with. The simplest and best method of minimizing deterioration of an object is to control its environment from excavation through transportation to the laboratory.

Objects begin to deteriorate from the moment of their manufacture, responding to changes in their environment brought about by use, disuse, burial, exposure, and reuse. When an object is buried, it responds to soil conditions. When conditions, such as temperature and humidity, fluctuate, deterioration is hastened. Where conditions remain constant, such as a dry cave site, or protected "micro-environments" within an open site, an object reaches a state of equilibrium with its environment, and deterioration may be greatly slowed or halted.

Exposure of a specimen to a new environment during excavation may present a sudden and drastic change. Many materials, such as most ceramics, lithics, well-preserved bone, and shell, may be excavated, bagged, and transported to the lab without special aids or treatment. More fragile material types, such as some bone and fibrous materials, may be badly harmed or destroyed by this change.

Consolidation or stabilization of an object is utilized only to arrest deterioration brought about by uncontrolled environmental changes. A buried artifact generally reaches a state of equilibrium in the ground; most severe and destructive changes occur when the item is excavated without taking proper steps to ease the transition. Thus, the most critical point in the conservation of an object occurs in the field, at the moment of exposure.

Information provided here is to be used by field personnel when excavating fragile and/or perishable items in the field. Arranged by material type, this guide contains a rudimentary description of the nature of the materials likely to be encountered during field operations, and of the types of deterioration anticipated under local climatic and soil conditions. Particular problems pertaining to the excavation of each material type are identified, with methods of avoiding or mitigating damage. Specific techniques of packaging for transportation to the lab for storage are also included.

When perishable or fragile items are identified in the field, consult this guide for steps to alleviate damage and to ensure adequate preservation. It should be emphasized that each item must be evaluated on a case-by-case basis, and that this guide is not a substitute for the advice or use of a trained artifact conservator.

This guide is meant for use by the field archaeologist so that he/she may be able to identify, isolate, and temporarily stabilize fragile objects for transportation to a laboratory or an artifact conservator. Unless fully trained as an artifact conservator, no archaeologist or laboratory personnel should attempt conservation of an object without the direct aid of an artifact conservator. The complete conservation of an object is very specialized and requires a detailed working knowledge of manufacturing techniques, physical properties of a variety of materials and an in-depth knowledge of chemistry.

The user of this guide should also be aware of the fact that not every object that could be conserved should be conserved. The archaeologist needs to be aware of the value of the object from different perspectives, and make his decision on conservation needs based on the best use of the object. As an example, suppose a human burial is discovered during excavation. The bone is very fragile and a fragile basket is also found with the burial. The archaeologist must make a decision to conserve or not to conserve any or all of the find and associated material. The archaeologist must ask questions, such as: will the conserved items be significantly altered so that scientific analysis will be more difficult or in some way hindered; is the scientific analysis more important than having a preserved object for use in an interpretive exhibit; will the long-term value of a publicly exhibited object outweigh the short-term gain of analysis; is this a rare or common object; is this a fragment of an object that has its best use in consumptive research or analysis? Once these kinds of questions have been answered in the mind of the archaeologist, then the appropriate field conservation procedures can be implemented. In the case of the burial an archaeologist may decide that uncovering the entire burial is preferable to treating and removing each bone as it is uncovered since the goal of the study of human burial practices from an analytical perspective outweights the preservation needs. In addition, the human bone may be reinterred after study, thus the economics of preservation become less than justifiable. The basket, on the other hand, has high analytical value and high public interpretive value, thus the decision might be to stabilize the object and remove it for full conservation by a qualified artifact conservator. The purpose of complete conservation of the basket would be to better analyze the object in a stabilized state and then it could be used as a public display after analysis.

GENERAL CONSIDERATION

This section outlines basic techniques and principles to be utilized in dealing with all excavated materials. Evaluate objects individually in terms of these constraints; common sense is your most valuable asset in applying these principles.

Types of Deterioration

Three basic types of deterioration can occur, both in the archaeological context and after excavation biological, chemical, and mechanical. They are often closely interrelated, and the resulting products from one type of deterioration may encourage or cause another.

Biological deterioration involves infestation by fungus, insects, or rodents. Organic materials are primarily susceptible, but organic adhesions or inclusions in inorganic objects may also be subject to attack. The presence of water and oxygen escalates biological activity, although there are varieties of anaerobic bacteria that thrive even in oxygen-poor environment. Damp environments, either in the ground or in a sealed plastic bag, provide ideal conditions for fungal growth. Totally dry conditions, such as cave sites, usually discourage micro-organism activity, and yield the best all-around preservation conditions. Chemical deterioration involves an alteration of the chemical makeup of an object caused by a reaction with some substance in its environment. Moisture speeds deterioration, and acids and bases in the soil can cause inorganic constituents of materials to be dissolved and leached out. The decay of organic materials by biological means often produce acids as a by-product, which then may escalate the demise of materials, such as shell or bone. Other types of chemical deteriorations include the depolymerization of the cellulose structure of vegetal materials or the rusting and corrosion of metal.

Mechanical damage includes breakage, abrasion, and disassembly, as imposed by ground pressure, a careless archaeologist, or frost-wedging. Most mechanical damage after excavation can be prevented by proper packaging and handling.

Photography

Before lifting any fragile specimen, (pedestaled or otherwise), photograph it *in situ*. In the event that it is damaged or destroyed during or subsequent to removal from the ground, a record of the object must be maintained.

Removal of Specimens

Very fragile or poorly preserved specimens should be brought to the lab encased in their matrix. Expose only enough of the specimen to determine its extent as adhering dirt may be the only thing holding a specimen together and the removal of dirt may cause significant surface attrition and the loss of small structural elements. Pedestal

Environmental Control

As a general principle, keep damp objects damp and dry objects dry after excavation. Package damp objects in plastic bags or plastic boxes. Do not seal the plastic completely, as condensation and direct wetting of the object can cause damage. Include a humectant, such as a damp cloth, tissue or cotton to maintain the humidity level. Be sure the included damp item will not touch, crush or become entangled with the artifact. Label the package clearly to ensure that it receives immediate attention in the lab.

Nearly dry specimens will generally do well in a closed but not sealed plastic bag.

During and after exposure of perishable materials, protect them from direct sun. Heat and bright light and associated rapid drying are deleterious to many materials.

Labeling

Mark all containers with fragile objects by writing "FRAGILE" prominantly on the package, and marking it additionally with a strip of orange tape.

All items requiring immediate conservation in the lab should be marked "CONSERVATION" on the bag label. They should also bear a strip of orange tape, to ensure careful handling.

It is to be emphasized that the designation of materials for conservation is not a blanket policy for all perishable materials, it is a mechanism by which immediate treatment can be provided as an emergency measure, to vulnerable objects. When in doubt about the stability of a specimen, it is best to label it "CONSERVATION" and let a conservator or qualified laboratory personnel decide if any treatment is appropriate.

Delivery to the Lab

All artifacts designated for conservation in the lab should be hand held in transport to the lab. When bringing in objects requiring immediate conservation, be sure lab personnel are aware of the object or objects requiring work. They should be examined the same day and treatment initiated as soon as is feasible.

Consolidation in the Field

Consolidation refers here to the application of an adhesive solution to reinforce a weakened object or keep loose fragments from being lost. Consolidation of an object in the field should be undertaken only in an emergency. Because conditions in the field are largely uncontrollable, thorough cleaning before treatment and good

penetration of the consolidant into the object are difficult. A consolidant applied in the field will generally have to be removed later to permit final cleaning and stabilization in the lab under controlled conditions.

When consolidation in the field is deemed a necessity, contact a Conservation Specialist for evaluation of the object and follow their recommendation.

VEGETAL MATERIALS

Vegetal materials in the archaeological environment include a wide variety of plant types, fibre constructions, wood, food remains, pollen, dendrochronological, Carbon-14, and other samples.

Composition, Physical Properties, and Sources of Deterioration

Plants are composed primarily of cellulose, and are subject to deterioration in the archaeological environment from a variety of sources, primarily involving chemical and biological breakdown. If preserved at all, they are generally in very poor condition.

Unburned vegetal materials generally survive best in dry conditions, where lack of moisture and/or oxygen has reduced or precluded bacterial and chemical action. If moisture is present, specimens are generally weakened, and often exist only as traces of decayed fibre or a soil impression. The physical structure of unburned vegetal material is not often well preserved; the cell protoplasm is destroyed quickly by bacteria, and the cellulosic cell walls are dissolved by moisture and chemical action.

Cellulose is also susceptible to deterioration by photolysis, or the breakdown of chemical bonds in the cellular structure through exposure to light. Some species, such as yucca and willow, have a layer of lignin or a similar substance deposited over the cellulose layers as a waterproofing agent. Though lignin may protect the underlying cellulose layer somewhat from moisture and concurrent bacterial action, it is easily deteriorated by chemical means. Lignin also is quickly destroyed by light.

Burned vegetal materials have had most of the organic materials in the cells reduced to carbon, which is essentially inert and not subject to deterioration through biological or chemical action. This crystalline material is relatively strong, but extremely brittle.

Carbonized materials are more structurally stable in response to sudden humidity changes, as when a buried artifact is exposed to dry and unburned, results in different dimensional changes in response to humidity variation. Therefore, most of these materials may be exposed with a lesser risk of damage due to stress caused by drying. Heavier or thicker elements of constructions may warp and split or crack as a result of differential rates of drying between the interior and the exterior.

Wood is especially sensitive to changes in humidity. It is anisotropic material, responding to humidity variation with uneven dimensional change. With the addition of moisture, wood swells to a greater extent in a direction perpendicular to the fibres, and to a lesser degree parallel to them. More expansion and contraction takes place in sapwood, the outer layers of nutrient-transporting tissues in a tree, than in the inner layers of heartwood, a denser structure.

When wood is subjected to rapid wetting or drying, the differential in rates of expansion or contraction between the surface and the interior can cause warping, splitting and separation of layers. After wood is returned to its previous humidity level, it does not necessarily resume its original dimensions. Damage resulting from the transition from damp soil to dry air can be severe and irreversible.

Special specimens containing organic or vegetal materials are subject to these same types of deterioration. Included are both archaeological materials and recent intrusive materials, such as rootlets or adhering bits of organic matter. Specialized packaging techniques create close environments that may be conducive to bacterial or faunal growth. Micro-faunal or vegetal remains may be attacked and destroyed. Especially critical are pollen grains and seed cases.

Excavation Techniques

When exposing and removing vegetal materials in the field, the primary dangers are changes in humidity and mechanical damage due to inappropriate lifting and packaging techniques.

Do not clean a fragile specimen completely in the field, as uncontrollable conditions and hurried actions will likely result in surface damage and removal of small structural elements for fibre constructions. Adhering soil may act as a temporary cement or reinforcement on a fragile object. Complete cleaning can occur later by the Conservation Specialist.

While exposing a specimen, maintain a humidity level constant with the specimen's buried environment by keeping an object partially covered with loose soil, plastic, or by misting lightly with water (mist only if object is very damp). After removal, place it in a closed but not sealed plastic bag in the shade. If condensation occurs, open the bag slightly. If removal can be postponed, cover the exposed specimen with soil and place plastic over it to allow slow drying with a limited air flow.

When excavating wood specimens, humidity level maintenance is of utmost importance, as dimensional change is damaging and irreversible. Once a wood specimen has dried and cracked or warped, it is essentially impossible to restore it to its original shape through rehumidification. Protect exposed specimens from direct sunlight, especially unburned materials. Not only is light and heat destructive to cellulose, but it promotes rapid and uneven drying, causing structural damage.

BONE

Composition, Physical Properties, and Source of Deterioration

In bone, the marrow and nutrient-transporting tissues are quickly destroyed by bacteria action and fungus in a buried environment, leaving ing a porous matrix. Percolating ground water or acidic soil conditions may, through chemical action, partially or completely dissolve this remaining material.

Bone responds to change in humidity by expanding and contracting to a greater degree across the width than along the length. Fluctuations in humidity cause structural weakening and facilitate warping, splitting, and cracking. Variation in humidity level will be particularly strong in shallow strata, especially in open (non-cave) sites, due to the more immediate action of surface conditions including precipitation, drainage, drainage, evaporation, and frost. Excavation and preservation of bone in this condition may be difficult.

At deeper levels, or in more compact, clayey soils, bone may be somewhat protected from humidity changes. Clayey particles tend to attract and hold moisture. A clayey soil will restrict water percolation, thereby limiting moisture variability and the stress responses produced in bone.

Structural instability in bone is most obvious when it is first exposed to dry air: if it has been weakened by varying soil conditions, it will tend to split or warp immediately on exposure to dry air. The problem is compounded by the fact that it is customary to expose an entire burial, for example, in situ for mapping and photography before removing any of the bones. The difference in humidity between the damp soil in which bones rest and the dry air to which they are exposed increases stress on the bones and promotes splitting, warping, and cracking.

When bone is burned, the organic constituents are converted to carbons, which are resistant to biological and chemical deterioration. The resulting structure is generally more stable than unburned bone. Antler is an outgrowth of the skull and is composed of the same constituents as bone, and therefore is subject to the same types of deterioration.

Antler consists of a compact outer layer and a very porous, spongy interior that is quickly destroyed in the archaeological environment. The resulting hollow shell can be weak and susceptible to collapse or other mechanical damage.

Bird bones are hollow and particularly thin-walled. If they survive in an archaeological environment, they too, are weak and susceptible to mechanical damage through crushing or splitting.

Excavation Techniques

Bone is susceptible to damage from the moment it is exposed, through removal, packaging, and transportation, until it arrives at the laboratory. During this time, it can be subjected to uncontrolled environmental change and careless handling, both of which can cause severe damage. When exposing wet or damp bones *in situ* ease the transition to a drier environment by misting them with water, or by keeping them shaded, lightly covered with loose soil or plastic sheeting. Thick or large bones, particularly long bones, must not suddenly be subjected to dry air or hot sunlight, because a differential in humidity levels of the surface and the bone interior may exaggerate anisotropic response, causing warping or separation of layers. Thinner bones, upon gradual exposure, usually dry more evenly and maintain a more homogenous overall humidity level.

When packaging bones, it is of utmost importance to maintain a constant humidity level. Place all damp bones in closed but unsealed plastic bags. Include a slightly damp cloth, cotton, or tissue paper, if necessary, with particularly damp specimens, but not in direct contact. Place these items immediately in the shade, as direct sun or a sudden change in temperature can cause condensation and wetting or swelling of the specimen.

Dry or nearly dry bone may also be placed in padded boxes in closed but unsealed plastic bags. Again, protect all packages and containers from direct sunlight or any sudden change in temperature to avoid possible condensation.

Provide adequate support for all bone. Plastic and/or paper bags are generally not adequate. For bone specimens, use padded cardboard or wooden boxes, trays, or other appropriate support. Mark all packages containing bone with orange tape.

Bone may be so severely weakened or fragmented that it is necessary to lift it with a portion of its surrounding soil matrix. Pedestal a specimen, and reinforce the sides of the soil block by wrapping with cardboard or plastic and securing it with tape or string. Use a cookie sheet or tray to slide under the soil and lift the section. Secure the section for transportation to the lab.

SHELL

Composition, Physical Properties, and Sources of Deterioration

Shell is basically a stable substance, composed primarily of calcium carbonate with a small percentage (1-2%) of organic protein. The constituents are not subject to biological attack; but may be weakened through chemical action.

Acids are the main deteriorants of shell. Rainwater or groundwater itself may be slightly acidic, and will percolate through soil, dissolving and leaching out compounds. Decaying organic materials can also produce acids; shell interred in humic soils generally is in a deteriorated state.

As shell is formed, it is deposited successively in layers. Deteriorated shell may delaminate along these layers. Powdering of all surfaces is common, and may escalate after exposure.

Excavation Techniques

The primary danger to shell during excavation and transportation to the lab is mechanical damage. Most shell is in fair to good condition. Upon excavation, keep it out of direct sun and package it with enough padding and support to prevent breakage.

A badly crumbled or powdered fragment is not usually reconstructable later, but may be lifted *in situ* with a portion of the soil matrix for consolidation in the lab.

Shell is generally soft and easily abrased. Touch shell as little as possible as the oil in the skin of the hands can have harmful effects.

CERAMICS, CLAY, AND GLASS

Composition, Physical Properties, and Sources of Deterioration

Ceramics tend to survive under virtually all circumstances in the archaeological environment. Through firing, the components of clay become compacted and chemically combined. At higher temperatures, the clay is vitrified, becoming glasslike and resistant to many types of biological and chemical damage. Glass is included here for purposes of this discussion since properties and sources of deterioration are similar between glass and high-fired ceramics.

Mechanical damage to ceramic objects is an obvious hazard throughout the continuum of manufacture, use, burial, excavation, and reuse, as illustrated by the vast quantity of sherds and the limited number of complete vessels in the archaeological record. Ground pressure may crack or break a vessel; after excavation, most damage results from careless handling or inadequate packaging.

One of the primary conservation problems concerning ceramics is the reconstruction of vessels. If edges are damaged, reconstruction may be difficult or unsatisfactory. Another problem is the loss of unstable or fugitive surface decoration which can result from harsh burial conditions or over-enthusiastic cleaning of sherds.

Certain constituents of ceramics, such as shell or calcite tempers, may be adversely affected by acidic conditions in the soil. Dissolution of temper may result in a porous structure and appreciably weaken a ceramic object. Analysis is also hampered.

Unfired clay or clay objects will generally remain intact while buried. Upon exposure, drying and removal of support provided by surrounding soil may initiate deterioration. As an unfired clay artifact dries, salts deposited in the walls crystallize and the object will become increasingly crumbly and powdery; such damage is often irreparable. Quick and uneven drying can cause structural weakening and fragmentation. Ceramics in burned structures or hearth areas may have devitrified through reexposure to high temperatures subsequent to initial firing. Refiring ceramics in a reducing atmosphere produces a weakened structure; these sherds may readily crumble upon exposure, retaining little or none of their original stability.

Glass is basically composed of a framework of silica ions interspersed with basic oxides or salts, usually of sodium, potassium, and calcium. Moisture and acids in the soil can cause these salts to be dissolved out, leaving a weakened silica structure that can cause an opaque, milky appearance or spalling of glass layers. In basic soil conditions, the silica structure can be weakened or partially dissolved.

Food and other organic culturally related adhesions occurring on ceramic objects are subject to fungal growth or removal through abrasion. Similarly, "fugitive red" or powdery slips and pigments may be removed by careless handling.

Excavation Techniques

Don't let excavated sherds dry out rapidly in the sun; shade and protect them until being packed for transport. Most potsherds can be packaged in paper bags with no special handling procedures. Sherds from an apparently reconstructable vessel may be packaged with additional padding, to prevent edge damage and ensure a closer fit when the pot is reconstructed.

Do not rub a sherd with your fingers or against cloth to remove dirt and expose the surface; in doing so, fragile surface characteristics may be removed. Don't try to scrape off hard calcarious encrustations or powdery white surface deposits.

Poorly fired or unfired clay objects are sensitive to environmental change and require maintenance of a constant humidity level during and after excavation. Package these objects in plastic, and pad them to prevent breakage. If necessary, include a humectant. Unfired clay objects must receive conservation in the lab as soon as possible; mark the package and field inventory sheet appropriately.

Some unfired clay objects may be so delicate that removal is impossible without consolidation. If it is judged that a specimen has little potential for use in a reconstructable vessel, collect a representative sample of the clay material for analysis of clay and temper in the lab.

When excavating whole vessels, be alert for inward or outward collapse. The content fill should be maintained in the vessel, and, if a crack should appear as surrounding fill is removed, plastic and then plaster gauze should be placed around the vessel for support. Always package whole vessels in cardboard boxes or other sturdy containers with copious amounts of padding. Mark them "Fragile: Whole Vessel" conspicuously for transportation to the lab.

OTHER MATERIALS

Other materials that will be encountered include a variety of both perishable and nonperishable substances. Most of these are included under the "Other Inorganic" and "Other Organic" material classes; others are classified by specific material type, such as "Metal," and "Synthetic." Occurrence of these materials will be rare in comparison with more abundant lithic, ceramic, and vegetal objects.

Substances including materials, such as adobe, fossilized shell, pigments, lithic specimens, eggshell, are resistant to biological attack, although organic inclusions or residues are vulnerable. Whereas, fossilized shell is virtually impervious to damage, other more fragile substances, such as pigment samples, adobe, and eggshell may be weakened, made porous, or dissolved by humidity in the soil. Acidic or basic conditions may also hasten an object;s demise.

Careless handling and improper packaging may damage delicate specimens through breakage or surface abrasion. Package these specimens securely and mark them "Fragile" to ensure careful handling, both during transportation and at the lab.

Fossilized shell and other relatively durable inorganics may be packaged in paper bags.

Organic substances include all protein (or animal-derived) materials: skin, feathers, hair, horn, claws, beaks, etc. Also included in this category are coprolites.

Animal-derived materials are most subject to infestation by insects and fungus, and are adversely affected by heat and moisture. Good preservation is rare, with the occasional exception of tanned or treated leather, or an object from a totally dry environment.

Dessicated hide, skin, or other materials, may be preserved intact, but will also be extremely brittle. Place these in a padded box covered with plastic to prevent mechanical damage.

Damp protein material should be kept damp until it can receive proper treatment in the lab. Include a humectant in a plastic bag with the object. Mark it "CONSERVATION" to ensure that immediate attention is given to it.

Paper from historical sites may be moldy or brittle and curled. Do not attempt to flatten or unroll paper in the field as it generally will not have enough flexibility to resist breakage. Conversely, do not roll flat papers for more convenient packaging. Wrap them as found on a rigid support that is covered with acid-free tissue. Moldy or insect-infested paper should be isolated from other materials to prevent contamination.

Textiles, such as cotton or wool from prehistoric or historic contexts, can be very fragile. They can be modly, stiff, and insect laden. Do not attempt to flatten, unroll or unfold the objects. Wrap the object as found on a rigid support (bags will be too flexible for adequate support) and box the item if possible. The object should be cushioned with cotton or another suitable soft substance. Acid-free tissue paper should be placed between the object and its cushion in order to prevent snagging as well as prevent inadvertent contamination of the textile that could skew the analysis of the object.

Metal is very vulnerable to chemical action when buried through exposure to water, oxygen and acids in the soil. Dissolution through weakening, encrustation or complete corrosion may result. Rust may completely replace an iron object; it is impossible to tell from the surface if an object is badly rusted on the surface or totally corroded. Therefore, handle metal artifacts with extreme care. Do not try to clean them or remove accretions in the field as this can result in damage to the original or less of valuable information which has been mineralized or embedded in the corrosion crust. In contrast to all other types, damp metal, when unearthed, must be dried promptly to prevent further corrosion or deterioration. Once packaged, maintain an air flow to object and take object to lab as soon as possible.

MATERIALS FOR FIELD CONSERVATION

The following tools and supplies should be available to all field crews for the implementation of conservation procedures in the field:

Tools

- A variety of small tools, such as spatulas, spoons, dental picks, needles, etc.
- Paint brushes and fine artist's brushes.
- Water sprayers or plant misters.

Containers and Supports

- Boxes and plastic bags.
- Metal or wood trays, cardboard beer flats, plywood or particle board sheets.

Padding

- Cotton or synythetic fibre batting, tissue, styrofoam packing material, cloth, open or closed cell foam, acid-free tissue.

Miscellaneous Supplies

- Sheet plastic or garbage bags, string, strapping or masking tape, wire twisties, orange tape for marking fragile packages, and plaster gauze.

SUMMARY OF PROCEDURES FOR ITEMS NEEDING CONSERVATION

1. Expose only enough of the specimen to determine its extent.

2. Photograph specimen *in situ*.

3. Determine deterioration of specimen

   a. Remove specimen from matrix
   or
   b. Pedestal specimen and maintain in matrix.

4. Package specimen properly and cover package with plastic.

5. Tag all conservation specimen packages with orange tape and mark "CONSERVATION."

6. Keep specimen in shade.

7. Hand hold conservation specimens in vehicle from field to lab.

8. Take conservation specimens to lab on day of discovery and place into "CONSERVATION" box.

ORGANIZATIONAL RESOURCES

Organizations and institutions which offer technical assistance and publications in the field of conservation:

American Institute for Conservation of Historic and Artistic Works (A.I.C.)
Martha Morales, Executive Secretary
1522 K. Street, N.W., Suite 804
Washington, D.C. 20005

International Institute for Conservation (I.I.C.)
6 Buckingham Street
London, WC2N 6BA, England
(publisher of Studies in Conservation)

Canadian Institute for Conservation
Ottawa, Canada

United Kingdom Group of the I.I.C.
Dept. of Conservation and Technical Services (Oriental Antiquities)
British Museum
London, WC1B 3DG, England

Institute of Archaeology
31-34 Gordon Square
London SE1 8NG

International Centre for the Study of the Preservation and the Restoration of Cultural Property (supported by UNESCO)
Via di San Michele, 13
Rome 00153, Italy

Conservation Analytical Laboratory
Smithsonian Institution
History and Technology Museum
Washington, D.C. 20560

National Conservation Advisory Council
c/o Arts and Industries Building 2225
Smithsonian Institution
Washington, D.C. 20560

MAJOR SUPPLIERS OF CONSERVATION GRADE MATERIALS

TALAS - Technical Library Service
104 Fifth Avenue
New York, N.Y. 10011 (catalogue and price list available)

Conservation Materials, Ltd.
340 Freeport Boulevard
Box 2884
Sparks, Nevada 89431 (catalogue and price list available)
(A variety of tools, resins, and other products)

Sierra Conservation Supplies
P.O. Box 339
Nevada City, Calif. 95959 (catalogue and price list)
(Limited variety of paper and archival products as well as fungicides)

Frank W. Joel, Ltd.
Museum Laboratory and Archaeological Supplies
The Manor House
Wereham, King's Lynn
Norfolk, PE 33 9AF, England (catalogue and price list)
(Good range of products and tools hard to get in the U.S.)

Process Materials Corp.
329 Veterans Boulevard
Carlstadt, N.J. 07072 (catalogue and paper samples available)
(Acid-free papers, adhesives and heat-seal tissues)

University Products, Inc.
P.O. Box 101
Holyoke, Mass. 01040 (catalogue and paper samples)
(Range of paper products for museum and archival use)

Hollinger Corp.
P.O. Box 6185
Arlington, Va. 22206 (catalogue and price list available)
(Acid-free boxes and papers)

Scientific Supply Companies including: Fisher Scientific, Van Water and Rogers (VWR) Scientific, Sargent-Welch, and Curtis Matheson Scientific

CONSERVATION MATERIALS AND SUPPLIERS

Supplies for Storage and Packing	Supplier
* Acid-free papers Tissue Paper 100% rag mat board Lining and wrapping papers Folders, document and storage boxes	TALAS PROCESS MATERIALS HOLLINGER CORP.
* Microfoam polyethylene foam padding (made by DuPont)	Paper and Packing materials suppliers
* Polyethylene plastic bags (zip-lock and regular)	Plastics Companies
* Clear, good quality polyethylene sheeting (1 to 4 mil. thick)	Plastics Companies Hardware stores
* Metal Storage Cabinets Zoological Specimen Cabinets #201 & 202 202 with shallow drawers (about $500/ea.)	Lane Scientific Equipment 105 Chambers Street New York, N.Y. 10007
A similar unit by Bassett Co. offers sturdier drawer construction at about the same price	Bassett Co. Calif.
* Metal map or blue-print cabinets with large, flat drawers used for storing documents, drawings, maps and large flat artifacts ($300-$400 each)	Available from many office suppliers, such as, Lane and Kistler Kwill

Climate Control	
* Silica Gel (dessicant crystals of small Particle size, about 8 - 16 mesh)	Scientific and Chemical supply companies
* Recording Hygrothermograph (with graph-paper for week-long records) about $325.00	Model No. 5-594 Belfort Instrument Co. 1600 S. Clinton St. Baltimore, Md. 21224 Serdex Hygrothermograph available from Fisher Scientific Co.
* Bendix Psychron Psychrometer (battery operated, about $80)	Bendix, Environmental Science Division 1400 Taylor Ave. Baltimore, Md. 21204

CONSERVATION MATERIALS AND SUPPLIERS

Materials	Suppliers
* Dial-type Hygrometers	
Inexpensive, less accurate gauges ($7 - $15)	Scientific Supply Companies
Hygrometer Gauge (accurate to ±3% RH) ($11.00)	Airguide Instrument Co. 2210 Wabansia Ave. Chicago, Ill. 60647
Compact Thermo-Hygrometer #4901 (very accurate, $48.50)	Conservation Materials, Ltd.
* Sling Psychrometer (good for spot checks and calibrating other units)	Scientific Supply Co.
Control of Light Levels	
* Photographic light meter capable of reading low light levels in foot-candles of lux	Gossen Luna-Pro Light Meter Spectra Lumicon Series II Light Meter Photo Research Div. of Kollmorgen Corp. Burbank, Calif.
*Plastic ultra-violet filtering sleeves for fluorescent tubes (products from different companies will vary in effectiveness and life expectance)	"Arm-A-Lite" Filter Ray Shields Thermoplastic Processes Inc. Valley Road Stirling, N.J. 07980 Solar-Screen Co. 1023 Whitestone Blvd. Whitestone, N.Y. 11357 TALAS
Pest Control	
* Thymol crystals	TALAS, Conservation Materials, Ltd. Scientific Suppliers
* Paradichlorobenzene or Naphtalene	Chemical Suppliers
* Shell No-Pest Strips or "Vapona"	Shell Oil Co. or hardware store
* Hyamine (Quarternary Ammonia)	Sierra Conservation Material
* Dowicide A (or Topane)	Dow Chemical Co.

CONSERVATION MATERIALS AND SUPPLIERS

Materials	Suppliers
Resins and Adhesives	
* Polyvinyl Acetate (PVA-AYAA, AYAC, and AYAF)	TALAS, Conservation Materials, Ltd. Union Carbide and other chemical suppliers
* Gelva (V1½, V7M50, TS100, and TS70)	Monsanto Corp. (tel. 413-788-6911) Shawinigan Resins Corp. Springfield, Mass.
* Rhoplex AC-33, AC-234, AC-235	Rohm and Haas Co. Independence Mall West Philadelphia, Pa. 19105
* Rhovinal B (polyvinyl butyral)	Rhone-Poulenc Rhodia Central Bldg. 230 Park Ave. New York, NY 10017
* Butvar (polyvinyl butyral)	Shawinigan Resins Corp. Springfield, Mass.
* Mowilith & Mowital	American Hoechst Corp. Industrial Chemicals Div. Rt. 202-206 N. Somerville, N.J. 08876
* H M G Glue (cellulose nitrate)	Frank W. Joel, Ltd.
* Elvacite or Lucite (poly-methacrylate)	TALAS Dupont, Union Carbide
* Soluble Nylon - Calaton CB	Conservation Materials, Ltd.
* Promatco Adhesive A1023 (a viscous PVA emulsion resoluble in water)	Process Materials Corp. Conservation Materials, Ltd.
* Ethulose 400 (Modocoll E)	Chemaster Corp. 24-64 45th St. Long Island City, N.Y. 11103
Ethyl Cellulose	Dow Chemical Co. Fisher Scientific
* Polyethlene Glycol (PEG)	Dow Chemical Co. Conservation Materials, Ltd.
"Carbowax"	Union Carbide

CONSERVATION MATERIALS AND SUPPLIERS

Materials	Suppliers
* Orvus WA Paste (detergent)	Proctor and Gamble Co. Conservation Materials, Ltd.
* Igepal (non-ionic detergent)	TALAS
* Atapulgite (absorbent earth used as a poltice in stain removal)	Conservation Materials, Ltd.
* Vulpex (a solvent-based detergent)	Frank W. Joel, Ltd.
* Tri-sodium phosphate	Most chemical suppliers
* Sodium hexa-meta phosphate (Calgon)	Most chemical suppliers
Miscellaneous	
* Portable heat-sealer for making your own odd-size plastic bags	Futura Portable Heat-Sealer "Poly Model" Packing Aids Corp. 370 Brannan St. San Francisco, Calif. CLAMCO Heat-Sealer Dixon Paper Co.
* Polyurethane varnish (Varathane) (for sealing construction wood)	Hardware store
* Plasticized "paper" labels for use with wet specimens	Frank W. Joel, Ltd.
* Flammable solvent containers and storage cabinets, metal	Scientific suppliers Eagle Brand Cabinets and fire-proof containers
* Polyfilla (cellulose-plaster filling material for ceramics, etc.)	Conservation Materials, Ltd.
* Hand-carts on wheels (for moving artifacts with minimal handling)	Office or shop equipment companies
* Silicone release paper (will not stick to adhesives during repairs)	TALAS, Process Materials
* pH Indicator Strips	Most scientific suppliers

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THE ARCHAEOLOGICAL RESOURCES OF THE UNCOMPAHGRE AND GUNNISON RESOURCE AREAS, WEST CENTRAL COLORADO

By

Alan D. Reed

and

Douglas D. Scott

ACKNOWLEDGEMENTS

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CHAPTER I

INTRODUCTION

The Bureau of Land Management is responsible for governing the use of approximately 12.5 million acres of federal lands in Colorado. In order to accomplish such an immense task with the desired degree of efficiency, it has been necessary for the Bureau to divide lands under its jurisdiction into several districts, and these districts into even smaller units, termed resource areas. The Uncompahgre and Gunnison Resource Areas are two such units; each consists of approximately 500,000 acres and is located in west-central Colorado.

The Uncompahgre and Gunnison Resource Areas are situated west of the continental divide, south of Grand Mesa, east of the crest of the Uncompahgre Plateau, and north of the San Juan Mountains in the Gunnison River drainage. The two Resource Areas share a common boundary, and are located in the vicinity of the towns of Delta, Gunnison, Ouray and Montrose (Figures 1, 2 and 3).

Cultural resources are plentiful in the Uncompahgre and Gunnison Resource Areas. With approximately five percent of the two areas inventoried, nearly 700 historic and prehistoric sites have been identified and recorded. Many of these sites are on federal lands. The Bureau of Land Management has the authority and legal responsibility to protect the cultural resources on its lands, as delineated primarily by the following legislation:

1. The Antiquities Act of 1906 (34 Stat. 224), amended, 16 U.S.C. 431-433.
2. The Historic Sites Act, 1935 (49 Stat. 666).
3. The Historic Preservation Act, 1966 (80 Stat. 195) as amended in 1976.
4. The National Environmental Policy Act, 1969 (83 Stat. 832).
5. Federal Land Policy and Management Act of 1976.
6. Archaeological and Historic Data Preservation Act of 1974.

In executing their role as managers of public resources, it is necessary for agents of the BLM to understand the nature and importance of cultural resources to the fullest extent possible. It is the purpose of this study to facilitate this understanding by synthesizing the data so far provided by the hundreds of prehistoric sites recorded in the Uncompahgre and Gunnison Resource Areas and, to a limited extent, to reconstruct salient features of the prehistoric cultures.

Environment

The environment of the Uncompahgre and Gunnison Resource Areas exhibits great diversity. Within the project area are some of Colorado's most rugged mountains, as well as mesa tops, canyonlands and broad river valleys. Elevations range from over 14,000 feet to 4,800 feet. Annual precipitation may average 60 inches in the high country, to as low as seven inches per year in the low river valleys. Other environmental components, such as temperature, geology, hydrology, pedology, and biology also vary greatly with elevation and topography.

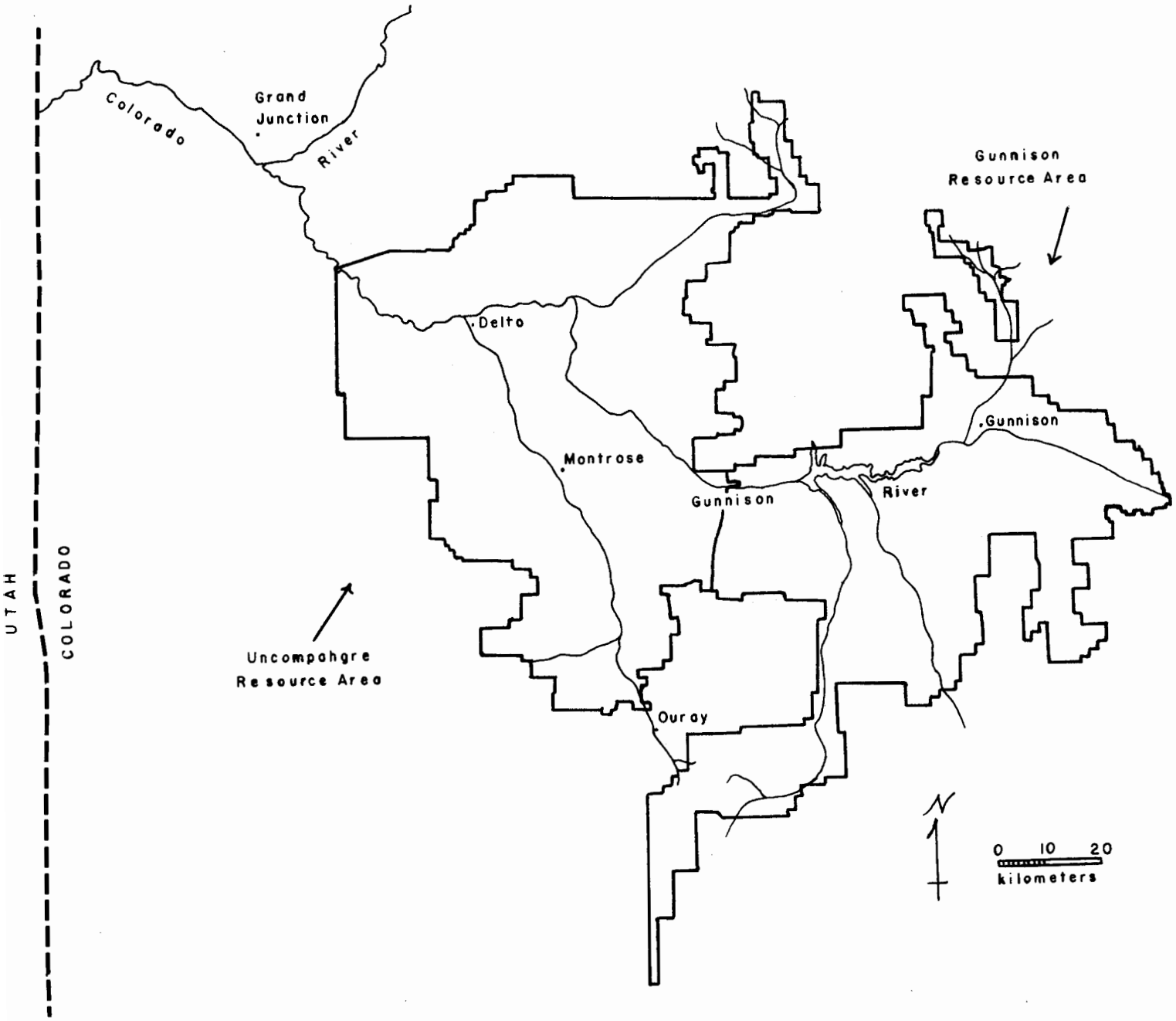


Figure 1. Map of the Uncompahgre and Gunnison Resource Areas.

Figure 2. The Shavano Valley
and the Uncompahgre Plateau.

Figure 3. The Gunnison Area
near Blue Mesa Reservoir.

The environmental aspects that perhaps best reflect the net effect of all other environmental components are floral communities. The U.S. Soil Conservation Service (1972) has defined twelve generalized natural vegetation types in Colorado. Six of these types are present in the Uncompahgre and Gunnison Resource Areas, and are described as follows (Soil Conservation Service, 1972):

1. Shrublands of the Saltdeserts. Flora include saltbush, rabbitbrush, galleta, Indian rice grass and greasewood. This vegetation zone is confined primarily to the Uncompahgre and the North Fork of the Gunnison River valleys, in the vicinities of Montrose, Delta and Hotchkiss. The elevations in this zone are lower than in any other zone.
2. Woodlands of the Intermountains. Flora include pinyon and/or juniper with wheatgrass, Indian ricegrass, bluegrass mixed with shrubs and forbs. This floral community is found upslope of the preceeding zone, along the eastern slope of the Uncompahgre Plateau and in the hills surrounding the Gunnison River near its confluence with the North Fork.
3. Sagebrush Lands of Mountain Parks and Basins. This community is characterized by big sagebrush, rabbitbrush, wheatgrass, needlegrass, and bluegrass. The zone is confined primarily to the upper portion of Gunnison River, from Blue Mesa Reservoir east to within a few miles of the continental divide. Tomichi Creek and Quartz Creek are within this zone.

4. Woodlands of the Lower Mountains. This zone is characterized by stands of ponderosa pine (and often Gambel oak) with Douglas fir, blue spruce, white fir and an occasional aspen mixed with fescue, muhly, bluegrass shrubs and forbs. This zone is found upslope of the predominantly pinyon and juniper woodlands of the intermountains east of the Uncompahgre River valley in the vicinity of the town of Cimarron.
5. Woodlands and Grasslands of Sub-Alpine Areas. Flora in this zone include stands of spruce and fir or lodgepole pine, or aspen, intermixed with Thurber's fescue grassland parks. This zone is found along the crest of the Uncompahgre Plateau and near the headwaters of many of the tributaries of the Gunnison River. The towns of Lake City and Crested Butte are located within this zone.
6. Grasslands and Meadows of Alpine Regions Above Timberline. Sedges, grass, willow, birch and numerous forbs dominate this floral community. This zone is confined to the highest elevations, primarily along the continental divide and in the San Juan Mountains between Lake City and Ouray.

Numerous species of fauna inhabit the various physiographic regions of the project areas. Notable are black bear (*Ursus americanus*), elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), mountain lion (*Felis concolor*), snowshoe hare (*Lepus americanus*), jackrabbit (*Lepus* sp.), prairie dog (*Cynomys gunnisoni*), and coyote (*Canis latrans*).

An abundance of natural resources are available in the Uncompahgre and Gunnison Resource Areas, linearly in a relatively short distance. Later on, prehistoric peoples' relationship with the areas' diverse environment will be discussed.

CHAPTER II

PREVIOUS ARCHEOLOGICAL WORK IN THE PROJECT AREA

In the late nineteenth and early twentieth centuries, when the cliff dwellings in the Four Corners area drew scores of relic seekers, explorers, and professional archaeologists, the cultural resources of the Uncompahgre and Gunnison Resource Areas went largely ignored. Structures, ceramics and burials were comparatively rare and unimpressive in the latter area and, save for projectile points and perhaps rock art, the area seemed to have little to offer. As a result, there were virtually no archaeological investigations in the area before 1922, and relatively few until the 1960's and 1970's when various historic preservation laws were enacted and/or enforced.

The following discussion will divide the legitimate archaeological investigations conducted in the project area into two categories. "Exploration and Definition" will trace the earlier works and those projects conducted solely as scholarly research, and "Cultural Resource Management Projects" will deal with projects conducted wholly or partially in response to pertinent historic preservation laws.

Exploration and Definition

As mentioned above, no legitimate inquiries into the prehistory of the Uncompahgre and Gunnison Resource Areas were made before 1922. Some "pothunting" undoubtedly occurred but, as such, contributed little or no significant information to the science.

The first formal investigation was conducted by W.C. McKern in 1922. McKern (1978) intensively analyzed several petroglyph panels in the Shavano Valley west of Montrose and along the Gunnison River southwest of Delta. The results of this exhaustive study were lost for over 50 years, but have recently been rediscovered and published by the Bureau of Land Management.

Betty H. Huscher and Harold A. Huscher conducted summer expeditions to the western slope of Colorado in 1939, 1940 and 1941. The Huschers, sponsored in part by the Denver Museum of Natural History, traversed a wide area of west-central Colorado, but did spend some time in the Uncompahgre and Lower Gunnison River drainages. Guided by local informants, the Huschers visited numerous sites with hopes of gaining an understanding of the prehistory of this largely ignored region. Unfortunately, the Huschers neglected to publish most of their findings. Data collected is in the form of field notes (Huscher and Huscher 1939), a discussion of site locations (Huscher and Huscher 1939), an article on petroglyphs (Huscher and Huscher 1940), and an article on enigmatic circular stone structures (Huscher and Huscher 1943) in Colorado.

Between 1937 and 1952, the Denver Museum of Natural History and the University of Colorado conducted excavations at several rock shelters in western Colorado and eastern Utah. Two of these sites, the Moore and the Casebier rock shelters, are located in the Uncompahgre Resource Area. These excavations were conducted and reported by H. M. Wormington

and Robert H. Lister. On the basis of these excavations, Wormington and Lister (1956) defined the "Uncompahgre Complex". This complex represents an archaic adaptation to the vicinity of the Uncompahgre Plateau and has endured as a concept in literature until the present. The definition of the Uncompahgre Complex was the first major effort to synthesize and explain the prehistory of the area.

The most important work done in the Uncompahgre and Gunnison Resource Areas to date was conducted by William G. Buckles on the Ute Prehistory Project. This project was sponsored by the National Science Foundation, and was implemented by the University of Colorado under the direction of Dr. Robert H. Lister. The project set as its goals the tracing of the origins of Ute culture in the vicinity of the Uncompahgre Plateau. Buckles analyzed 75 prehistoric sites, 39 of which he excavated to one degree or another. Field work was performed between 1961 and 1963. On the basis of data collected by the Ute Prehistory Project, Buckles produced a voluminous dissertation (Buckles 1971) detailing the excavations, with emphasis upon rock art and recovered material culture. Buckles redefined the Uncompahgre Complex (Table 1) and formulated eight phases and four distinct tool assemblages not placed in his phase sequence. Unfortunately, the project's major goal--that of tracing the origins of Ute culture in the area--was not realized.

TABLE 1

PROBABLE SEQUENCE AND DATES OF PHASES AND ASSEMBLAGES
OF THE UNCOMPAHGRE COMPLEX (AFTER BUCKLES 1971)

Estimated Dates	Phases and Assemblages	Constituent Assemblages
A.D. 1500 - A.D. 1880	Escalante	5MN13; 5MN40, Ex. Unit 2, Level 1: 5MN41; 5MN42; 5MN44; 5MN45; 5MN46; 5MN65.
A.D. 1300 - A.D. 1880	*Level 2 5MN40 (2)	Same
A.D. 1300 - A.D. 1500	Camel Back	5MN14, Levels 1 and 2; 5MN30, Levels 2 and 3.
A.D. 700 - A.D. 1300	Coal Creek	5MN14, Levels 3, 4 and 5; 5MN34, Surface through Level 4; 5DT2, Levels 1 through 4.
A.D. 700 - A.D. 1100	*Level 2 5MN55	Same
A.D. 0 - A.D. 700	Ironstone	5MN38; 5MN40, Ex. Unit 1, Level 3.
A.D. 0 - A.D. 700	Dry Creek	5MN57
500 B.C. - 0 A.D. 150 B.C. ± 220	Horse Fly	5MN40, Ex. Unit 1, Level 4.
3000 B.C. - 500 B.C. 745 B.C. ± 180	Roubideau	5MN40, Ex. Unit 1, Level 5; 5DT2, Levels 5 through 9a.
3500 B.C. - 7000 B.C.	Shavano	5MN40, Ex. Unit 1, Levels 6 and 7; 5MN40, Ex. Unit 2, Level 6.
3500 B.C. - 1500 B.C.	Monitor Mesa	5MN43, Levels 5 through 8.
8000 B.C. - 3000 B.C.	*Buttermilk	5DT2, Levels 9b through 11c.

* Assemblages

Cultural Resource Management Projects

As mentioned above, there have been numerous laws passed within the last decade aimed at locating and preserving significant historic and prehistoric sites. These laws, coupled with a realization in the scientific community of the importance of man's adaptive strategies in all geographical areas, have produced many archaeological investigations in the Uncompahgre and Gunnison Resource Areas.

Reservoir Projects

Archaeological inventories of lands to be inundated by the construction of reservoirs have constituted a large proportion of the clearance projects completed in the Uncompahgre and Gunnison Resource Areas. As a result, many more acres have been surveyed and many more sites have been located in the narrow corridors formed by these projects than in upland regions.

Crawford Reservoir: In 1958, Dr. Joe Ben Wheat of the University of Colorado, surveyed the present site of Crawford Reservoir, southeast of Hotchkiss, Colorado. Dr. Wheat recorded two prehistoric sites (Wheat 1958). The sites were not excavated.

Blue Mesa Reservoir: Dr. Robert H. Lister and students of the University of Colorado surveyed in 1962 the area presently inundated by the Blue Mesa Reservoir. In this area of high site density, only ten prehistoric sites were recorded (Lister 1962). None of the sites was excavated.

Morrow and Crystal Reservoirs: Located immediately downstream of Blue Mesa Reservoir, these two reservoirs are situated in the deep and narrow portion of the Gunnison River Valley just upstream of the Black Canyon of the Gunnison National Monument. The area inundated by these two reservoirs was surveyed by personnel of the University of Colorado udner the direction of Dr. David A. Breternitz. No cultural resources were found (Breternitz 1974; Buckles 1964).

Ridgway Reservoir: Archaeological investigations for the Dallas Creek Project began in 1973. In August of that year, Dr. David A. Breternitz of the Mesa Verde Research Center directed the reconnaissance of those lands to be impacted by the construction of the Ridgway Reservoir and by the relocation of U.S. Highway 550 around the proposed lake. Eight sites were located and recorded (Breternitz 1973). Personnel from the Mesa Verde Research Center returned for further investigations in 1975 (Carpenter and Stiger 1975). Twelve prehistoric and two historic sites were located during this phase of the project. In 1978, Steven G. Baker of Centuries Research, Inc., conducted a small-scale investigation of the historical resources in the Dallas Creek Project Area (Baker 1978). Sixteen historic sites were located in the approximately 2,800-acre area.

Dominguez Reservoir: Carl E. Conner of the Historical Museum and Institute of Western Colorado, Grand Junction, surveyed the impact area of the Dominguez Reservoir in 1975. This survey evidently consisted of interviews with local informants and an "intensive search of suspect areas" (Conner 1975). A total of 63 prehistoric and 10 historic sites were recorded.

Other Water-Related Projects

In 1976, Dr. David A. Breternitz of the University of Colorado's Mesa Verde Research Center directed the survey of the Fruitland Mesa Project. This project, located north of the Black Canyon of the Gunnison in Montrose County, was designed to locate cultural resources threatened by the construction of a system of conduits, recreation areas, and by the irrigation of hitherto undeveloped lands. Twenty-one sites were found during the inspection of approximately 7,000 acres (Carpenter *et al*. 1976).

Federal Lands Inventory

Projects in this category include those inventories on federal lands primarily aimed at executing Executive Order 11593. These projects are designed essentially to "see what's out there", which is of great importance for proper federal lands' management.

Black Canyon of the Gunnison National Monument: In 1973 and 1974, Dr. David A. Breternitz of the University of Colorado's Mesa Verde Research Center directed a cultural resource inventory within the Black Canyon of the Gunnison National Monument. These lands are administered by the National Park Service. Thirty-eight sites were recorded (Breternitz *et al*. 1974).

Curecanti Project: Mark A. Stiger of the Mesa Verde Research Center conducted an archaeological survey of the Curecanti National Recreation Area in 1976. The recreation area, administered by the National Park Service, surrounds the Blue Mesa Reservoir. Stiger recorded 134 sites (Stiger 1977).

Gunnison Gorge: The Bureau of Land Management in 1976 secured the services of Dr. David A. Breternitz of the Mesa Verde Research Center to conduct an archaeological survey along a section of the Gunnison River, north of the Black Canyon of the Gunnison National Monument. Paul Roebuck supervised the survey. Fifty-nine archaeological sites were recorded (Roebuck 1977).

Uncompahgre Environmental Statement: In 1976, the BLM contracted the Mesa Verde Research Center to conduct an archaeological survey in the Uncompahgre Resource Area. The contract called for the implementation of a random sampling design. The sampling fraction was set at one percent. Under the direction of Dr. David A. Breternitz, Curtis W. Martin stratified the Resource Area into five physiographic zones and utilized quadrats to sample the strata. One hundred and eighteen sites were located on the 5,816 acres surveyed (Martin 1977).

Energy-Related Clearance Surveys

Blue Mesa/Lake City Transmission Line: Susan M. Applegarth of Fort Lewis College directed an archaeological survey along the proposed

path of a transmission line, to be erected by the Colorado Ute Electric Association. The survey was confined to a narrow powerline right-of-way between the Blue Mesa Dam and Lake City. Twenty-one sites were recorded on this project (Applegarth 1975).

West Central Colorado Coal Lease: Archaeological Associates, Inc. employed a stratified, random sampling scheme in their reconnaissance of approximately 7,880 acres, most of which lies in the Grand Junction District although a portion is in the Uncompahgre Resource Area. The strata were defined on the basis of vegetation zones. The field work, conducted in 1977 and 1978, resulted in the discovery of 10 sites in the vicinity of Cedaredge and Paonia. A report of the survey is forthcoming.

Orchard Valley Mine: Steven G. Baker of Centuries Research, Inc. recorded 13 historic sites during his survey of lands to be impacted by the development of the Orchard Valley Mine, a coal operation located near Paonia (Baker 1977). The survey encompassed approximately 2,500 acres.

AMAX Project: At the time of this writing, Centuries Research of Montrose and Western Cultural Resources Management of Boulder, Colorado, are conducting archeological survey and test excavations in the area of a proposed molybdenum mine near Gunnison and Crested Butte.

Miscellaneous Clearance Surveys

Numerous small-scale inventories have been carried out in recent years in the Uncompahgre and Gunnison Resource Areas. As with the larger-scale archaeological projects, Dr. David A. Breternitz of the Mesa Verde Research Center has contracted with the BLM for many of these. In 1975, Breternitz directed the survey of lands to be impacted by a BLM chaining project, land exchanges, timber sales, road construction and other similar small-scale public works (Breternitz and Breternitz 1975; Breternitz and Williams 1976; Breternitz and Breternitz 1975). In 1976, Breternitz directed the Thomas Exchange Project, a survey of both public and private parcels of land amounting to 9,800 acres. Sixty-six sites were recorded on this project, in areas widely scattered about the vicinity of Gunnison (Euler 1977).

Kim Pinkerton of the Colorado State University did some field work on BLM lands in the vicinity of Paonia in June of 1975. Pinkerton recorded at least seven sites but, unfortunately, did not publish any accounts of his works. All of the sites discovered by Pinkerton were later relocated and recorded again by Breternitz (Breternitz and Breternitz 1975).

The Colorado Highway Department has conducted surveys along existing and proposed highway rights-of-way between Delta and Olathe, and between Cimarron and Blue Mesa Reservoir. The former project yielded no cultural resources, but the latter resulted in the discovery of at least 20 sites. A Folsom projectile point was recovered on one of these sites. The surveys were conducted in 1977 and 1978, but the results have yet to be published.

Numerous drill pad surveys have been executed in recent years, most of them located between Delta and Paonia. Most of these surveys have been conducted by BLM archaeologists, but some private contractors have lately been obtaining some of these projects (e.g., Conner and Alexander 1978).

Excavations

While only five archaeological excavation projects have been carried out to date in the project area, an abundance of interesting data are coming to light. Excavations at ten sites in the Curecanti National Recreation Area (Figure 4) along the Gunnison River have uncovered an abundance of prehistoric firehearths. Also reported (Stiger, personal communication) are the possible remains of a house structure dating to the Archaic Tradition (ca. 4500-6000 years B.P.). These excavations, conducted between 1978 and 1979, were sponsored by the National Park Service and represented an effort to mitigate the impacts of various construction activities and big wave action of the Blue Mesa Reservoir. Analysis of the excavated data is in progress.

The Colorado Highway Department is presently writing up excavation data obtained from the testing of several sites located during 1977 and 1978 surveys of a stretch of U.S. 50 between Cimarron and Blue Mesa Reservoir (Figure 5). The sites tested were surficial lithic scatters.

Figure 4. A slab-lined firepit excavated at 5GN10 by the National Park Service.

Figure 5. Colorado Department of Highway excavations at lithic site 5GN96.

Dr. Susan Riches of Fort Lewis College directed the excavation of a lithic scatter near Cushman Creek, approximately 15 miles west of Montrose. This site was excavated prior to a land exchange which would have placed the site in private ownership. Excavations were conducted in the Fall of 1977. A report is forthcoming.

During 1979, Centuries Research, Inc. and Western Cultural Resources Management began excavations of those sites to be impacted by the development of AMAX's molybdenum mine. No reports have to date been released on their findings.

CHAPTER III

PALEO-ENVIRONMENT

A culture is shaped to a considerable degree by its environmental context. While the environment by no means determines the specific attributes of a culture, it does impose certain restrictions on its overall character. In order to understand the nature of prehistoric man's adaptations to the Uncompahgre and Gunnison Resource Areas, it is important that his culture's environmental constraints be considered.

The earliest evidence of man in the project area consists of a single Clovis projectile point (Carpenter et al. 1976), typologically similar to others dated at approximately 9000 B.C. The Pleistocene Epoch, or more specifically the Wisconsin Age, was drawing to a close at this approximate date, resulting in shifts in vegetation and possibly contributing to the eventual extinction of a certain species of Pleistocene megafauna. The changes in vegetation, as evinced by the pollen record of the North American Southwest, evidently transpired in a relatively brief period of time (Martin and Merhinger 1965). The climatic trend was from the cool and moist conditions of the Wisconsin glacial advances to the warmer and drier conditions approximating our present climate. The climatic change, while perhaps rapid, may not have been especially severe in the Southwest. According to Judge (1973) the difference between our present climate and that of the late Wisconsin was relatively minor, and in the form of cooler summer rather than winter temperatures, and an increase in annual precipitation.

There is considerable debate concerning the magnitude of environmental changes occurring since the termination of glacial conditions. Some, such as Martin and Mehringer (1965), argue that no important change in the Great Basin and Southwest have occurred (the "importance" of an environmental change in this context, is a function of its effect on the subsistence strategies of man). Others, notably Swanson (Martin and Plog 1973:79) see major environmental fluctuations in the past 10,000 years. In the Great Basin, Swanson (1966) sees a shift at about 5000 B.C. towards aridity, with the resulting increase of xerophytic flora upsetting the habitat conducive for big game, and changing man's adaptive strategy from a hunting to a more generalized economic pattern.

The postulated climatic shift at 5000 B.C. marks the beginning of the Altithermal. The Altithermal alledgedly represents "the maximim of warmth in the northern hemisphere since the retreat of the last ice sheet" (Wedel 1961:18), and has been considered severe enough to have forced many of the inhabitants of the Great Plains to abandon that area in favor of areas of heavier precipitation (Wedel 1961). The extent and the magnitude of the Altithermal is moot. Martin and Merhinger (1965), for example, question its impact in the Southwestern United States, but do concede that evidence for the Altithermal drought exists in the Great Basin and the Central Rockies in the form of a reduction in tree pollen counts from stratigraphic profiles. Determination of the nature of climatic conditions during the Altithermal in the Uncompahgre and Gunnison Resource Areas must await further work.

By approximately 2500 B.C., the Altithermal had ended. A resurgence of glacial activity occurred at this time in the Rocky Mountains (Porter and Denton 1967), indicative of cooler summer temperatures and possibly of more moist conditions. Neoglacial advances also occurred in the Rockies at approximately 700 B.C., and several times in the last several centuries (Porter and Denton 1967).

Pollen and geological evidence suggests that the climate has fluctuated during the past 10,000 years. Overall changes appear to have been relatively minor, however, and probably took the form of vertical displacements of vegetation zones, in the order of 150 to 400 meters (Martin and Mehrinjer 1965:443). According to Madsen and Berry (1975) the availability of floral resources to man has remained relatively stable.

Madsen and Berry (1975:399) do outline one important change in the flora of the Great Basin region, however, that if true may have had a substantial impact on some perceptions of prehistoric man's subsistence patterns. These authors assert that prior to about 1000 B.C., the woodlands now covered by pinyon and juniper were dominated by juniper. After 1000 B.C., however, they note a marked increase in the percentages of pinyon pollen from several areas in the Great Basin (from both cultural and non-cultural profiles), and so argue that man's extensive use of the pinyon nut proposed by some Great Basin archaeologists (e.g., Thomas 1973) only occurred relatively recently. Pinyon and

juniper woodlands comprise a major vegetal zone in the Uncompahgre and Gunnison Resource Areas. The ramifications of Madsen and Berry's (1975) hypothesis are, therefore, important.

Very little paleo-climatic and paleo-botanical research has been done in the Uncompahgre and Gunnison Resource Areas. It is hoped, therefore, that data generated from recent excavations (Figures 6 and 7) in the Curecanti National Recreation Area and from excavations in nearby areas (see Scott 1978a) will extend our knowledge of the paleo-environment of the project area. Recent pollen analysis of archaeological deposits (Scott 1978a and b) in west-central Colorado suggests that there were minor changes in the climate through time but that the boitic makeup of the area changed little if at all. More work in the area is required to substantiate this, but a trend is beginning to appear.

Figure 6. The opening of 5GN189
near Blue Mesa Lake.

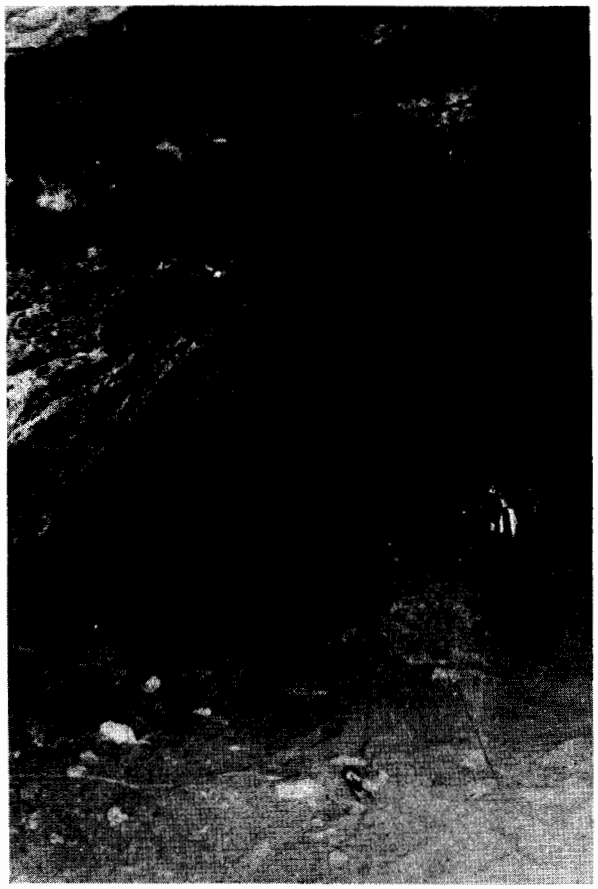


Figure 7. Test excavations into the
Pleistocene deposits in 5GN189.

CHAPTER IV

PALEO-INDIAN OCCUPATION

The date of man's first entry into the New World has been a topic of considerable debate. Undisputed sites, accurately dated, appear in considerable numbers at approximately 9,200 B.C. These sites are attributed to the "Paleo-Indian Tradition", a tradition which will be discussed below. There is emerging evidence, however, for an earlier arrival date placing man in the New World at approximately 25,000 B.C., well before the end of the Wisconsin stage of the Pleistocene Epoch or Ice Age.

An argument for an early arrival date must consider sites of unquestioned integrity, employment of credible dating techniques, and glacial geology. It is generally agreed that Asians, well-adapted to peri-placial climates, crossed into the New World over a land bridge between Siberia and Alaska. This land bridge, called "Beringia", periodically appeared and disappeared during glacial advances and retreats. During glacial advances, vast amounts of water were locked up in the form of ice in continental ice masses. As the continental glaciers grew, the sea level dropped. Beneath the Bering and the Chukchi Seas lies a vast, not too deeply submerged plain. A drop in sea level of only 45 meters would have exposed a land bridge nearly 200 miles wide; a drop of 140 meters would have exposed a land bridge nearly 1,300 miles wide at its maximum (Haag 1962).

Jennings (1978a:3) citing evidence reported by Butzer (1971) and Hopkins (1967) writes that there were one major and two minor glacial advances between approximately 23,000 and 8,000 B.C. He suggests that the Bering land bridge was open for all but approximately 2,000 years of that time, and that is is possible the land bridge never entirely disappeared until approximately 8,000 B.C. (Jennings 1978a:3).

While glacial advances exposed a dry passageway into Alaska, they also cut off a route south into the heart of the continent. Two major continental glaciers have been identified in North America: the Cordilleran, which centered along the Rocky Mountains, and the Laurentide, which centered near Hudson's Bay. During maximum glacial advance, these two ice sheets would expand outward and coalesced, covering all of Canada under ice up to 3,000 meters thick (Jennings 1978a:6). A passageway between the two glaciers appeared only during glacial retreats; Jennings (1978a:6) suggests that such a corridor was present prior to 16,000 B.C., disappeared between 16,000 and 12,000 B.C., and was permanently open after 10,000 B.C.

The bulk of archaeological evidence of man's early entry into the New World emanates primarily from four archaeological sites in North America and a few sites in South America (Jennings 1978a). The North American sites--Old Crow Flat in Alaska, Fort Rock Caves in Oregon, Wilson Butte Cave in Idaho, and Meadowcraft Shelter in Pennsylvania--have been carefully excavated and dated. Radiometric dates of 17,650 $\pm$ 2,400 B.C. and 17,150 $\pm$ 2,400 B.C. and 17,150 $\pm$ 800 B.C. have been obtained for Meadowcraft Shelter and a date of 25,000 $\pm$ 3,000 B.C. has been obtained for the old Crow Flat site (Jennings 1978a:22-23).

Present evidence is indicating that man may have entered the New World prior to 10,000 B.C. Obviously, a great deal more data needs to be generated before an arrival time can be accurately determined.

As mentioned above, there is a considerable number of sites accurately dated to approximately 9,200 B.C. These sites are attributed to the Paleo-Indian tradition. Sites of the Paleo-Indian Tradition, when compared to the numbers of the later traditions, are comparatively rare, and knowledge concerning them is limited. Characteristic of the earliest of these sites are large, bifacially flaked lanceolate projectile points with basal fluting, known as Clovis points. Clovis projectile points and various stone artifacts related primarily to butchering activities have been found in association with extinct forms of mammoth, bison, horse, tapir, and camel, and to a lesser extent with smaller fauna.

Between 9000 and 8000 B.C., the Clovis projectile point was replaced by a smaller, more finely chipped projectile point known as the Folsom point. This projectile point type is also lanceolate in form and fluted, but unlike the Clovis point, the fluting usually extends over more than half of the artifact's length. Folsom points have also been found in association with several extinct species of fauna, but reflect an emphasis upon bison.

Folsom points were in turn evidently supplanted by non-fluted projectile points attributed to the Plano complex of the Paleo-Indian tradition. Projectile points of this complex include considerable variation in form, but generally retain the lanceolate shape. The Plano projectile point types have been divided into two basic groups (Bryan 1962), the Plainview and the Parallel-flaked series. The Plainview series, including the Plainview, Midland, Milnesand, and Meserve forms, retain the general outline of Folsom and Clovis points. Projectile points of the Parallel-flaked series, including Scottsbluff, Eden, Hell Gap, Cody and Agate Basin types, exhibit superb craftsmanship, and are considered to be slightly more recent than the Plainview series (Judge 1973). The Plano Complex, and so the Paleo-Indian tradition, terminated at approximately 5500 B.C.

Presently, the subsistence patterns of the Paleo-Indians are not well understood. The association of Paleo-Indian projectile points with extinct forms of Pleistocene megafauna, and the relative absence of grinding stones has traditionally led to the interpretation that these people predominantly relied upon big game hunting. This interpretation is supported by the location of many Paleo-Indian sites--atop hills, with an unobstructed view of a broad "hunting area" near a water source (Judge 1973:312-318). Wilmsen (1971) and Judge (1973), on the basis of use-wear analysis and ethnographic analogy, assert that vegetal resources were also utilized. The extent of floral utilization is difficult to determine, however, due to the lack of preservation of vegetal remains and problems inherent in use-wear analysis of the lithic remains.

At least four Paleo-Indian projectile point types have been found and/or described in the Uncompahgre and Gunnison Resource Areas, including Clovis (Carpenter et al. 1976), Folsom (Wormington 1955:120, Stiger 1977), Plainview (Buckles 1971:606, 799), Jimmy Allen (Martin 1977), Midland (Buckles 1971:714), Eden (Stiger 1977), and Scottsbluff (Buckles 1971:703, 733, 808) types. These points have been found as both isolated artifacts and as constituents to surface and subsurface assemblages dated to later stages of development by the presence of associated Archaic projectile points (Buckles 1971). Buckles (1971:606-607) asserts that later Archaic peoples collected and re-used these artifacts, and so explains their apparently incongruous artifactual associations and stratigraphic displacement. No undoubted in situ artifacts dating to the Paleo-Indian tradition have yet been discovered in the project area. While some of the Paleo-Indian projectile points may have been reused by later archaic peoples, their presence nonetheless suggests at least a sporadic use of the area as early as 9000 B.C. Hurst (1942:251) reports that fossil mammoth and bison remains have been found in the Gunnison River valley, possibly indicating that megafauna were available for exploitation in the area at that time. Excavations in 1978 in a small cave (5GN189) adjacent to Blue Mesa Reservoir revealed a Pleistocene deposit associated with some crude flakes. Analysis of the flakes, which is underway, has not yet determined whether the flakes are the result of natural spalling or man-produced; however, in either case, the cave deposit further substantiates the presence of Pleistocene fauna in the area (Mark Stiger, personal communication July 4, 1979).

CHAPTER V

ARCHAIC TRADITION

Introduction

At approximately 6000 B.C., an apparent shift in subsistence strategy occurred in the New World. The shift represented a trend away from reliance primarily upon big game exploitation towards a more diversified economy. Floral, and in some areas, aquatic resources became increasingly utilized, as evinced by the greater numbers of grinding stones discovered in archaeological sites dating after 6000 B.C., and by the appearance of large shell middens (Cohen 1977). The shift, to what is termed the Archaic Tradition, constituted a more intensive and efficient utilization of space, which in turn resulted in greater variation in tool types from region to region. It is probable that the population had increased significantly over that of the Paleo-Indian tradition. Projectile points in the Archaic were typically smaller in size than their apparent predessors and were primarily propelled by atlatl and dart. It has been proposed that the reduction in point size reflects an emphasis upon the hunting of smaller, modern species (McDonald 1976:33). The remainder of the material culture was similarly simple, consisting of chipped and ground stone tools, fine basketry, netting, and in rare instances, crude ceramics. Transhumanance, the patterned, seasonal movement of peoples from one maturing resource to the next, remained the most prevalent lifestyle. The migratory lifestyle was probably somewhat different from that of the Paleo-Indian tradition, however, as the larger population and reliance upon newly-emphasized resources undoubtedly had significant effect on group movements.

Much of the study of the Archaic Tradition has centered in the Great Basin, where excellent preservation, especially in cave sites, and the persistence of an Archaic-type lifestyle up into historic times has made the area most attractive to archaeologists. Perhaps the most influential archaeologist in the Great Basin is J.D. Jennings, whose work at Danger Cave, Utah led to the formulation of the Desert Tradition (Jennings and Norbeck 1955). The Desert Tradition is, in essence, an Archaic adaptation to the arid and semi-arid west, not necessarily confined to the Great Basin (Jennings and Norbeck 1955).

As a function of the proposed wide geographic distribution of the Desert Culture, it has been proposed by Wormington and Lister (1956) that sub-regional variants of the larger Desert Tradition emerged. One such variant, according to Wormington and Lister (1956), is the Uncompahgre Complex, an adaptation to the Uncompahgre Plateau area of western Colorado.

In the 1930's through 1950's, Wormington and Lister conducted excavations at four rock shelters in Mesa and Montrose counties in western Colorado. On the basis of these excavations, Wormington and Lister (1956) defined the "Uncompahgre Complex", noting that while the materials recovered were generally similar to other Archaic sites in the west and southwest, unique tool classes existed. Criteria for membership in this complex include allegedly distinctive cutting and scraping tools (the "Uncompahgre scraper" and a variety of adze-like scrapers) as well as more widely distributed traits such as large corner notched projectile

points, thin bifacially flaked knives, largely unshaped metates with shallow, elliptical grinding surfaces, handstones (manos), and an absence of cultigens, house structures and ceramics.

In 1962 and 1963, William Buckles, then a graduate student at the University of Colorado, conducted an intensive study of the archaeology of the Uncompahgre Plateau area as part of the Ute Prehistory Project. With the hope of defining the cultural history of the Utes, Buckles investigated 75 sites, of which 39 were excavated to some degree. From the data gathered, Buckles (1971) postulated that the area had been utilized since approximately 8000 B.C., though not necessarily by the Ute peoples. Buckles redefined the concept of the Uncompahgre Complex. In his redefinition of the Complex, Buckles (1971) dismisses the importance of Wormington's and Lister's (1956) "Uncompahgre scrapers" and adze-like tools, noting that similar tools have been found in areas far removed from the Uncompahgre Plateau. Buckles characterizes the "Uncompahgre Complex" as a comparative unit for the description of an Archaic adaptation to the arid west in which no individual tool types or classes are unique, but in which qualitative and quantitative criteria of tool assemblages differentiate it from other complexes.

Buckles (1971) notes a continuity of the material culture of the Uncompahgre Plateau area dating from 8,000 B.C., but does not argue for the continuity of a single culture. Rather, he considers the Uncompahgre complex as possibly a series of similar adaptations to the environment specific to the Uncompahgre Plateau region. Buckles (1971) concurs with Wormington and Lister (1956) that a good many similarities exist

between the Uncompahgre Complex and the Desert Culture, but is hesitant to state that one derived from the other, whereas Wormington and Lister (1956) see the Uncompahgre Plateau occupation as an offshoot of the parent Desert Culture expanding into a peripheral area.

The primary goal of Buckles' work, that of tracing the prehistoric origins of the Ute peoples, was not realized. The problem lay mainly in the difficulty of assigning cultural labels to the almost exclusively lithic remains of an Archaic egalitarian society.

The material culture recovered in the Uncompahgre Plateau region is with minor variations, similar to that of other non-agricultural peoples in the west. Different cultures and linguistic groups are undoubtedly represented in the archaeological record of the west, but such distinctions are difficult, if not impossible, to make from the archaeological record. To effectively deal with the archaeological data in the Uncompahgre Plateau area, it is, therefore, necessary to view it in broader terms than "cultures".

The technocomplex model, such as that so aptly utilized by Toll (1977) in his work in the San Miguel River region of Colorado, seems the best suited. According to Clark (1968:232), a technocomplex can be defined as "a group of cultures characterized by assemblages sharing a polythetic range but differing specific types of the same general families of artifact-types, shared as a widely diffused and interlinked response to common factors in environment, economy and technology". As implied by the term "polythetic" above, each individual site in this

model possesses a large number of the attributes displayed by the site population as a whole, but that no single attribute would be sufficient for membership as in a monothetic model (Williams et al. 1973:219). Similarities in the archaeological material from the Uncompahgre Plateau and from the Great Basin imply, then, that what has previously been classified into the Uncompahgre Complex can best be lumped into a larger unit, the technocomplex. The technocomplex model avoids the problem of trying to put cultural labels on specific tool assemblages. Also, the model regards cultural adaptations in the area as more continuous than a model of specific cultural nomenclature (Toll 1977:177) which is viewed here as desirable. The technocomplex considered herein shall include all sites in the arid and semi-arid west that reflect an Archaic lifestyle based on seasonally migratory hunting and gathering of modern fauna and flora, and shall herein be referred to as the "Desert Archaic".

Ethnographic Analogy

The use of ethnographic analogy has done much to further our understanding of the lifestyle probably employed by the hunters and gatherers of the Archaic Tradition. Early American anthropologists envisioned the prehistoric hunters and gatherers as spending most of their waking hours ardently trying to stave off starvation by exploiting practically every available resource. The Desert Archaic peoples of western Colorado have modern analogs in living hunter-gatherer groups whom anthropologists have studied and by interpretation of archaeological evidence have suggested what past lifeways may have been like. Analysis

of contemporary hunters and gatherers suggests a less perilous existence than previously suspected. Comparative studies by Sahlins (1972) of people living in some of the harshest of environments, have shown that the hunting and gathering lifestyle can provide adequate nutrition, usually with far less work than required by horticultural lifestyles. For example, Lee (1969:73) writes that the !Kung Bushmen of the Kalahari Desert procure an estimated 2,140 calories and 93 grams of protein per day for every man, woman and child while working an average of only three to four days per week. As Truswell and Hansen (1976:190) point out, Lee's estimate is for the month of July, a month in which, while food is not particularly abundant, is more readily available than in August and October. Nevertheless, Lee's July caloric estimate exceeded energy requirements by about 165 calories per day (Lee 1969:73), indicating that intake could still decrease somewhat before starvation resulted. It seems reasonable to assume that in the past when hunters and gatherers inhabited less severe environments, sufficient calories and proteins could have been secured in less time than even the !Kung spend in such efforts.

Even while spending an average of a mere 2.5 days per week in food procurement and preparation activities (Cohen 1977:30), the hunting and gathering way of life still affords considerable choice in the kinds of foods exploited. Of the scores of edible species available, only a few dozen may be intensively exploited. Among the !Kung, for example, only ten of the fifty-four animals classified as edible are regularly hunted for food (Lee 1969:59). Which species are utilized is a cultural choice, partially dependent upon factors such as ease of procurement and preparation, perceived palatability and possibly caloric/nutritional content.

While comparisons of contemporary hunting and gathering cultures can imply general characteristics of the Archaic Tradition techno-complex that once exploited western Colorado, analysis of the aboriginal groups that historically occupied this area may provide more specific insights. The Utes are the only native people described as living in western Colorado in historic accounts (Stewart 1973b). They, and the linguistically and culturally related Shoshone of the Great Basin, may be historically related to the prehistoric Archaic inhabitants of this area and so may be particularly suited for ethnographic analogy.

The Utes, who inhabited western Colorado and eastern Utah from the time of the first Euro-American contact until their ouster in 1880, had primarily a hunting and gathering subsistence base. The introduction of the horse in 1680 (Stewart 1973a:3) and increasing contact with Euro-American cultures in the 19th Century of course had profound effects on Ute culture, but prior to such, Ute culture was quite similar to other Great Basin adaptations--adaptations probably just as efficient in even earlier times. The Utes had a fairly diverse economy, exploiting several species of rodents, artiodactyls (e.g., deer, mountain sheep, elk and bison) and insects and their larvae (Steward 1955:105; Stewart 1973a:26). Floral resources were important and included pinyon (*Pinus edulus*), serviceberry (*Amlanchier alnifoliu*), choke cherry (*Prunus malanocarpo*), squaw berry (*Rhus trilobata*), currant (*Ribes awiaum*), raspberry (*Rubus leucodermis*), elderberry (*Sambueus microbolrys*), wild rose (*Rosa ultramontana*), sego lily (*Calochotus nuttallii*) wild onion (*Claytonia lanceolata*), and wild carrot (*Lepototaenia multifida*)

(Stewart 1973b:5). Grasses were also an important food source; Indian rice grass (*Oryzopsis hymenoides*) and other species were collected for their seed. According to Stewart (1973a:5) acorns, products of the ubiquitous scrub oak of portions of western Colorado, were used only sparingly due to their irregular production and possibly to the difficulty of their preparation for consumption. The pinyon nut was reportedly the most important vegetal food item (Stewart 1973b:83; see also Steward 1955:104). The nuts are high in protein and in fats, are easy to collect and prepare, and have a high caloric content. Pinyon nut production is irregular, however, according to Thomas (1973), a "good" crop of nuts occurs an average of once every 7.7 years in a specific locality; an "acceptable" crop occurs about once in 5.4 years. To effectively exploit pinyon nuts annually, bands would have had to frequently change the locality of their pinyon nut gathering. In that pinyon nut production is closely related to environmental vagaries, movement from an area of poor nut production to one more productive may have involved considerable distance.

Among some inhabitants of the Great Basin (see Steward 1955, Downs 1966), the collection of pinyon nuts had important social ramifications. When a certain locality produced an abundant crop of nuts, usually in the late fall, groups from a wide area would congregate to exploit them. Small "microbands", consisting of one, two or possibly three nuclear families would join with others to comprise a "macroband" consisting of perhaps 30 to 50 people. The large gathering, made

possible by a concentrated and abundant resource, was undoubtedly the focus of much social and ceremonial interaction. Eventually, when the state of abundance subsided, microbands would again form and continue their seasonal rounds.

Social Organization

Ethnographic analogy becomes especially important when attempting to reconstruct prehistoric social organization. The old cliche that one cannot dig up social organization stands essentially correct; however, careful analysis of archaeological remains can deduce patterns consistent with those found in contemporary cultures.

Morton Fried, among others, has analyzed the social organization of scores of contemporary primitive cultures worldwide and has discerned three major groupings: egalitarian, ranked and stratified societies (Fried 1967). Egalitarian societies are the simplest and most loosely organized, followed by ranked societies in which certain political "offices" exist, and fairly complex centralized redistribution systems are extant. Stratified societies possess actual social classes, and have a highly specialized political organization.

Most historic and contemporary hunting and gathering cultures can be classified as being egalitarian in nature. The more severe the environment, the more likely this appears to be the case. In that the project areas being considered here are far less abundant in resources,

than, for example, the northwest coast where hunting and gathering people may have possessed a ranked society, and that the historic and ethnographic accounts of the project areas' aborigines imply an egalitarian form of social organization (Steward 1955, Stewart 1973), it seems reasonable to assume that the egalitarian type of social organization predominated here through time.

As the term implies, an egalitarian society is one in which ranking and stratification are absent. Leadership positions exist, but are informal and are based solely on the personal attributes of an individual. Leaders are held in somewhat higher esteem than others in the society, but their positions are based entirely upon strength, expertise, prowess as hunters or warriors, or generosity. Leadership positions are held only as long as the desired virtues are recognized. Leaders lead only as long as followers desire to follow--they lack coercive powers.

Leadership roles are transient in the sense that one may be a leader in one activity or situation, but not in another where different expertise or personal attributes are desired. There are hence as many leadership roles as there are people with the desired attributes.

Status distinctions in egalitarian societies are usually based upon age and sex. More status is usually conferred upon the male rather than female gender (Service 1971:55), and men, not women, usually occupy the political-like positions. Division of labor is similarly divided on the basis of age and sex; males usually specialize in hunting activities, and females the gathering and child-rearing activities.

Some anthropologists have defined social types more specifically than has Fried (1967). Service (1971), for example, would divide Fried's "egalitarian" societies into "band" and "tribal" societies, and would even divide the relatively simple "band" societies into two types: "patrilocal" and "composite" bands. Patrilocal bands are characterized by three main principals: (1) band exogamy, (2) patrilocal post-marital residence rules, and (3) band territoriality (Service 1971). Some anthropologists, notably Service (1971) consider patrilocal bands to have been the primary type of band social organization among pre-Columbian hunters and gatherers. In contrast to patrilocal bands, "composite" bands are seen as relatively open social groups with overlapping and shared territories (Lee 1976:76). The comparatively non-rigid social structure of the composite band has led Service (1971) to conclude that such an amorphous type of social organization must be the result of cultural disintegration in the New World resultant of Euro-American contacts and concomittant acculturation.

It is debatable whether or not loosely organized "composite" bands represent the flotsom of a once more complex social structure. To examine this question, a look at a living group of peoples organized at the composite band level may be in order. One of the few surviving and best documented groups are the !Kung of the Kalahari Desert in southern Africa. The !Kung lack band exogamy, rigid post-marital residence rules, and concepts of inviolate band territories (Lee 1976). Marriage must respect certain incest tabus, as with all people, but endogamy evidently occurs. Post-maritial residence rules _per se_ do not exist--such decisions are up to the individual couples and are based on a

variety of factors. Concepts of subsistence space are bounded, but these boundaries are vague and are not defended (Lee 1976:79). !Kung usually wander in small bands consisting of perhaps 25 people, in search of maturing foods. Frequently, however, two or more of the small bands may join to exploit a certain abundant resource (such as mongongo nuts or a permanent water source) and to socialize. Individuals freely visit friends and relatives in the other bands, and if they choose and display a modicum of good manners, are free to stay with the other band and partake in its subsistence exploits. Group membership is quite fluid.

Lee (1976:77) admits that such a social structure seems chaotic. The form of social organization does, however, possess certain adaptive advantages, advantages apparently removed from problems of acculturation. According to Lee (1976:76), the fluid social groupings serve to even out demographic variations in sex ratios and family size, adjusts group size to the resource availability, and facilitates the resolution of conflict by fission. A patrilocal band in the same condition and with similar subsistence patterns, would have less efficient means of dealing with such problems, leading Lee (1976:76) to assert that this form of social organization is empirically rare and that a composite-like form of band organization prevails among contemporary hunters and gatherers.

An ecological analysis of the composite band, such as that done by Lee (1976), demonstrates the viability of this form of social organization, and implies, therefore, that such a form may have been possible in prehistoric societies. Lee's (1976:76) assertion that patrilocal

bands are "empirically rare" may demand closer analysis, however. While the patrilocal band may be disadvantageous for the !Kung and most other contemporary hunters and gatherers, there may be instances in which this comparatively rigid form of social organization is the most efficient form of cultural adaptation. If an accurate model of social organization is to be constructed for prehistoric west-central Colorado, the conditions best suited for each band type must be discussed.

Composite band structure appears to be an efficient cultural adaptation for hunting and gathering groups with a low population density and little population pressure. If, as Lee (1976) implies, the !Kung can be considered an example of a composite band society, a brief survey of some of their subsistence and demographic attributes may be in order. As mentioned earlier, the !Kung procure ample calories and protein with minimal effort, working only an average of 2.5 days per week (Cohen 1977). The foodstuffs exploited reflect a high degree of selectivity. Foodstuffs are hunted and gathered by means of transhumanance wandering in a patterned fashion in pursuit of maturing resources. Throughout much of the year, groups are small and widespread in their pursuits; when certain localized resources produce abundantly, however, two or more groups may converge upon this resource to exploit it and to socialize. Even when groups are small and scattered, considerable inter-group interaction still exists. Band territories are vague and are not considered inviolate. Territories are much larger than needed in an average year. The surplus, however, assures

survival with little change in lifestyle in lean years. Population density is low, estimated at approximately one person per square mile (Cohen 1977:56). !Kung populations appear to be stable (Cohen 1977:285).

Population growth and the resulting pressures appears to be one of the major stimuli for social change (Boserup 1965, Cohen 1977). What would happen to a composite band society such as the !Kung if populations were to grow to a point straining the potential of their subsistence system? Cohen's (1977) work on population growth and resulting prehistoric adaptations may provide valuable insights. According to Cohen (1977), a dilemma faces a hunting and gathering society when its numbers grow to the point where it can no longer support itself by working just a few hours per day exploiting highly favored resources. The society is then faced with two viable responses; either it must begin exploiting less desired resources or it must begin investing greater amounts of energy towards more highly productive resources. In the former option, hitherto infrequently-utilized resources, perhaps considered less palatable than more traditional foodstuffs, are turned to, possibly resulting in decreased nutritive value per hour of labor because of inherent foodstuff composition, or because of greater amounts of labor involved in procurement and preparation. In the latter option, increased labor is inherent. This adaptation may involve the expansion of certain foodstuffs' habitat by clearing, irrigation, weeding, or planting. No diffusion or revolutionary discovery of such techniques need be involved, for as Cohen (1977) writes, such techniques are known by hunters and gatherers throughout the world today, and were probably

known by those with similar subsistence systems in prehistoric times. The subsistence strategy in this case has changed from one of simply harvesting resources, to one of nurturing and harvesting. More work is involved.

In either option, more clearly defined concepts of territoriality are likely to result. The exploitation of less-desired resources may involve foodstuffs such as shellfish (Cohen 1977:79), which are of course a localized resource. The encouragement of certain resources by means of increased labor and an increased reliance upon the encouraged resources represents a greater degree of investment in a unit of land. An increase in investment makes defense of one's land worthwhile. It follows, then, that an increase in population density may lead to a well defined concept of territoriality--one of the three main principals of a patrilocal band structure.

With a high value placed upon certain lands, social mechanisms for the control and succession of lands become more necessary than before. Patrilocality or matrilocality, are likely to emerge, the form possibly depending upon which sex is primarily responsible for the exploitation of the specialized resource. A social mechanism for interaction between groups may also become necessary. Whereas such interaction is a simple matter in the composite band society, the increased perception of territoriality that comes with an increased population density may result in less inter-band communication. If this were the case, band exogamy

may have developed to formalize inter-band interaction, and so would have functioned to maintain peaceful relations and its associated benefits. An increased population density would also function to reduce the probability of a chance demographic variation in sex ratios.

The adaptive advantages of the composite band structure can be seen to become less useful as population density increases. As population densities increase, more complex levels of social organization become necessary (see Sanders and Price 1968). In all but perhaps the most harsh of new world environments, and so possibly excluding the Great Basin, patrilocal band structures may have supplanted composite band structure as prehistoric populations increased.

CHAPTER VI

ARCHAIC SITES IN THE UNCOMPAHGRE AND GUNNISON RESOURCE AREAS

At the time of this writing, 685 historic and prehistoric sites have been recorded in the project area. Six hundred and thirty-eight of that total are prehistoric, many of which have definite Archaic components as demonstrated by association of Archaic style projectile points (Figures 8 and 9). The great majority of those lithic scatter sites without associated projectile points can also be attributed to the Archaic Tradition since no definite Paleo-Indian Tradition sites have been yet discovered in the project area. To discuss site types and site location strategies for the Archaic Tradition in this area, then, is to discuss virtually all of this area's prehistoric sites.

Habitation Sites

Habitation sites are settlements which Chang (1962:29) defines as "any place occupied by one or more individuals for one or more nights, for any purpose that falls within the ordinary, expected, and predictable round of activities of the society in question". Such activities may include the preparation and distribution of subsistence goods already procured and the processing of on-hand raw materials into tools (Binford and Bindord 1966:268). Habitation sites are herein differentiated from "Limited Activity Areas", which are sites utilized primarily for the exploitation of a specific resource, such as a quarry or a collection area for gathering vegetal foodstuffs, or the performance of a short-

Figure 8. A small lithic site situated overlooking the Gunnison River Valley, now the site of Blue Mesa Reservoir.

Figure 9. An open lithic site in the pinyon-juniper forest of the Uncompaghre Plateau.

term task such as the butchering of a beast, or putting the finishing touches on a stone tool. It may be argued that habitation sites were centrally located in the site catchment, with numerous limited activity areas scattered about the site catchment reflecting the "extraction" of resources. Archaeologically, the two types of sites are difficult to distinguish. Frequently in the literature of this area, habitation sites have been distinguished from non-habitation sites simply by the presence or absence of a single attribute, such as ground stone or a rock overhang. Such a practice is at best risky, for as Toll (1977:45) points out: "vagaries of soil deposition and erosion, prehistoric discard rates and practice, surveyor perceptivity, and especially previous collection of sites (render) this practice unreliable". In his work on the San Miguel River in Colorado, Toll (1977) employed a polythetic model for distinguishing habitation sites, requiring that a site display a certain number of attributes in order to be confidently classified. Toll (1977:46) selected the following attributes as indicative of habitation sites, requiring the possession of at least three for group membership: prepared tools, groundstone, fire, flat area, overhang, structure or ceramics. The same model and requirements were applied to the sites in the Uncompahgre and Gunnison Resource Areas.

Of the 685 sites in the project area, 161 or 23.5 percent of the prehistoric sites are classified as habitation sites. Some of the remaining 75 percent may have also functioned as habitation sites, but

further distinctions would require an intensive functional analysis of the survey collections. Nonetheless, a pattern of a relatively few habitation sites surrounded by scattered limited activity areas emerges.

Toll (1977:46) calculated that 35 percent of the sites in the San Miguel River area were habitation sites. The apparent disparity between Toll's and this report's number of habitation sites may be due to sampling error, as Toll's total number of sites is considerably smaller. However, the difference may indicate a difference in subsistence strategies, as there are factors which would tend, all other things being equal, to produce a high number of sites classified as habitation sites in this area. First, approximately 40 sites have been excavated in the Uncompahgre and Gunnison Resource Areas, as opposed to less than 10 in Toll's project area (Douglas Scott, personal communication). Excavation exposes buried site features and artifacts, and so may increase the number of attributes a site possesses over the required number. Secondly, Toll controlled slope as a factor much more rigidly than this report. Whereas Toll (1977) recorded slope information as each site was recorded, this work frequently had to rely on topographic map interpretations and general landform descriptions. This writer was inclined to classify sites as "flat" when there was doubt, possibly resulting in more sites possessing the "flat area" attribute than would result from on-site inspection. Finally, this author speculates that arrowhead collectors may have had more of an impact in the project area than along the San Miguel River. Future analysis should determine the significance of the 10 percent difference.

Limited Activity Areas

Of the 638 prehistoric sites in the project area, 65 have been classified as limited activity areas. The basis for this classification is possession of two or less of the site attributes discussed for the habitation sites, and a total area of artifact scatter less than 100 square meters. Problems are inherent in defining sites as limited activity areas; site size, for example, may be a poor criterion. As Wilmsen (1971:8) notes, "limited activity areas may be as small as a square meter or so or as large as the largest settlements". Furthermore, some activities may not leave the expected quantities of archaeological remains. Yellen (1976:67), for example, observed !Kung Bushmen butcher a large eland, and noted that the site was marked only by a few bones, horns, stomach and intestine contents, and the remains of a small fire built to cook a few choice pieces of meat. Such a site, Yellen (1976:67) notes, would probably be invisible in the passage of a few years. Also, this writer has observed a wickiup village, a habitation site, in which surface artifacts were virtually nonexistant. Destruction of the wickiups may have resulted in the classification of this site as a limited activity area.

Regardless of the problems in determining site function, the majority of the sites herein classified as limited activity areas probably are classified correctly.

It is hypothesized here that limited activity sites are located with reference to the location of a specific resource being exploited, and therefore would not reflect criteria (e.g., near water) used in the selection of a habitation site. If true, it would seem reasonable to expect limited activity areas to be located further from a water source than habitation sites. This hypothesis was tested in the Uncompahgre and Gunnison Resource Areas, using proximity to permanent water as the variable. The assumption was that habitation sites would be located closer to permanent water sources than would limited activity areas since the former site type would tend to locate where all essential resources could be obtained with minimum expenditure of labor, and the latter site type would tend to be located where a specific resource was exploited or special activity performed. A chi-square test was performed, and the results are as follows:

	<	<	<	>	Total
Habitation	20 /14.2	28 /34.9	21 /20.7	92 /91.2	161
Limited Activity	0 / 5.8	21 /14.1	8 / 8.3	36 /36.8	65
	20	49	29	128	226

$x^2 = 12.94$

At three degrees of freedom, in a one tailed test, the null hypothesis, stating that limited activity areas are not significantly farther from water than habitation sites, can be rejected even with alpha at .01. Limited activity areas do tend to be farther from water than habitation sites.

Quarries

Quarries, sites where the raw material for stone tool manufacturing was obtained, are not too abundant in the project area. At least seven quarry sites have been recorded. These sites produce either quartzite or cryptocrystalline quartzites; no major obsidian sources are known. Several of the quarries cluster in the vicinity of the Blue Mesa Reservoir in Gunnison County.

Structures

Thirty-six sites with structures have been recorded in the project area. Most are made of stone, but seven brush structures, all wickiups, are also included.

Five types of stone structures can be distinguished. The first type to be discussed here includes the so-called "tipi rings". A "tipi ring" consists of a circular alignment of unshaped stones, usually two or three meters in diameter. These structures more often than not are found on lithic scatters. "Tipi rings" are so named because of their alleged function of securing the base of tipis. The validity of this functional speculation is largely unsubstantiated, however. Regardless of their function, they appear to be associated with habitation sites. Of the twelve sites possessing "tipi rings", all are located on a relatively flat area, all but five are associated with prepared tools, and three are found with ground stone.

The Huschers (1939) have referred to stone structures similar to these as "hogans", and attribute their presence to an Athabaskan migration southward through the Colorado mountains. As the Greisers (1977:30) point out, however, the Huschers' work on Colorado's "hogans" produced no diagnostic artifacts, and a lack of empirical evidence to support their interpretation.

Comprising the second type of stone structures are dry-laid, coursed, rectangular structures. These structures are built with 3 to 15 courses of unprepared stone, and measure approximately three meters by four meters. Four structures are classified in this type; three are found on canyon rims and one on a valley floor. Only one has an associated artifact found with it--a large corner notched projectile point. The function and the time period these structures represent are unknown.

A third type of stone structure found in the project area are the so-called "hunting blinds". Six such sites are included in this category; all are circular or semi-circular in shape and stand less than .8 meters in height. They occur on all physiographic units--canyon rims, benches, steep talus slopes and mesatops. Some envision that these structures were used to conceal a hunter from his quarry; hence, their name. Their actual function is yet to be determined.

Four sites with dry-laid walls situated in rock shelters comprise the fourth type of stone structure. Three of the four sites were classified as habitation sites. Like the other types of stone structures, the function of these walls is uncertain.

Cairns comprise the final type of stone structure. These structures are nearly impossible to date and so may be prehistoric or may have been built by historic ranchers or sheepherders. Some, but not all are located atop canyon rims or points of high visibility suggesting the use as landmarks of some sort.

Wickiups

Wickiups are brush shelters consisting of a cone-shaped internal superstructure of poles (Figures 10-12) over which boughs, bark, and perhaps hides were secured. The superstructure, usually enclosing an area approximately two meters in diameter at the base, stands (on an average) a meter and a half to two meters in height. At the top of the superstructure, where the poles converge, gravity and pressures rather than wire or twine are relied upon to hold up the wickiup. The base of the poles are not buried, nor are "tipi rings" employed. Some wickiups are free-standing and others incorporate a living tree for support. Firepits are frequently located in the center of the wickiup's floor. Numerous ethnographic and historic accounts of Utes and other Great Basin aborigines describe this type of structure (Huscher and Huscher 1939:28).

Seven sites with standing wickiups have been recorded in the Uncompahgre Resource Area. All are within pinyon and juniper forests. Their consistent association with pinyon-juniper forests may suggest a seasonal use, such as during winters when fuel and protection from

Figure 10. A free-standing wickiup at 5ME469. Note the protective fence.

Figure 11. A free-standing wickiup and a possible tree platform (at left of figure) at 5ME469.

winds are desired, or during the Fall when pinyon nuts mature. There is a distinct possibility, however, that wickiups were wide-spread in many vegetation zones, but that the dense pinyon-juniper forests have simply provided the protection necessary for their survival into recent times.

As one would expect from such seemingly frail structures, standing wickiups date rather late. Various surface collections and excavations conducted by Buckles (1971) at four wickiup sites on the Uncompahgre Plateau have produced artifacts such as crude brown-ware ceramics, brass knife blades, stone pipes and small side-notched projectile points. Jeffrey Dean of the Laboratory of Tree-Ring Research in Tuscon supports their relatively late occurrence; dendrochronological analysis of five wickiups from three villages have provided dates clustering around the mid-1700's A.D. (Dean, personal communication, Jan. 16, 1979).

While standing wickiups may be relatively recent, it is possible that these structures were used in this area at a very early date. Evidence of early wickiups, as one would expect of exposed wooden structures, has simply weathered away. The recent excavations at Blue Mesa Reservoir have uncovered evidence of structures that resemble floor patterns of wickiups (Mark Stiger, personal communication, July 20, 1979). These structures have been radiocarbon dated at 4,500 B.C. suggesting a long-time depth for wickiup-like structures.

The Huschers (1939:114-140) discuss two types of sites that have not been described in more recent literature for the project areas--tree platforms and game traps. Tree platforms consist of a simple horizontal platform constructed of poles and bark in large cottonwood or juniper trees. While amateurs supposedly considered these structures to be burial platforms, the Huschers believe these platforms served as vantage points for hunters or possibly warriors (Huscher and Huscher 1939:114). Fifteen tree platforms were described. Unfortunately, the Huschers failed to adequately record the location of these structures in their field notes, making reappraisal of these sites impossible.

Game traps described by the Huschers (1939) consist of "fences" of brush and debris piled in a manner as to force fleeing game into a constriction where they might be killed. Five such structures are described (Huscher and Huscher 1939:132-139). As with tree platforms, adequate location information is omitted from the field notes.

Rock Art

For an extensive analysis of the rock art found on the Uncompahgre Plateau, one should refer to Buckles' (1971) dissertation. This exhaustive work includes numerous sketchings, and also defines several distinctive styles of rock art, which Buckles places in a general time frame. The styles will be discussed below.

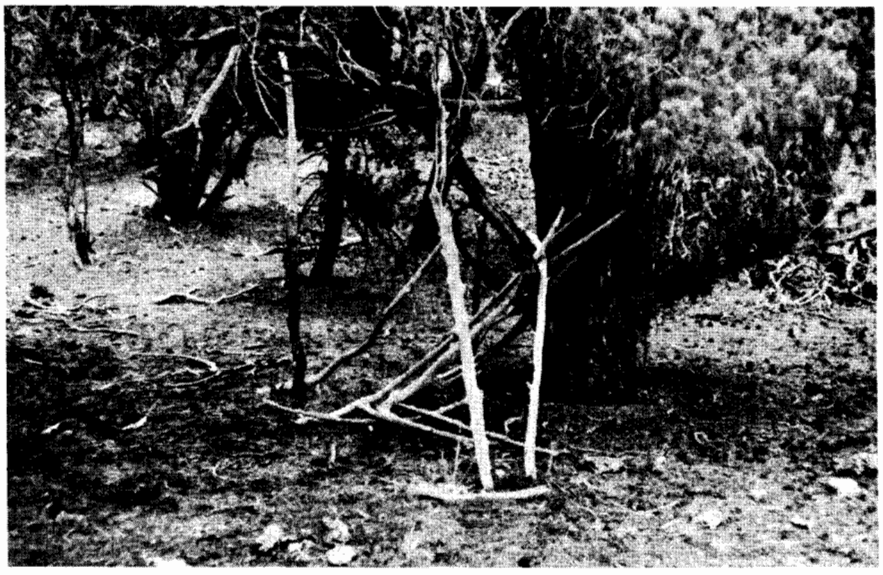


Figure 12. A lean-to wickiup
at the Lee Ranch Village, 5MN41.

Figure 13. The pictograph at 5DT1.

Figure 14. Bear petroglyphs possibly representing a bear dance motif at 5MN5.

Rock art in the Uncompahgre Resource Area consists almost exclusively of petroglyphs, which are art forms created by pecking or grinding a design into the surface of a rock. Pictographs or rock paintings do exist, such as one consisting primarily of mud found at 5DT1 (Buckles 1971) (Figure 13) but they are a distinct minority. The Gunnison Resource Area contains only one known petroglyph, 5GN7. It was reported by Hurst and Hendricks (1952), and is now inundated by Blue Mesa Reservoir. The motifs used in the project areas are largely similar to those found in other areas of the west. Depictions of mountain sheep, deer, conventionalized bear paws (Huscher and Huscher 1940), artiodactyl tracks, anthropomorphs, horse-mounted riders, hand prints, and a gamut of unidentified linear designs. A number of these motifs are illustrated on Picture Rock, a petroglyph site in the Shavano Valley southwest of Montrose (Figures 14-16). In nearly all petroglyphs, the entire figure and not just its outline is pecked.

Rock art, and especially petroglyphs, are very difficult to date by chronometric means. This is due to the obvious lack of any datable organic component and to the fact that patination does not necessarily develop over the pecked surfaces at a constant rate. Even if a constant rate for patination is assumed, "freshening" of some petroglyphs by later people re-pecking old petroglyphs is a distinct possibility. In that petroglyphs are usually found on vertical rock faces, artifacts are seldom of any aid in their dating. Artifacts found on the ground in the immediate vicinity of a petroglyph cannot usually be considered directly related to the petroglyph.

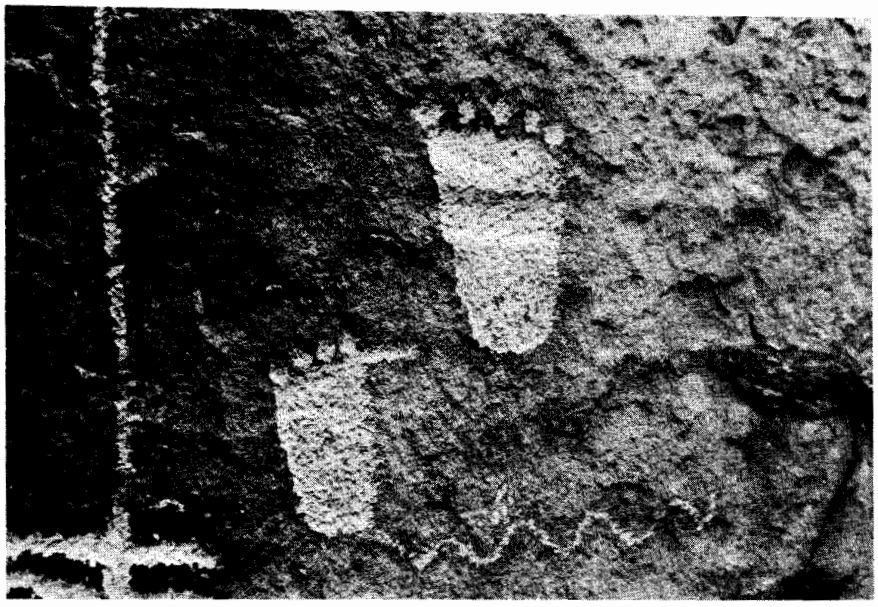


Figure 15. Conventionalized footprints and linear elements at 5MN5.

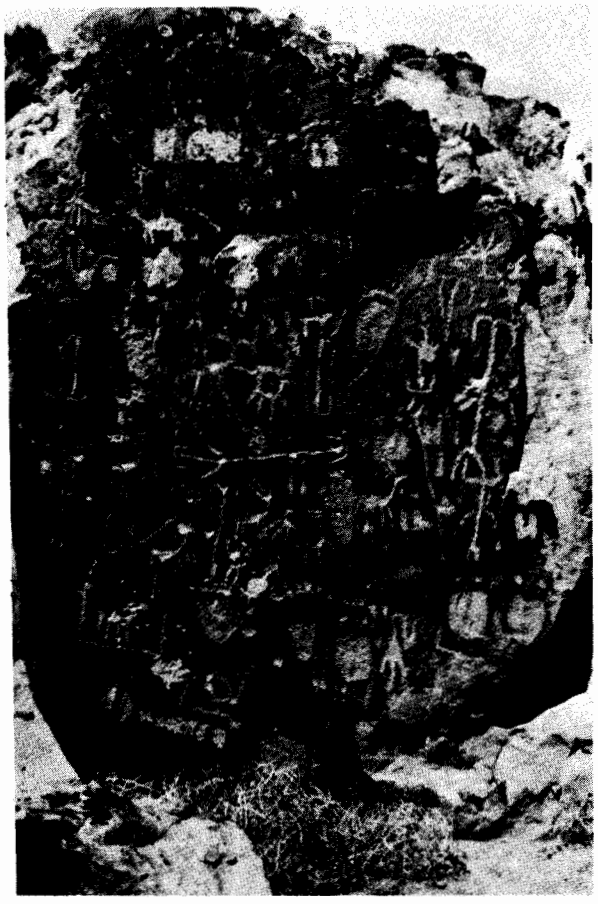


Figure 16. Picture Rock in the Shavano Valley.

Buckles (1971) defines five distinct styles of rock art depicting life forms. Abstract linear and curvilinear designs are omitted from his classification. While Buckles (1971:1062) admits that his class distinctions are based largely on stylistic variations, and that two or more of his styles may have occurred simultaneously, he nonetheless gives a chronological order to his styles, based upon "analysis of weathering, superimposition, and other indications of age".

The most recent of Buckles' styles is the "Late Historic Style" (Figure 17). Like its predecessor, the "Early Historic Style", this style is distinguished by the depiction of the horse. The two styles are distinguished by varying degrees of such attributes as "realism" and "degree of animation". The Late Historic Style is considered by Buckles to be very stiff and unanimated, yet quite realistic in the sense that certain anatomical necessities such as ears, hooves, and horns are usually attributed to the proper creatures.

Prior to approximately A.D. 1830 and extending until the time of historic contact, Buckles (1971:1066) asserts that the Early Historic Style was the most prevalent. Life forms are depicted in a less realistic fashion, consisting largely of slender trunks and short stiff legs; perhaps these characteristics appear somewhat like "stick-men" doodles in our culture.

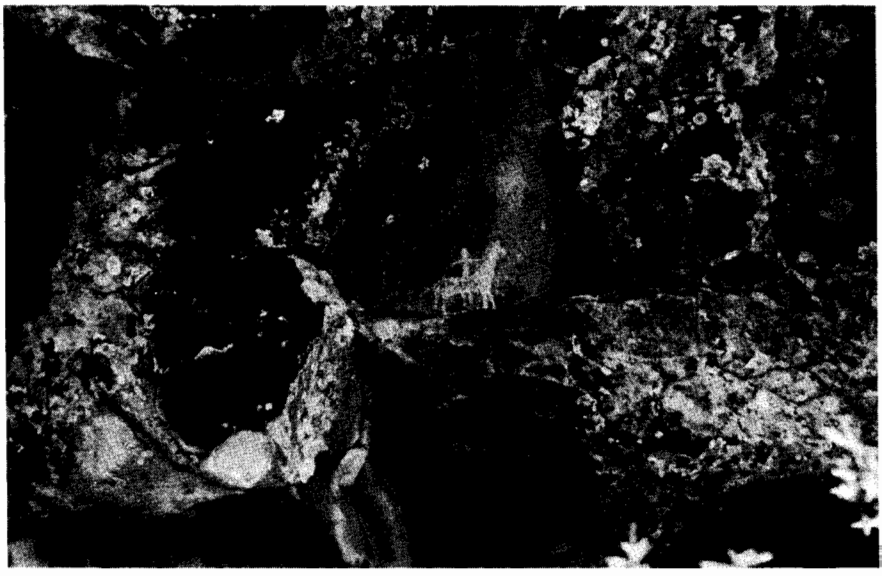


Figure 17. An historic Ute petroglyph, 5MN66.

Petroglyphs not depicting historic phenomena are divided into three styles by Buckles (1971). Style 1 is thought to be the most recent, as its life forms are also "linear abstracts", very much like those of the Early Historic Style. Style 1 petroglyphs are often associated with historic life forms (Buckles 1971:1085). Style 2 is less linear than later styles, resulting in more full-bodied figures that are more realistic (Buckles 1971:1087). Figures are rarely animated. Life forms of Style 3 are even more realistic and are frequently animated, usually with legs indicating motion (Buckles 1971:1085-1086). Anthropomorphs are sometimes shown interacting with zoomorphs.

In some ways, the rock art of the project areas is similar to much of that found in the western United States. Certain motifs, such as mountain sheep, bear paws, hand prints, and artiodactyl tracks have a very wide geographical and cultural distribution. On the other hand, some motifs and styles characteristic of nearby cultures, specifically the Fremont and Anasazi, are very rare in this area, as pointed out by Buckles (1971:1123) and the Huschers (1940). The notable exception is a petroglyph depicting Kokopelli at 5DT4 (Figures 18-19). Kokopelli, according to Toll (1977:99) is the most confidently classified Anasazi anthropomorph.

In general, the petroglyphs of the Uncompahgre and Gunnison Resource Areas are homogeneous, but not especially unique. The homogeneity may be an indication of cultural continuity, on either the level of a specific culture or on the level of the previously described technocomplex.

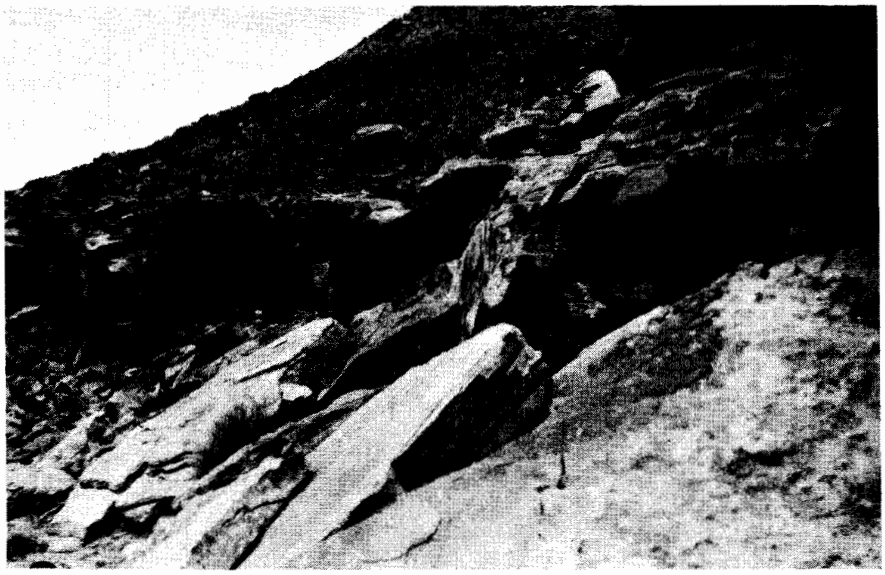


Figure 18. 5DT4, the Musser petroglyph site.

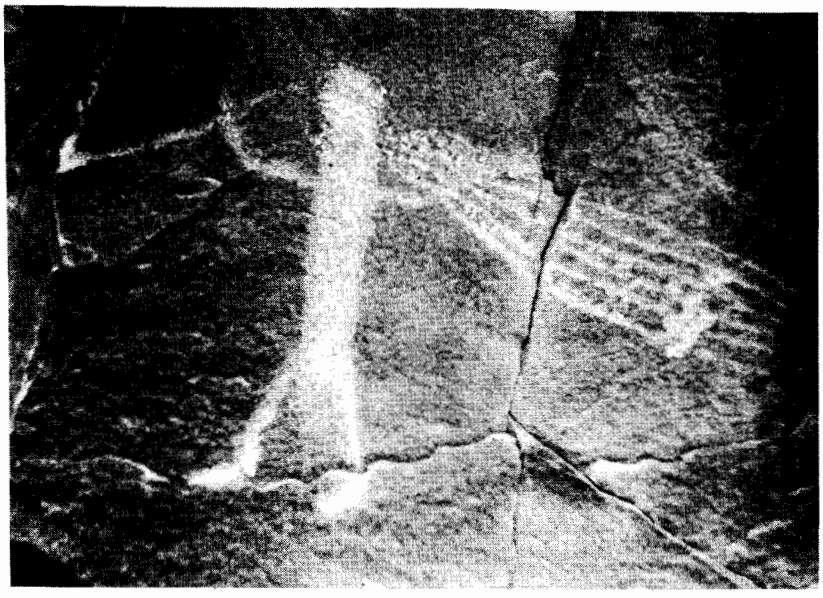


Figure 19. A Kokopelli-like figure at 5DT4.

Site Location Strategy

"Site location strategy" simply refers to the criteria by which people select a locale for habitation or for specific activities. The criteria are both environmental and social in nature. Environmental criteria may include such factors as slope, protection from the elements, and resources such as water, fertile soil, vegetation zones and faunal concentrations. Social criteria may include proximity to other contemporaneous sites, food preferences and material culture limitations. Different cultural adaptations are apt to have different site location strategies. A horticultural group, for example, may place a high value upon factors such as soil fertility and proximity to water, and have little regard for faunal distributions. A hunting and gathering group, on the other hand, may place little emphasis upon soils and proximity to water (to a degree), but will view faunal distributions as very important. The study of prehistoric settlement patterns then, provides insights into prehistoric land use and so cultural continuity or change. Regardless of the form of cultural adaptations, one strategy appears to govern site location in most cases: the "mini-max" strategy (Plog and Hill 1971:12). This strategy simply means that human behaviors strive for maximum returns with a minimum of output. Accordingly, sites are located so as to minimize the efforts required to procure proper quantities of critical resources (Plog and Hill 1971:12). In the case of habitation sites, this may mean that locations are selected that are centrally located with respect to actual and perceived critical resources, and to other groups. The central location ensures a minimum amount of time spent in transit to resources. The "mini-max" strategy also applies to specific or limited activity areas; the selection of a quarry site, for example, is probably a function of the degree of concentration of a lithic material and its ease in extraction.

Unfortunately, it is not possible to make many confident generalizations concerning site location strategies in the Uncompahgre and Gunnison Resource Areas. The reason for this is twofold. First, too little of the sampling universe, perhaps five percent of the project area, has been surveyed. The probability of erring in making predictions with such a small sample is high. Secondly, of the lands that have been surveyed, few attempts have been made to represent all of the environmental zones in the percentages in which they occur in nature. Most of the surveys were designed to locate sites within areas destined to be altered by large scale construction or development. The majority of such projects are by nature located along the major rivers, resulting in riparian and major valley environments being over-represented in the sample, and highlands being under-represented. Accordingly, the discussion of site locations that follows is not based upon statistical analysis and must be viewed with caution.

Sites in the project areas do not appear to be randomly distributed. Certain site types seem to cluster in certain environmental zones. Habitation sites, for example, seem to occur less frequently than expected below 6,000 feet and above 9,000 feet in elevation. The lands below 6,000 feet occur in the lower Uncompahgre and Gunnison River valleys and are characterized primarily by "Shrublands of the Saltdeserts" (Soil Conservation Service, 1972). There, annual precipitation averages seven to nine inches. The xeric environment of this zone evidently offered few foodstuffs to the prehistoric peoples, and so was not intensively utilized.

Above approximately 9,000 feet, the subalpine and alpine vegetation zones predominate. Snow cover presently renders these areas inaccessible by foot for at least nine months out of the year. Selected areas, especially along major drainages and near mountain passes, were probably intermittently utilized during the summer months.

Between approximately 6,000 and 9,000 feet are three major vegetation zones: "Woodlands of the Intermountains", "Sagebrush Lands of Mountain Parks", and "Woodlands of the Lower Mountains" (Soil Conservation Service, 1972). These zones, where the bulk of the habitation sites are located, are comparatively accessible yet possess varied and abundant resources.

Habitation sites are found on nearly all types of landforms, but tend to cluster along canyon rims and on benches. Such locations provide vistas from which to watch for game and people, and also provide easy access to the various ecotones of the canyons. Sites are seldom located less than 100 meters from a water source; Yellen (1976:52), studying contemporary hunters and gatherers, suggests that this practice avoids frightening away game animals that also utilize the water source.

Site location data from the project areas strongly suggest that petroglyphs are not randomly distributed. All but one are found below 7,500 feet in elevation, and the exception, found at above 7,600 feet near Sapinero, has been described as being most "unusual" in design (Hurst and Hendrick 1952). Toll (1977) has observed that petroglyphs

in the San Miguel River area tend to be located at major drainage confluences, and so may have functioned to relay travelers' information. Such a distribution is found in the Uncompahgre and Gunnison Resource Areas. Excluding petroglyphs found in association with rock shelters, ten of fifteen petroglyph sites are located near confluences. Of the remaining, several are located in the Shavano Valley, a large but generally dry valley just west of Montrose, where early maps show an old Ute trail passing through the rock art area (McKern 1978).

Proposed Projectile Point Typology for the Desert Archaic in the Uncompahgre and Gunnison Resource Areas

Within the artifact assemblages that represent the remains of prehistoric hunters and gatherers in the area now encompassed by the Uncompahgre and Gunnison Resource Areas, there exist few artifact classes that serve to readily identify a specific assemblage to their proper cultural or temporal context. This is due to several reasons; primary among them is the fact that most sites in the project area are located so as to be exposed to the elements, which results in the destruction of virtually all cultural material not made from either stone or ceramics.

Of the artifacts that have endured from the time of their deposition until the present, only those which are relatively abundant, easy to identify, and sensitive to cultural change are suitable for

use as "index fossils". Ceramics generally are the most precise cultural and temporal indicators. On sites in the Uncompahgre and Gunnison Resource Areas, however, they are seldom part of the artifact assemblage. Ceramics are extant at some sites in the project area, but appear quite late in the prehistoric record, and never seem to have achieved a very widespread use. This leaves lithic artifacts as the basis for analysis. Of the various lithic artifact classes produced by the hunting and gathering peoples that once inhabited the project area, projectile points are the most suitable.

Certain inherent limitations in the use of projectile points in dating and determining cultural affiliation of an artifact assemblage should be noted, however. Some types of projectile points, for example, may have a wide geographical distribution. Types common to the Uncompahgre and Gunnison Resource Areas may be similar to types found near the Pacific Coast or the Eastern Woodlands. Not only do some projectile point types demonstrate a wide geographical distribution, but often they are representative of a time span encompassing several thousand years. Most projectile point types, then, are at best imprecise temporal and cultural indicators although still useful as a rough indicator.

Below is presented a classification of projectile points found in the two Resource Areas. The classification scheme is based upon morphological rather than functional attributes. The dearth of chronometrically dated projectile points in the project area necessitates that approximate dates be derived from radiocarbon dated projectile points in other regions of the western United States.

Large Corner Notched Points

Projectile points of this type are generally in excess of 3 cm. in length, have corner notches and have flat or convex bases (Figure 20a). Large corner notched points are the most common projectile point type in the Uncompahgre and Gunnison Resource Areas and probably in most western states as well. This type evidently enjoyed popularity over a long time span, ranging from approximately 5000 B.C. into historic times (Aikens 1970; Hester and Heizer 1973) (Table 2).

Stemmed, Indented Base Points

As the name implies, points of this type are stemmed, have concave bases and generally exceed 3 cm. in length (Figure 20b). Points of this type are frequently classified into taxa more specific than is done herein. Similar projectile points are commonly referred to as Pinto Basin (Campbell and Campbell 1935), Duncan, Hannah, and Bajada (Chapman 1977) points. The dates of these types cluster between 4000 B.C. and 1000 B.C. (Chapman 1977; Frison 1978; Hester and Heizer 1973).

Large Side Notched, Indented Base Points

Projectile points of this type possess side notches and concave to notched bases (Figure 20c). This type is similar to Frison's (1978;50) "Mallory" point and Aiken's (1970) "Bitterroot Side Notched" types. Excavated projectile points of this type generally date between 4000 B.C. and 1000 B.C. (Frison 1978:50; Hester and Heizer 1973).

FIGURE 20

Archaic projectile point types found in the Uncompahgre and Gunnison Resource Areas.

a. Large Corner Notched

b. Stemmed, Indented Base

c. Large Side Notched, Indented Base

d. Stemmed, Square Base Points

e. Contracting Stem

f. Expanding Stem

g. Small Corner Notched Points

h. Small Side Notched Points

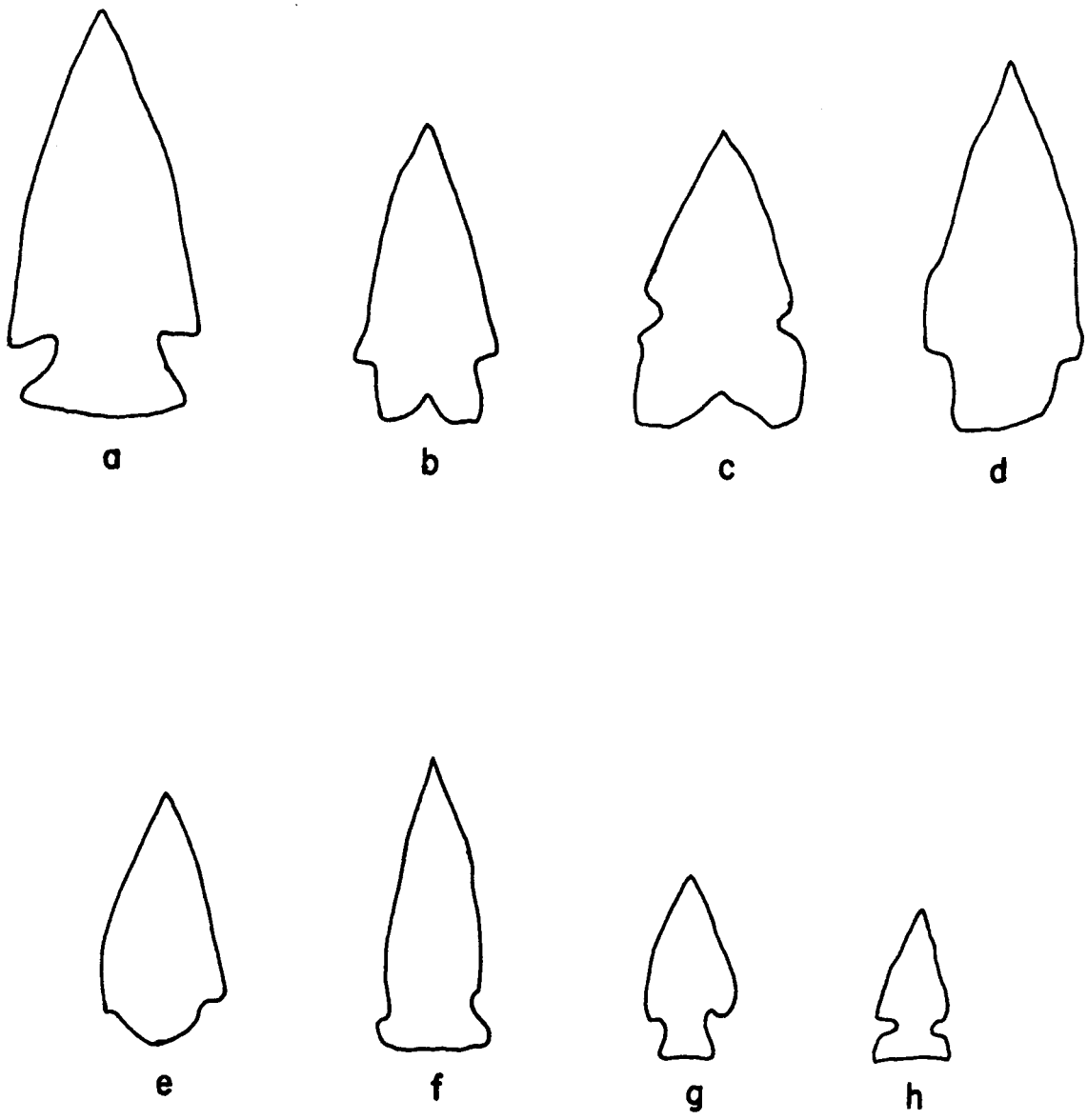
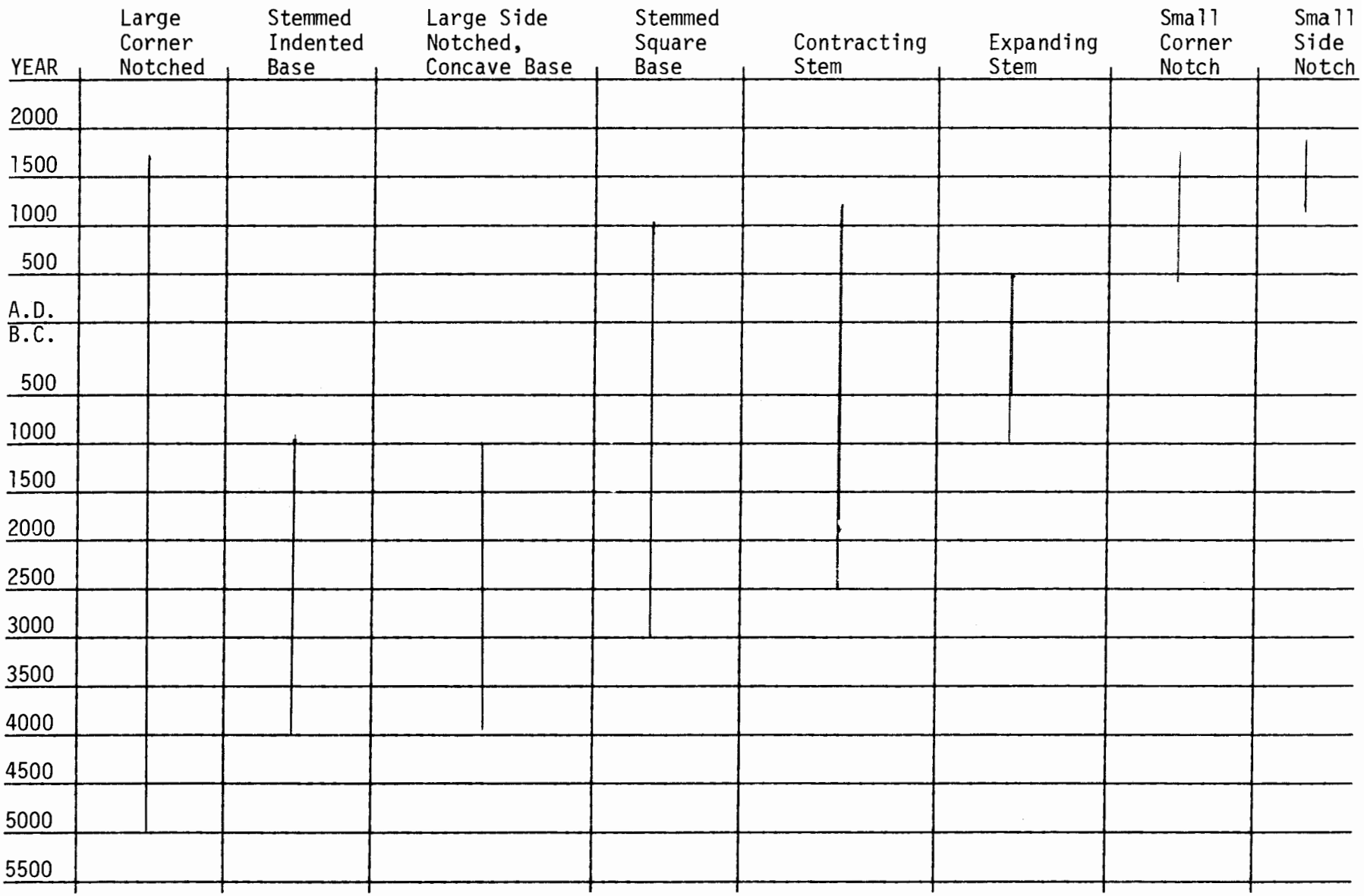

a
b
c
d
e
f
g
h

TABLE 2

TEMPORAL DISTRIBUTION OF ARCHAIC PROJECTILE POINT TYPES



Stemmed, Square Base Points

Projectile points of this type are stemmed, but terminate in (as the name implies) a square base (Figure 20d). They are generally longer than 3 cm. Stemmed, square base points were manufactured between approximately 3000 B.C. and A.D. 1000 (Wedel *et al*. 1968; Hester and Heizer 1973).

Contracting Stem Points

Artifacts of this type are characterized by contracting stems, terminating in a rounded base (Figure 20e). According to Chapman (1977), projectile points of this type date from approximately 2500 B.C. to A.D. 1100.

Expanding Stem Points

Points of this type possess a flared, short stem (Figure 20f). Bases tend to be concave to flat, and the point's overall length generally exceeds 3 cm. The temporal span of this projectile point type is uncertain. This writer believes that they were manufactured sometime between 1000 B.C. and A.D. 500 (see Irwin Williams 1973).

Small Corner Notched Points

The bow and arrow appears to have been introduced into western Colorado at approximately A.D. 500, replacing the dart and atlatl (Figure 20g). Small projectile points, generally less than 2.5 cm. in length, appear at this time (Reed and Kainer 1978).

Small, corner notched projectile points are relatively common in the Uncompahgre and Gunnison Resource Areas. Projectile points of this style were probably manufactured between A.D. 500 and A.D. 1850 (Buckles 1971; Hayes and Lancaster 1975).

Small Side Notched Points

Small side notched points appeared at approximately A.D. 1200 in Colorado (Hayes and Lancaster 1975; Buckles 1971), and persisted until the expulsions of the Utes from the area in the 1880's (Figure 20h). These artifacts functioned primarily as arrow points, partially supplanting small corner notched points in popularity.

Other Artifacts Characterizing the Desert Archaic in the Project Areas

The most abundant artifact type found on sites in the project area is debitage, or the waste flakes produced in the manufacture of stone tools. They are comprised predominately of medium to fine grained quartzite and cherts. Frequently, waste flakes were picked up and used briefly by their makers for a variety of activities. Such flakes possess crushing, attrition, or polishing along one or more edges, the type of wear, of course, being a function of the manner in which they were used. Carefully prepared cutting and scraping tools are also fairly common, especially lanceolate, bifacially-flaked blades approximately 10 cm. in length.

Ground stone artifacts are relatively abundant. Of the 638 prehistoric sites in the project area, 130 have manos and/or metates present. Manos are the "one handed" or "biscuit" variety consisting usually of an oval river cobble 10 to 15 cm. in length. Metates usually are made from relatively unmodified sandstone slabs, with an elliptical shallow grinding surface. Manos and metates are found in all vegetation zones in the project area, except the alpine zone in which no sites are yet recorded. They seem to increase in frequency as elevation decreases. Of the vegetation zones described in the introductory chapter of this report, the "Woodlands and Grasslands of Sub-Alpine Areas" produced two ground stone artifacts, the "Woodlands of the Lower Mountains" produced 17, the "Sagebrush Lands of Mountain Parks and Basins" produced 31, the "Pinyon-Juniper Woodlands" produced 39, and the "Shrublands of the Saltdeserts" produced 41 such artifacts.

Ceramics are relatively rare in the Uncompahgre and Gunnison Resource Areas. Less than 20 sites in the project areas have been reported to have possessed pottery. Buckles (1971) calls the pottery, apparently indigenous to the area, "Uncompahgre Brown Ware", and divides it into two types: Plain and Fingertip Impressed. Both types lack slips and painted decoration but the latter type, as the name implies, is decorated by impressing fingertip in horizontal bands about the exterior of the vessel (Buckles 1971:1243). Vessel forms seem to be restricted to large, wide-mouthed, conically based jars. According to Stewart (1973b:14) the vessels were made by the coil technique.

Ceramics are evidently a relatively late addition to the material culture in the region. Buckles (1971:1243) places their occurrence between A.D. 1500 and 1800 but adds that they may have appeared slightly earlier. As the number of potsherds found in the project area suggests, and on the basis of ethnographic accounts (Stewart 1973a:26) ceramics were not widely used in west-central Colorado.

CHAPTER VII

HISTORICAL ARCHAEOLOGY IN THE AREA

Of necessity, this will be a brief chapter not because there is little to be done in the archaeology of history, but because there has been so little done in this geographic area that contains so many remnants of our own heritage. Historic archaeology is the study of our own culture and heritage and the study of past contact with American Indian cultures through the two disciplines of history and archaeology. Historical research is employed to determine what documents are available and what those documents contain that is pertinent to the study at hand. Archaeological techniques of excavation and analysis are used to study the physical and material remains of a particular group, unit, or element of our own cultural heritage.

Reconstruction of past lifeways is the general goal of both archaeology and history, and in both disciplines the goal is to reach and define patterns of culture. Various levels of the overall patterns are subjected to intensive study to define such elements as social class stratification, economic status, or to look at such mundane things as the growth of transportation networks, the technology of glassmaking, or the whys and wheretofors of charcoal making. Archaeology and history have, for many years, sought to separately define their own patterns from their own types of evidence. The historian has used documents to produce his data and theories, while the archaeologist has used, in

the language of computers, the hard copy--the artifact to generate his data and theories. In recent years, the combination of the two disciplines has become more accepted and better utilized. Historic archaeology, combining the different types of research technologies of the historian and the archaeologist, has produced a product with a broader base and sometimes better understanding of past events and phenomena.

Although historical archaeology has been accepted as a good way to deal with American colonial period sites and early frontier sites, such as the fur trade posts, for nearly two generations, it is only just beginning to be utilized to study the late Victorian sites, particularly those on the frontier of urban development.

The Uncompahgre and Gunnison Basins were not settled to any extent by Euro-Americans until the last quarter of the nineteenth century. It is those visible and material links with our past--the mines, mills, ranches, homesteads and towns--that constitute the historical archaeology of this area. They are the remains of an earlier segment of our society--a society that fostered a frontier ethic and developed a technology to move people and material into incredibly rugged areas and exploit those areas for the resources they had to offer. These sites and objects are the material remains of the mass industrialization and exploitation of America.

The use of historical archaeology in this area to study exploitation, industrialization, the frontier ethic, and urbanization has just barely begun. Historic sites have been and are being recorded as a part of routine cultural resource inventories. The historic sites are being evaluated in accordance with cultural resource preservation laws and directives, but there is little sense of understanding of these sites in regional or national terms of historic development. Many of these sites are being regarded as typical or mundane--just another homestead or an ore processing facility.

Fortunately, a beginning has been made in the study of these historic resources and their place in a regional and national framework. Some systematic inventory of historical sites has been initiated in Ouray County (Baker 1977b). This survey is preliminary in nature, but it begins to place the historic values in perspective. In addition, Baker (1978) has also inventoried the Dallas Project area for the Water and Power Resources Service. He identified a number of homesteads from different periods of the homesteading cycle as well as a possible site of the Ute Chief Shavano's town or village. The townsite of Dallas was also located and some initial test excavations were made in the site. The excavations revealed trash and burned material from what may have been an hotel. The Water and Power Resources Service is now in the process of testing and excavating a number of these sites as a part of the mitigation program for the reservior construction. William Buckles of the University of Southern Colorado through Escatech Corporation is the cultural resources contractor.

Although this will be the first major effort in the archaeological study of homesteads in this area, it is not the first excavation to be done. Baker (personal communication, July 8, 1977) was the first to conduct historical and archaeological investigations in the area. He began a long-term project in 1972 with the study of the Vanoli block in Ouray (Figures 21 and 22). The study was intended to research the history of the Vanoli family and develop a more comprehensive view of the social and economic history of Ouray through the Vanolis (Baker 1972). The Vanolis owned and operated several businesses in the north part of Ouray. They operated a restaurant, hotel, Chinese laundry, theater and a house of prostitution. Baker collected a variety of oral and written data on the family and businesses. He also conducted architectural and archaeological investigations in the block concentrating primarily on the privy pits.

These privy vaults yielded vast quantities of data concerning the material possessions of the inhabitants and their social status. Besides the data on social status, there was artifact confirmation of the professions of the inhabitants and the various types of businesses that were operating on the property. Unfortunately, analysis and publication of the data is not yet complete, although when done it should provide some significant insights into the social and economic history of Ouray and the surrounding area.

Figure 21. The Goldbelt Theater, dance hall, and house of prostitution, Ouray.

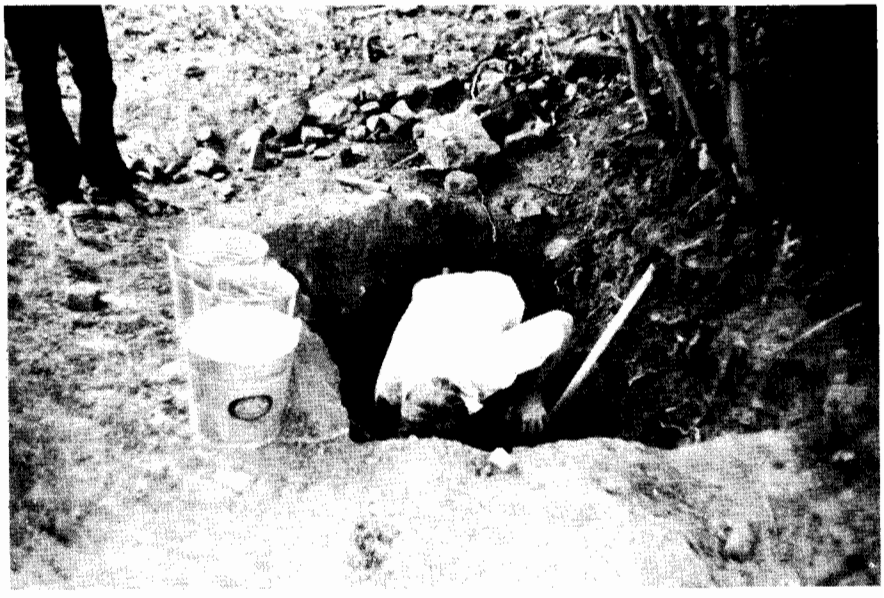


Figure 22. Excavation in one of the privy vaults in the Vanoli property, Ouray.

One other excavation has also been done in the area. This one was at the site of a saloon that burned in 1916 in Lake City. Baker again conducted the excavations as a part of a mitigation project prior to the construction of a city wading pool (Houston 1978). The investigation consisted of the excavation of the saloon basement. While most of the saloon furnishings had been salvaged during the fire, a good deal of information about the saloon was still recovered. The basement contained many stored items relating to the liquor and entertainment business of the saloon that was not salvaged at the time of the fire. In addition, some of the bar furnishings from the main floor fell into the basement when the structure collapsed during the fire. These data were also recovered and when analysis is completed, it should reveal something of the social and economic history of the saloon as it related to Lake City and the mining activity in the area. The data should also provide some idea of the entertainment and drinking habits of the saloon patrons.

The archaeological data from these sites in the Dallas reservoir, the Vanoli block, and the Lake City saloon helps to establish the social status, condition, material cultural likes and preferences of the inhabitants and patrons of these sites. These data go beyond the individual and local sites by establishing a basis for understanding the development of the intermountain region. The development can be interpreted in light of the available technology that reached the area and the social and economic interactions that occurred on the sites.

CHAPTER VIII

RESEARCH DIRECTIONS AND CULTURAL RESOURCE MANAGEMENT OPPORTUNITIES

The serious study of the prehistory in the Uncompahgre and Gunnison Resource Areas began in the 1930's. Since that time, only about 100 papers, reports and publications have been produced. About 25% of the reports have been published and about the same percentage was written prior to 1970. In other words, 75% of the work done in the areas has been accomplished since 1970 and primarily as a result of action by the various Federal agencies. Most of this work, with the notable exceptions of McKern (1978), Buckles (1971), Wormington and Lister (1956), Wormington (1955) and the Huschers' work (various) has been project clearance-oriented at the behest of the Federal Government.

The work prior to 1970 was formative in nature as has been previously discussed. It was meant to delineate the cultural tradition in the areas and establish chronometric controls for future analysis. Even today the culture history phase cannot be considered completed. Cultural traditions are incompletely understood and chronometric controls have just barely been established.

Future research in the areas, whether for Federal projects or for purely scientific motivations, needs some direction. The following presentation suggests some directions project work and pure research may take. By no means is the presentation meant to be taken as the

only true way to achieve the desirable end of knowledge of the meaning of the cultural manifestations in the area. This presentation reflects the current knowledge and the biases of the authors. This section is meant to be dynamic in nature. As new sites are recorded or excavated, new information becomes available to reassess the directions research is or will be taking.

Obviously, dating would be one of the more useful tools to have under control for the area. Gross typologies for some tools, particularly projectile points, exist (Buckles 1971 and this volume), but these typologies are not well-established. Neither are they well-dated by radiocarbon or other absolute or relative means. One aspect of continuing research should be the acquisition of chronometric data to establish reasonably secure time controls.

Another aspect of a formative approach would be to continue efforts to establish the sequence of cultural traditions in the area. The confirmation of cultural traditions goes hand-in-hand with the development of reliably dated cultural sequences. This not only provides time depth and extent of the aboriginal occupation, but also establishes which phases followed another or which may be intrusive.

This formative research cannot exist in a vaccum; it must be coordinated on a regional basis. Research or project results from eastern Colorado or Utah cannot be ignored since the past uses of this area may be part of a cultural tradition of wide distribution or may have influenced or been influenced by other cultural groups. The regional research approach allows for a much more comprehensive understanding of human use in the area.

Human use of any area is tied directly to the availability of exploitable resources, whether they are plants and animals or economically valuable ore bodies. In order to better understand the past use of an area, it is necessary to understand the past environment. The study of the paleoenvironment and its impact on man's use of the area, as well as man's impact on the environment, is a sadly neglected area of research in the Uncompahgre and Gunnison Resource Areas. Some attempts are now being made to begin to define the paleoenvironment but these are just beginning. A major effort should be made to address this issue in future research.

There are numerous avenues of research that may be explored that will benefit not only the understanding of past systems, but will aid the manager of those resources on public lands. The manager needs to know why and where resources are located in order to determine their scientific and legal value as well as to protect those finite cultural

values. Human systems are patterned and these patterns can be determined if the appropriate questions are asked of the data. Some of the questions might be oriented to establishing the location strategy of sites and how this, in turn, relates to the subsistence system of the group or culture under study. Site catchment is another area of consideration--how do base camps, limited activity sites and available resources relate to one another. What were the available resources, which ones were used, and how were they used. Available resources would vary from all types of wood and plant materials to stone materials used to make tools.

When looking at site location strategy, questions related to site patterning could be addressed in terms of spacial distribution of sites. Other questions might include what items or goods were acquired through diffusion, how were groups affected by contact or acculturation with other Indian and Euro-American cultures, and what was the population density through time and how did climate or resource availability affect changes in population. The essence of these research questions is to understand the way human systems developed and changed through time and why did those cultures change.

Historical archaeology is also beginning to carve a niche in the study of man's use of the Uncompahgre and Gunnison Basins. Obviously, much more work needs to be done and research designs are definitely in their formative stages. However, research in this area should concentrate

on developing an understanding of the exploitation of the area through time. Studies of the growth of mining and its relationship to the urban and rural development should provide some insight into the growth of the western frontier in the Victorian period. Questions can also be asked of these data that may answer why the mining towns were developing an urban flavor in essentially a frontier context. Many questions about transportation, social class, economic development and material culture may be raised and studied in the framework of the broader research designs.

Specific questions that might be asked of the historic archeological data are:

1. What is the degree of direct exploitation of the natural resources?
2. What is the extent of local or larger based market exchanges?
3. What is the effect of economic or social stress on population density?
4. Can discreet ethnic groups be identified through material culture?
5. What affect did new or specific technologies have on exploitation patterns?

As was previously mentioned, the research questions suggested above are not a finite list. They are only suggestions for future research and they are intentionally "broad-brush" so that other researchers may formulate their own specific questions for any given project.

As noted, there are many gaps in our knowledge of prehistoric peoples' utilization of the project area. This is partially because such a small percent (5%) of the lands comprising the Uncompahgre and Gunnison Resource Areas have been systematically explored for archaeological resources, but primarily because the surveys that have been completed have concentrated in the narrow corridors along the major rivers, usually at elevations above 6,000 feet. Extant data, therefore, are inherently biased towards the prehistoric exploitation of the riverine environments. In that the corridors along the major rivers constitute such a small portion of the total range of environmental possibilities within the Uncompahgre and Gunnison Resource Areas, our knowledge of prehistoric cultural adaptation to the project area as a whole cannot be considered complete. It is, therefore, important that future archaeological investigations focus upon the upland regions. The most economical and scientifically meaningful way to accomplish this goal is to implement a stratified random sample of the project area, with a sampling fraction of at least ten percent. Should financial constraints prohibit a joint sample of the Uncompahgre and Gunnison Resource Areas combined, then a stratified random sample should be conducted in the Gunnison area first. There is a considerable discrepancy between the amount of archaeological work completed in the Gunnison Resource Area as opposed to the Uncompahgre Resource Area. The Gunnison Resource Area is badly under-represented; approximately 10 times as many sites have been recorded in the Uncomphagre Resource Area as opposed to the Gunnison Resource Area. One section of the Gunnison Resource Area, termed the "American Flats", encompasses approximately 200,000 acres but possesses only one recorded archaeological site which is historic anglo in nature. Such neglect needs to be remedied.

A stratified random sample of the Gunnison and Uncompahgre Resource Areas would provide the best overall picture of the region's cultural resources and, in turn, prehistoric adaptations to the area. There is another type of inventory that may be of concern to energy developers, Federal land managers, and archaeologists alike. In the east-central portion of Utah, west of Grand Junction, Colorado, is an energy-rich region commonly called the "Cisco Desert". This region is practically devoid of surface water and has rather sparse vegetation. As the Cisco area was developed for energy, the energy companies funded numerous site-specific archaeological inventories prior to ground disturbances, as required by law. These scattered surveys suggested that the region had a very low site density--so low, in fact, that such efforts hardly seemed to be worth the archaeologists' or Federal land managers' time. Accordingly, the Bureau of Land Management in Utah funded a stratified random sample of a portion of the "Cisco Desert" to project the area's overall site density and to define certain areas or "strata" where site densities may be higher than others. If, in certain strata, the site densities approached zero per square mile, the need for site-specific archaeological clearances could be reappraised (Reed and Nickens 1979).

Along the eastern portion of the Uncompahgre River Valley and along the southern slopes of Grand Mesa, is a physiographic feature known locally as the "Adobe Hills". These hills resemble badlands, are practically devoid of vegetation, and comprised of eroding Mancos Formation shales. Few sites have been recorded to date in the Adobe

Hills, suggesting that site densities may approach zero per square mile. While energy development in this physiographic feature by no means parallels that of the Cisco Desert, there is a growing amount of energy-related development in the area. In the long run, it may be economically expedient and scientifically acceptable to conduct a stratified random sample within the boundaries of the Adobe Hills to determine the intensity necessary for future archaeological surveys within these badlands.

Cultural resource management has the opportunity to further research goals in the course of required project work. The data on sites generated as a result of CRM work is directly applicable to the research goals. The projectile points, data on site ecology, elevation, topography, etc. are important not only for management purposes, but for research goals as well.

Managers should view cultural resources as a non-renewable land value that can illuminate past and present exploitative land use patterns. Cultural values that will not be directly affected by land-altering activities and, therefore, require no formal mitigative measures, should be preserved for future study. All cultural values have some information to impart. Some sites will contribute relatively little new data while others are likely to contribute significant amounts of new data to the understanding of the past use of the area. All sites should be considered valuable enough to be avoided when

possible. Those sites that cannot be avoided should then be addressed for mitigation needs in the light of the comprehensive regional research goals and be mitigated commensurate with their relative value and significance. Only in this way can a site's true significance be assessed.

Regional research goals will change with time as a result of the acquisition of new data and as a result of shifting research emphasis due to changes in the philosophy of archaeological theory or changing management needs. For these reasons, sites should be avoided and thus preserved as a data bank. The less a resource is destroyed or scientifically used now, the more data is likely to be recoverable in the future.

More is known today about the prehistory of west-central Colorado than was twenty-five years ago. The growth of archaeology and cultural resource management is responsible for this knowledge as is the ever-expanding data base which is built on the previous research. The continuity of the archaic life style in this area for at least 8,000 years and the interactions of these peoples with other groups provide some interesting units to study in a regional framework. The presence of possible Paleo-Indian sites also suggests some intriguing possibilities for research. As more is learned about past lifeways in west-central Colorado and surrounding areas, the more our currently held concepts are likely to change. The goal of understanding cultural continuity and change in this area can only be accomplished through an emphasis

on establishing and using a regional research framework. Pure research and cultural resource management are dependent upon the regional approach for the understanding of the past in the Uncompahgre and Gunnison Resource Areas.

CHAPTER IX

SUMMARY

The Uncompahgre and Gunnison Resource Areas evince a long and continual use by human populations. Big game hunters of the Paleo Indian Tradition probably intermittantly exploited the area's varied natural resources, perhaps as early as 9000 B.C. By 5500 B.C., this tradition was replaced by the Desert Archaic Tradition, probably as a result of environmental and demographic changes. The Desert Archaic technocomplex persisted in the project areas until the nineteenth century, when Euro-American expansion effectively removed the native inhabitants to reservations.

While the Desert Archaic technocomplex proved a most effective adaptation to this region, specific cultures may have come and gone. The identification of these cultures in the archaeological record may be difficult, with the obvious exception of the Ute who were inhabiting the area at the time of historic contact. The duration of Ute culture in the area prior to historic contact is debatable.

Whatever the cultural identity of the prehistoric people inhabiting the project area, the fact that only two technocomplexes represented by the Paleo-Indian and Desert Archaic Traditions have been identified suggests little diachronic variation in lifestyles. Transhumance was undoubtedly the way of life. High mountain passes were probably consistently utilized, but like other alpine and near-alpine

areas, were only utilized a few months out of the year. The elevations between 6,000 and 8,000 feet were utilized extensively, with a possible emphasis upon the area near the Gunnison River.

Various resources are available in those elevations. The "Sagebrush Lands of Mountain Parks and Basins" may have been exploited primarily for grass seeds during the late spring and summer or may have been used as hunting grounds during the winter months when deer, elk and bighorn sheep congregate in the winter pastures. The lower pinyon and juniper woodlands may have provided sufficient quantities of pinyon nuts, fuel and shelter to have been attractive wintering grounds. Use of the various vegetation resources may have gradually changed through time, however, possibly as a result of increasing population pressure.

The Uncompahgre and Gunnison Resource Areas undoubtedly contain several thousand historic and prehistoric sites. These sites are resources and must be managed accordingly for the benefit of all. Contingent upon proper management is a proper understanding of those resources. The formulation and execution of a regional research design would greatly facilitate such an understanding.

Chapter X

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Chapter XI

Archeological Bibliography of the Gunnison Resource Area

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THE ARCHAEOLOGY OF THE WEST END
(San Miguel Resource Area)

By

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CHAPTER I

INTRODUCTION

This report intends to provide a review and synthesis of the cultural resources of the San Miguel Resource Area. With archeological investigations concentrating on the San Juan Anasazi to the south and Fremont to the west, the San Miguel Resource Area (SMRA) has, until recently, remained virtually untapped for archeological research. Due to the sporadic nature of archeological work in this area, little attempt has been made to present a comprehensive overview of its prehistory. The most substantive effort to date is H.W. Toll's (1977) attempt to define patterns of human occupation of the area; however, his work was limited primarily to the Dolores and San Miguel River Canyons. This overview will attempt to broaden Toll's work and provide a research strategy for understanding the human systems operating within the area.

The goals of this overview are threefold. First, it is an effort to synthesize the last fifty years of archeological work in this region, presenting a "state of the art" summary for professional archeologists interested in the area. Secondly, the overview is intended to provide background data to those individuals charged with managing the land and its resources. This document is intended to provide land managers with insight into the type, number, and complexity of cultural resources within the SMRA so that they may better realize the unique values inherent in these resources. Thirdly, this overview is designed to demonstrate the potential of research into the dynamics of culture change by providing a readily available introduction to the prehistory of the SMRA to be used by archeologists, land managers and interested members of the public alike. Increased appreciation of the value of cultural resources by all is an essential step in the process of preserving and understanding these fragile remnants of our cultural heritage.

While the cultural resources of the San Miguel Resource Area exhibit traces of influence from the San Juan Anasazi to the south and Fremont horticulturist to the west, the main adaptation present is an Archaic hunting and gathering based mode of subsistence. Ideas and material culture converged into the area from these adjacent culture areas were received, weeded out, and utilized by the indigenous peoples creating a unique cultural adaptation to the local environment. To what extent this incoming information was adapted and adopted and to what extent did these influences and interactions occur are important questions in the understanding of the prehistory of the study area. While this overview may not be able to provide the answers to these questions, hopefully it will provide a sound basis and direction for further work in this area of Colorado prehistory, and broader studies of cultural behavior and processes.

LOCATION OF STUDY AREA

The San Miguel Resource Area in southwestern Colorado is one division of public land within the Bureau of Land Management's Montrose District. Formed as a management unit, the boundaries of the resource area are largely political although to some extent natural features help to define the boundaries. In essence the region consists of the San Miguel River drainage and a portion of the Dolores River drainage, from the north end of the 'Ponderosa Gorge' at the south to the confluence of Mesa Creek and the Dolores River at the north. Natural boundaries include the La Sal Mountains and the Uncompahgre Plateau uplift on the northwest and northeast, the Dallas Divide and the San Miguel Mountains on the east, and the San Juan range on the southeast.

Political boundaries follow the natural boundaries fairly closely. The eastern boundary along the Dallas Divide coincides with the countyline separating Ouray County from San Miguel and Montrose counties. The Utah border forms the western boundary and the northern boundary is formed by the Uncompahgre National Forest, the Manti-La Sal National Forest, and the boundary of the BLM's Montrose District between the two forests. The southern boundary is the Dolores-San Miguel county line on the extreme southwest and the San Juan National Forest on the southeast. (See Figure 1).

Locally referred to as the "West End" 80% of the San Miguel Resource Area is found in San Miguel and Montrose counties. The remaining portion is situated in central Dolores county to the south and in a portion of Mesa county to the north.

There are 78 whole or partial townships in the study area, extending from Township 39 North to Township 50 North, and Range 9 West to Range 20 West, New Mexico Principal Meridian. Total acreage within the above boundaries is approximately 1,257,579. Approximately 57% (715,218 acres) of this is public domain administered by the Bureau of Land Management; 39% (488,487 acres) is private, municipal, and county land; 2% (14,304 acres) is state owned; and 2% (14,304 acres) is U.S. Forest Service Land.

For management purposes, the BLM has divided the area into two planning units. The Dolores Planning Unit is the western half of the area, and with the exception of the land around Egnar, Nucla and Paradox, it is almost entirely public domain. The eastern half of the area is the Lone Cone Planning Unit, which is mainly private land with isolated parcels of public land. Land on either side of the San Miguel River Canyon is the most consolidated BLM controlled land in the Lone Cone Planning Unit.

In order to provide a more coherent regional overview of the prehistory, all land, regardless of ownership, within the borders of the San Miguel Resource Area has been included in this study. Major sites adjacent to but outside of the resource area are also included for interpretive purposes.

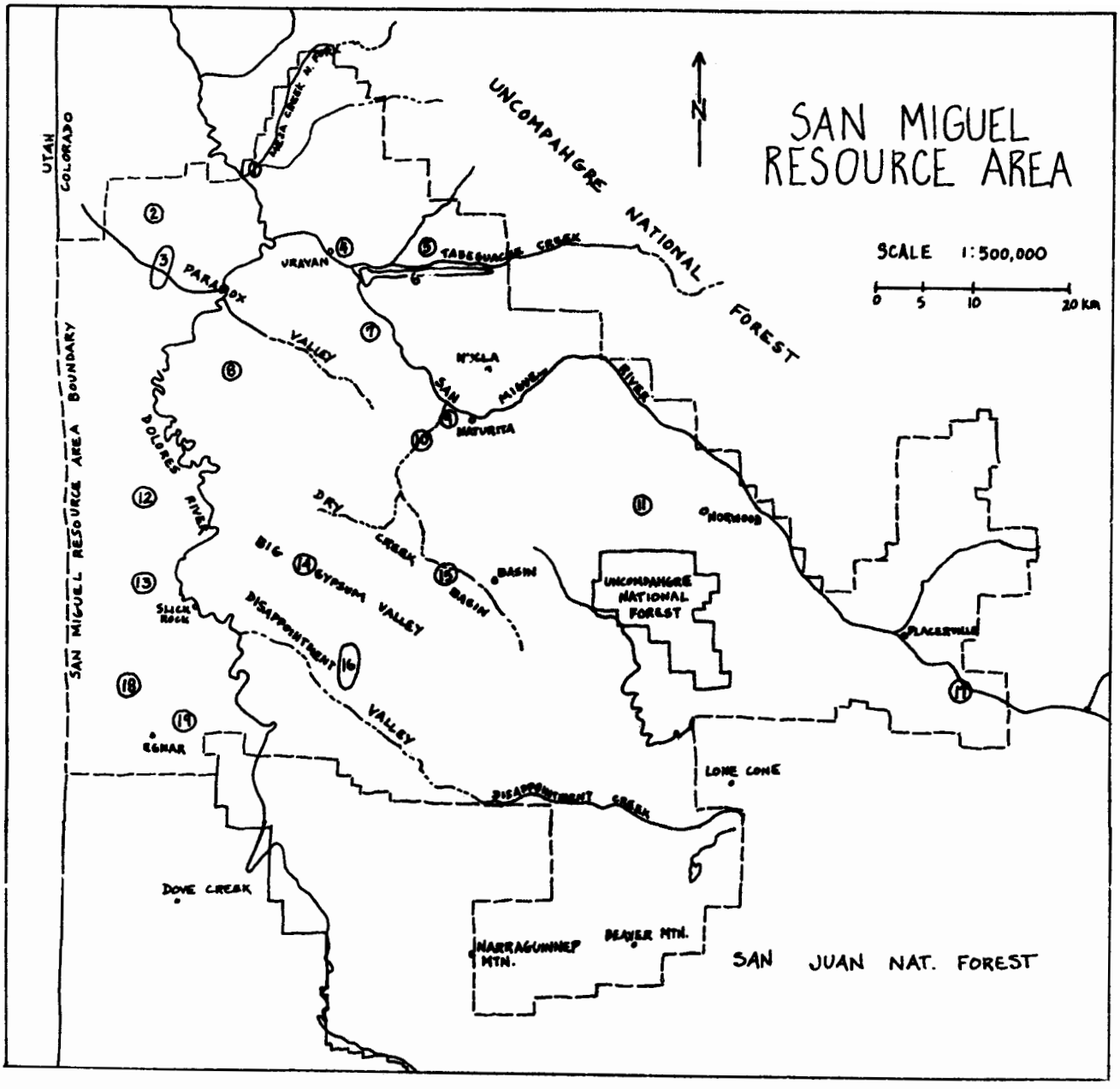

FIGURE 1. The San Miguel Resource Area
With Major Topographic Features

CHAPTER II

ENVIRONMENT

ENVIRONMENTAL BACKGROUND

The majority of the San Miguel Resource Area lies within the Canyonlands portion of the Colorado Plateau Physiographic Province. The eastern end of the area shades into the Rocky Mountain Province, in this case, the San Juan Mountain Range and the San Miguel Range.

Most of the exposed bedrock in the area is sedimentary, ranging in age from the Mississippian and Pennsylvanian Carboniferous (Paleozoic era) to Quarternary (Cenozoic era). The predominant rock is sandstone, followed by shale. Triassic and Jurassic formations occur throughout the area, particularly the Wingate, Kayenta, Entrada, and Morrison formations, however, Cretaceous age formations (Burro Canyon, Dakota, and Mesa Verde Sandstones and Mancos Shale) appear to be the most common. The floors of Paradox Valley and Gypsum Valley are carboniferous beds of the Hermosa Formation, covered by Quarternary surficial deposits of alluvium. Table I (from the BLM's San Miguel Unit Resource Analysis Step II) shows this stratigraphic profile of the area.

The region is topographically quite diverse, with mountainous terrain near the eastern, southeastern, and western borders, and the Uncompahgre Plateau Uplift on the northern margin. The San Miguel Range and the San Juan Mountains contain peaks with elevations of 10,000 to 14,000 feet, while the La Sal Mountains reach an elevation of 12,500 feet. The resource area itself is comprised of both horizontal sedimentary beds, and valleys and ridges formed by synclinal and anticlinal folding and by high angle faults. Stream entrenchment has emphasized the synclinal and anticlinal valleys and crests, and has formed steep walled canyons which dissect the horizontal beds into numerous mesas. Elevation within the area ranges from 4800 feet at the confluence of Roc Creek and the Dolores to 9500 feet near Telluride. Canyons with a total relief of over 2000 feet exist within the study area.

The San Miguel River and the Dolores River are the major drainages within the study area. With its source in the San Juan Mountains, east of Telluride, the San Miguel River flows in a northwesterly direction to its confluence with the Dolores River, west of Uravan. The river is fed by streams flowing north out of the San Miguel Mountains and by streams flowing south-southwest from the Uncompahgre Plateau. The Dolores River, originating on the southern flanks of the San Miquel and San Juan Mountain flows south, then loops back north, flowing through the western portion of the study area. Continuing to the north and west the Dolores River meets its confluence with the Colorado River in the State of Utah.

TABLE I
Stratigraphic Section
San Miguel Resource Area

Period	Formation	Member	Thickness Feet	Description
Quaternary	Alluvium-Glacial		up to 100	Sandy clay loam to heavy sandy clay in valley bottom. Sand & gravel.
	Mesa Verde	Point	0-150±	Light colored, massive-even textured medium grained sandstone. Forms cliff above mancos shale.
	Mancos Shale		0-1000±	Dark gray to black, soft fossil shale eroding to smooth rounded shapes. Near base contains sandy, calcareous fossiliferous bed.
	Dakota		80-200±	Gray and yellow to buff, flaggy sandstone, chert and quartz-pebble conglomerate and carbonaceous shale with thin, impure coal seams.
Cretaceous	Burro Canyon		190-210	Green, sandy claystone, light orange to buff conglomeratic sandstone with chert pebbles, pale green sandy mudstone with irregular layers and pods of chert and silicified claystone, dark reddish-brown claystone, sandstone gray, green and yellow to orange, conglomeratic, some beds clayey, poorly sorted.
		Brushy	350-430	Variegated, bentonitic, shale and mudstone with intercalated thin beds and lenses of sandstone and conglomerate, maroon, purple and light shades of red, blue and green. Contains appreciable amounts of fossil saurian bone and wood. Forms slopes.
Jurassic	Morrison	Salt Wash	320-380	White, gray, buff to rusty red, fine to medium-grained, cross-bedded and massive sandstone in interfingering, lensing beds with intercalated thin beds and/or lenses of shale, mudstone and limestone. Beds often contain much carbonaceous trash & commercial deposits of uranium and vanadium.
	Summerville		105±	Various shades of red, green, brown, yellow to nearly white, thin, evenly bedded, sandy and silty shales mostly, but grading from clean claystone to fine-grained sandstone.
	Wanakah	Pony Express Limestone	0-30	Gray fine-grained limestone and limestone breccia. Contains lead-zinc near Sawpit.

Data on climate is somewhat spotty with Paradox, Norwood and Uravan being the only climatological stations within the area. Information from Gateway to the northwest and Telluride to the southeast is provided for comparative purposes (Table 2). Average annual precipitation ranges from less than 12 inches near Paradox to around 16 inches in the higher country adjacent to the National Forests. Precipitation is about equally divided between winter snows and summer thunderstorms. Snowfall between October and April results in little actual snowpack, particularly in the area west of Redvale. Accumulations of more than 12 inches are rare, except near the National Forests where snowpack may reach 36 inches. Snow usually remains for brief periods in the valley bottoms and on the south slopes, but may remain on north slopes and protected areas for several months. Accumulations of 12-24 inches are common east of Redvale, and may last from December through February. May and June are the driest months with summer thunderstorms occur primarily from July to September. Figures 2 and 3 indicate monthly precipitation and temperatures variation within the area.

In this context, it should be pointed out that average annual and monthly precipitation figures are misleading. Although the area experiences a bimodal precipitation pattern, most of the effective moisture is produced by winter snows and runoff from snowpack in the surrounding high country. The amount of effective moisture is significantly less from summer rains due to the highly localized nature of summer thunderstorms, the rapid runoff from these cloudbursts, and the fact that large amounts of precipitation are lost to evaporation and transpiration, especially during the growing season (Zorn 1977:5).

The average frost free growing season is 106 days at Norwood (June 6 - September 16) and 131 days at Paradox (May 17 - September 25). The frost free season is quite variable, and extremes are known of 54 to 140 days. Present farming in the area is limited to crops of hay and small grains, with some corn and fruits grown.

Distribution of vegetation types is primarily dictated by elevation and the associated differences in precipitation. Soil type, substratum, and aspect or exposure influence the amount of effective moisture determining species distribution. According to Kuchler (1964) pinyon-juniper woodland (Pinus - Juniperus) is the major natural vegetation type in the area, followed by Great Basin Sagebrush (Artemisia), Saltbush-Greasewood (Atriplex-Sarcobatus) and Mountain Mahogany-Oak Scrub (Cercocarpus-Quercus). Higher elevations around the La Sals, San Juans, and the Uncompahgre Plateau are occupied by Ponderosa-Douglas Fir Forest (Pinus-Psuedotsuga) and Spruce-Fir Forest (Picea-Abies). Species mentioned are dominants for the vegetation types, each type including many components. These vegetation types do not necessarily form discrete units. Instead, there are many transition areas and mosaics composed of an interfingering of several types. Moreover, the dominants for any one type do not always occur together, e.g., pinyon-juniper woodland may consist of mixed pinyon and juniper or may be almost totally juniper to the exclusion of pinyon or visa versa.

TABLE II

CLIMATOLOGICAL DATA SUMMARY

Station	Temp. Average Annual °	Annual Precip. "	Wettest Months "	Warmest Month °	Coldest Month °	Extreme °	Annual Snowfall
Gateway	50.4	10.97	Mar. 2.25 Apr. 1.90	July 73.2	Jan. 26.4	-8 98	42.6
Norwood	43.2	14.96	Aug. 2.14 Jul. 1.66	July 66.2	Jan. 20.0	-18 90	73.1
Paradox	46.2	11.62	Aug. 1.65 Oct. 1.26	July 72.5	Jan. 17.4	-15 98	44.7
Telluride	39.8	23.41	Aug. 2.98 Jul. 2.42	Jan. 21.2	Jan. 21.2	-16 86	202.5
Uravan	51.3	12.61	Jul. 2.83 Apr. 2.40	July 76.3	Jan. 24.7	-9 102	No information

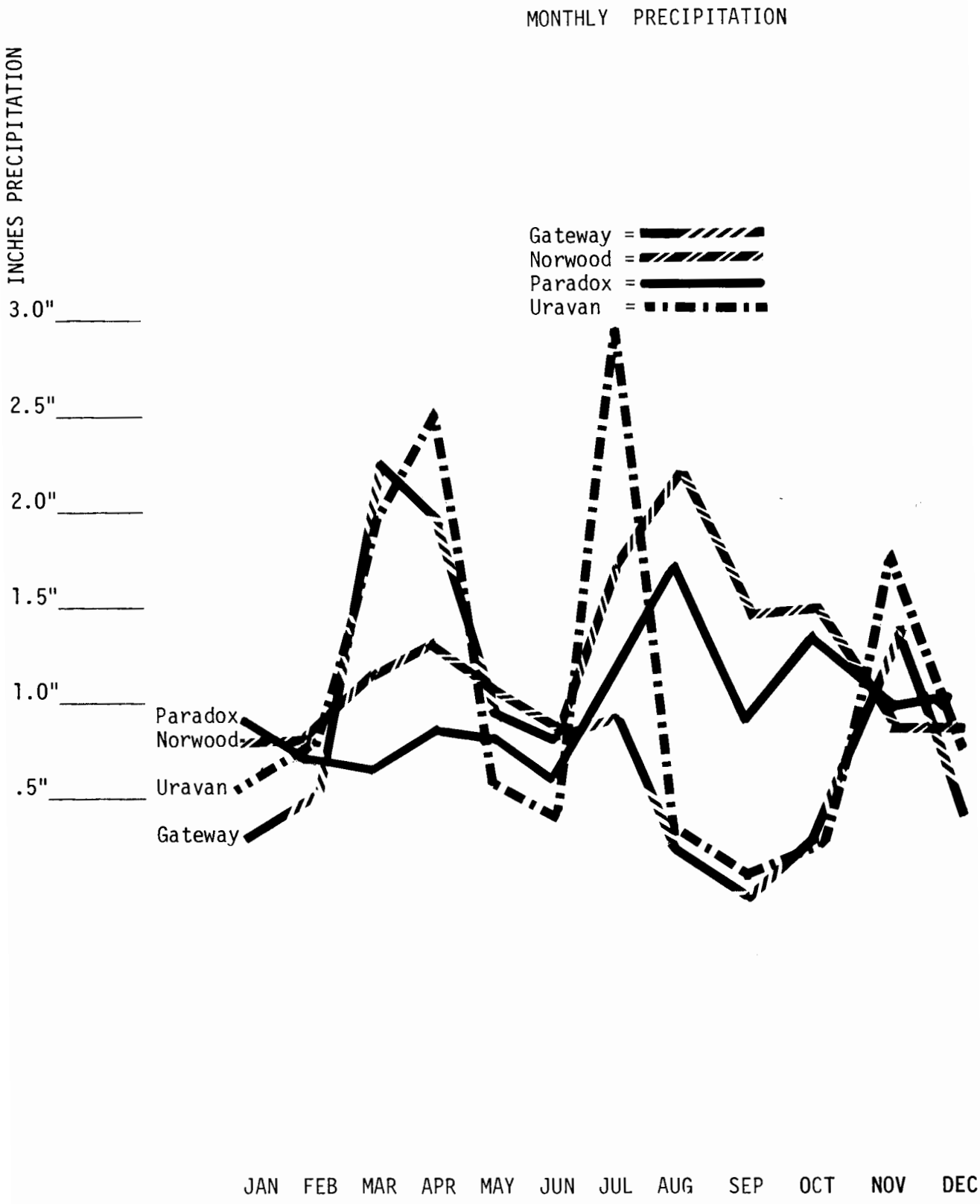

FIGURE 2. Monthly Precipitation

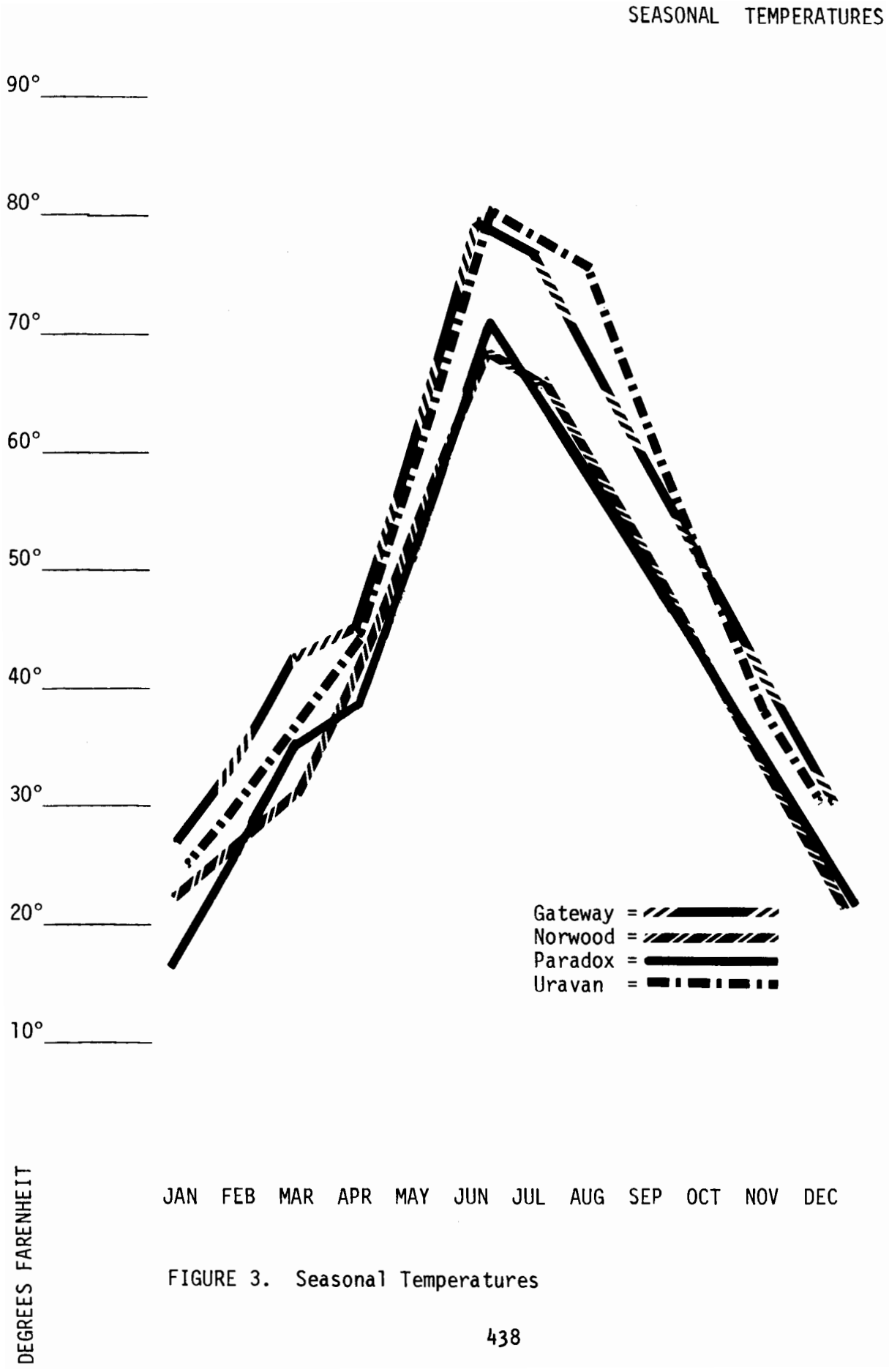

FIGURE 3. Seasonal Temperatures

The comparatively sparse human population and use in the San Miguel area has permitted a continuing abundant and diverse wildlife population. Large mammals present (some seasonally) are mountain lion (Felis concolor), bobcat (Lynx rufus), elk (Cervus canadensis), mule deer (Odocoileus hemionus), coyote (Lanis latrans), badger (Taxiclea taxus), beaver (Castor canadensis), porcupine (Erethizon dorsatum), cottontail (Sylvilagus audobonii), and jackrabbit (Lepus townsendii). Black bear (Ursus americanus) are present on the Uncompahgre Plateau. Pronghorn (Antilocarpa americana) have been recently introduced to Gypsum and Disappointment Valleys, but whether the Pronghorn were present prehistorically is unknown. Also in question is the prehistoric presence of mountain buffalo (Bison bison) within the study area. Numerous small mammals, birds, and reptiles are known for the region. Extensive lists of flora and fauna found on the Colorado Plateau are readily available (e.g. Zorn 1977).

The composition of natural vegetation and wildlife has been affected and modified by the introduction of nonnative species and historical land-use practices. Mine tailings have polluted many waterways in the West End, including the lower San Miguel and Dolores Rivers, with attendant adverse effects on fish and mammals. There is some indication that Ponderosa Pine may have been more common prior to the onset of mining and ranching in the region. Ponderosa can presently be found around springs on the mesa tops, along the upper San Miguel Canyon, and along the Ponderosa Gorge of the Dolores River, just south of the study area. Ponderosa pine was a prime resource for early mining and construction use. Indian Henry's cabin in Bull Canyon, for example, is built of ponderosa, although there are currently no ponderosa in or around Bull Canyon. Overgrazing has led to an invasion of grassland by sagebrush, less desirable grasses, and/or pinyon-juniper. Range management practices, such as chaining, controlled burns, seeding, and contour furrowing have also had a dramatic impact.

Past climatic conditions are not clearly understood for the desert west and southwest in general, and are unknown except by implication for the San Miguel Resource Area. There is evidence of fluctuating amounts of effective moisture in the past, both in the Great Basin (Jennings 1978) and in the southwest (Mehringer 1967, Irwin-Williams and Haynes 1970, Schoenwetter and Dittert 1968, Schulman 1949). Changes in the bimodal pattern of precipitation, variation in the amount of precipitation, and/or fluctuations in temperature increase or decrease the amount of effective moisture. Increased effective moisture can increase the density of vegetation as well as causing depression of vegetation zones; plant types shifting down to lower elevation zones. Decreased effective moisture has the reverse effects, with plant communities retreating to higher elevations. The can result in decreased biomass and lower carrying capacity within the system. Since amount and type of biotic resources in an area have a definite effect on the human use and occupation of the area, it is important to know when past climatic fluctuations or changes took place, in what direction those changes were (wetter or drier), and their magnitude.

While no attempts have been made to reconstruct the past environment in the study area; adjacent areas have received some study. The Anasazi area to the south has been most intensively studied for changes in the paleoenvironment (cf Martin and Byers 1965; Wycoff 1977; Scott 1980). The area to the north and east has also recently been the focus of some paleoenvironmental reconstruction (Scott 1978; Lutz 1978). The result of these various studies suggests that there have been minor changes or variations in the amount of available effective moisture through time, although the biotic make-up of the area does not appear to have changed for at least the last 5,000 years.

CHAPTER III

PREVIOUS ARCHEOLOGICAL WORK IN THE AREA

Archeological investigations within the San Miguel Resource Area can be divided into two separate periods. Early research, from 1930 through the mid-1940's concentrated on the more visible habitation sites resulting in the excavation of several sites and a small amount of surface reconnaissance. From 1947 through 1970, the archeology of the San Miguel Resource Area was virtually ignored while research continued in adjacent areas to the north, west and south. With the onset of the 1970's, surface inventory in response to legislative actions protecting cultural resources became a dominant form of archeological research.

The early period of research was characterized by a focusing of attention towards sites with architectural features, large overhangs and rock art. The prehistory of the area was viewed within the framework established by the Northern San Juan Anasazi culture sequences. Although the study area was thought to be peripheral, the research emphasis on the more visible, material sites normally associated with agrarian peoples resulted in an inattention toward open, surface sites such as lithic scatters. Because of this, prehistoric and historic Ute remains were relegated to an archeologically insignificant status.

This type of archeological research which predominated during the early period of research in the West End was typical of that carried out throughout North America in the 1930's and 1940's. Willey and Sabloff (1974) have termed this the classificatory-historical period of American archaeology. The following summaries of early work in the study area reflect the reliance of these archeologists on a trait-list approach.

In 1931, under the auspices of the State Historical Society of Colorado and the Smithsonian Institute, George and Edna Woodbury conducted a survey of Paradox Valley and surrounding areas. This survey was a series of spot checks, with portions of the floor of west Paradox Valley more intensively inventoried. The Woodburys reported (1932) finding sixteen ruins in West Paradox Valley, which they described as being late Pueblo I-early Pueblo II in age and culture. One ruin of at least four contiguous rooms was tested, with two rooms being excavated. Ceramics from the structure, consisting of corrugated, black-on-white, and black-on-red wares were identified by Earl Morris as being of Pueblo I-Pueblo II style. A wooden beam recovered from the structure was sent to A.E. Douglass at the University of Arizona. This has recently been dated at AD 1025vv by the Laboratory of Tree Ring Research, placing the site in the middle of the Pueblo II period, if it is, in fact, Anasazi related. (William Robinson personal communication, May 25, 1979). Also recovered were chipped stone tools, bone beads, gaming pieces, and awls; all of which have been recently studied (See Toll 1977:91-95, 243-255).

Rock shelters (overhangs), two circular dry laid stone structures, and two rock art sites were also described by the Woodburys. One of the rock art sites, located in La Sal Creek Canyon, had been previously described by Jeancon (1926:44,45) who noted the occurrence of broad shouldered human figures. Jeancon compared the figures to Basketmaker glyphs in northeast Arizona, but on the basis of stylistic differences surmised a Ute origin for the petroglyphs.

Between 1938 and 1941, Betty and Harold Huscher of the Colorado Museum of Natural History (now the Denver Museum) conducted surveys and excavations in western and southern Colorado. In an effort to define Athabaskan migration routes, the emphasis of their research was aimed towards locating, recording and testing sites containing stone structures. Their work can best be described as a spot survey rather than a thorough reconnaissance effort. Numerous stone structures were described by the Huschers (1943), including several in the San Miguel River drainage. Detailed locational information for these sites was destroyed in the 1959 fire at the Denver Museum of Natural History, but most of their sites within the study area have been relocated.

One of the "ruins", described as having several groups of structures as well as nearby solitary structures (Huscher 1943:19-21) will herein be termed the Cottonwood Creek Locality. Structures comprising the Cottonwood Creek Locality include Cottonwood Pueblo and Hill Pueblo, both partially excavated by C.T. Hurst (1948a, 1948b) and several other structures recently excavated by J. Vondracek of Metropolitan State College (Crane 1977). The Cottonwood Creek Locality is about two miles upstream from the confluence of Cottonwood Creek and the San Miguel River. These structures may be synonamous with the site mentioned by Escalante in his journal entry for August 23, 1776: "...There are ruins of a small and ancient pueblo whose houses appear to have been of stone. . ." (as translated by Bolton 1950:148). If the recent retracing of the route of the Dominguez-Escalante Expedition is accurate (Miller 1976), the expedition was ascending the Uncompahgre Plateau in the area of Cottonwood Creek. These ruins would then be the second archeological area of three noted by the expedition and the second earliest identified site noted in Colorado.

The Huschers (1943:17-22) recorded four other structures scattered throughout San Miguel and southern Montrose County, including a site on the rim of Naturita Canyon previously mentioned by the Woodburys (1932:17, 18), and recently recorded by Toll (1976) as 5SM57. Although the sites exhibited a variety of architectural styles, spatial configurations, and artifact assemblages, the Huschers attributed them to Athabaskans and labelled them hogans (1942, 1943). Today, most archeologists disagree with their identification and attribute the remains to a variant of the Fremont culture.

C.T. Hurst of Western State College excavated several sites in the area during the 1940's. A large sandstone overhang in Tabeguache Canyon, called Cave II, contained evidence of three occupations (Hurst 1943, 1944, 1945a). ". . .Cave II yielded Ute, an earlier nomadic culture associated with conquest or trade Basketmaker II, a hiatus, and finally, a still earlier nomadic culture possibly the "Tabeguache . . ." (Hurst 1945b: (Fig. 4 and 5) 106.

The occupational layer at Cave II containing postulated nomadic and Basketmaker material included a slab-lined cist, reed projectile shafts, corn, squash, rush matting, cordage, and two rod-and-bundle basketry. With a few exceptions, Hurst did not attempt to specify artifacts as to culture of origin - artifacts regarded by Hurst as being Basketmaker are a corn cob on a stick, a bundle of yucca leaves, and "basketmaker projectile points". Hurst doubted that the slab-lined cists or basketry was Basketmaker and assumed the cave had been utilized soley by nomads (1943).

The lowest cultural layer, separated from the nomadic/basketmaker level by a sterile layer, contained bifaces, small hand stones and milling stones, and long, narrow, basally notched points labelled 'Tabeguache points' (See Hurst 1944:10, 1945b:106 for description). The only features found were rock-lined hearths and numerous ash-filled potholes set into the bottom sterile clay layer. Hurst did not elaborate on the 'Tabeguache' culture beyond speculating that it may have been related to the hypothetical Basketmaker I (1945a:10).

During Hurst's excavations at Cave II, collections were made of chipped stone tools from surface sites in the vicinity. Projectile points from these collections included "Yuma" (Plano), Gypsum Cave and Pinto Basin types, as well as Tabeguache and later types. Hurst (1944, 1945b) devised a chart hypothesizing evolutionary steps and relationships through time between types of points in the area, based on temporal data for the known types and the stratigraphic sequence at Cave II.

Dolores Cave (Fig. 6) was excavated by Hurst in 1946 (Hurst 1947) and was another large overhang, up to five feet deep, without definite stratigraphy. Artifacts included dart foreshafts, leather, basketry and other perishables, corn, and bone and stone tools (Fig. 7). A slab-lined hearth was also found (Fig. 8). Hurst believed that the cave showed "basketmaker affinities in its lower levels and modern nomad ancestry in its upper levels" (1947:11). He did not see any evidence of earlier occupation or any Ute material.

Another site, Tabeguache Pueblo, (Figs. 9 and 10), is a hilltop masonry ruin with four structures, with at least one structure having several rooms. Hurst (1946) excavated one structure completely and portions of two others, and tested two trash dumps. Among artifacts recovered were 53 sherds, representing a variety of pottery types. H.P. Mera and H.S. Colton identified some of the sherds as being Pueblo II in style, including Mancos black-on-white. Hurst (1946:10) categorized the site as a "peripheral Pueblo II site".

Figure 4. C.T. Hurst in Camp
near Tabeguache Cave 1941

Figure 5. Tabeguache Cave II

Figure 6. Dolores Cave

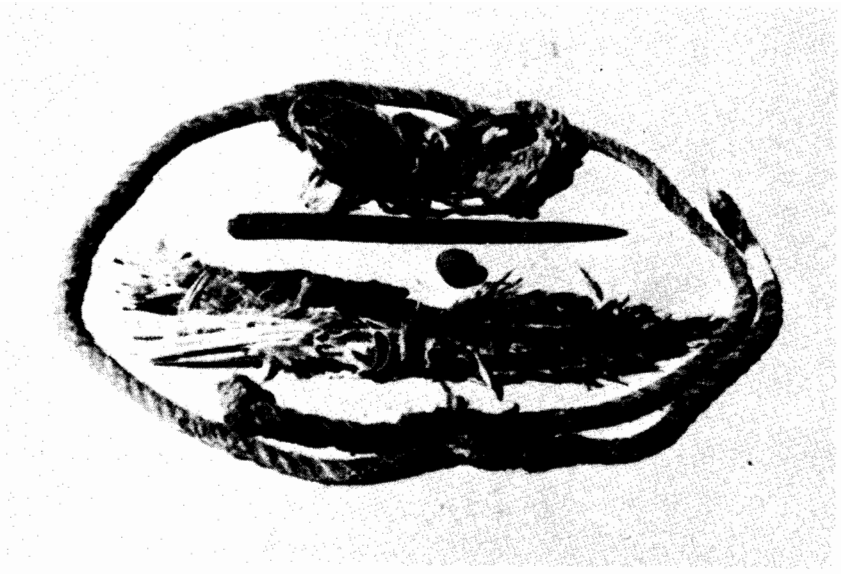

Figure 7. A Possible Medicine Bundle
from Dolores Cave Excavated
by C.T. Hurst in 1946

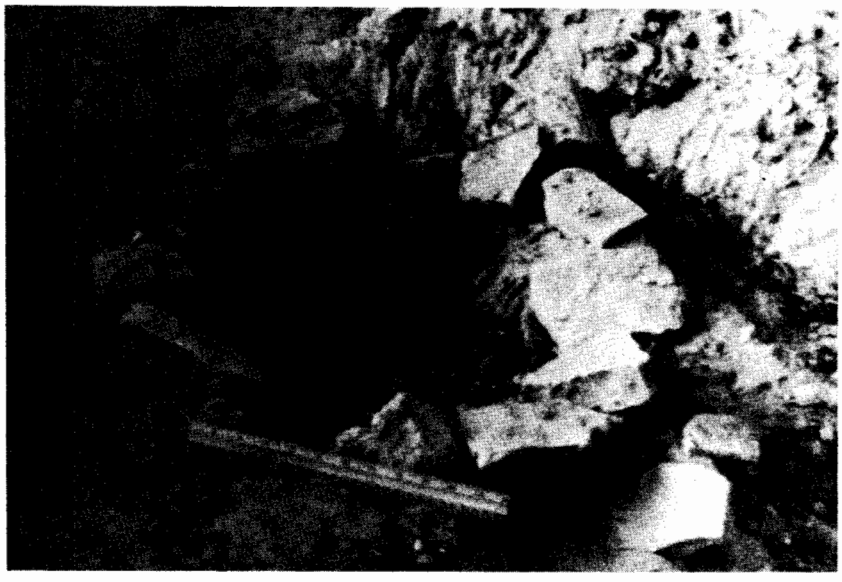

Figure 8. A Slab Lined Hearth Excavated
by C.T. Hurst at Dolores Cave

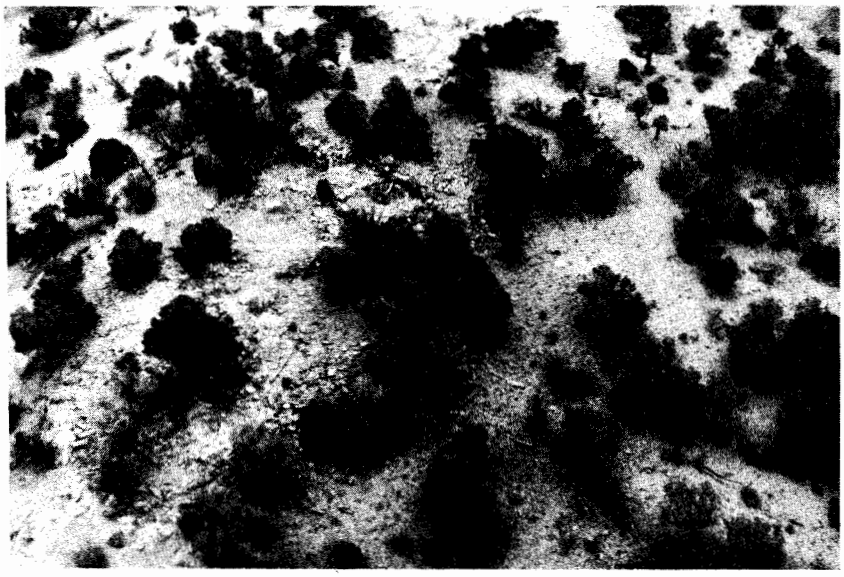

Figure 9. Tabeguache Pueblo in 1976.

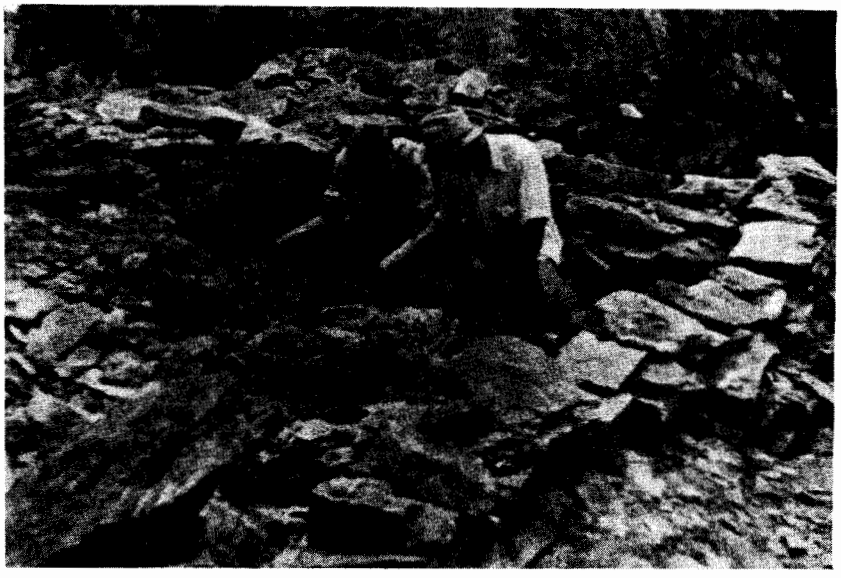

Figure 10. Tabeguache Pueblo
During Excavation 1945.

Hurst also excavated several sites bordering the BLM's San Miguel Resource Area. Tabeguache Cave I, (Fig. 11) ten miles upstream from Cave II, was believed to have been used intermittently by the Basketmaker II culture (Hurst 1940, 1941, 1942). The overhang contained a retaining wall of dry-laid stone and timbers, and two 3-sided slab-lined cists with flat stone floors. Perishable artifacts included square-toed sandals, single rod-and-bundle baskets, fur cloth, corn, squash, and wild seeds and nuts (Fig. 12). Projectile points were corner-notched with stems and barbs, and unnotched triangular forms. Timbers from Cave I were analyzed by Hurst's students and dated at A.D. 348, A.D. 361, and A.D. 372. The Laboratory of Tree Ring Research recently dated samples from the cave, and arrived at 10 B.C. - 10 A.D. as the latest dates of occupation.

Cottonwood Cave (Figs. 13-15) on Cottonwood Creek, was also considered to have a peripheral Basketmaker II occupation (Hurst 1948a, 1948b). Deposits in the cave were in places over 13 feet deep. A prepared cache was found containing 14 ears of corn and nearly a gallon of shelled corn wrapped in juniper bark. The corn resembled Baksetmaker corn in some aspects, but in others was closer to corn from coastal Peru (Hurst and Anderson 1949). A Tabeguache Point was found in the lower portion of the deposits.

As mentioned before, Hurst excavated two sites at the Cottonwood Creek Locality, and reported the existence of 14 more (1948a:5). Cottonwood Pueblo was partially excavated in 1947 (Hurst 1948a). The ruin consisted of four rectangular masonry houses separated by a courtyard. One house called "Lone Tree House" was excavated. Pottery, though minimal in amount, included plain and corrugated grey wares, Mancos black-on-white and black-on-red wares. A nearby round structure, labelled "Hill Pueblo" was excavated in 1948 (1948b). Hurst noted architectural dissimilarities between the Cottonwood Creek locality and Anasazi sites to the south, yet maintained that the structures were Pueblo I-Pueblo II in style and time.

Recently, Jiri Vondracek of Metropolitan State College conducted excavations at these same sites. Unfortunately, a disappointingly meager amount of data is available from the excavations. Crane (1977, 1978) provides a brief sketch of the architecture and artifacts from several sites, and a classification of the less than 200 sherds recovered from the sites. The system of site designations, however, is more than confusing; in some cases each room of a structure is assigned a Smithsonian number, in another case several spatially distinct areas are lumped under one number. Apparently, four circular structures, two rectangular structures, and one square structure have been excavated, including further work at Hurst's Cottonwood Pueblo. Two open, non-structural "work areas" were also excavated. One contained an adult burial radiocarbon date to A.D. 1080±70 (UGA-1274).

The sites contained large amounts of chipped and ground stone tools and bone fragments, as well as small amounts of corn and wild seeds and nuts. Considering the appropriateness of the area for hunting and gathering and the inappropriateness of the area for cultivation (the area currently averages less than 100 frost free days), Crane (1977:101) hypothesizes that the economy was more dependant upon wild resources than horticulture.

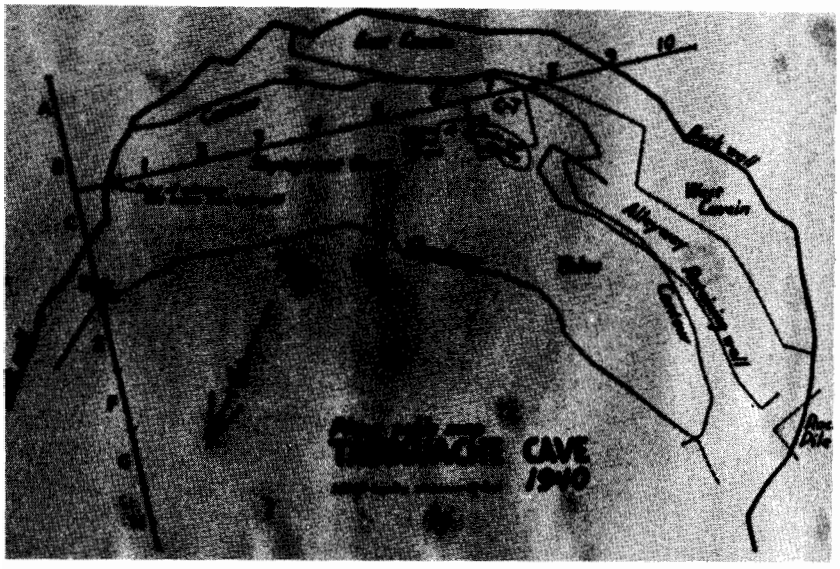

Figure 11. C.T. Hurst's Map of
Tabeguache Cave I

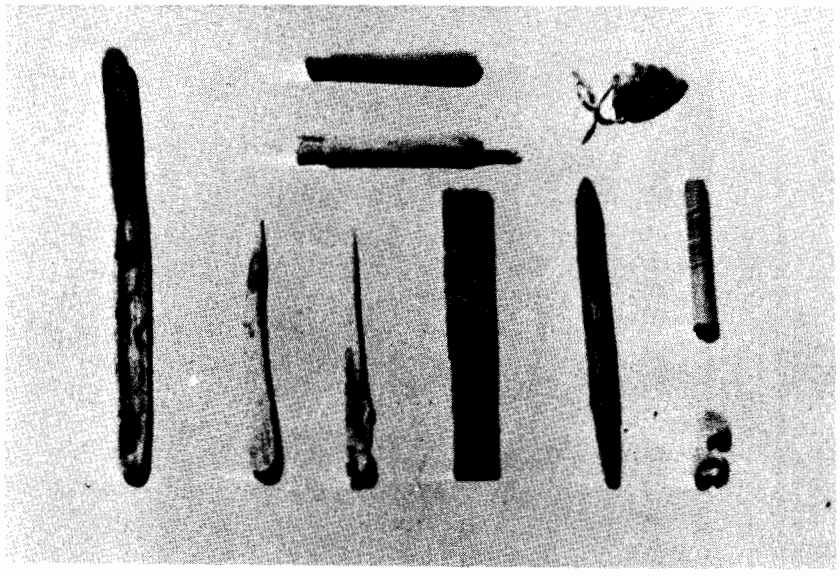

Figure 12. Artifacts of Stone and Bone
from Tabeguache Cave I

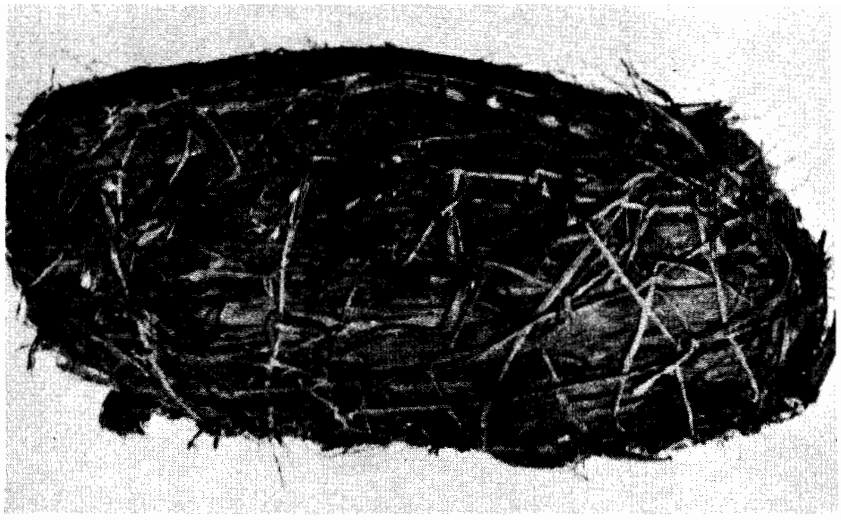

Figure 13. Corn Cache Bundle from Cottonwood Cave

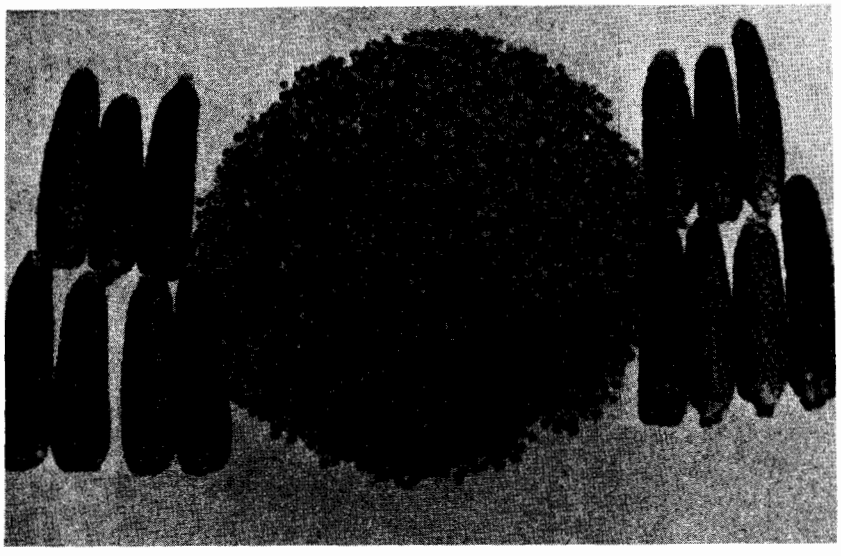

Figure 14. Corn Cache Bundle after Separation from Cottonwood Cave

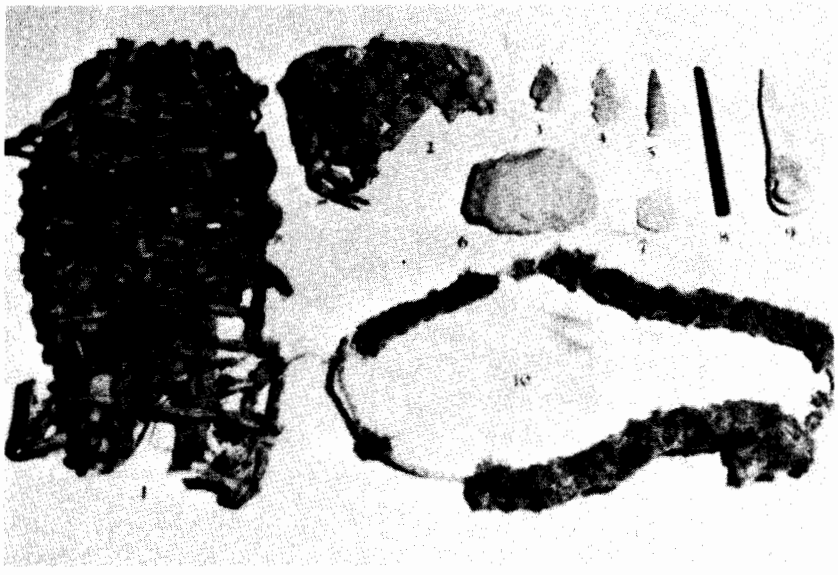

Figure 15. Sandals, Projectile Points
Bone Tools, and Rabbit Fur Cordage
from Cottonwood Cave

Ceramics were typed in the Mesa Verde sequence as Chapin and Mancos utility and painted wares, Moccasin Grey, Cortez black-on-white, Deadmans black-on-white, and plain red wares. Several sherds were typed as Gallup black-on-white (Crane 1977:46-56). The ceramic analysis, along with a few radiocarbon dates, lead Crane to assume that the Cottonwood Creek Locality was occupied continuously for over 400 years during the Pueblo I and II periods - A.D. 700+ through 1100+ (Crane 1977:43). Crane further states that the entire San Miguel-Dolores River area was abandoned by about A.D. 1150 (1977:103).

Twenty years prior to the reexcavation of the Hurst sites, Alice Hunt conducted several years of survey in the La Sal Mountains; the results were published in 1953. The survey covered some 500 square miles and 354 sites were recorded. With the exception of seven sites located in Paradox Valley (1953:232) all of the sites recorded were in Utah, west of the San Miguel Resource Area. Unfortunately, when a check of the site files at the Office of the Utah State Archaeologist was made (1978), no information concerning the Paradox Valley sites could be found.

Hunt recognized three environmental zones in the area, with differing remains for each zone. The shrub zone, or canyons (4000 feet - 6000 feet) contained the most sites (151); those with masonry, corn cobs and pueblo pottery, aceramic campsites including lithic quarries, and campsites with small amounts of non-Anasazi pottery and no architecture. The mountain zone (8000 feet - 13,000 feet) with 119 sites, had no dwellings and few sherds, but abundant lithics, with ground stone being the most common artifact found. The intermediate pinyon-juniper zone (6000 feet - 8000 feet) with its lithic sites contained an abundance of chipped stone artifacts, particularly knives and projectile points. Sites found in the pinyon-juniper zone were generally located along the edges of open sage areas.

Hunt believed the area had several different occupations, including a pre-pottery lithic culture, Fremont, bands of Hopi (this from the occurrence of Jeddito Plain ware), Utes, and a nomadic hunting-gathering culture designated as Fremont (?). Hunt postulated that the Fremont (?) were in the area during pre-pottery times as well as during the Fremont occupation of the canyons. (1953:20, 21). Reanalysis of the Hunt material, particularly the ceramic data, suggested that the Hopi wares were actually misfired Anasazi pottery (William Lucius personal communication, Dec 5, 1979).

Expanding on Hunt's work, Marie Wormington (1955) summarized the archeology of west central Colorado. Based on her excavation findings, she developed the idea of the Uncompahgre Complex, a localized hunting and gathering adaptation. Wormington and Lister (1956) presented more detailed evidence for the definition of the complex, based on the excavation of several sites on the northern and eastern slopes of the Uncompahgre Plateau. The Uncompahgre Complex was considered to be a variant of the Desert Culture (1956:92), distinguished by the assemblage of artifacts found at the sites. Present were bifaces, drills, utilized flakes, a variety of projectile forms - large and small corner notched, stemmed, and leaf-shaped points, and Uncompahgre scrapers. Uncompahgre scrapers were described as being generally triangular, with one unifacially worked edge and one or more bifacially worked edges. End scrapers were quite rare. Handstones were small, shaped, river cobbles; and metates

were flat sandstone slabs. Traits lacking in the complex were cultigens, ceramics, and masonry.

The Uncompahgre Complex was believed to have been widely distributed on the Uncompahgre Plateau, and the same complex, or a closely related one, was believed to have been present in the La Sal Mountain Area (Wormington and Lister (1956:81). Wormington and Lister stated that the complex may have been represented in the Tabeguache Drainage and possibly in Dolores Cave (1956:81). The Uncompahgre Complex is thought to possibly be represented in the lowest level of Tabeguache Cave II (Hurst's "Tabeguache Culture") (Wormington 1955:127), but the quality of Hurst's reports made them hesitant to categorize these manifestations.

The Uncompahgre Complex was estimated to date to 1000 to 2000 B.C. on the basis of a correlation of occupation layers with Tsegi and Piney Creek alluvial deposits.

Two additional complexes, the 'La Sal' and the 'Moab' were defined by Hunt and Tanner (1960). Sites of the Moab Complex were characterized by Folsom points, a type of Pinto Basin Point, scrapers, and knives. The sites were located northwest of Moab, Utah, between the Green and Colorado Rivers, and were considered to be the oldest sites in the area (on typological and geological evidence). The La Sal Complex was characterized by Gypsum Cave points and a different type of Pinto point. Sites of this complex also contained a variety of chipped stone tools, slab metates with subrectangular and oval manos. The complex occurred in the pinyon-juniper zone at the base of the La Sal Mountains and extended up the mountains as high as 10,000 feet. Hunt and Tanner considered the La Sal Complex to be younger than the Moab Complex, and saw the two as being spatially discrete with little overlap in territory utilized (Hunt and Tanner 1960:111). The pre-pottery, non-horticultural sites designated Fremont (?) by Hunt (1953) were assigned to the Uncompahgre Complex by Wormington (op. cit: 114).

The concept of the Uncompahgre Complex was later redefined in the mid-1960's. As a part of the University of Colorado's Ute Prehistory Project under R.H. Lister, William Buckles investigated seventy five sites along the northeastern slopes of the Uncompahgre Plateau (Buckles 1971). The sequence of rock art and material culture at these sites led Buckles to separate the Uncompahgre Complex into eight phases. While the goal of the project to discern the prehistory of the Utes was not achieved, the investigations did show a long term, probably continuous, archaic adaptation present on the plateau up to historic times (Buckles 1971).

RECENT WORK

While the works of Wormington (1955), Wormington and Lister (1956), Hunt and Tanner (1960) and Buckles (1971) were important contributors to our knowledge of prehistory in west central Colorado and eastern Utah, the applicability of these studies to our understanding prehistoric occupation in the West End is limited. In contrast to earlier research projects, most recent archeological data involving the West End specifically has been obtained through surface surveys. Within the

last ten years Federal agencies have assumed an increasingly active role in assessing and managing cultural resources. Compliance procedures for water projects, timber sales, range improvements, rights-of-way actions, mine development and mineral exploration have accumulated archeological data via clearance inventories. This Federal involvement, combined with the recognition in the early 1970's that site survey is an important archeological technique, has produced nearly all recent data generated in the West End.

Beginning in 1971, the University of Colorado Mesa Verde Research Center, under the aegis of the Bureau of Land Management, conducted several surveys in the West End. The San Miguel River was inventoried, from its confluence with the Dolores to approximately 10 miles up-river towards Naturita, and from the confluence of Cottonwood Creek to the Norwood Hill Bridge (Breternitz, Newsom and Toll 1973; Toll 1975, 1976). Much of the Dolores River was also inventoried at this same time (Breternitz 1971, 1972; Toll 1974, 1977). The San Miguel and Dolores River surveys are the largest and most intensive projects undertaken in the study area to date. Toll's synthesis of Dolores River archeology (1977) remains the most cogent work on the area and has formed the basis for much of the current work in the SMRA.

The Mesa Verde Research Center also conducted a random sample survey of the Area for the BLM (Gleichman and Legard 1977). Despite a small sample fraction, significant differences in the distribution of prehistoric sites across the area were noted.

The random sample was based on stratifine physiographic divisions into Canyon rim areas, mesa top/bench/terrace areas, talus areas, outlying areas away from the main rivers, and valley bottoms. Canyon rim areas were estimated to contain 27.7 sites per square mile, outlying areas 3.7 sites per square mile and valley bottom 24.3 sites per square mile. This produces an average of 14.2 sites per square mile for the entire area. This gross estimate is thought to be too high a density for the area. With less than a 1% sample it can only be viewed as a "rule of thumb" index until more extensive inventories are done.

The results of the study also inferred that sites are not randomly distributed within the study area. Lithic sites and limited activity areas appear to be found in all zones but concentrate near canyon rims. Habitation sites or lithic sites with ceramics and/or ground stone tend to be situated on canyon rims, mesa tops and in valley bottoms. Source areas were generally found to occur on terraces, benches or talus slopes. Finally, structural sites were associated with canyon rims although they were also found on flat talus slopes and on hillocks within valley bottoms.

Recent work by Copeland (1979) reporting on the results of seismic line inventories tends to corroborate Gleichman and Legard's findings (1977). Copeland, studying the sites found within his seismic transects, based his analysis on vegetation and elevation as well as physiographic divisions. Although the variables differ slightly, the results tend to be very similar.

Under contract to the Water and Power Resources Service, Fort Lewis College completed several inventories relating to various proposed water projects. Further portions of the San Miguel River and surrounding areas were surveyed for the proposed San Miguel River Project (Biggs 1978). Portions of Leopard Creek, in the northeast corner of the SMRA were surveyed (Applegarth et. al. 1976). In addition, various small area and short linear surveys were carried out in the vicinity of Paradox Valley and Dry Creek (Applegarth and Vanness 1976; Biggs and Hibbets 1976).

The United States Forest Service has also sponsored a number of inventories for proposed timber sale areas. Surveys within the SMRA are situated south of Norwood along Naturita Canyon (William 1976, Johnson 1977). In addition, several inventories have been conducted on lands adjacent to the study area in the Uncompahgre Plateau (Copeland 1980a, 1980b).

Centuries Research, Inc., of Montrose, has recently been involved with seismic line surveys and drill pad clearance (Copeland 1978, 1979, 1980a, 1980b, Horvath 1980). In addition, sites have been located and recorded by archeologists with the Colorado Department of Highways and the Bureau of Land Management for "in-house" project inventories.

A block inventory of 2,000 acres of potential coal lease lands was completed by Centuries Research near Nucla, Colorado, in 1977. 124 sites, the majority of which were lithic scatters, were recorded. Situated within a deer wintering area, it's likely these sites were related to the procurement of wild game resources. Baker (1978) identifies these sites as secondary procurement areas and sees the area being used as such over a long time span. He (Baker 1978) suggests the sites range in date from 3000 B.C. to A.D. 1850.

Two recent test excavations have been conducted at the Paradox Valley structural site (5MN191) partially excavated by the Woodburys (1932). One program was conducted by the Colorado College field school directed by L. Leach, the other by Metropolitan State College. No detailed reports on the excavations have been issued; however, Leach sees both a clear Fremont and Anasazi occupation of the site during Pueblo I - Pueblo II times, overlying a Basketmaker III pithouse (cf Kasper 1977).

Another recent excavation in the SMRA was at 5MN367 in Roc Creek Canyon. The project was conducted by Metropolitan State College, and again, little information concerning the site is available. Three of eight contiguous circular masonry rooms were excavated, with ceramics typed as Emery Gray (Crane 1977:76-82). A single radiocarbon date of A.D. 950±60 (U.G.A. - 926) exists for the site.

Susan Riches and Janet Tankersley (1982) reported on the excavation of a lithic scatter, 5SM53. The site tested out to be a surface site of minimal depth and appears to date 500 B.C. to A.D. 1880. Apparently there were several occupations over time with similar activities of hunting and plant processing occurring.

The most recent excavations in the study area were part of a site reevaluation and testing program conducted by the Office of the State Archeologist (Halasi 1979). Nineteen sites were tested or evaluated for eligibility to the National Register of Historic Places. Most sites were found to have little depth and individually were not National Register significant. However, when considered in a regional context, these sites are significant due to their high density occurrence and their reflection of prehistoric settlement patterns.

CHAPTER IV

NATURE AND DISTRIBUTION OF SITES

As of October 1980, there were 1235 recorded sites within the boundaries of the San Miguel Resource Area. 1160 sites (94%) are prehistoric and 75 (6%) are historic sites (eight of which have aboriginal components). Of the prehistoric sites, 90 (8%) are overhangs including several with cists, masonry walls, or other features; 41 (4%) are open sites containing masonry structures or upright slab alignments, single walls, brush structures or other emphasis of construction; and 1023 (88%) are open lithic areas.

These numbers may not be truly representative of the nature and distribution of sites in the West End, but rather probably reflect the changing emphasis of archeological research through time. The proportions of historic sites to prehistoric sites is biased because of the past tendency to concentrate on prehistoric sites. It has only been within the last seven years that historic sites have been recorded and even this has not been consistently effected during recent surveys.

The above listed percentage of prehistoric sites containing structures is probably also elevated, due to the amount of attention these structural sites have received. There are many thousands of unrecorded lithic sites in the area, and while unrecorded structures are known to exist, there are relatively very few such sites. The assumption that structural sites comprise far less than 1% of the total number of prehistoric sites gives a more realistic view of the configuration of sites in the region. It is quite likely that the percentage of overhang sites are similarly inflated.

The following discussion will focus on identifying the nature and distribution of the cultural resources in the area based on the available data. Lithic areas, overhangs, and structural sites have been segregated here for descriptive purposes, not because they represent different types of sites in any cultural, temporal or functional sense.

LITHIC AREAS

Chipped stone is by far the predominant form of material culture encountered in the West End. The occurrence of tools and debitage runs the gamut from solitary artifacts to spatially discrete sites of varied dimensions and quantities of material to lithic areas, extending for many hundreds of meters. These continuous scatters are usually made up of thin scatterings of flakes with several interspersed areas of concentration. Occurring predominantly along canyon rims, these scatters present unique problems of site delineation, recordation and interpretation. Coherent sites are not especially discernible among lithic scatters covering such immense tracts, and while one hesitates to record an entire canyon rim as a site, it is seemingly impossible to determine where one locus of cultural material ends and another begins, where they overlap or how they relate to one another temporally.

Given the defuse and undefinable spatial limits of these sites, they may fit under the "non-site" classification (Thomas 1975, Plog, Plog and Wait 1978). However, material within these areas is not necessarily very limited or sparse but is often quite dense. The term "polysite" or "megasite" may be more apropos.

In addition to problems with site and component definition, the assignment of lithic sites into functional, chronological or cultural classifications is often a difficult task. Unfortunately in many cases there is a lack of satisfactory diagnostic indicators within the surface remains of these sites. This is largely due to the fact that the area has been intensively collected by amateurs and vandals over the last fifty years.

The archeological record of past systemic behavior is subject to natural and cultural transformation processes (Schiffer 1976). These processes are usually more severe on surface remains than on buried remains, as surface remains are subject to continued disturbance by erosion, trampling, arrowhead collecting, etc. There is a lack of confidence that material present on the surface of a site is representative of what was discarded at the site, and/or that material discarded at a site is representative of the primary function of the site (Binford 1978). In addition, survey collection techniques of unprovenienced "grab samples" have attendant biases which have further constrained the types of subsequent analysis possible.

Efforts to classify sites have largely relied on Toll's methodology (1975, 1977). Based on the attributes they possess, sites are described as lithic area, lithic area with groundstone, lithic area with ceramics, with hearth, etc. Taking this a step further, Toll (1977) used site attributes both cultural and environmental, in a polythetic approach to distinguish habitation or campsites from special activity sites.

Using information collected from his inventory of the Dolores River, Toll (1977:46) identified seven attributes defining a campsite, prepared tools, groundstone, pottery sherds, flat area, structure, overhang, and fire. Toll (1977:46) further stated that he had somewhat arbitrarily decided that only three of the seven attributes needed to be present on any given site to give it the designation of a camp or habitation site. Using this technique, 35% of the sites from the Dolores River survey were classified as living areas (Toll 1975:45-49).

Specialized or limited activity sites make up the remaining 65% of the Dolores River sites. Classification of these sites into rigid categories (e.g., extractive vs. maintenance) may imply an unrealistic compartmentalization of functions, since sites commonly contain a variety of tools and material types and give the appearance of being multipurpose. Specialized or limited activity sites certainly do exist, including sites representing floral and faunal resource exploitation, lithic source areas, tool preparation, lookouts, ephemeral or transitory camps, and probably sites related to ceremonial or sacred functions.

These distributions are not particularly unexpected, but a great deal more work needs to be done on site catchment analysis, site location strategy, temporal placement, and site function before a complete picture of prehistoric land use of the area is made relatively clear.

One diagnostic artifact, usually relied upon for relative site date is the projectile point. In the West End, projectile points are a relatively common find, but due to the mixture or interaction of different culture groups in the area, the projectile point chronology presents a confusing picture. Projectile points reminiscent of or directly related to Paleo-Indian lancolate styles, Oshara types, Desert Archaic types, Anasazi, and Uncompahgre complex styles are found throughout the area.

Paleo-Indian traditions in the area are suggested by only a few projectile points. Joe Ben Wheat of the University of Colorado Museum has seen a Clovis point that was found near the Carpenter Ridge area (Fig. 16) and Copeland (1978) located a projectile point that resembles a Humbolt Basal Notched point from the Great Basin area (Hester, Heizer, 1973). A large lancolate point with a notched base and excellent transverse flaking from 5SM349 resembles an Allen point except that the lateral edges are not ground and the flake pattern is not characteristic of that type. Two lancolate point fragments, one from Spradlin Park and one from 5SM345 resemble Hell Gap points. One of the points that came from 5SM345 may be scavanged a point as the site contained much later components than would be indicated by these artifacts (5SM345-Ironstone/ Coal Creek phases).

Several artifacts recovered necessitate comparison to a cultural tradition of the Plains Archaic. These artifacts resemble artifacts of the Mckean Technocomplex (ca. 3000 B.C. - 1000 B.C.) as defined for the High Plains areas in Wyoming (Frison, Wilson, Wilson 1974: Frison 1978). Several lancolate concave base Mckean like points and other large side and basal notched points resemble Mallory or Scoggin like points. Similar Mckean technocomplex type points have been reported by Hunt (1953) from the La Sal Mountains, by Wormington and Lister (1956) at the Taylor site on the Uncompahgre Plateau, by Breternitz, et al (1973) on the San Miguel River, and Williams (1976) near Norwood and Copeland (1978).

The Uncompahgre Complex as defined by Wormington and Lister (1956) and later elaborate upon and defined in terms of a sequence of phases by Buckles (1971) has been used in the majority of cases as a basis of describing the resources of the West End in a temporal frame. The complex is described as continous Archaic stage level of adaptation (hunting and gathering) that continued through time with little change except for variations in tool form. Buckles (1971) uses handstones and milling stones as an example of this continuity through time.

Lithic sites comprise the most numerous type of site found in the West End where 86 percent of the known sites are lithic sites or areas. This particular type of site is also the least studied of all site types in the San Miguel Resource Area. There are several reasons for this including bias toward the structural sites, lack of chronological indicators on the sites, and the general lack of depth or potential for stratified deposits.

The majority of open lithic sites contain few diagnostic items, either projectile points or ceramics and they also tend to be located on shallow soils or in eroded areas where there is little likelihood of stratified deposits. Another problem with open lithic sites is not only the lack of diagnostic materials, but the lack of other datable elements, and the contamination of those elements. Obsidian is found on sites occasionally and firepits are noted with some regularity. However, the West End is known for its wildfires and most of the obsidian that has been dated and some of the surface firepits have been thermally altered by the relatively intense wildfires of the region. This contamination further limits the information that can be readily recovered from sites in the West End.

As was noted earlier, lithic sites pose problems of interpretation not only because of the lack of datable elements, but because their size as well. It is difficult on the large sites to determine specific use loci and even if an area is a major camp of one or two seasons or a series of small camps of 10 or even a 100 seasons. The excavation of one moderate size open lithic site by Riches and Tankersley (1982) indicates reuse of the sites for around a thousand years. Similar evidence of reuse has accumulated in recent inventories of the area (CF Baker 1978, Copeland 1978, 1980).

While it is difficult to define site function, there is a pattern of site location emerging from these inventories. Open lithic sites are found in all environments and at all elevations. The majority tend to be located near canyon rims, along ridge tops with access to game trails, and in pinyon-juniper stands near sagebrush covered openings (Gleichman and Legard 1977; Copeland 1978). Most sites are found in the pinyon-juniper zone (5,600 ft to 7,500 ft of elevation) with significant reductions of site density above and below this zone. Base camps or living areas as defined by Toll (1975) are found to occur at almost all elevations but tend to decline significantly above 6,900 ft. Non-base campsites or limited activity sites, especially those without groundstone decline significantly above 6600 feet of elevation.

Isolated finds of projectile points are most commonly found above 6,600 ft of elevation at a point where base camps and limited activity sites begin to decline. The correlation of the base camp, limited activity area, and isolated projectile point finds is associated with changes in ranges of floral and faunal resources. The base camps and limited activity sites are concentrated in the pinyon-juniper ecotone and the isolated projectile points in the more desirable big-game hunting habitat.

Figure 16. A Clovis Point
Found Near Carpenter Ridge

While the complex was defined for those manifestations on the Uncompahgre Plateau and not those of the West End, the majority of projectile points recovered (Figs. 17-19) show a very close resemblance to those described as occurring within the complex and it should be remembered that the Uncompahgre Plateau lies to the immediate north and northeast of the project area.

Following Buckles (1971), one of the time frames applicable to the area would be as follows:

Butter Milk Phase	8000 B.C. - 3000 B.C.
Monitor Mesa Phase	3500 B.C. - 1500 B.C.
Shavano Phase	3500 B.C. - 1000 B.C.
Roubideau Phase	3000 B.C. - 500 B.C.
Horsefly Phase	500 B.C. - A.D. 0
Ironstone Phase	A.D. 0 - A.D. 700
Coal Creek Phase	A.D. 700 - A.D. 1300
Camel Back Phase	A.D. 1300 - A.D. 1500
Escalante Phase (Ute?)	A.D. 1500 - A.D. 1880

The Escalante phase may be a representation of protohistoric and historic Ute groups but Buckles (1971) admits that this has yet to be proven.

The possibility always exists that some of the phase components represented by the resources recovered during work in the West End might reflect past aboriginal collecting of artifacts, and may not be an accurate representation of those resources. The artifacts do at least suggest that different cultural entities were present in the area. Using the surface collected artifacts to compare with the Uncompahgre Complex may not be entirely viable because equal comparisons cannot be made between surface finds and the materials from the excavated stratified sites that Buckles (1971) based his sequence upon. These reservations also apply to the other chronologies described and should be considered in any attempt at comparisons.

Not all of the artifacts can be compared with the Uncompahgre Complex. The Oshara Tradition as defined by Irwin-Williams (1973) for the region of northwestern New Mexico is apparently represented in the area as indicated by a number of artifacts. The Oshara Tradition is defined as the likely origins of the Anasazi culture of the Four Corners area to the south and like the Uncompahgre Complex, it too had a hunting and gathering based economy. Those phases of the Oshara Tradition seemingly represented are:

Bajada Phase	4800 B.C. - 3200 B.C.
San Jose Phase	3000 B.C. - 1800 B.C.
En Medio Phase	800 B.C. - 400 A.D.

San Jose like points have been reported at the Moore and Casebier sites (Wormington, Lister, 1956), near Delta, Colorado, and by Buckles (1971) from the Uncompahgre Plateau. A San Jose like point is also illustrated by Hunt (1953, Fig 21,k) as coming from the La Sal Mountains. Several Armejo phase like points (1800-800 B.C.) and a San Jose like point are illustrated by Williams (1976) and came from south of Norwood.

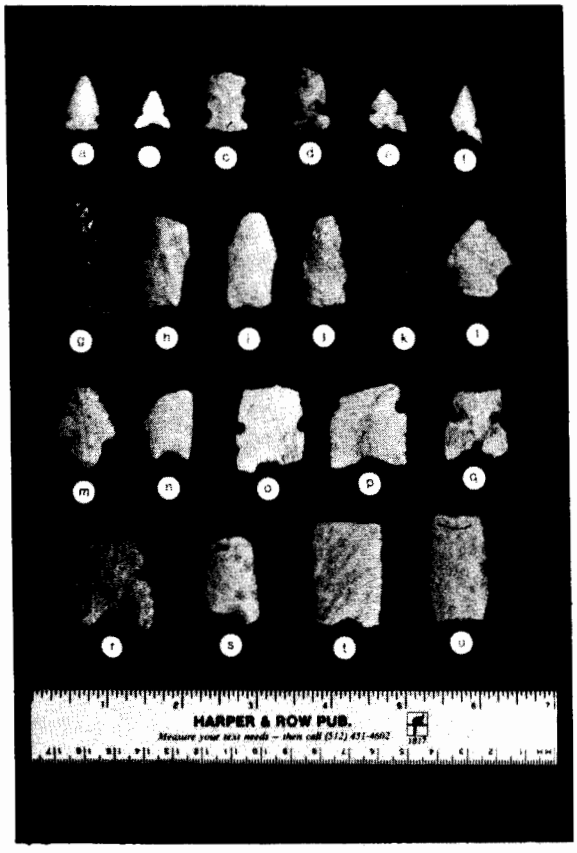

Figure 17. Representative Projectile Points. Escalante Phase, a-f; Plll Anasazi, g; Bajada Phase, h-i; San Jose Phase, j-k; En Medio Phase, l-m; Mckean Point, n; Mallory/Scoggin Points, i-r; Humbolt Basal Notched, s; Allen Point, t; Hell Gap Point, u.

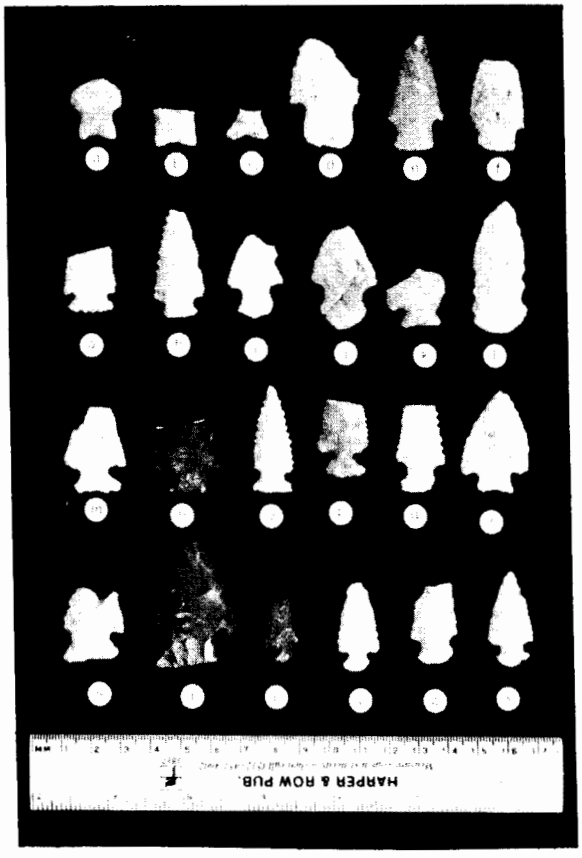

Figure 18. Representative Projectile Points. Monitor Mesa Phase, a-c; Shavano Phase, d-f; Roubideau Phase, g-r; Horse Fly Phase, s-x.

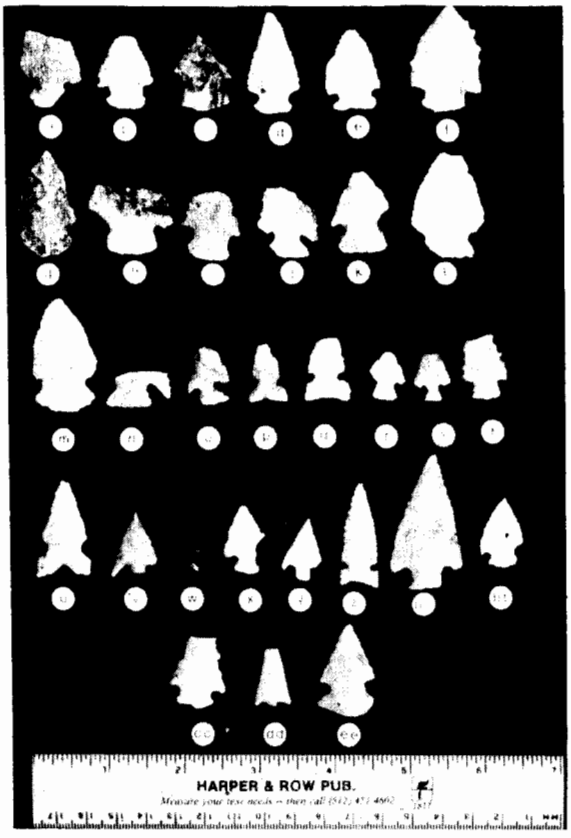

Figure 19. Representative Projectile Points. Ironstone Phase, a-n; Coal Creek Phase, o-dd; Camel Back Phase, ee.

Puebloan or Anasazi material culture remains are also found in the West End. Most Puebloan artifacts are ceramic, but some projectile points have been found and discussed by Toll (1975), Gleichman and Legard (1977) and Copeland (1978).

The variety of projectile points found in archeological sites suggests use of the area or influence by a number of diverse cultural groups. The majority of projectile point types are related to the Uncompahgre Complex, which further suggests a dominant archaic style hunting-gathering activity pattern in the West End.

A recent study on Spring Creek Mesa near Uravan (Klesert and Webster 1981) tends to confirm this proposition. The inventory of a large portion of Spring Creek used a processual archeological approach to suggest several hypotheses about the occupation and use of the Mesa. The analysis of the recovered data suggests the occupation of the Mesa from Paleo-Indian times to the late prehistoric era, there are some changes in site patterns that may indicate changes in use of the Mesa through time, but with little change in the subsistance pattern. Klesert and Webster (1981) also note the projectile points are typologically most similar to the Uncompahgre style, but they also indicate broader Great Basin technological ties and ties to the whole concept of the Archaic lifestyle of hunting and gathering.

CERAMIC SITES

Ceramics are quite rare in the San Miguel Resource Area with only 45 known sites (4%) yielding ceramic materials. Even within these ceramic-bearing sites the quantities of sherds are minimal; usually less than five sherds per site.

Six of the 45 ceramic sites are sites which contain stone structures - 5MN191 (Paradox Valley), 5MN319, 5MN364, 5MN367, Tabegauche Pueblo, and 5SM57 (Naturita Ruin). These sites contain utility and decorated Anasazi wares, apparently late Pueblo I through early Pueblo III styles (CA. A.D. 8-1150). The single exception is 5MN367, on Roc Creek, close to the NW boundary of the SMRA. This site contained ceramics tentatively identified as Fremont type Emery Gray (Crane 1977:79). These structural sites are discussed in more detail below.

The lithic scatters and overhang sites that contain ceramics are listed in Table 3, and the ceramics described (as the information is available). The majority of the sites contain Anasazi wares, in the form of a few sherds or a single potbreak. The sherds are predominantly Mesa Verde types, although some Kayenta types have been identified in the Area and adjacent areas to the east. Possible Fremont sherds are present only at 5MN359. Black micaceous sherds are reported from 5 sites (5MN141, 345, 510, 890 - Tabeguache Cave 2, 1034). Hurst (1943, 1944) and others have labelled these as Ute sherds, but this is doubtful. Sites 5SM186, 5SM435 and 5SM395 also are thought to contain Ute ceramics. Pottery is poorly documented for Utes ethnographically, and at least one Ute scholar doesn't believe the Utes ever had a ceramic technology (Omar Stewart, personal communication). The black sherds are not Uncompahgre brown ware, Buckle's (1977) designation for Ute ceramics.

TABLE 3

SITES WITH ASSOCIATED CERAMICS

Site #	Site Type	Ceramics
5MN76	1 Lithic, 1 Sherd	Tusayan corrugated sherd
5MN85	Overhang w/lithics and groundstone	1 sherd, type ?
5MN100	Open lithic area	2 corrugated sherds
5MN141	Open lithic area	1 jeddito b/yellow rim sherd 2 black corrugated micaceous sherds
5MN159	Open lithic area	3 BL/W bowl sherds, mineral paint/greyware
5MN345	Open lithic area w/groundstone	23 black micaceous sherds from 1 pot
5MN358	Open lithic area w/groundstone	9 corrugated sherds
5MN359	Open lithic area w/groundstone	2 banded punctate sherds-fremont?
5MN362	Open lithic area w/groundstone	1 corrugated
5MN510	Open lithic area w/groundstone	1 basket impressed micaceous "Ute" dark grey to black
5MN522	Open lithic area w/groundstone	6 sherds, type?
5MN617	Open lithic area w/groundstone	2 sherds, type?
5MN664	Open lithic area w/groundstone	4 sherds, Pedra B&W
5MN776	Open lithic area w/groundstone	2 sherds, grey jar, mancos grey?
5MN777	Open lithic area w/groundstone	5 sherds from 3 vessels: Whiteware bowl body (1) white jar body (3), B/W bowl body w/mineral paint (1) cortez B/W.
5MN805	Lithic Area	2 B/W bowl rim - McElmo B/W.
5MN890	Tab. Cave 2 (Hurst 1943:14, 1944:7)	"Ute" sherds, black
5MN1034	Several overhangs w/rock art, groundstone	10 black micaceous w/ext surface treatment
5MN1115	Sherd scatter	9 body and 3 rim sherds, plain grey w/fine sand temper
5MN1153	Open lithic area w/groundstone scatter w/sweatlodge	4 Chapin black on grey
5MN1273	Open lithic area	2 plaingrey sherds
5SM10	Open lithic area w/rock art, groundstone	1 sherd - type ?
5SM27	Open lithic area w/rock art, groundstone	1 corrugated sherd
5SM35	Open lithic area w/rock art, groundstone	P II sherds - pot break
5SM36	Open lithic area w/rock art, groundstone	P I sherds
5SM47	Overhang with lithics	3 P2-P3 sherds
5SM49	Lithic area	1 whiteware - Anasazi
5SM92	Lithic area	37 sherds from late P2 Grey Jar
5SM186	Overhangs w/rock art (gypsum gap)	1 grey jar body, 1 neckbanded grey jar body, mancos grey.
5SM200	Lithic Area, groundstone	?
5SM290	Lithic Area, groundstone	?
5SM334	Historic structure w/ceramics	Greyware (P II - P III?)
5SM349	Open lithic area w/groundstone	?
5SM363	Overhang w/lithics	?
5SM395	Overhang w/lithic groundstone	Greyware w/ground rock temper, Shoshone

Site #	Site Type	Ceramics
5SM421	Lithic w/Hearth and Ceramics	Fingertip impressed is heavy micaceous with fine to medium quartz sand temper. Color is light reddish brown to green to grey to black with core color beige black. Also, Uncompahgre brownware same as above but isn't micaceous
5SM428	Open lithic w/groundstone	Plain greyware with coarse to medium sand/rock temper (PI-PII)
5SM435	Open lithic area	Shoshone/Ute?
5SM507	Overhang w/lithic, groundstone and hearth	Utility greyware, BM III

Although sherds of Uncompahgre brown ware, both micaceous and nonmicaceous, were found at Site 5SM421. Black micaceous sherds were found in association with horiticultural rockart at 5MN1034 and with a Jeddito black/yellow rim sherd at 5MN141. Utes are known to have used the area until the early 1880's but the age and cultural affiliation of these sherds remain unknown.

The Anasazi wares are types that were manufactured between CA. A.D. 700 and A.D. 1200. Their presence indicates some relationship between the West End and areas to the south and southwest during this time period. The nature of the relationship, and the cultural affiliation of the ceramic sites is unclear. The ceramics may have been transported, utilized, and deposited by Anasazi moving into the area on a permanent or seasonal basis for horticultural purposes, or by Anasazi making brief hunting or gathering forays into the area. Ceramic vessels, or their contents, may have also been traded into the area. It can be assumed that the ceramic sites date to the period of manufacture of the pottery types present, or shortly thereafter; however, some sites may date considerably later. Lateral cycling, or the scavenging and reuse by archaic peoples of vessels from abandoned Anasazi sites, could have resulted in redeposition at a time far removed from the time of manufacture of the vessel. This practice is known ethnographically for the Uintah Utes (Lowie 1924:226).

OVERHANGS

Common throughout the desert west sandstone caves, overhanging cliffs and talus boulders were frequently utilized for the shelter and security they provided. The canyonlands nature of the study area is characterized by numerous types of rockshelters; however, a cultural selectivity toward the use of overhangs is evident. In some cases, geological factors are involved in the selection of overhangs for sites. Unstable overhangs in the friable Morrison Formation are void of visible cultural material, while accessible overhangs in the Entrada Formation usually contain cultural debris (Toll 1975:35, see also Woodburys 1932:12-15). Toll reports unutilized and utilized overhangs in both the Dolores River Canyon (1977:141) and the San Miguel Canyon (1975:35). Accessibility, stability, distance to water and a generally southern exposure appear to be major factors in rockshelter utilization.

Table 4 lists recorded overhangs and rock shelters in the San Miguel Resource Area and the cultural attributes present at each. "Lithics" refers to flakes and shatter, and may include cores. "Tools" are choppers, hammerstones, and chipped stone projectile points, knives, bifaces, etc. "Fire" refers to the existence of a hearth, charcoal or ash, and/or smoke blackening on the overhang ceiling. Some sites consist of sandstone caves with all material contained within the shelter, while others exhibit a scatter of material with an overhanging boulder or cliff as part of the site.

Review of Table 4 provides some insight into rockshelters and associated features. Of the 26 recorded rock art sites in the study area, 18 (69%) occur in association with rockshelters. Evidence of fire is apparent in 49 of the 90 shelters (54%) and dry laid walls and cists

are present in 17 overhangs (19%). The most consistent characteristic of these shelters is the diversity of artifact types. This variety of material viewed within the stratigraphic sequences often occurring within rockshelters provide the opportunity for analyzing functional, chronological and cultural associations.

In applying Toll's criteria for determining habitation sites versus specific activity sites, 73 of the 90 rockshelter sites (81%) have 3 or more living site attributes (includes assumption of "flat area"). It is likely that this percentage actually underrepresents the number of living sites since lack of information, collecting and erosion probably account for "missing" attributes at many of the remaining sites.

The protection provided by the configuration of these rockshelters created an hospitable locale for prehistoric residents through time. The same factors which provided shelter for the inhabitants of these overhangs have, in turn, helped to protect and preserve the remnants of their occupation creating a high potential for data retrieval (Fig. 20). The testing and excavation of these relatively untapped resources have brought us closer to a better understanding of the culture, environment and chronology of these prehistoric peoples.

Of the 90 rockshelter sites recorded in the West End only four have received professional attention. All four overhangs were excavated by C.T. Hurst (two on BLM, two on Forest Service lands) in the late 1930s and 1940s. No excavations have been conducted in overhangs in the West End since Hurst's work in 1948.

Tabeguache Cave II was almost completely excavated by Hurst (1943, 1944, 1945a). Subject to heavy visitation and vandalism, no cultural material is visible within the cave today. Dolores Cave, another Hurst excavation (1947) was vandalized prior to its excavation and has been vandalized since. A pair of sandals, yucca fibers, cordage and other perishables taken from the cave prior to 1946 were donated to the Grand Junction Chamber of Commerce and are currently curated at the Colorado National Monument. Hurst's report (1947) on the cave is vague as to thoroughness of excavation; there are currently numerous cores and flakes in the cave. Moreover, with large sandstone roof spalls covering portions of the cave floor the deposits under these slabs are probably undisturbed. The collections resulting from the Hurst excavations have become a valuable and understudied source of data on the prehistory of western Colorado.

Hurst's excavations yielded some of the best evidence for early use in the area as well as uncovering information concerning early incipient agriculture in the West End. The perishable material recovered from the excavations comprises one of the most complete representations of the area's material culture from 2,000 years ago. Sandals, hides, gathered food plants as well as lithic tools, groundstone, and ceramics have been found at these sites. In light of today's knowledge and understanding of past events, the reevaluation of Hurst's results as well as the undertaking of new work in other recently recorded sites offer an excellent opportunity for the investigation of prehistoric lifeways in the area.

TABLE 4
ROCKSHELTERS AND THEIR ATTRIBUTES

Site	Lithic	Tools	Groundstone	Rockart	Ceramics	Fire	Cist	Structural	Perishables	Corn
5MN71	X	X	X			X				
5MN72	X		X	X						
5MN73	X	X	X	X						
5MN81	X	X	X			X	X			
5MN82	X	X	X			X				
5MN83	X							Dry Laid Wall		
5MN84	X	X	X			X				
5MN85	X	X	X		X	X				
5MN86	X	X				X				
5MN88	X									
5MN127	X	X								
5MN155	X			X						
5MN164	X									
5MN170	X		X					Dry Laid Wall		
5MN253	X	X								
5MN288	X	X						Dry Laid Wall		
5MN305	X					X				
5MN306	X					X				X
5MN365	X	X		X				Dry Laid Wall		
5MN388	X		X	X		X				
5MN433	X	X				X				
5MN434	X	X				X		Wall		
5MN435	X		X			X				
5MN436	X									
5MN439				X						

TABLE 4 (CONT'D)

Site	Lithic	Tools	Groundstone	Rockart	Ceramics	Fire	Cist	Structural	Perishables	Corn
5MN440	X	X	X	X		X				
5MN442	X		X							
5MN443				X		X				
5MN498				X						
5MN502										
5MN613						X				
5MN615	X	X				X				
5MN621	X	X		X						
5MN622	X	X								
5MN810	X	X								
5MN813 (Tabeguache II)	X	X	X		X	X	X	Walls	X	X
5MN877	X	X	X			X				
5MN912	X	X			X					
5MN915 (Dolores Cave)	X	X	X			X			X	X
5MN1034	X		X	X	X	X			X	X
5MN1100	X	X				X			X	
5MN1117	X									
5MN1124	X	X	X			X				
5MN1129	X									
5MN1141	X		X					Dry Laid Walls		
5MN1142	X		X			X				
5MN1144	X	X	X			X				
5MN1152	X					X				
5MN1164	X					X				
5MN1179	X	X								
5MN1186	X			X						

TABLE 4 (CONT'D)

Site	Lithic	Tools	Groundstone	Rockart	Ceramics	Fire	Cist	Structural	Perishables	Corn
5MN1192				X						
5MN1214	X									
5MN1364	X						X			
5MN1366	X	X								
5SM9	X	X	X	X						
5SM16	X	X	X							
5SM22	X	X					X			
5SM24	X	X						Dry Laid Wall		2 Cobs
5SM41	X	X				X				
5SM43	X	X	X			X	X			
5SM44	X	X				X				
5SM45	X	X		X		X				
5SM47	X	X			X	X		Dry Laid Wall		
5SM50	X	X				X			Twill, Sandal Yucca	
5SM67										
5SM68										
5SM165										
5SM166										
5SM186				X	X					
5SM342	X	X	X			X				
5SM352	X	X	X							
5SM355	X					X				
5SM363	X	X			X					
5SM368	X	X	X	X		X		Dry Laid Walls		
5SM370	X		X	X		X				
5SM393	X				X Ute	X				

TABLE 4 (CONT'D)

Site	Lithic	Tools	Groundstone	Rockart	Ceramics	Fire	Cist	Structural	Perishables	Corn
5SM394	X									
5SM395	X		X		X	X				
5SM397	X		X			X				
5SM401	X					X				
5SM403						X		Dry Laid Wall		
5SM458	X									
5SM489						X				
5SM507	X		X		XBMIII	X				
5SM512	X		X			X		Rubble & Wall		
5SM516	X					X				
5SM542	X		X			X				
5SM633	X	X								
5SM637	X					X		Possible Windbreak		
5SM638		X				X				

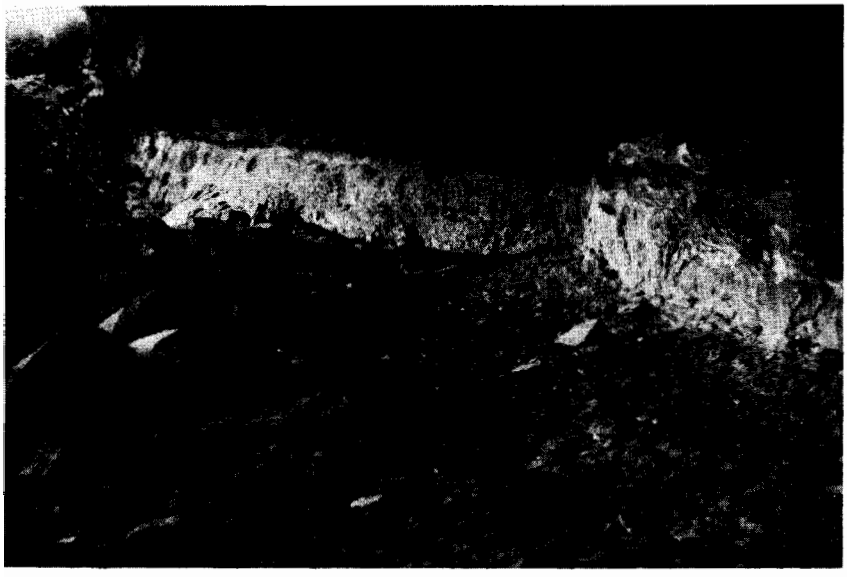

Figure 20. Bull Canyon Rockshelter
5MN1000

An additional manifestation worth noting is the presence of two pecked hand and toe holds on the cliff face leading up to Dolores Cave. Directly across the drainage from Dolores Cave is a large, steepsided, sandstone formation known as the Biskit (5MN 916) with a series of hand and toe holds providing the only access to the top. The toe holds are mentioned in a letter sent to Hurst in the early 1940's informing him of the existence of Dolores Cave (in C.T. Hurst Files, Western State College), and while they have probably been deepened and the number increased by recent Anglo visitors, prehistoric use of the Biskit is confirmed by lithics on top of the formation. These are the only known instance of pecked toeholds in the West End, a practice which was more common among the Anasazi to the south and southwest.

ROCK ART

A long and abiding public and professional interest in rock art exists despite, and perhaps because of, the lack of concrete knowledge regarding the art and the difficulty in applying current archaeological techniques to its investigation. A total of 26 rock art sites including some 61 panels, have been located in the West End. The sites, ranging from single figures to complex panels, are often associated with other cultural manifestations such as overhangs and lithic scatters. Both pictographs and petroglyphs exist, sometimes occurring together on the same panel. However, pecked glyphs of naturalistic, stylized and abstract forms are the most common. (Table 5).

Rock art in the West End is broadly continuous with that found on the Colorado Plateau (cf Turner 1963, Schaafsma 1963, 1971, 1975); one of the richest regions for rock art in the U.S. (Grant 1967:17 Map). Far from being ignored, the rock art of Western Colorado has been discussed by Jeancon (1926), Buckles (1971), Toll (1977), McKern (1978) and Olson (1980). Toll's (1977:97-130) discussion of rock art along the Dolores River provides the basics with which to discuss the rock art of the West End as a whole.

The majority of known rock art sites in the West End have been located and recorded within the last 10 years. The term "recorded" is used with reservations. Since many of the site reports consist primarily of sketch maps and occasional photographs, most of the panels were not recorded in detail, mapped to scale, traced, nor photographed completely.

Rock art can be very subtle, and pecked panels have the nasty habit of mysteriously altering their appearance at different times of day as lighting conditions change. No information is available regarding the rock art at 5MN 366 or 5MN 498, and very little information is available from 5MN 621. These drawbacks in the state of the art reduce the viability of any detailed or meaningful analysis of specific attributes such as form, number and distribution of elements and motifs, technique of manufacture, panel composition, and overall aesthetic quality.

Various combinations of the above attributes have been used as criteria in the definition of Colorado Plateau rock art styles, and the styles defined generally have putative temporal and/or cultural affinities (Turner 1963, 1971; Buckles 1971, Schaafsma 1971). However, some notable design elements are present in the West End that are not found to the north or east of the area.

TABLE 5 ROCK ART IN SAN MIGUEL AREA

SITE	LOCATION	TECHNIQUE Pecked	Painted	Incised	ELEMENTS/MOTIFS	ADDITIONAL SITE INFORMATION
*5SM9	Dolores River, South of Gypsum Valley	X			Horned human figures (one a stick figure) other human figures, fringed line - straight and parallel with one wavy line.	Overhang site with lithic tools and flakes
*5SM10	Dolores River, Gypsum Valley	X			2 large horned and phallic human figures, mountain sheep and other ungulates, straight lines, meandering lines, crescent	Open site, lithics, grinding stone and one sherd
*5SM14	Gypsum Valley	X			Triangular bodied human figure, freeform human figures, footprints, bear tracks.	Open site
*5SM45	Dolores River South of Disappointment Valley	X			Panel 1: 3Mtn sheep, ungulate tracks, bear track, meandering line, quartered circle, vertical row of dots. Panel 2: 11 Mtn Sheep	Overhang, lithic tools and flakes
5SM186	Gypsum Gap	X			Horned human figure (stick figure) square shouldered human figure, mtn sheep, other quadrupeds, crescent	Overhang (potted) lithics, 2 sherds (greyware) glyphs faint and indistinct

*Discussed/illustrated in Toll 1977

TABLE 5 ROCK ART IN SAN MIGUEL AREA

SITE	LOCATION	TECHNIQUE Pecked	Painted	Incised	ELEMENTS/MOTIFS	ADDITIONAL SITE INFORMATION
5SM368	East Broad Canyon			X	Six incised vertical lines	Lithics, groundstone, fire cracked rock, dry laid walls, rockshelter
5SM370	East Broad Canyon		X		Stick figures in blue paint (?)	Rockshelter w/groundstone, lithics, firecracked rocks
*5MN72	Dolores River near Bull Canyon	X	X		Horned human figures, freeform humans (one a stick fig.) mtn sheep, fringed line with parallel wavy lines, other abstract figures. Row of horizontal red dots with unconnected straight lines below them.	Overhang, lithic tools and flakes, grinding stones
5MN73	Dolores River Serpentine Canyon	X			Horned human, 2 (possibly 3) other humans, 1 phallic, Mtn sheep, bear tracks, meandering lines, cross	Overhang, lithics, grinding slab, "axe grinding" grooves
5MN155	Hieroglyphic Canyon - near Uravan		X		Red, black and yellow paint-crossed lines, parallel lines, wavy line. Amorphous blobs with lines emanating from them. Parallel red bars, some with yellow filling space between them.	Overhang, portions of which have been filled by debris from road construction
5MN220	San Miguel River near Cottonwood Creek		X		Human figure, rust red paint, 15 cm. long	Overhanging boulder with lithic areas nearby

TABLE 5 ROCK ART IN SAN MIGUEL AREA

SITE	LOCATION	TECHNIQUE Pecked	Painted	Incised	ELEMENTS/MOTIFS	ADDITIONAL SITE INFORMATION
5MN310	San Miguel River near Horsefly Creek	X	X		Pecked, crescent and meandering lines, figure in grey clay, red smudge, 2 rectangular bodied humans in charcoal	Overhang with associated lithics
5MN365	San Miguel River near Naturita	X			Isolated elk and complex panel with rows of deer or elk, mtn sheep, other quadrupeds, 4 bear tracks, ungulate track, small human fig., a cross, sun.	Overhang with tools and flakes
5MN366	Near Roc Creek	NO INFORMATION AVAILABLE (Vondracek)				
5MN388	San Miguel River near Clay Creek		X		Panel 1: 2 groups of triangular to trapezoidal humans, in lines of 5 and 7, apparently holding hands Panel 2: 5 or 6 humans, in a line Both panels in red.	Overhang, lithics, grinding stone
*5MN439	Dolores River near La Sal Creek	X			Bear tracks, human figures (both square shouldered triangular bodied - some horned - and free form humans), spiral, parallel lines, meandering lines, fringed line, quartered circle, mtn sheep and other ungulates, bird-like fig.	3 overhanging boulders - lithics, 6 glyph panels, one reported by Woodburys (1932:15-16)

TABLE 5 ROCK ART IN SAN MIGUEL AREA

SITE	LOCATION	TECHNIQUE Pecked	Painted	Incised	ELEMENTS/MOTIFS	ADDITIONAL SITE INFORMATION
*5MN440A	Dolores River, North of La Sal Creek			X	Parallel, crossing, and zigzag lines, "turkey tracks"	Overhang, lithic tools and flakes, grinding stone
*5MN443	Dolores River, near Roc Creek	X		X	Complex site with superimposition, numerous human figures, some in rows or chains, triangular bodied, horned, and otherwise, sun figure, crescents, circles, fringed lines, meandering lines, parallel lines, mtn sheep, quadrupeds, hand, foot, bear tracks, possible shield figures	Overhang, lithics 12 glyph panels, "awl grooves"
5MN498	Dry Creek, Southwest of Naturita	NO INFORMATION AVAILABLE (Applegarth & Vanness 76)				
5MN621	Near Broad Canyon	UNKNOWN			4 human figures, shape unknown (Biggs - '78)	Overhang, lithics, burned bone
5MN806	East Paradox Valley	X			Trapezoidal bodied human figure, free form humans, deer, mtn sheep, foot and hand prints, lizard, numerous small forms and amorphous pecking	Open site, flakes in area
5MN838	Near Mavarick Draw north of Redvale			X	Straight lines, turkey tracks	

TABLE 5 ROCK ART IN SAN MIGUEL AREA

SITE	LOCATION	TECHNIQUE Pecked	Painted	Incised	ELEMENTS/MOTIFS	ADDITIONAL SITE INFORMATION
5MN1034	East Paradox Valley			X	Triangular bodied humans with headgear or hair bobs, free form human, ungulate tracks, elk, mtn. sheep, straight lines, meandering lines, spirals, footprints, lizard, vertical row of pecked dots, long-legged birds, abstract geometrical designs.	Several small overhangs, flakes, 14 glyph panels, metates, "awl grooves" grinding basin pecked into boulder, sherds (black micaceous w/ corrugated or punctate surface).
Jeancon (1926: 43,4)	La Sal Canyon	X			Square shouldered triangular bodied humans, one with horns, sun, meandering lines, deer and mtn sheep.	Location uncertain, no state site number. Also visited by Woodburys (1932:13)
5MN1186	Dolores River Canyon, upstream from Roc Creek	X		X	Ungulates (including elk, mtn sheep), linear abstract designs awl grooves, bear and ungulate tracks.	Over 50 individual designs, the majority of which are zoomorphs. Associated with a rockshelter, historic inscriptions; 1934 and 1975.
5MN1192	At the confluence of Tabeguache Creek and Spring Creek	X			Zoomorphs (possible mountain sheep) meandering lines	Associated with a small overhang.

Placing any particular locus or general style of rock art into a chronological framework can sometimmes be accomplished only within broad temporal categories. When applicable, patination, lichen growth, super position of elements, and erosion or obliteration through chemical and mechanical weathering provide empirical evidence on intra-panel, intra-site, and intersite temporal relations. These methods of relative dating can also be misleading in that variables governing processes of weathering, formation of patina, and the rate of lichen growth are not clearly understood and vary with location and time. Deposition and deflation processes as they affect access and visibility of rock art panels also provide relative dating.

Absolute dating of rock art can be accomplished through association of the art with datable archaeological deposits. The key word is of course association, and this method involves numerous assumptions, particularly when the archaeological deposit is surfical or shows multiple components, or when a specific panel exhibits differential weathering, patination, or styles. Perhaps the most successful application of dating art by association in this region has been with the Glen Canyon Project (Turner 1963), where ceramic cross-dating aided in the identification of several temporal styles.

Pictographs are potentially datable via radiocarbon in the organic elements of the binding, vehicle, or pigment. Moreover, paint is amenable to X-ray diffraction analysis for identification of composition (e.g., Mckee and Thomas 1973).

Cultural affiliation of rock art is also determined by association with archeological deposits or by the presence of distinctive iconography. Diagnostic subject matter, e.g., Bow vs. Atlatl, european animals or material items, give the art an immediate temporal parameter.

West End rock art is quite variable as to size, configuration and arrangement of motifs. Attempts to classify rock art of the West End into existing style categories leads to the realization that a large amount of subjectivity is involved in style demarcations, and that many styles are not particularly discreet, culturally or geographically.

Motifs and techniques of manufacture in the West End resemble Glen Canyon styles 4 and 5 (Turner 1963). Glen Canyon Style 4 is associated with both Mesa Verde and Kayenta Anasazi sites, and dates from A.D. 1050 - 1250. Style 5 begins 4000 - 8000 B.P. or earlier (Turner 1971), with a transition period from Style 5 to Style 4 taking place between A.D. 900 and A.D. 1050 (Turner 1963:39). Not only does Turner see Styles 4 and 5 covering a wide range temporally, but sees them widely distributed spatially over most of southwestern United States.

Parallels with Fremont styles can also be drawn for some of the motifs found in the West End, particularly the square-shouldered anthropomorphs with trapezoidal or triangular bodies and headgear. At least 16 sites have anthropomorphic representations, 10 of these depicting square-shouldered trapezoidal or triangular bodied humans. These anthropomorphs are similar to the "classic Vernal style" variant described by Schaafsma (1971:15). They are also similar to San Juan Basketmaker - Anasazi styles. Other human figures found in the West End are less

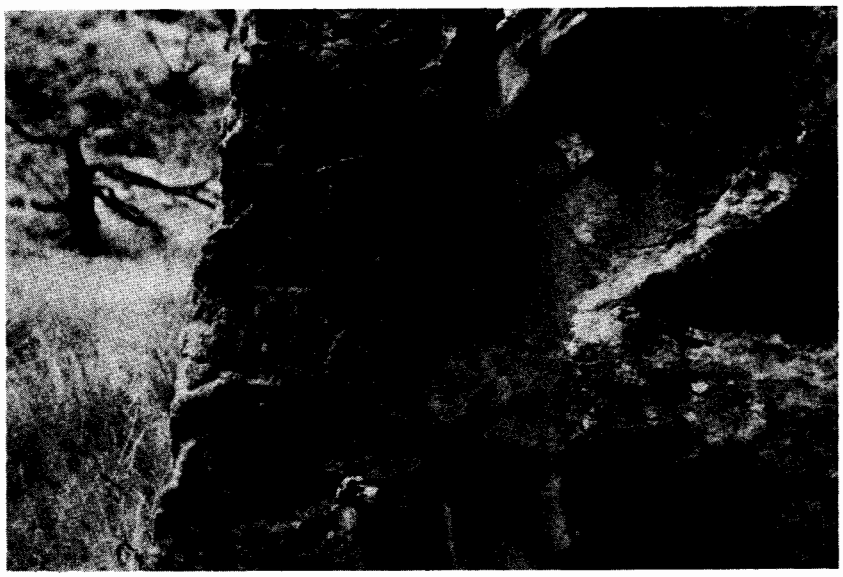

Figure 21. Panel 6 5MN1034 in the Paradox Valley. Note the Human Figure with Horns in the Photograph.

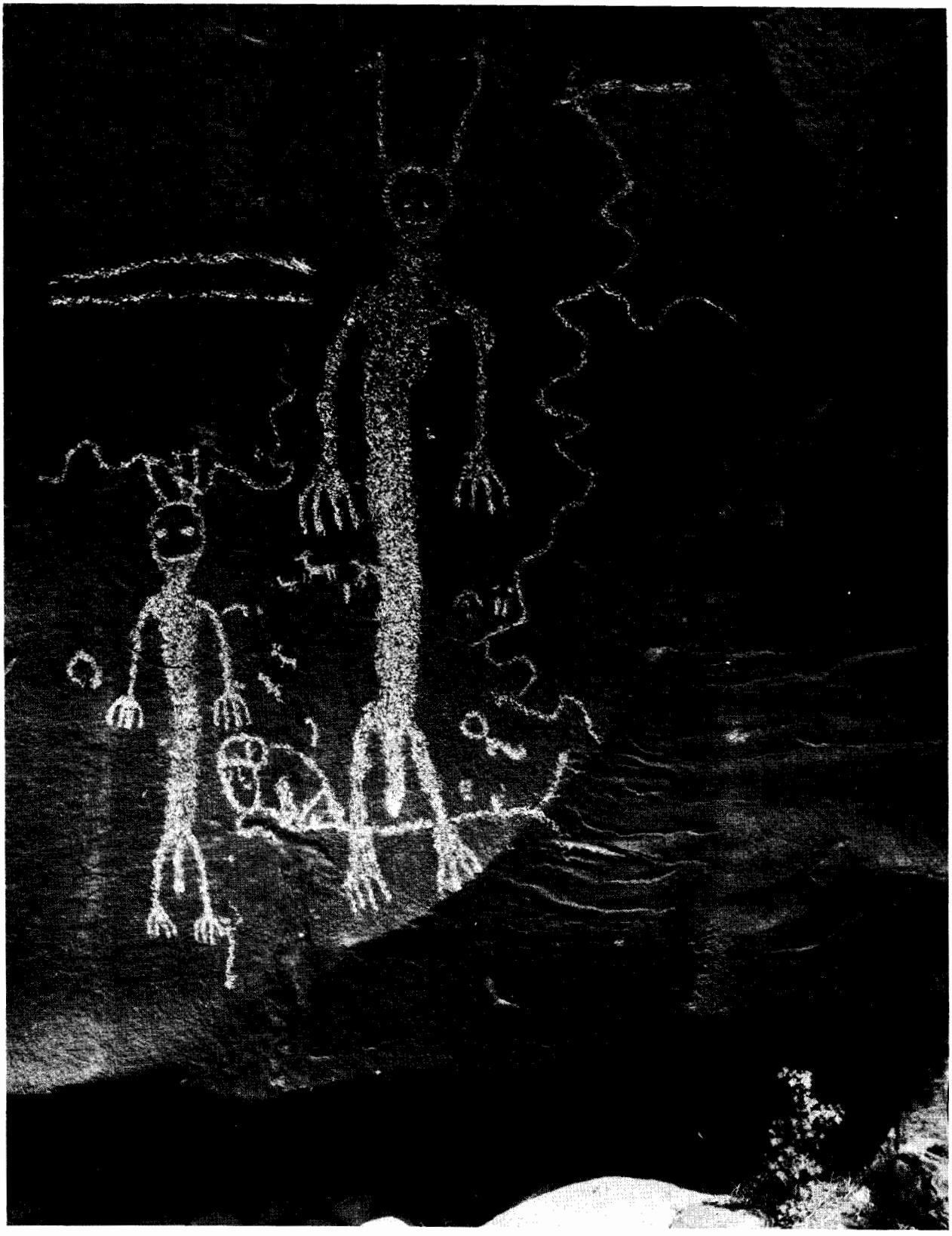

Figure 22. Human figures at 5SM10 on the Dolores. Courtesy, Smithsonian Institution National Anthropological Archives.

stylized with a variety of body shapes and a range of anatomical detail and accuracy. Several of these "freeform" figures have horns or antenna-like projections (Fig. 21). Some have enlarged hands, feet, and/or phalluses (Fig 22). These freeform anthropomorphs are present at 9 sites. Stick figures, some with horns, are present at 4 sites. Square-shouldered and freeform human figures are occasionally found at the same site, possibly an indication of a multicomponent site. Generally, both forms occur on panels composed of 1 or more humans, with quadrupeds, animal tracks, various abstract figures and curvilinear and rectilinear lines and designs. Two sites are known at which the rock art consists solely of square-shouldered pictographs - 5MN 220 has a single square-shouldered human figure, and 5MN 388 contains two panels, each depicting lines of square-shouldered human figures, apparently holding hands. Anthropomorphs, particularly the square-shouldered figures, tend to dominate the panels either through greater elaboration, size or special placement.

Square-shouldered anthropomorphs occur throughout the San Miguel and Dolores drainages. Hurst has reported such a figure near Tabeguache Cave I on the southwestern slope of the Uncompahgre Plateau (1940:6). Similar stylized anthropomorphs are known to occur in the La Sal Mountain area (Hunt 1953), and northwest of the Uncompahgre Plateau in Seiber Canyon near Glade Park (Huschers 1939; Wormington and Lister 1956: 122, 123). Others occur across eastern Utah and throughout the Four Corners region but are absent to the east and northeast of the study area (across the Dallas Divide or northeast of the Uncompahgre Plateau). Instead, the anthropomorphs found in these regions tend to be of the freeform variety (Buckles 1971, McKern 1978).

The range of occurrence of the square-shouldered trapezoidal-triangular figures correlates with the area occupied and utilized by horticulturist populations. To associate each of these human figures to the Fremont style versus the Anasazi style, however, becomes a more difficult task. Although "typical Fremont" and "typical Anasazi" are represented within the study area, a large number of anthropomorphic figures fall in between. The typical Fremont and Anasazi figures tend to grade into each other (Schaafsma 1971, Toll 1977) with shared characteristics of enlarged appendages, headdresses and body decoration. The study area being peripheral to the core areas of both these cultures further complicates the distinction.

The most popular motif in rock art within the West End are zoomorphic figures. Nearly every large mammal known for the area is represented through naturalized or stylized zoomorphs or tracks. Most commonly depicted is the unoulates. With deer, elk, mountain sheep and possibly antelope being distinguished by the horns or antlers. In some cases, they are represented in large numbers on the panels (5MN 365, 5MN 806, 5MN 443)(Figs. 23 and 24).

Other quadrapeds present are vague, perhaps representing dogs, coyotes and bears and possibly a bison. A possible mountain lion is represented at 5MN 365; a quadraped with a long tail and dints around the feet (claws?). Lizard and snakes occur but in rare instances and the only definite depictions of birds is at 5MN 1034, a long-legged type similar to a crane.

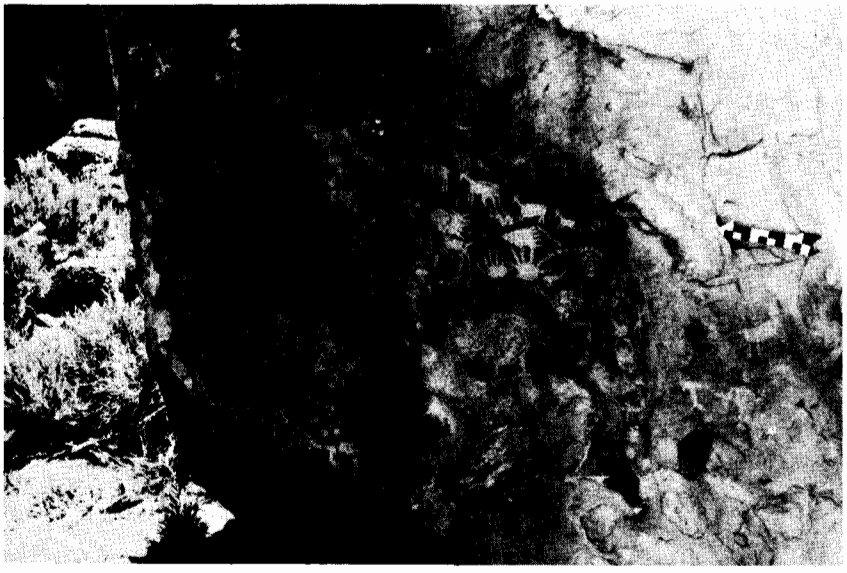

Figure 23. Zoomorphs, Anthropomorphs, Footprints and Animal Tracks at 5MN806.

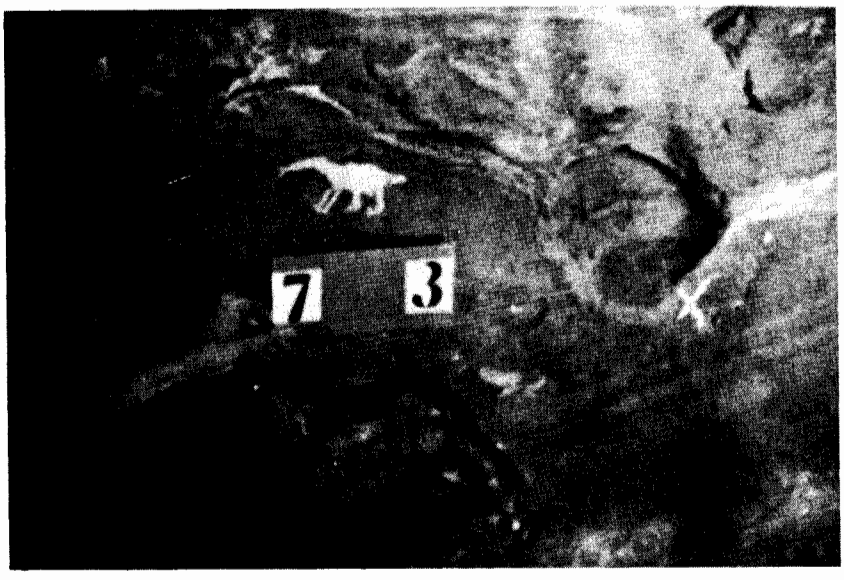

Figure 24. Zoomorph Petroglyph in Tabeguache Cave I. Courtesy, Western State College.

Animal tracks are a common form of petroglyph in the West End rock art sites. Bear paw prints are the most common form and can be compared to the conventionalized tracks of the petroglyphs on the Uncompahgre Plateau (Huscher and Huscher 1940). Deer or elk tracks are also numerous. Possible turkey tracks are incised at two sites as well as pecked impressions of human hand and foot prints.

A variety of abstract curvilinear and rectilinear elements are present at most sites, including meandering lines, straight lines, fringed lines, rows of dots, crescents, circles, spirals and miscellaneous combinations and patterns with these elements. These designs can be either be pecked or incised. Awl grooves are also found in the study area creating another form of linear design.

Pictographs are present at six sites, two of which also have petroglyphs. Five of the sites contain anthropomorphs, painted at 5SM 370, 5MN 220, 5MN 310 and 5MN 388 and pecked at 5MN 72. 5MN 155 presently contains only abstract designs. This site is at the mouth of Heiroglyphic Canyon, near Uravan (the canyon is named for the site), and has been partially destroyed by the mining activites. Five of the six pictographs are located near the confluences of tributaries to the main rivers - 5MN 72 at the confluence of Bull Canyon and the Dolores River, 5MN 155 at the confluence of Heiroglyphic Canyon and the San Miguel River and 5MN 220, 310 and 388 are respectively located at the confluences of Cottonwood Creek, Horsefly Creek and Clay Creek with the San Miguel River.

In fact, most of the rock art sites in the West End appear to be associated with the rivers. This may be a function of the portion of the West End surveyed since inventory has been most concentrated near the rivers. Sites do occur away from the rivers and creeks in the area, e.g., 5SM 186 (Gypsum Gap), 5MN 806 and 1034 (East Paradox Valley) and 5MN 838 (near Maverick Draw).

The known rock art sites occur in sandstone overhangs and on stable sandstone cliff faces and isolated boulders. The majority of rock art panels are located near the confluence or juncture of two or more major canyons, creeks, valleys or other points of access.

Except in a few instances visibility on the access corridor appears to relate to the presence or absence of rock art in the West End. Whether the peckings and paintings represent messages, or symoblic hunting magic, or mere doodlings is left open to further speculation and interpretation. There are also a few sites, such as those in the Paradox Valley, that tend to be isolated instances of rock art panels. These boulder sites show repeated use of the boulder with definite superimposition of elements. These sites are not, today at least, on what could easily be called an access corridor. These isolated sites may have been used for more formalized magico-religious functions than those found in the more accessible areas.

STRUCTURES

Peoples who participated in an archaic lifestyle characterized by scheduled seasonal movements for resource extraction generally did not build permanent structures. Transitory shelters constructed of perishable materials were utilized, and in the case of the Utes and Paiutes who inhabited western Colorado and eastern Utah in historic times, brush and pole shelters (wickiups) were used (cf photos in Fowler and Fowler 1971; Peterson 1977:8-10). One site (5MN 813) containing a brush wickiup has been recorded in the West End, although wickiups are known from other parts of the Uncompahgre Plateau (Buckles 1971), and these sites are relatively recent (cf 1700-1880 Reed and Scott 1980). It is assumed many of the lithic areas in the West End once contained brush structures at the time of occupation, and that brush structures were the most common form of shelter used during the 7000 to 9000 years of archaic occupation in the West End.

Peterson (1977) in his discussion of an ecological model references Fray Escalante's journal where he mentions finding occupied and ruined huts or wickiups of the Utes in the West End. One site is specifically identified as being on Disappointment Creek, although this site has not been identified archeologically.

Two other types of structures have been identified in the West End. One is a single pithouse excavated by Leach (Kasper 1977) at the Paradox site. Leach attributes the pithouse to a Basketmaker III San Juan Anasazi occupation of the area; however, since the site has never been fully or adequately reported, it is difficult to adequately assess the significance of the find. The third type of site found in the West End are stone structures.

A variety of stone structures are present in the West End, and, as noted, these structures have received the attention of several archaeologists. Despite the history of interest in structural sites and the partial excavation of several of the sites, there is not a great deal of hard data available concerning the sites. Reports from the excavations conducted by the Woodburys, Huschers, and Hurst are not detailed, probably a reflection of the methodology used in the 1930's and 1940's, which, from today's viewpoint, suffers from a lack of rigor in both excavating and recording techniques. Information from the recent excavations conducted by Leach and Vondracek has, by and large, not been made available.

One subset of the sites containing structural remains can be characterized as sites with habitation structures built at least partially of sandstone masonry. Included are 5MN191 - the Paradox Valley site, Tabeguache Pueblo, 5SM57, 5MN367 and 5MN1031. These sites consist of more than one structure, and those that have been excavated contain an artifact assemblage of chipped and ground stone, worked and unworked bone, ornaments and ceramics.

Tabeguache Pueblo was partially excavated by Hurst (1946:7-16) who described it as a "peripheral Pueblo II site", consisting of a ruin group of 4 "houses". Tabeguache Pueblo sits on an open hilltop at an elevation of 7060 ft. The hill overlooks fields which presently produce crops with the aid of irrigation water diverted from small streams nearby. The four houses whose walls were traced were designated the Northwest House, SW House, NE House and SE House. Hurst recognized the possibility of their being other rooms or houses, and the possibility that all the houses were part of one building. Hurst also stated that there was "a defense wall around part if not all of the site"; but did not trace the wall or attempt to determine the total number of houses or rooms. The four houses exposed were roughly rectangular to trapezoidal, with dimensions of the NW house given as 20x21 ft and dimensions for the other structures as follows:

	North	East	South	West
SW House	16'	15'	20'	16'
NE House	20'	18'	19'	20'
SE House	20'	11'	18'	9'

A possible storage bin (a semicircular structure) was outside of and contiguous with the NE house. The NW house had the highest wall, standing to 45 inches above ground surface, and set to 18 inches below ground surface. The SE house had walls varying in thickness 14 to 35 inches. Masonry was sandstone slabs with some possible shaping, with no mortar remaining above ground, but a friable mortor containing numerous small rock fragments for chinking was present below ground. Floors were the original site surface. A 10 inch thick layer of charcoal and ash was present above the floors of the NW and SE houses, including burned roof timbers identified as juniper and at least one piece of impressed daub. Two trash dumps or middens were located and tested, one of which extended under a house foundation, indicating either some internal architectural development at the site, or more than one component at the site.

All artifacts within rooms were found on floors. Artifacts recovered include 10 corner notched projectile points (Fig. 25), scrapers, hammers, cores, flakes and beads. Two deer bone awls were found as well as deer (and other) bone refuse. Several fragmentary sandstone manos and two sandstone metate fragments were present, the metates described as "bowl-type". Aside from litchic debitage, the most numerous artifacts were the 53 sherds (Fig. 26). The sherds were from several different vessels, including plain, corrugated, and black/white wares. H.P. Mera of the Laboratory of Anthropology identified some of the sherds as "appearing" to belong in a Pueblo II category . . . . .I do not find anything which would be apt to date earlier than the 11th century" (Letter from Mera to Hurst, 15 Nov 1945). H.S. Colton of M.N.A. identified other sherds as being P.II corrugated and mancos black/white (Letter from Colton to Hurst, 6 March 1946).

A visit to the site in 1978 showed that there were still standing walls and quantities of lithic debris present, as well as indications of pothunting and unauthorized collecting. A projectile point fragment was located on the surface.

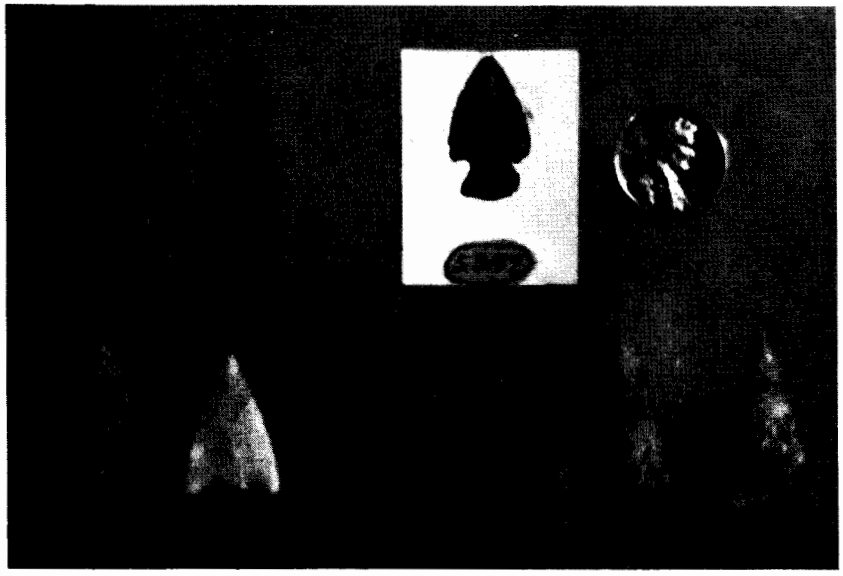

Figure 25. Projectile Points from Tabeguache Pueblo.

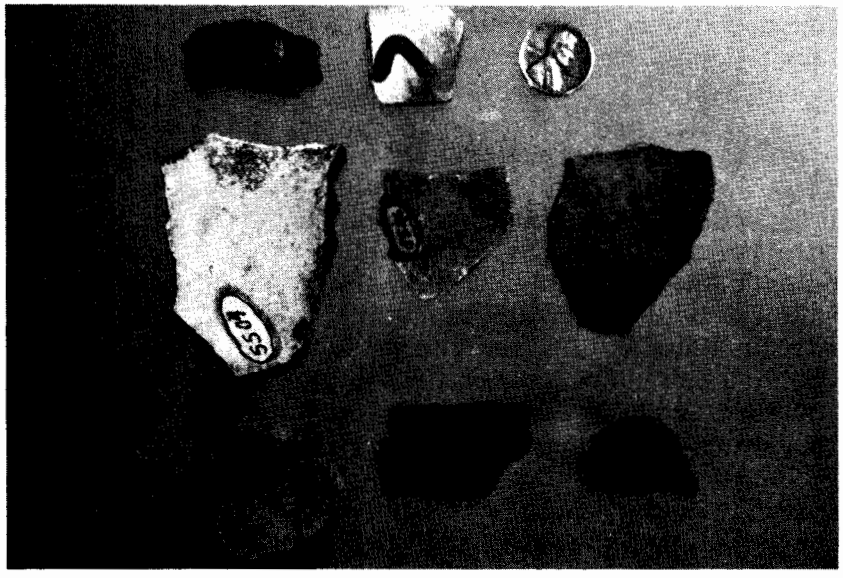

Figure 26. Northern San Juan Anasazi Pottery Sherds from Tabeguache Pueblo.

5MN 1031 - Hurst (1946) mentions this site as a "barely discernible" ruin near his field camp for the Tabeguache Pueblo excavation. The site is located on a low finger ridge at 6020 ft., between two intermittent drainages, with the end of the ridge at the confluence of the drainages. Rock rubble is scattered and mounded over an area ca. 35 MN-S x 25ME-W, with some alignments visible. A circular masonry structure, ca. 8M. diameter is at the NE part of the site. Some alignments are linear, but individual structures or rooms are not defined. There is a possibility of a wall around the perimeter of part of the site, enclosing other structures. 5MN 1031 was located in late May, 1978 and it was obvious that the site had been potted a few weeks previously. Several large though shallow potholes were present, and a complete corner-notched projectile point was found in the backdirt of one. Other lithic debris was sparse but present. No ceramics were seen.

5SM57 - This site was originally reported by the Woodburys (1932:19,18) as a permanent pueblo habitation, the remains covering "about an acre and a half".

The site is located on the rim of Naturita Canyon. At 6800 ft., with the long axis of the site oriented along the brink of the canyon. Hay is currently grown in the area around the site, and arable land is located at the bottom of the canyon, along Naturita Creek. Informants told the Woodburys that walls had stood 4-5 ft above ground in 1910, but extensive quarrying for building stone by local ranchers had left only a vague outline of oblong shape. No sherds were found by the Woodburys who did not excavate at the site.

The Huschers (1943:19) also visited this site, and substantially agreed with the Woodburys description. They were not sure about the presence of an enclosing wall due to stone-robbing, but they did take advantage of a pothole to examine one room. The room was about 4 1/2 ft (1.4m) across, with rectangular corners and masonry of large, apparently unshaped slabs. No definite mortor was seen. The floor was a prepared, packed clay, over one foot (.3m) below ground surface. The amount of charcoal present indicated the structure had burned. The Huscher's reported potsherds and arrowpoints similar to those described by the Woodburys from the Paradox Valley site. (5MN191). (No collections attributable to this site could be found with the Huscher collections at the Denver Museum of Natural History).

Toll (1976) recorded this site as 5SM57, noting a mounded ridge (collapsed wall?) 1m high, about 2m wide enclosing an oval area 20m NE-SW x 16m NW-SE. Within this area is a rubble mound with six probable rooms, apparently contiguous. Stone is unshaped rectilinear blocks, variable in size, and oxidized (burned) red. Potholes are present in the enclosure, but some floors may be intact.

5MN369 - this site was partially excavated by Vondracek (See Crane 1977:70-82). It is located on a ridge at 5,260 ft., on the south side of Roc Creek, near a wide point in the canyon with a large amount of arable land. The site consists of approximately 8 contiguous circular masonry rooms built in a semi-circle around the base of a large boulder. Three rooms were excavated, and the masonry in these was a mixture of small boulders and slabs, unshaped, with no mortar apparent. No post-

holes or roofing materials were found, but lumps of burned adobe (daub) were present. Floors were packed dirt, located several inches below the surface. Dimensions of the structures are not given. Unit I is considered by Crane to have been a food processing and cooking area, containing a large firepit which yielded a C14 date of A.D. 905 60 (UGA-926). The structure contained several metates and about 50 mano fragments, sherds, bone tools, beads, gaming pieces, and bone refuse, projectile points (form not described), other stone tools and debris, and a few corn cobs. The function of unit 2 was unclear. The structure contained a firepit and few artifacts. Unit 3 is considered a habitation room, containing a central firepit and manos, metates, bones and stone tools and debris.

105 sherds were recovered from the site, and most were typed by Crane as plain and corrugated emery gray, a Fremont type. Two unclassified black/white sherds were found. Crane notes some modern disturbance of the site, including the attempted reconstruction of part of a structure.

Two sites recorded by the Huschers (1943) may also be of the same genre as those described above - H.H.C. (5SM 346) and H.R.H. which has not been reidentified or recorded. In addition to these sites, there are several others in the West End. One of these is Cottonwood Pueblo partially excavated by Hurst (1948 a&b) in 1948 but never completely reported on due to his death in 1949. Vondracek (Crane 1977, 1978) re-excavated the site but no complete report has ever been made available. Several unexcavated structural sites have been recorded in the area like 5MN 363 near Spring Creek on the San Miguel River.

The stone structural sites have several elements in common, although size, shape, and construction may differ. The sites are generally located on hills, terraces, or other prominant places with a good viewshed. The viewshed generally overlooks a valley bottom or area of arable land. Finally all of the stone structural sites, that have been dated, range in date from A.D. 700 to A.D. 1150.

This timespan covers the period of Pueblo I and II of the Southwest and more specifically the Fremont era of eastern Utah (Madsen 1979). These stone structures despite their dating do not appear to be directly related to either the Anasazi or Fremont cultural manifestation. The stone structures are similar to those of the Fremont, the ceramics are for the most part derived directly from the Anasazi to the South, and the projectile points are Uncompahgre in style.

The lifestyle of the peoples using the structures, according to Crane (1977), is incipient horticulture with a heavy emphasis on hunting and gathering. This then might suggest that the local hunting and gathering peoples occupying the West End in the 8th century may have acquired the means for and the concepts of horticulture and sedentism. Instead of accepting either the Anasazi or Fremont cultures in toto, they chose to utilize and/or adapt specific cultural elements from each to their own established hunting and gathering lifeway.

It is further suggested that this horticultural adaptation was not widespread nor fully successful. First the number of structural sites known is relatively small compared to other types of sites. Secondly, all of the known structural sites are in areas that could be used as overlooks to arable lands. Third, since the sites are not on the arable lands, this may suggest a limited supply of agricultural lands that had to be used as expeditiously as possible or required a defensive posture. Fourth that the adaptation was not totally successful is demonstrated by the apparent heavy reliance on hunting and gathering.

The reason for this horticultural adaptation and subsequent return to hunting and gathering in the 12th century may be related to a period of climatic change between A.D. 700 and A.D. 1150. Approximately A.D. 700 there was a shift in the westerly wind pattern that had borad ranging climatic and subsequent cultural effects in the western half of the U.S. (Bryson and Murray 1977). This change manifested itself in Western Colorado (Scott 1978) and the West End as a period of increased effective moisture. This period may have allowed the growing of corn or other cultivatable items at that time. Following the 12th century, the moisture regime appears to have returned to a pattern very similar to that of today. This pattern has only 140 frost free days in the West End and such low available moisture that corn can only be grown with the aid of irrigation. It would thus appear that the period of horticultural adaptation in the West End was the result of ideas spreading from the west and south into an area receptive to the concepts, but only climatically marginally able to implement them.

The cultural adaptation during this period might best be characterized as a West End variant of the San Raphael Fremont of eastern Utah. The reasoning behind this concept is the apparent closer relationship of site types and location strategy of the West End to the San Raphael Fremont of eastern Utah. The area has also been considered a part of the Anasazi Pueblo II period expansion out of the classic area to the south; however, the functional and typological characteristics of the sites seem to have a closer affinity to those sites commonly called Fremont. Whether Anasazi or Fremont related is of less concern than the fact that an indigenous people adapted to a horticultural lifestyle for a short period and then returned to hunting and gathering when horticulture was no longer a feasible way to sustain themselves.

CHAPTER V

SYNTHESIS AND CULTURE HISTORY

This synthesis and attempt at a culture history will be general in nature. While a good deal of inventory has been done in the West End, very little excavation has been done in the last 30 years. Although the inventory date is helpful it can not replace excavation as a primary tool of interpretation. Inventory data has inherent biases built into it that only excavation can ameliorate. The lack of excavation does hamper interpretation of the existing data, but at least a picture of past use of the land is emerging through the inventory. This picture must be tempered by the knowledge of the type of data that was used to construct the culture sequence. It is general, but it is a starting point for discussion and model building of prehistoric land use and social behavior.

The West End has five relatively distinct cultural stages. At least three of these overlap in time and may very well blend traits of the other into their stage, thus confusing and complicating the interpretation of the cultural evolution of the area. The earliest stage known to be in the West End is the Paleo-Indian which dates 8000-10,000 years old. The suceeding archaic stage was characterized by a hunting-gathering based economy and in essence lasted as a lifestyle through the occupation of the Utes until 1880. Technology changed and thus the archaic stage can be subdivided into several archaic periods and later prehistoric periods as identified by Buckles (1971). At the same time as the archaic lifestyle was occurring in the area, the Anasazi groups from the south were apparently using the area for hunting and were possibly trading with the local peoples. When the Northern San Juan Anasazi were reaching their floresence a variant of the Fremont occurred in the West End (AD 700-1100). This Fremont variant was only partially sucessful in adapting agricultural practices to the area and by AD 1100 had failed. The last period of aboriginal occupation of the West End was by the Ute Indians. They are the only historic aboriginal group known to have inhabited the West End. They were removed to reservations in Southern Colorado in 1880.

Paleo-Indian Stage

The "Paleo-Indian" stage is a term applied to the earliest definable human occupants of the Colorado Plateau. This New World cultural development can be divided into three cultural units or complexes: Llano, Folsom, and Plano. It is common to define each of these complexes on the basis of distinctive projectile points and by the animal(s) hunted. Although overlapping occurs, it is possible to place the complexes into a temporal ordering with the Llano complex being earliest, followed by Folsom, and ending with the Plano.

The Earliest complex, the Llano, was characterized by the manufacture and use of the Clovis point, a unique, fluted, lanceolate point averaging 3 to 6 inches in length. The mammoth (Mammuthus sp.) appears to have been the primary prey for these groups although other animals were hunted. As a result of several radiocarbon determinations throughout the Southwest, it is estimated that the Llano complex of the Paleo-Indian stage dates between 10,000 and 9,000 B.C.

The Folsom complex sites (ca. 9000 - 7000 B.C.) are more numerous than Llano sites and have a wider distribution throughout North America. The distinctive projectile point of this complex was the Folsom point, also lanceolate in form and made with pressure-flaked retouch. The points were thinned by the removal on each face of a long, thin flake. Animal remains found associated with Folsom points are those of large-horned, extinct bison - Bison antiquus.

The third and terminal Paleo-Indian complex is the Plano which has been dated to the period 7000 - 5500 B.C. This complex is identified by several projectile point types which have considerable variation in form and geographic distribution. Plano points are generally lanceolate--shaped, unfluted, and exhibit fine pressure-flaked flintwork. Plano complex points and other tools are often discovered with postglacial "modern" fauna, such as bison or antelope.

In addition to changes in projectile point styles and big game preference, there are other cultural characteriestics which define the Paleo-Indian complexes. Groups in each period appear to have oriented their subsistence patterns toward the larger, migratory faunal forms but one aspect of Paleo-Indian subsistence pattern that should not be overlooked is a dependence on smaller animal species and many varieties of edible floral species.

In a general the lifeways of the Paleo-Indians included a completely nomadic round of hunting and gathering over the course of a year. Data relating to these groups are usually scant in archaeological record due to their ephemeral nature.

There are only hints of the existence for each of the Paleo-Indian complexes in the West End. These include definite reported surface finds of projectile points which have been attributed to each of the three Paleo-Indian complexes. To date, however, no finds have been made of a concrete association between Paleo-Indian points and extinct forms of fauna.

Archaic Stage

The Archaic way of life which followed the Paleo-Indian period is looked upon as an adaptation to the postglacial environments found in North America following the Pleistocene. In many areas groups could no longer depend on the large herds of big game animals which had been replaced by smaller, more solitary animals such as deer. The origins of the Archaic stage and its relationship to the earlier Paleo-Indian period are not completely understood and there is little evidence for direct development from one stage to the other.

Reed and Nickens (1981) have summarized the western Archaic in an earlier overview and the following encapsulates their review of the western Archaic. The Western Archaic pattern or Desert Culture concept includes many characteristics that are common throughout the West as well as to comparable cultures in the eastern United States. Many of the basic traits are even common to world-wide cultural patterns found amoung prehistoric and ethnographic cultures engaged in a hunting and gathering way of life. Further, elements of this lifeway persisted into the 1800s in some places in the western United States. Thus, it will be of benefit here to briefly define this general pattern of Archaic existence in that the concept represents an important part of the culture history in the project area.

Generally speaking, the Desert Culture is seen as oriented toward the exploitation of many animal and plant species, as opposed to the earlier Paleo-Indian concentration only upon big game animals. This hunting and gathering pattern was characterized by many techniques--hunting, trapping, and snaring of birds, insects, deer, antelope, mountain sheep, rabbits, and other animals; and exploitation of available plants: seeds from plants and grasses, lily bulbs, nuts, roots and berries.

Given the environmental and hence available resource constraints found throughout the region, it is assumed that the food quest must have been nearly continuous throughout the year. Small groups of people, perhaps 25 to 50 kin-related individuals, were probably moving from place to place within a definable territory in response to the growth and maturing of certain plants and/or animal populations. Caves and overhangs appear to have been favored for base camps, especially in the winter time. However, just because the majority of the data comes from caves or overhangs where preservation is best, the fact should not be overlooked that much of the time was probably spent at seasonal specialized activity camps located in the open. From the ethnographic literature, it is also seen that several groups might be able to congregate in the area of an especially "rich" temporary food resource for a short time period. During such occasions social interaction, including visiting, marriages, and the forming of alliances would have been possible between groups.

As expected, the technological aspects of the Desert Culture are geared toward an array of tools for specialized tasks associated with the food quest, and also are related to the nonsedentary lifestyle. Nonetheless, the diagnostic artifacts of this stage are extensive and include: basketry (twined basketry generally predominant) and cordage; fur cloth; woven sandals; the atlatl (or spear-throwing device) and dart; a wide variety of small projectile points; chipped-stone knives; flat and basin millingstones and the one-handed grinding stone; digging stick; wooden clubs; tubular pipes; use of Oliva and Olivella shells from California for beads; firedrill and hearth; and a variety of bone and antler tools.

In brief, then, the Desert Culture concept provides a useful and unifying scheme for expressing the overall pattern of the Archaic groups of the western United States. It is apparent, however, that discrete regional variants within the larger Desert Culture area can be delineated. These regional or subareal variations adhered to the general definition of the Desert Culture, but they each possess distinctive culture traits and developmental sequences which serve to distinguish them from other regional variants.

One of these regional variants of the Desert Culture, which includes the Archaic Tradition sites in west-cental Colorado is the Uncompahgre Complex. Between 1937 and 1952, the Denver Museum of Natural History and the University of Colorado conducted excavations at four rockshelters located on the northeastern slope of the Uncompahgre Plateau. These excavations were conducted and reported by H. M. Wormington and Robert H. Lister. On the basis of these excavations, Wormington and Lister (1956) defined the Uncompahgre Complex, which was considered to be a regional variant of the Desert Culture. The Uncompahgre Compex as defined by Wormington and Lister (1956) was characterized by a great variety of projectile points, with arrow points appearing at an early date and being contemporaneous with dart points. Three tool types were thought to be unique to the Uncompahgre Complex: an adze-like scraper, a large and partially polished stone object of unknown function, and a particular style of scraping tool, termed an "Uncompahgre Scraper" (ibid.:78). No temporal framework was developed for the Uncompahgre Complex.

William G. Buckles redefined and refined the concept of the Uncompahgre Complex as a result of fieldwork performed between 1961 and 1963 as part of the Ute Prehistory Project (Buckles 1971). Buckles views the Uncompahgre Complex as a series of cultural adaptations to life on the Uncompahgre Plateau, made similar by common environmental, social, and technological constraints.

The general pattern of these Desert Culture sites in Western Colorado is similar to those of the Uncompahgre Complex. There are differences in the sites between the Uncompahgre Valley and the West End, but the number of similarities between sites and artifacts is great enough to warrant the use of the Uncompahgre Complex as the primary model of settlement and subsistance.

One relatively rare and unique type of site occurs in the West End that is not common elsewhere in Western Colorado and that is what in the greater Southwest would be called the Basketmaker II sites. These sites which are exemplified by Tabeguache Caves I and II, Cottonwood Cave, Dolores Cave, and Bull Canyon Rockshelter are more properly identified as terminal archaic or early formative sites. These sites which are about 2000 years old and because they are in rockshelters, have excellent preservation, contain an assemblage of artifacts that represent a mixed hunting and gathering subsistence strategy, but the sites also contain corn. The artifact assemblage in these rockshelters has yielded basketry, yucca cordage, rabbit fur blanket fragments, sandals, evidence of the use of a variety of wild plants and the incipient domestication of corn.

Many open lithic matters in the West End of the same time period may be related to these rockshelter sites but the lack of preservation makes it extremely difficult to determine how extensive horticulture may have been practiced. The current evidence suggests that the local inhabitants of the area had a short period of favorable environmental conditions and received corn and the knowledge about cultivation around 2000 years ago. These late archaic peoples appear to have sought fertile valley areas where they planted the corn. Most of these fertile areas were associated with rock formations that contained rockshelters, which were used by the corn growing groups. The people probably planted the corn and continued on their hunting and gathering cycle; returning to harvest the crop in the late summer or fall. The rockshelters provided a unique situation where many artifacts of daily life, not normally preserved in open sites, are preserved along with the remains of the corn use. These people appear to be hunters and gathers of the Ute archaic tradition who were practicing incipient horticulture.

It has been difficult to determine one period of occupation of archaic open lithic site from another without the presence of projectible points. A recent study by Klesert and Webster (1981) suggests that there are some changes between certain periods of open lithic sites that can be distinguished by inventory data. They suggest that the archaic lifestyle is manifested in archeological sites as evidence of short-term camps, but about 1480 years ago there was a change to a Post-Archaic lifestyle that manifest itself as a series of chipping sites in the area they studied. It appears that in this study area the Post-Archaic sites were hunting or limited procurement stations separated from the base camps as opposed to the archaic periods sites which may have been band oriented multi-resource procurement sites.

The site location strategy, associated with pinyon-juniper woodlands, did not change through time nor is there any direct evidence for change in social organization, but the evidence does suggest some changes in exploitation patterns. The junior author of this report suggests that this change should be investigated more thoroughly to see if it can be found in these areas. It is possible to build a model of this change that could suggest the change from short term camps to chipping stations may represent the influx of the Shosonean-Ute groups or changes in environment or social organization. Innovative research like that of Klesert and Webster (1981) is worth developing further.

Extraregional Contacts - The Anasazi and Fremont

The previous archeological work discussed in this report has indicated that some more or less permanent habitation sites related to either the Fremont or the Anasazi meet in the West End. There is no question that pottery, masonry structures, possibly pithouses, and other artifacts related to either or both of these traditions have been found in the area. The question is do they represent actual incursions and settlement by these outside groups or do they represent the exchange of goods and ideas with local peoples?

It is the junior author's contention that the Anasazi and Fremont did use the West End primarily for hunting and gathering and for trading with local peoples for local products like meat or wild plant foods and medicines. The evidence does not definitely suggest the presence of the Anasazi or Fremont as agricultural settlers. Instead the data at hand points to the exchange of goods and ideas with local people. These local inhabitants then took the agricultural information and attempted to grow corn. They also built masonry structures and possibly pithouses for temporary use. The available evidence does not suggest year-round occupation of these structures, but further study of the sites will be the only way to prove or disprove the hypotheses.

It also appears that the period of agricultural exploitation was limited to an episode of environmental change about AD 1100 that was favorable to the growing of maize. Today corn can not be grown in the West End without the aid of irrigation. The growing season at Norwood is 106 frost-free days and in the Paradox Valley 131 frost-free days. Modern Hopi maize requires 115 to 130 frost-free days which makes the Paradox area extremely marginal for growing corn even today.

The environmental shift between AD 700 and AD 1100 made the area less margianl for horticulture but the question of who was practicing agriculture and building the structures is still open to question. The Anasazi and even the historic Pueblo groups were present in or trading with the area as evidenced by the pottery found in the West End. The Fremont were either trading or present also. The contention is at the least these groups were in the area, but a good deal more study is required to determine if the Anasazi, Fremont, or local peoples were responsible for the horticultural period that is present in the archeological record.

Historic Aboriginal and Euro-American Patterns in the Project Area

Following the disappearance of horticultural settlement and subsistence practices in the West End, the region was inhabited primarily by the Ute. These people were described in Spanish accounts of explorations into the area as early as 1775. There exists limited evidence, however, of Navajo utilization of the area.

While the early historic presence of Utes in the West End is clearly documented, archaeological sites attributed to Ute affiliation are relatively uncommon. Reed and Nickens (1981) have noted this situation appears somewhat enigmatic, but when they reviewed Ute ethnographic and culture material literature possible solutions to the problem were found. Pre-twentieth century Ute encampments were apparently temporary in nature with relatively unsubstantial brush shelters being the rule. Domed or conical-shaped frames covered with brush or bark (termed "wikiups") were present among the Weeminuche band (Stewart 1942), the evidence of which would have disappeared rather quickly after abandonment. After the arrival of the Americans and the adoption of horses by the Utes, skin-covered tipis came into vogue which were capable of being moved from one camp to another.

Studies of Ute material culture provide addtional clues to the problem of identifying Ute sites. Pottery, one of the diagnostic hallmarks of archaeological investigation, was very rare among the Southern Ute groups. Opler (1939) noted that Ute pottery was evidently not manufactured in quantity and, despite a careful search of several known Ute camping spots in southwestern Colorado, he could find no examples of ceramics. He further states that informants of 60 years and older at the time of his study in 1936-37 related that they had never seen ceramic vessels made by Utes. Evidently, basketry and skin sacks were the preferred containers among the Southern Utes. An exhaustive study of Ute culture elements and their distributions by Stewart (1942) which included Weeminuche and Mouache informants adds further confusion to the problem. The Southern Ute informants' stone tools, including arrow points, knives, drills, grooved stone axes, and grinding stones, were not manufactured but rather were collected for use from prehistoric sites. In the case of arrows, hardwood points were employed frequently in place of stone tips. Some percussion and pressure flintknapping was done, but stone tools which might be considered as being diagnostic were generally scavenged from prehistoric sites which are plentiful in the area. In short, it appears that some recorded archaeological sites which lack ceramics and contain only stone tools, even diagnostic Anasazi artifacts, may have been incorrectly attributed to the earlier cultures. Seemingly, however, this mistake is unavoidable unless historic documentation of Ute encampments at a particular locale can be substantiated or there are historic artifacts present at the site.

Navajo sites are relatively rare in the West End. The most frequent form of Navajo remains recorded are sweathouses, small conical structures made of poles covered with earth. These features are built by Navajo men for ceremonial sweat baths and it is not uncommon to find sweatlodges near work locations, especially around old uranium mines. It should be noted that the Utes also use sweathouses (Stewart 1942); a practice they adopted from the Navajo. Some sweathouses may be Ute rather than Navajo.

Euro-American Tradition

The history of the West End has been covered very well by O'Rourke (1980). Essentially this history is oriented to ranching and farming and the rise and fall of uranium mining. A number of historic cabins, mines and mining related features have been recorded during various inventories. Unfortunately, no historic archaeology has ever been done in the West End. The best work done to date has been by Copeland (1981) in his recording of Indian Henry's Cabin and the associated oral history of Henry's life and death. The West End, while containing mostly late 19th Century and 20th Century historic sites, has the potential to yield significant information on mining and ranching through the techniques of historic archaeology.

Summary

The archaeology of the West End is diverse and complex. The West End appears to be a meeting ground for many different cultural groups through time. While the dominant prehistoric lifestyle was the archaic of the Uncompahgre complex, the sites also blend elements of other archaic Desert Culture Techno-complexes. The meeting and blending of cultures is especially prevalent in the period when the Anasazi and Fremont traded in the area or utilized its horticultural potential. Changes in social organization over time, the changes in site patterning and the identifcation of Ute sites are still questions that need to be resolved. The West End has the potential to answer many of these questions. More inventory is needed to clearly define the site pattern and excavation is needed to fill in many other blanks. Archaeologically the West End is extremely important in furthering the understanding of prehistoric cultural dynamics in West Central Colorado.

CHAPTER VI
RESEARCH DESIGNS AND MANAGEMENT CONSIDERATIONS

The serious study of the prehistory in the San Miguel Resource Areas began in the 1930's. Since that time, only about 90 papers, reports and publications have been produced. About 29% of the reports have been published and two theses have been written on the area. Fifty-eight percent of the reports were published prior to 1970. 81% of the work done in the areas has been accomplished since 1970 and primarily as a result of action by the various Federal agencies. Most of this work, with the exceptions of Toll (1977), Crane (1977), and Kasper (1977) has been project clearance-oriented at the behest of the Federal Government.

The work prior to 1970 was formative in nature as has been previously discussed. It was meant to delineate the cultural tradition in the areas and establish chronometric controls for future analysis. Even today the culture history phase cannot be considered completed. Cultural traditions are incompletely understood and chronometric controls have just barely been established.

Future research in the area, whether for Federal projects or for purely scientific motivations, needs some direction. The following presentation suggests some directions project work and pure research may take. By no means is the presentation meant to be taken as the only true way to achieve an understanding of the cultural manifestations in the area. Nor is this chapter meant to bypass or supercede the regional research designs developed by the Colorado Council of Professional Archaeologists for the state wide Historic Preservation Plan. This chapter simply reflects the current knowledge and the biases of the authors. As new sites are recorded or excavated, new information will become available to reassess the directions research takes.

Obviously, dating would be one of the more useful tools to have under control for the area. Gross typologies for some tools, particularly projectile points, exist (Buckles 1971 and this volume), but these typologies are not well established. Neither are they well dated by radiocarbon or other absolute or relative means. One aspect of continuing research should be the acquisition of chronometric data to establish reasonably secure time controls.

Another aspect of continuing the formative approach would be to establish the sequence of cultural traditions in the area. The confirmation of cultural traditions goes hand-in-hand with the development of reliably dated cultural sequences. This not only provides time depth and extent of the aboriginal occupation, but also establishes which phases followed another, which may be intrusive, and which might have coexisted in the West End.

This formative research cannot exist in a vaccum; it must be coordinated on a regional basis. Research or project results from other areas such as Northwestern Colorado or Utah cannot be ignored since the past uses of this area may be part of a cultural tradition of wide distribution or may have influenced or been influenced by other cultural groups. The regional research approach allows for a much more comprehensive understanding of human use in the area.

Human use of any area is tied directly to the availability of exploitable resources, whether they are plants and animals or economically valuable ore bodies. In order to better understand the past use of an area, it is necessary to understand the past environment. The study of the paleoenvironment and its impact on man's use of the area, as well as man's impact on the environment, is a sadly neglected area of research in the West End. A major effort should be made to address this issue in future research.

There are numerous avenues of research that may be explored that will benefit not only the understanding of past systems, but will aid the manager of those resources on public lands. The manager needs to know why and where resources are located in order to determine their scientific and legal value as well as to protect those finite cultural values. Human systems are patterned and these patterns can be determined if the appropriate questions are asked of the data. Some of the questions might be oriented to establishing the location strategy of sites and how this, in turn, relates to the subsistence system of the group or culture under study. Site catchment is another area of consideration--how do base camps, limited activity sites and available resources relate to one another. What were the available resources, which ones were used, and how were they used. Available resources would vary from all types of wood and plant materials to stone materials used to make tools.

When looking at site location strategy, questions related to site patterning could be addressed in terms of spacial distribution of sites. Other questions might include what items or goods were acquired through diffusion, how were groups affected by contact or acculturation with other Indian and Euro-American cultures, and what was the population density through time and how did climate or resource availability affect changes in population. The essence of these research questions is to understand the way human systems developed and changed through time and why did those cultures change.

One recent example of range of possibilities for investigators is the detailed research design for the multiyear Dolores River Project (Breternitzetal 1980). There, investigators have identified a set of five broadly-defined problem domains including: (1) economy and adaptation; (2) paleodemography; (3) social organization and settlement patterns; (4) extraregional relationships; and (5) culture process. The problem domains are further subdivided into dozens of specific questions, each of which it is hoped may be answered by forthcoming data retrieval and analysis.

Few projects will possess the overall breadth and scope of the Dolores River Project; and such detailed research designs may not be applicable in all instances. Nevertheless, it is important to identify certain research orientations which may be of importance to the study of the West End.

As was previously mentioned, the research questions suggested above are not a finite list. They are only suggestions for future research and they are intentionally "broad-brush" so that other researchers may formulate their own specific questions for any given project.

In summary they are:

1. Improvements of local chronologies and cultural developments

2. Paleodemography - population numbers at synchronic and diachronic intervals; population shifts and causal factors

3. Prehistoric land use - their relationship to productive organization

4. External influences and relationship to adjacent area - Fremont to the West and the Northern San Juan Anasazi to the south

5. Internal relationships

6. Village community structure

7. Ideology and ceremony

8. Better understanding of the overall nature of horticultural and other subsistence practices, and the relationships between the various subsistence procurement systems.

9. Paleoenvironmental conditions - local and regional correlations.

10. Early cultural traditions - Paleo-Indian and Archaic; transition to Formative patterns.

11. Mortuary patterns - population characteristics and health problems.

12. Identification of cultural and environmental factors behind withdrawal from the area by the horticulturists.

13. Later traditions - Ute

14. Euro-American social and material culture patterns.

This listing of research orientations, includes topics which can be addressed from a regional perspective, by <u>both</u> small - and large scale projects.

It is entirely conceivable that a single archaeological site, recorded in association with a proposed well location, for example, may have the capability to contribute data to one or more of these domains. It may be, however, that such input may not be realized until a later date when additional comparable information has been compiled on a regional basis. Only that regional approach can be expected to explain these phenomena which are pertinent to the West End.

Managers should view cultural resources as a non-renewable land value that can illuminate past and present exploitative land use patterns. Cultural values that will not be directly affected by land-altering activities and, therefore, require no formal mitigative measures, should be preserved for future study. All cultural values have some information to impart. Some sites will contribute relatively little new data while others are likely to contribute significant amounts of new data to the understanding of the past use of the area. All sites should be considered valuable enough to be avoided when possible. Those sites that cannot be avoided should then be addressed for mitigation needs in the light of the comprehensive regional research goals and be mitigated commensurate with their relative value and significance. Only in this way can a site's true significance be assessed.

Regional research goals will change with time as a result of the acquisition of new data and as a result of shifting research emphasis due to changes in the philosophy of archaeological theory or changing management needs. For these reasons, sites should be avoided and thus preserved as a data bank. The less a resource is destroyed or scientifically used now, the more data is likely to be recoverable in the future.

While avoiding direct impact to cultural values there is another aspect to preserving this data for the future. Long term protection of the values is a necessary management strategy for preservation of data. In the West End; aside from direct impacts caused by mining, oil and gas, etc.; the most severe pressure on the cultural values are vandalism and fire. Vandalism is directly related to the amount of access in the area and even more to the lack of a public education program to make people aware of the damage they are doing to American Heritage by collecting and excavating cultural sites. To most people collecting artifacts is a recreational pastime and is not conceived as an illegal act.

Management needs to consider the development of a protection and public education program to combat this attitude and continued destruction of cultural resources. Physically limiting access will also help to deter additional vandalism.

Wildfire and prescribed burning also effect the cultural values by altering the materials on the surface as well as destroying paleoenvironmental information. Prior to prescribed burning inventories should be done and those important cultural resources avoided. In the case of wildfire inventories should be conducted after the fire in order to more effectively determine the effect of fire on cultural values peculiar to the West End.

There is another type of inventory that may be of concern to energy developers, Federal land managers, and archaeologists alike. In the eastcentral portion of Utah, west of Grand Junction, Colorado, is an energyrich region commonly called the "Cisco Desert". This region is practically devoid of surface water and has rather sparse vegetation. As the Cisco area was developed for energy, the energy companies funded numerous sitespecific archaeological inventories prior to ground disturbances, as required by law. These scattered surveys suggested that the region has a very low site density--so low, in fact, that such efforts hardly seemed to be worth the archaeologists' or Federal land managers' time. Accordingly, the Bureau of Land Management in Utah funded a stratified random sample of a portion of the "Cisco Desert" to project the area's overall site density and to define certain areas or "strata" where site densities may be higher than others and where inventories need not be required. (Reed and Nickens 1979).

Such a study for the West End may be very useful considering the amount of energy development now taking place in the area.

More is known today about the prehistory of west-central Colorado than was twenty-five years ago. The growth of archaeology and cultural resource management is responsible for this knowledge as is the ever-expanding data base which is built on the previous research. The continuity of the archaic life style in this area for at least 8,000 years and the interactions of these peoples with other groups provide some interesting units to study in a regional framework. The presence of possible Paleo-Indian sites also suggests some intriguing possibilities for research. As more is learned about past lifeways in west-central Colorado and surrounding areas, the more our currently held concepts are likely to change. The goal of understanding cultural continuity and change in this area can only be accomplished through an emphasis on establishing and using a regional research framework.

Management of the cultural resources through public education, protection, inplace preservation, and mitigation offer the line manager an opportunity to expand the concept of multiple use management. The cultural values in the West End have the potential to expand our knowledge of how peoples adapted to a marginal environmental situation. The understanding of the changes through time in technology and life style as well as the why of continuity may be of use in predicting future changes of modern human use of the area. Mining and energy mineral extraction are based upon technology and economic considerations just as the prehistoric use was based on technology and economics of land use exploitation. Changes in technology and/or changes in economy usually result in changes or adaptations of models of changes perhaps we can understand if not predict changes in our modern social system. The type of data and models, if available to the land manager may provide an additional set of information for making better land use decisions.

CHAPTER VII

A Bibliography of the Archaeology of the San Miguel Resource Area.

This bibliography contains 90 references to the archaeology of the West End. It is complete as far as pre 1975 references are concerned and as far as references to work done on BLM managed lands. The bibliography is complete as of January 1982.

It is interesting to note that these 90 references comprise the bulk of the known literature on the San Miguel Resource area and on the West End in general. This is especially revealing when compared to the southwestern Colorado, and northern San Juan Anasazi literature base. That base is known to have over 1250 entries. The West End bibliography reinforces the need for additional work in the area.

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